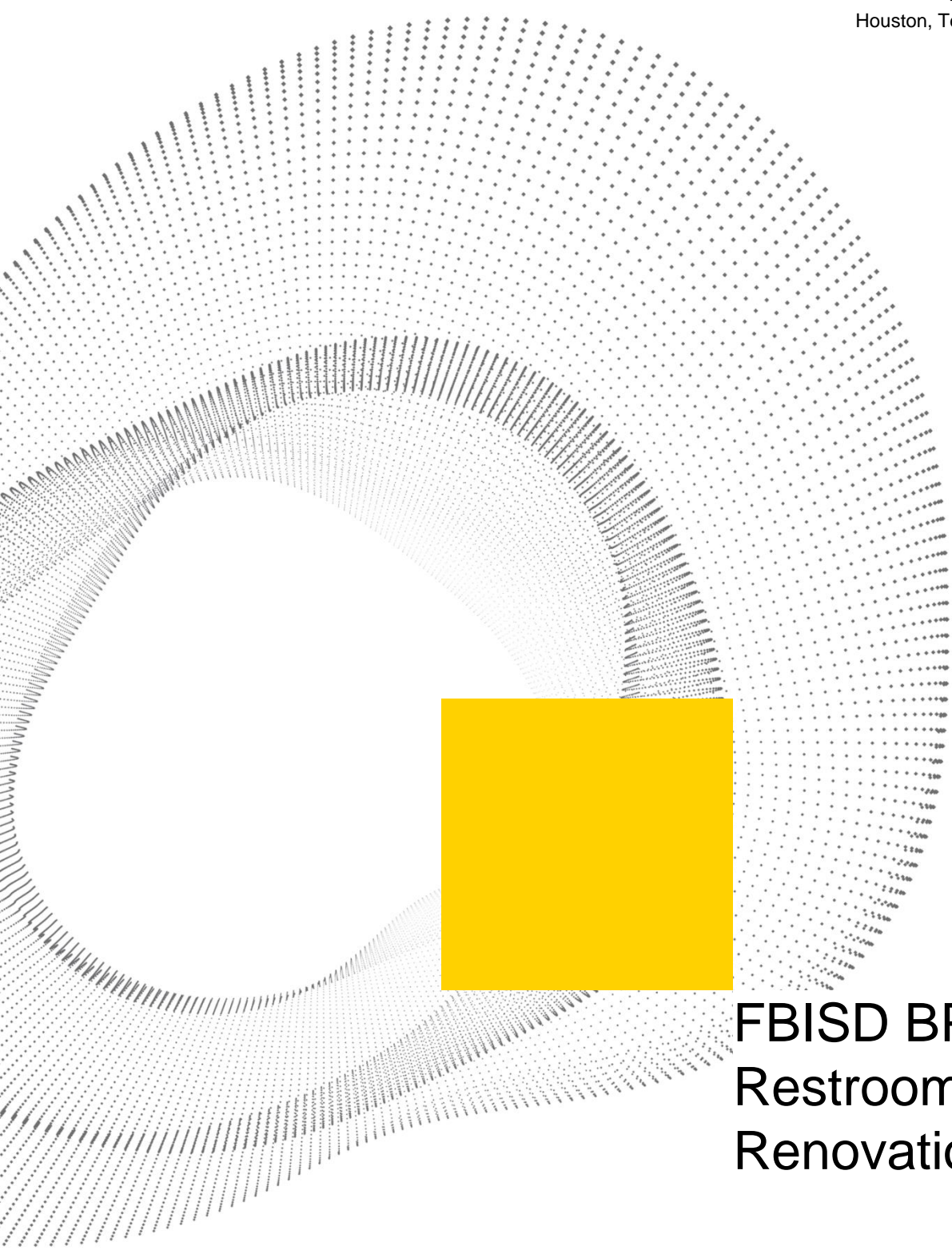




CSP 24-058KB BP027  
Issue for Bid and Permit  
30 April 2024  
23383.000

**Project Manual**

Corgan Associates, Inc.  
9 Greenway Plz Suite 3000  
Houston, Texas, 77046



**FBISD BP027  
Restroom  
Renovations**

**Section 00 01 10**

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**Fort Bend Independent School District**

**Competitive Sealed Proposal for**

**BP027 Restroom Renovations  
CSP 24-058KB**

**Package “A” Base Bid and all documents except Alternates & SBE documents.  
DUE NO LATER THAN 2:00 PM Central Time (CST) June 5, 2024**

**Package “B” Alternates and Package “C” SBE  
DUE NO LATER THAN  
3:00 PM Central Time (CST) June 5, 2024**

**Bids will be opened and read aloud at 3:00 PM. Package “A” is still due at 2:00 PM (CST)  
and will be held by the district until the public opening at 3:00 PM (CST).  
LATE PROPOSALS WILL NOT BE ACCEPTED**

**SUBMIT PROPOSAL PACKET THROUGH:**

**FBISD Bid Portal: <https://fortbendisd.bonfirehub.com/portal/>**

BP027 Restroom Renovations  
CSP 24-058KB

**BACKGROUND:**

Fort Bend ISD (FBISD) is a K-12 public school district in Fort Bend County serving a student enrollment of over 80,000. The district currently consists of 83 campuses and multiple administrative sites. The intention of this Competitive Sealed Proposal (CSP) is to solicit proposals for the renovation of existing restrooms at multiple campuses (BP027). The estimated construction cost of work for this project is **twelve million, eight hundred thousand dollars. (\$12,800,000.00).**

**PRE-PROPOSAL CONFERENCE:**

A pre-proposal conference is scheduled for **Thursday, May 16, 2024, at 10:00 AM** via Microsoft Teams. Attendance is highly recommended in order to have an understanding of the requirements of this CSP. For this pre-proposal meeting, persons with disabilities requiring special accommodations should contact Kathleen Booker at [kathleen.booker@fortbendisd.com](mailto:kathleen.booker@fortbendisd.com) at least two (2) days before the conference. Any questions/clarifications that result from the visit should be submitted through the Opportunity Q&A section in Bonfire.

**Meeting Link:** [Join the meeting now](#)

**WALK SCHEDULE:**

A pre-proposal walk is scheduled in 2-parts for **May 22, 2024 at 1:00 PM (CST)** for 8 campuses, starting at Willowridge High School and **May 23, 2024 at 1:00 PM (CST)** for the remaining 8 campuses, starting at Ridgemont Elementary School. Attendance at both walk throughs is highly recommended in order to have an understanding of existing site conditions and the project's scope of work. Please arrive 15 minutes early for badging.

Walk 1 of 2 – May 22, 2024 at 1 PM

1. Willowridge HS
2. Lake Olympia MS
3. Dulles HS
4. Kempner HS
5. Kempner Ag Barn
6. Garcia MS
7. Hodges Bend Transportation Center
8. Hodges Bend MS

Walk 2 of 2 – May 23, 2024 at 1 PM

1. Ridgemont ES
2. Ridgegate ES
3. Hunters Glen ES
4. Lantern Lane ES
5. Colony Bend ES
6. Sugar Mill ES
7. Townewest ES
8. Admin. Building

**SPECIAL NOTE:**

Please be reminded that all Fort Bend ISD campuses and departments are tobacco, drug, and weapon-free facilities. Contractors are responsible for the conduct of their employees and adherence to Fort Bend ISD building policies.

## **QUESTIONS AND ANSWERS:**

Any questions or needed clarifications shall be submitted through the Opportunity Q&A section in Bonfire before the deadline for questions due date and time, **Monday, May 27, 2024, 10:00 AM (CST)**. Questions received by the deadline and corresponding answers will be included in an Addendum and posted in FBISD e-bidding portal Bonfire.

**All Fort Bend ISD procurement solicitations and addendums can be accessed on Bonfire at <https://fortbendisd.bonfirehub.com> PLEASE NOTE THAT IT IS THE RESPONSIBILITY OF THE PROPOSERS TO CHECK FOR ANY ADDENDUMS ON THE BONFIRE ELECTRONIC BIDDING SYSTEM PRIOR TO SUBMITTING A PROPOSAL.**

## **GENERAL TERMS, CONDITIONS, AND REQUIREMENTS FOR SOLICITATIONS:**

This solicitation shall be governed by the documents incorporated herein as well as the Fort Bend ISD General Provisions for Purchasing Solicitations are incorporated herein. A copy may be obtained at <http://www.fortbendisd.com/docs/purchasing/general-provisions-for-purchasing-solicitations-and-contracts.pdf> or by contacting the Fort Bend ISD Buyer listed on the coversheet.

Copy of the Construction contract, the A101 and A 201, are incorporated herein.

Texas Education Code 44.031(a)(5); Texas Government Code Chapter 2269

*Purchasing and Acquisition*, FBISD Policy CH (Legal)

*Purchasing and Acquisition*, FBISD Policy CH (Local)

*Facilities and Construction*, FBISD Policy CV (Legal)

*Facilities and Construction*, FBISD Policy CV (Local)

Proposers are required to respond to all requests identified in this CSP and indicate their acceptance or objection to the terms of the CSP, the General Provisions, and the terms of the Agreement for Construction Services. Any exceptions to the terms and conditions in the CSP, the General Provisions, or the Agreement for Construction Services must be clearly indicated in the Proposer's submitted proposal. Each Proposer, by submitting its proposal, represents that the Proposer has read, understands, and agrees with the CSP, the General Provisions, and the Agreement for Construction Services, excluding any exception specifically made by Proposer in its proposal.

### **Scope of Work**

FBISD is seeking a contractor to provide renovations to existing restrooms at multiple campuses (BP027). The scope of work also includes but is not limited to the selective demolition, reconfiguration, and replacement of existing finishes as well as mechanical, electrical and plumbing systems as documented and required for the work.

### **Contractor Experience and References**

Contractor must provide customer references letter in order to receive points in the evaluation criteria section. Contractor must provide proof of pertinent experience (previous educational experience) along with documentation of successful completion of projects completed within the last 3 to 5 years with a minimum construction cost for K-12 interior renovations at approximately \$7,000,000 to \$9,000,000.

minimum construction cost for K-12 interior renovations in the range of \$7,000,000 to \$9,000,000.

**For information and questions regarding this CSP process, please contact:**

Senior Buyer: Kathleen Booker

Email: [kathleen.booker@fortbendis.com](mailto:kathleen.booker@fortbendis.com)

**EVALUATION CRITERIA:**

Proposals shall be evaluated using the evaluation criteria listed below, and the scope of work will be awarded by Project. Based on scope of work, FBISD reserves the right to award the Project to the top ranked contractor in the manner that provides the best value to the district based on price and other evaluation criteria.

	<b>Evaluation Criteria (Government Code 2269)</b>	<b>Point System</b>
1	<b>The price; Section 2269.055.a (1)</b> Total Proposed Pricing - Provides thoroughly developed, competitive pricing using the tables in Pricing Delivery information section of the CSP	40 points
2	<b>Offeror’s experience and reputation; Section 2269.055.a (2)</b> Provides evidence of your experience in planning, staging and delivery of recent projects of similar scope and scale (14 pts)	19 points
	<b>Past experience with FBISD and other school districts</b> Provides a summary of nature of work, on time delivery and quality of work contracted with FBISD and/or other school districts and FBISD’s assessment of the presented summary. (5 pts)	
3	<b>Quality of the offeror’s goods or services; Section 2269.055.a (3)</b> Contractor’s products should be new and be of the highest quality with an option to substitute for a company branded item of equivalent quality. (14pts)	21 points
	<b>Quality of contractor’s response in the proposal</b> Effectively responds and processes all request for information and documentation included in this CSP (2pts)	
	<b>Project Plan and schedule (5pts)</b>	
4	<b>Utilization of historically underutilized businesses; Section 2269.055.a (4)</b>	N/A
5	<b>Offeror’s safety record; Section 2269.055.a (5)</b> Provides a summary of Experience Modification Rate (EMR) for the last three years, as well as a summary of your company’s safety policies and procedures	5 points
6	<b>Offeror’s proposed personnel; Section 2269.055.a (6)</b> Proposed Personnel, personnel directly assigned to work on this project	5 points
7	<b>Offeror’s financial capability appropriate to the size and scope of the project; Section 2269.055.a (7)</b> Provide proof of Insurance, financial stability and Letter of Surety from Bonding Company	5 points
8	<b>SBE Commitment; CV (Local) 2017.04</b>	5 points
	TOTAL	100

**TIME TABLE:**

FBISD anticipates following the time table listed below for this proposal: **The time table is only an estimate and actual dates may vary.**

<b>Item</b>	<b>Activity</b>	<b>Date</b>
1.	Job starts to advertise (1 <sup>st</sup> run)	5/7/2024
2.	Job advertises (2 <sup>nd</sup> run)	5/14/2024
3.	Pre-Proposal Conference 10:00 AM (CST)	5/16/2024
4a.	Pre-Proposal Walk (1 of 2) 1:00 PM (CST)	5/22/2024
4b.	Pre-Proposal Walk (2 of 2) 1:00 PM (CST)	5/23/2024
5.	Final Questions due 5:00 PM (CST)	5/27/2024
6a.	Proposal Package “A” Due <b>2:00 PM (CST)</b> Base Bid and all documents, except Alternates and SBE documents Click or tap here to enter text.	6/5/2024
6b.	Proposal Package “B” Due <b>3:00 PM (CST) Alternates only</b>	6/5/2024
6c.	Proposal Package “C” Due <b>3:00 PM (CST) SBE documents only</b>	6/5/2024
7.	Presentation to Board of Trustees for contract award (Tentative, subject to change)	08/2024
8.	Tabulations and awards posted to <a href="https://fortbendisid.bonfirehub.com/portal/?tab=pastOpportunities">https://fortbendisid.bonfirehub.com/portal/?tab=pastOpportunities</a>	08/2024
9.	Substantial Completion of the Work	03/31/2026

**SUBMISSION DEADLINE:**

Fort Bend ISD will accept proposals submitted electronically through Bonfire e-bidding portal until **Wednesday, June 5, 2024, 2:00 PM CST.** <https://fortbendisid.bonfirehub.com>.

Proposals must be uploaded and finalized prior to the closing date and time. Proposals received after the opening will not be accepted. Public bid opening will be conducted via Microsoft Teams **Wednesday, June 5, 2024, 3:00 PM CST.**

**Meeting Link:** [Join the meeting now](#)

It is recommended that once you have completed your final submission and received a notice status of “Submission Complete” from Bonfire, you access your account again and review the documents to verify that the correct content has been provided.

Once the close date has passed, you will be unable to submit an opportunity or make changes to any of the submitted documents. **HARD-COPY PAPER FAXED OR E-MAILED SUBMISSIONS WILL NOT BE ACCEPTED.** Only responses properly submitted to FBISD Bonfire Purchasing Portal will be considered.

## **Prevailing Wage Rate Determination Information**

*The following information is from Chapter 2258 Texas Government Code:*

### **Sec. 2258.021. Right to be Paid Prevailing Wage Rates.**

- (a) A worker employed on a public work by or on behalf of the state or a political subdivision of the state shall be paid:
  - (1) not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the work is performed; and
  - (2) not less than the general prevailing rate of per diem wages for legal holiday and overtime work.
- (b) Subsection (a) does not apply to maintenance work.
- (c) A worker is employed on a public work for the purposes of this section if the worker is employed by a contractor or subcontractor in the execution of a contract for the public work with the state, a political subdivision of the state, or any officer or public body of the state or a political subdivision of the state.

### **Sec. 2258.023. Prevailing Wage Rates to be paid by Contractor and Subcontractor; Penalty.**

- (a) The contractor who is awarded a contract by a public body or a subcontractor of the contractor shall pay not less than the rates determined under Section 2258.022 to a worker employed by it in the execution of the contract.
- (b) A contractor or subcontractor who violates this section shall pay to the state or a political subdivision of the state on whose behalf the contract is made, \$60 for each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the contract. A public body awarding a contract shall specify this penalty in the contract.
- (c) A contractor or subcontractor does not violate this section if a public body awarding a contract does not determine the prevailing wage rates and specify the rates in the contract as provided by Section 2258.022.
- (d) The public body shall use any money collected under this section to offset the costs incurred in the administration of this chapter.
- (e) A municipality is entitled to collect a penalty under this section only if the municipality has a population of more than 10,000.

### **Sec. 2258.051. Duty of Public Body to Hear Complaints and Withhold Payment.**

A public body awarding a contract, and an agent or officer of the public body, shall:

- (1) take cognizance of complaints of all violations of this chapter committed in the execution of the contract; and
- (2) withhold money forfeited or required to be withheld under this chapter from the payments to the contractor under the contract, except that the public body may not withhold money from other than the final payment without a determination by the public body that there is good cause to believe that the contractor has violated this chapter.



## Prevailing Wage Rates – School Construction Trades

June 1, 2022

Texas Gulf Coast Area

CLASSIFICATION	2022 HOURLY RATE
ASBESTOS WORKER	\$21.13
BRICKLAYER; MASON	\$25.32
CARPENTER; CASEWORKER	\$23.38
CARPET LAYER; FLOOR INSTALLER	\$25.12
CONCRETE FINISHER	\$23.40
DATA COMM/TELE COMM	\$23.50
DRYWALL INSTALLER; CEILING INSTALLER	\$26.65
ELECTRICIAN	\$25.93
ELEVATOR MECHANIC	\$28.80
FIREPROOFING INSTALLER	\$22.25
GLAZIER	\$22.30
HEAVY EQUIPMENT OPERATOR	\$22.40
INSULATOR	\$20.50
IRONWORKER	\$25.50
LABORER, HELPER	\$16.71
LATHERER; PLASTERER	\$23.25
LIGHT EQUIPMENT OPERATOR	\$20.50
METAL BUILDING ASSEMBLER	\$21.10
MILLWRIGHT	\$33.63
PAINTER; WALL COVERING INSTALLER	\$19.60
PIPEFITTER	\$26.97
PLUMBER	\$26.71
ROOFER	\$20.50
SHEET METAL WORKER	\$19.90
SPRINKLER FITTER	\$26.13
STEEL ERECTOR	\$23.25
TERRAZZO WORKER	\$23.50
TILE SETTER	\$19.58
WATERPROOFER; CAULKER	\$19.88

This document was developed by PBK Architects, Inc., in strict accordance with Chapter 2258 of the Texas Government Code.

## Prevailing Wage Rates Worker Classification Definition Sheet

CLASSIFICATION	DEFINITION
ASBESTOS WORKER	Worker who removes and disposes of asbestos materials.
BRICKLAYER; MASON	Craftsman who works with masonry products, stone, brick, block, or any material substituting those materials and accessories.
CARPENTER; CASEWORKER	Worker who build wood structures or structures of any material which has replaces wood. Includes rough and finish carpentry, hardware and trim.
CARPET LAYER; FLOOR INSTALLER	Worker who installs carpets and/or floor coverings, vinyl tile.
CONCRETE FINISHER	Worker who floats, trowels, and finishes concrete.
DATA COMM/TELE COMM	Worker who installs data/telephone and television cable and associate equipment and accessories.
DRYWALL; CEILING INSTALLER	Worker who installs metal framed walls and ceiling, drywall coverings, ceiling grids, and ceilings.
ELECTRICIAN	Skilled craftsman who installs or repairs electrical wiring and devices. Includes fire alarm systems and HVAC electrical controls.
ELEVATOR MECHANIC	Craftsman skilled in the installation and maintenance of elevators.
FIREPROOFING INSTALLER	Worker who sprays or applies fire proofing materials.
GLAZIER	Worker who installs glass, glazing, and glass framing.
HEAVY EQUIPMENT OPERATOR	Includes but not limited to: all CAT tractors, all derrick-powered, all power operated cranes, back-hoes, back-fillers, power operated shovels, winch trucks, and all trenching machines.
INSULATOR	Worker who applies, sprays, or installs insulation.
IRONWORKER	Skilled craftsman who erects structural steel framing and installs structural concrete Rebar
LABORER, HELPER	Worker qualified for only unskilled or semi-skilled work. Lifting, carrying materials or tools, hauling, digging, clean up.
LATHERER; PLASTERER	Worker who installs metal framing and lath. Worker who applies plaster to lathing and installs associated accessories.
LIGHT EQUIPMENT OPERATOR	Includes but not limited to, air compressors, truck crane drivers, flex planes, building elevators, form graders, concrete mixers less than 14cf), conveyers.
METAL BUILDING ASSEMBLER	Worker who assembles pre-made metal buildings.
MILLWRIGHT	Mechanic specializing in the installation of heavy machinery, conveyance, wrenches, dock levelers, hydraulic lifts, and align pumps.
PAINTER; WALL COVERING INSTALLER	Worker who prepares wall surfaces and applies paint and/or coverings, tape, and bedding.
PIPEFITTER	Trained worker who installs piping systems, chilled water piping and hot water (boiler) piping, pneumatic tubing controls, chillers, boilers, and associated mechanical equipment.
PLUMBER	Skilled craftsman who installs domestic hot and cold-water piping, waste piping, storm system piping, water closets, sinks, urinals, and related work.
ROOFER	Worker who installs roofing materials, Bitumen (asphalt and coal tar) felts, flashings, all types of roofing membranes, and associated products.
SHEET METAL WORKER	Worker who installs sheet metal products, Roof metal, flashings and curbs, ductwork, mechanical equipment, and associated metals.
SPRINKLER FITTER	Worker who installs fire sprinklers systems and fire protectant equipment.
STEEL ERECTOR	Worker who erects and dismantles structural steel frames of buildings and other structures.
TERRAZZO WORKER	Craftsman who places and finishes Terrazzo.

TILE SETTER	Worker who prepares wall and/or floor surfaces and applies ceramic tiles to these surfaces.
WATERPROOFER; CAULKER	Worker who applies water proofing material to buildings. Products include sealant, caulk, sheet membranes, and liquid membranes, sprayed, rolled or brushed.



## INSTRUCTIONS TO BIDDERS

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## **Instructions to Bidders:**

### **Bidders Communication**

Please remember that during the selection process, we desire to avoid even the perception of preferential treatment.

Therefore:

- Other than the designated contact person listed in this CSP: All Communication regarding this CSP with district employees, staff, consultants (Architects/Engineers), or Board members is strictly forbidden and may result in disqualification.
- All requests for clarification must be provided in writing to the designated person.
- The answer to the request for clarification and all other communication, clarification, or questions regarding this CSP will be issued in writing by addenda to all participants.

The district electronic bidding portal <https://fortbendis.bonfirehub.com/portal/> is the source for all CSP documents and direction; Addenda, Proposal packet, Drawings and specifications.

- **VERY IMPORTANT**
  - Communication regarding this CSP with district employees, staff, consultants (Architects/Engineers), or Board members is strictly forbidden and may result in disqualification. (Other than the designated contact person listed in this CSP.)

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## CSP Process for Successful Bidders

### 1.0 GENERAL INFORMATION

- 1.1 The Proposer will furnish and pay for a bid bond in the form of a bid bond, postal money order, certified check or cashier's check in the amount of five percent (5%) of the total greatest amount, bid including any applicable alternates, in accordance with Section 6.0.
- 1.2 If awarded, the Bidder shall furnish and pay for a Performance Bond and a Payment Bond each in the full contract amount in accordance with Section 7.0. Include this cost in your bid.
- 1.3 Bidder shall carry and keep in full force for the duration of the Project, insurance coverage for builder's risk, workmen's compensation, comprehensive general liability, and automobile liability as required by the General Provisions and/or Supplementary General Conditions of the Specifications, as outlined in Section 8.0.
- 1.4 The Bidder will assign a competent full-time superintendent, to the project, and that superintendent shall be maintained on the project for the duration of the project, subject only to his continuous employment.
- 1.5 During this process all communication regarding this CSP with district employees, staff, consultants (Architects/Engineers), or Board members is strictly forbidden and may result in disqualification. (Other than the designated contact person listed in this CSP)
- 1.6 In accordance with Texas Government Code Section 2269, The Board of Trustees, as appropriate, has delegated its authority under this subchapter regarding an action authorized or required by this subchapter to be taken by a school district to the Ft Bend ISD Superintendent. In procuring the construction services, the Board of Trustees has delegated the ranking, selection, or evaluation of bids.
- 1.7 In determining the award of contract and in accordance with Texas Government Code Section 2269, the district may consider: the price, the offeror's experience and reputation, the quality of the offeror's goods or services, the impact on the ability of the governmental entity to comply with rules relating to historically underutilized businesses, the offeror's safety record, the offeror's proposed personnel, whether the offeror's financial capability is appropriate to the size and scope of the project; and any other relevant factor specifically listed in the request for bids, proposals, or qualifications.
- 1.8 **Evaluation of the proposed substitutes/deviations does not constitute Owner's acceptance of the substitutes/deviations but can be considered during negotiations.**
- 1.9 In accordance with Texas Government Code Section 2269, The district shall select the offeror that submits the proposal that offers the best value for the governmental entity based on:
  - o the selection criteria in the request for proposal and the weighted value for those criteria in the request for proposal; and
  - o its ranking evaluation.
- 1.10 In accordance with Texas Government Code Section 2269 the Board of Trustees has determined the method that provided the best value for the district is the Competitive Sealed Proposal method.
- 1.11 In accordance with Texas Government Code Section 2269 the district shall publish in the request for proposals or qualifications the criteria that will be used to evaluate the offerors, and the applicable weighted value for each criterion.
- 1.12 In accordance with Texas Government Code Section 2269 the district shall document the basis of its selection and shall make the evaluations public not later than the seventh day after the date the contract is awarded.
- 1.13 In accordance with Texas Government Code Section 2269, the district will receive, publicly open, and read aloud the names of the offerors and their bids.
- 1.14 In accordance with Texas Government Code Section 2269, the district will evaluate and rank each proposal submitted no later than 45 days after the opening.
- 1.15 In accordance with Texas Government Code Section 2269, The district shall first attempt to negotiate a contract with the selected offeror. The district and its architect or engineer may discuss with the selected offeror options for a scope or time modification and any price change associated with the modification. If the district is unable to negotiate a satisfactory contract with the selected offeror, the district shall, formally and in writing, end negotiations with that offeror and proceed to the next offeror in the order of the selection ranking until a contract is reached or all proposals are rejected.

**2.0 COMPETITIVE SEALED BID DOCUMENTS PRE-BID**

**2.1** A Pre-proposal conference will be held as required. Representatives of the Owner, and design team will be present at this meeting. All Bidders are encouraged to attend.

**3.0 COMPETITIVE SEALED PROPOSAL PACKET**

**3.1** Bids will be received only on the Owner's "Bid Form" for the work as indicated by the proposal documents, filled in, and submitted in Bonfire as listed below. Bids will be received at no other place.

**3.2** Bonfire Submittal Organization

**SUBMIT PROPOSAL PACKET THROUGH:**  
<https://fortbendis.d.bonfirehub.com/portal/>

<b>Submission Package "A"</b>	
CSP Cover Page Addenda Acknowledgment Section Bid Bond Base Bid Form	<b>DUE on Bid Day at 2:00 PM</b>
All required Forms	<b>DUE on Bid Day at 2:00 PM</b>
Financial Section	<b>DUE on Bid Day at 2:00 PM</b>
Safety Manual	<b>DUE on Bid Day at 2:00 PM</b>
<b>Submission Package "B"</b>	<b>Submit Through Bonfire E-Bidding Portal Package "B" DUE same day at 3:00PM</b>
Alternate Pricing	
<b>Submission Package "C"</b>	
SBEP commitment Submission	<b>Submit Through Bonfire E-Bidding Portal Package "C" DUE same day at 3:00PM</b>

**4.0 INTERPRETATION OF COMPETITIVE SEALED PROPOSAL DOCUMENTS**

- 4.1 Bidders and sub-Bidders requiring “CSP” clarification or interpretation of the CSP documents shall make the request in written form, by email to FBISD buyer listed in the CSP documents.
- 4.2 Any interpretation, correction or change of the CSP documents will be made by Addendum and posted to our website. Interpretations, corrections or changes of the CSP documents made in any other manner will not be binding.

**5.0 SUBSTITUTIONS OF MATERIALS AND EQUIPMENT**

- 5.1 Substitutions of Goods. The materials, products and equipment described in the CSP documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. The materials and equipment named in, and the procedures covered by these specifications have been selected as a standard because of quality, particular suitability or record of satisfactory performance. It is not intended to preclude the use of equal or better See (Part V, Section 3.9 of General Provisions)
- 5.2 If the Owner/Engineer approves any proposed substitution prior to receipt of bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.
- 5.3 **No deviations are allowed in the base bid or base bid adjustment. Any deviation from the Base Bid shall be submitted as Alternate No. 2 on the Deviations Form.**
- 5.4 **Evaluation of the proposed substitutes/deviations does not constitute Owner’s acceptance of the substitutes/deviations but can be considered during negotiations.**
- 5.5 Price scores will be based on the base bid plus/minus the base bid adjustment which must be in adherence to all plans and specifications published.

**6.0 BID BOND/BID GUARANTEE**

- 6.1 Bid bonds are required for bids in excess of \$25,000. A Bid bond will be submitted in the form of a Bid bond, postal money order, certified check or cashier’s check in an amount not less than **five percent (5%) of the total greatest amount bid, including any applicable alternates**, payable without recourse to Fort Bend Independent School District. Failure to furnish a bid guarantee in the proper form and amount by the time set for opening may be cause for rejection of the bid. If the successful Bidder, upon acceptance of his bid by the District within the period specified therein for acceptance, fails to execute such further contractual documents, if any, and give such bond(s) (i.e., performance bonds, payment bonds, delivery, etc.) as may be required within the time specified (ten [10] calendar days if no period is specified) after receipt of the forms by him, then he shall be liable for any cost of procuring the work which exceeds the amount of his bid, and the bid guarantee shall be available toward offsetting such difference.



**7.0 PERFORMANCE BOND AND PAYMENT BOND**

- 7.1 Performance bonds are required for bids in excess of \$100,000. Payment Bonds are required for bids in excess of \$25,000 Gov't Code 2253.021
- 7.2 .When a performance or payment bond is required, the amounts shall be for 100% of the contract amount (including contingency). Any required bond(s) must be filed with the District within 10 days from the date of the Notice Of Award.
- 7.3 The only forms of surety acceptable as a performance or payment bond are: Cashier's Check, Certified Check, or a Surety or Blanket Bond from a company chartered or authorized to do business in Texas. Bonds completed (signed) by an out-of-Texas surety require a counter signature by a Texas resident agent of a company chartered or authorized to do business in Texas.
- 7.4 Bonds and other forms of surety must be made payable to Fort Bend Independent School District.
- 7.5 Bonds in excess of \$100,000 must be from a surety that holds a Certificate of Authority from the United States Department of Treasury or have reinsurance for liability in excess of \$100,000 from a United States Treasury listed reinsurer.
- 7.6 Payment and Performance Bonds must be in accordance with Texas Government Code 2253.

**8.0 INSURANCE**

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**Exhibit A**

**FORT BEND I.S.D. CONSTRUCTION BOND & INSURANCE REQUIREMENTS**

*It is suggested that this Exhibit be provided to the Contractor's insurance provider.*

Contractor shall not commence work until all required bonds and insurance coverages have been obtained and such insurance has been reviewed and accepted by the District. Certificates of Insurance on the current ACORD form shall be issued to the District showing all required insurance coverages.

**Bonds Required**

Construction, installation and service contracts (including repair and alteration) exceeding \$100,000 requires that a 100% Performance Bond be furnished by the successful bidder (contractor). Contracts exceeding \$25,000 require that a 100% Payment Bond be furnished by the successful bidder (contractor). All such bids must include a 5% Bid Bond.

Bonds shall be issued by a company authorized to do business in the State of Texas with an A.M. Best Company rating of at least A- X and included on the U.S. Department of the Treasury Listing of Approved Sureties (Dept. Circular 570). The contractor shall be responsible for obtaining bonds and shall absorb any and all costs of such Bonds.

<b><u>Insurance Required</u></b>	<b><u>Limit Required</u></b>
Automobile Liability insurance covering Any Auto	\$1,000,000 Combined Single Limit
Comprehensive (Commercial) General Liability insurance including Products, Completed Operations, Independent Contractors, Broad Form Property Damage, Pollution and Blanket Contractual Liability coverages. XCU exclusions to be removed when underground work is performed.	\$1,000,000 Occurrence \$2,000,000 Aggregate \$1,000,000 Personal Injury \$ 500,000 Fire Damage \$ 5,000 Medical Payments  Per Project Aggregate (CG 70 49)  Evidence of coverage must be shown on certificates of insurance.
Professional Errors & Omissions Liability insurance may be required from all contractors and licensed or certified as professionals; e.g., engineers, architects, insurance agents, physicians, attorneys, banks, financial consultants, etc.	One time project amount; \$1,000,000 Occurrence & Aggregate minimum, \$5,000,000 Maximum Limit  Retroactive Date preceding date of contract must be shown  Extended Reporting Period three years past completion of contract
Workers Compensation insurance with limits to comply with the requirements of the Texas Worker Compensation Act  Employers Liability insurance	Statutory Limits  \$1,000,000
Umbrella or Excess Liability insurance (excess of primary General Liability, Automobile Liability and WC Coverage B)  Applicable to minimum contract amounts of \$100,000	100% of Contract Amount up to a maximum of \$25,000,000. For construction contracts in excess of \$25,000,000 higher limits may be required.

Limits for primary policies may differ from those shown when Umbrella or Excess Liability insurance is provided.

<p><b>All Risk Builders Risk Property Insurance</b> shall be required for all construction contracts when property of the owner is at risk or in the care, custody and control of the Contractor. Builders Risk insurance shall be required for all construction contracts requiring a bond. All Property insurance shall include coverage against the perils of Flood and Earthquake. (Installation Floater may be substituted when contract involves installation only.)</p>	<p>Contract Limit or Replacement Cost Value of Scope of Work whichever is greater</p> <p>Permission to Occupy granted</p> <p>Deductible: 1% of contract, \$50,000 maximum, unless otherwise approved by the Owner.</p>
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**Insurance Conditions**

All insurance coverages shall be issued on an Occurrence basis (except Professional Liability) by companies acceptable to District and licensed to do business in the State of Texas by the Texas Department of Insurance. Such companies shall have a Best's Key rating of at least "A- X".

All certificates must include:

1. The location or description and the bid number, CSP number or Purchase Order number
2. A 30 day notice of cancellation of any non-renewal, cancellation or material change to any of the policies
3. "Additional Insured" on the Property, General Liability, Automobile Liability and Umbrella (Excess) Liability policies naming the District.
4. A "Waiver of Subrogation" clause in favor of the District will be attached to the Workers Compensation, General Liability, Automobile Liability, Umbrella Liability and the Property insurance policies.
5. In addition to certificates of insurance, copies of policy endorsements must be provided (a) listing the District as Additional Insured, and (b) showing waivers of subrogation in favor of the District: CG2010, CG2037, CG2404, CA0070, CA0032, WC0003 or their equivalents.

All insurance must be maintained for one year following substantial completion with Certificates of Insurance provided.

Contractor shall be responsible for payment of all deductibles; the District shall approve the deductibles selected.

If any policy has aggregate limits, a statement of claims against the aggregate limits is required.

The District reserves the right to review the insurance requirements during the effective period of any contract to make reasonable adjustments to insurance coverages and limits when deemed reasonably prudent by District based upon changes in statutory laws, court decisions or potential increase in exposure to loss.

FORT BEND Independent School District  
C/o Director – Design & Construction Department  
2323 Texas Parkway  
Missouri City, TX 77489

## 9.0 EVALUATION CRITERIA AND RELATIVE WEIGHTS

In accordance with Government Code Section 2269.056 the applicable weighted value for each criterion is published in the front pages of the CSP package.

### 9.1 Proposal Delivery and Organization

Offeror is to organize the Proposal in the following format:

- 1) To comply with Government code chapter 2269.059 your submittal must be sealed before delivery. Provide the requirements listed below in the order provided.
  - 1.1 Provide with the Proposal Base Bid Form (Submit in Bonfire Proposal Bid Form Section):
    - Addenda Acknowledgment Sheet
    - Bid Bond
    - Proposal Base Bid Form
  - 1.2 Provide the district and statute required forms in Bonfire Under Required Forms Section:
    - No Response Form(Optional)
    - Contractor Informational Form (Required)
    - Contractor Questionnaire (Required)
    - Bonding Capacity Certification Letter (Required)
    - Proposal Submission Form (Required)
    - Non-Collusion Certification (Required)
    - Certificate of Residency (Required)
    - Affidavit of Non-Discriminatory Employment (Required)
    - Contractor Certification (Required)
    - Felony Conviction Notification (Required)
    - Vendor Debarment Statement (Required)
    - Conflict of Interest Questionnaire (Required)
    - Certification regarding Lobbying (Required)
    - Confidential Copyrighted Information (Required)
    - Owner(s) Name of Business (Required)
    - Delinquent Taxpayers (Required)
    - Identification Number & Certification (Required)
    - Fort Bend ISD Contractor and Subcontractor Participation Form (Required)
    - Certificate of Interested Parties Form 1295 (Required)
    - Forms Certification (Required)
    - Per Govt. Code 2270.002, provide written verification that the company does not boycott Israel and will not during the term of the contract.
  - 1.3 For Proposals Formal Submission: Provide in Each Section in Bonfire as listed below. Provide information that details the evaluation response for each of the following criteria. Must be in the location specified in Bonfire.
    - Section ONE (**Offeror's Experience and Reputation**)



- Section TWO (**Quality of the Offeror’s Goods and Services**)
  - Section THREE (**Offeror’s Proposed Personnel**)
  - Section FOUR (**Other Relevant Factor- Plan and Schedule**)
- 1.5 **Financial Section** (Submit in Bonfire Offeror’s Financial Section) **“Financial stability and bonding capacity”** (all financial information provided in Bonfire is confidential)
- 1.6 **Safety plan and safety record”** (Submit in Bonfire Safety Manual Section)
- 1.7 **Alternate Bid Proposal Submission** (Submit in Bonfire Package “B” Section)
- Alternate Bid Proposal Form
  - **Deviation Form (if Applicable)**
- 1.8 **SBEP commitment”** submission (Submit in Bonfire Package C Section)

## 9.2 Relative Weights

**To determine the best value bidder, the Owner will evaluate the responses and information submitted on the Bid Form, Contractor’s Information Statement Form and other bid documents in regards to the following criteria:**

### **1) “The Price”**

**Texas Government Code 2269.055.a (1) The price.**

- 1.1) Proposed construction contract price (base price plus alternates as defined on the bid form). Contract price shall include both base price and accepted alternate price as defined on the bid form. The final weighting distribution will be a calculated percentage.
- 1.2) **No deviations are allowed in the base bid or base bid adjustment. Any deviation from the Base Bid shall be submitted as Alternate No. 2 on the Deviations Form.**
- 1.3) **Evaluation of the proposed substitutes/deviations does not constitute Owner’s acceptance of the substitutes/deviations but can be considered during negotiations.**
- 1.4) Price scores will be based on the base bid +/- the base bid adjustment which must be in adherence to all plans and specifications published.

### **2) “FORMAL SUBMISSION SECTION ONE – “Offeror’s Experience and Reputation”**

**Texas Government Code 2269.055.a (2) The offeror’s experience and reputation.**

- 2.1) Provide three (3) letters of reference for projects completed in the past **one (1) year** from major suppliers and/or sub-contractors which specifically address the bidder’s history of paying sub-contractors and material providers on time.
- 2.2) List current or past FBISD projects completed within the past **five (5) years** of similar scope and size.
- 2.3) List current or past projects with other school district completed within the **past five (5) years** of similar scope and size.
- 2.4) Letters of reference from Director of Facilities/Operations/Maintenance & from campus on housekeeping and cleanliness from FBISD and/or other school district
- 2.5) The district staff will contact the Owners, identified in the list of current or past K-12 projects or Non K-12 projects completed within the **past five (5) years** of similar scope and size. References

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may be conducted by FBISD staff to ascertain the following:

- The quality of the work provided by bidder.
- The bidder's history of providing warranty documents.
- The bidder's history of timeliness in completing warranty work.
- The bidder's history of staying on schedule.
- The bidder's cooperative attitude when working with the owner and its architect in resolving construction issues.
- The bidder's history of providing detailed documentation and a fair assessment of change order pricing.
- The bidder's history of repeat business with owner(s).

- 2.6) Provide a detail of your history of on-time project completion. The district may verify the bidder's history based on references contacted by FBISD Administrative staff.
- 2.7) List all claims, judgments, arbitration proceedings or suits pending or outstanding against your company or its officers. Summarize the nature of the claims.

### **3) "FORMAL SUBMISSION SECTION TWO – Quality of the Offeror's Goods and Services"**

#### **Texas Government Code 2269.055.a (3) The offeror's experience and reputation**

- 3.1) Include in the proposal; your firms' philosophy on construction management, your sub-contractor selection process, details of managing conflicts, staffing issues, subcontractor disputes. Include your plan for operating on an occupied school site. Include your system for coordination with local jurisdictions, your methodology for quality control. Provide a statement in your work flow plan that indicates scheduling and timing of site meeting, coordination with owners, documentation, and your firm's unique ability to satisfy the client. Include a project schedule/timeline with project specific parameters or limitations (e.g. evening, summer, holiday work).
- 3.2) Provide evidence of sufficient resources necessary to manage, staff and successfully perform the Work.
- 3.3) The bidder's history of on-time project success
- 3.4) Provide a sample quality management plan that would include your role in substantiating conformance with the contract documents. Include in the plan your performance history for: quality assurance/quality control, preconference processes, process for documenting and correcting nonconforming work, as well as the process and staff that would oversee this plan.
- 3.5) Provide cost saving ideas and associated cost.
- 3.6) Provide details of firms PMCS capabilities, include familiarity with major software packages, CAD coordination, and electronic filling, submissions, and transmittals.

### **4) Utilization of historically underutilized businesses**

#### **Texas Government Code 2269.055.a (4). Not Applicable**

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## **5) Offeror’s Safety Record – “Safety plan and safety record”**

**Texas Government Code 2269.055.a (5) The offeror’s safety record.**

- 5.1 Provide your company’s safety program manual. (see submission process in section A above)
- 5.2 Provide Workers Compensation Experience Modification Rate (EMR) for the last three years, as obtained from your insurance agent.
- 5.3 Provide OSHA No. 300 Log information for the past three (3) years regarding following points:
  - Number of injuries and illnesses
  
  - Number of lost time accidents
  - Number of recordable cases
  - Number of fatalities
  - Number of employee direct hire fixed hours worked (round to 1,000's)
- 5.4 Provide your company’s safety orientation program for new employees.
- 5.5 State the frequency and provide evident of ongoing safety inspections as implemented in current projects.
- 5.6 Provide your company’s drug/alcohol prevention policy.

## **6) “FORMAL SUBMISSION SECTION THREE – “Offeror’s Proposed Personnel”**

**Texas Government Code 2269.055.a (6) The offeror’s proposed personnel – Resumes, experience, certifications, past specific experience with similar scope.**

- 6.1 List individuals and provide detailed resumes of the positions for Project Manager, Assistant Project Manager, Project Superintendent, Assistant Project Superintendent and MEP Quality Control Specialist who will be assigned for the entire duration of the Project. Resumes should address the following points for each of the positions mentioned above.
  - Amount of time assigned to project;
  - Years of experience;
  - Current project assignment and availability for this project
  - Relevant K-12 experience;
  - Certifications
  - Include project available dates for key staff

## **7) “Offeror’s Financial Capability Appropriate to the Size and scope of the Project”**

**Texas Government Code 2269.055.a (7) whether the offeror’s financial capability is appropriate to the size and scope of the project**

- 7.1 Submit Bond on FBISD mandated form.
- 7.2 Provide your company’s single limit coverage.

- 7.3 Provide your company's aggregate/total available limit of coverage.
- 7.4 List your surety company and address following points.
- Years your company has had a business relationship with surety;
  - AM Best Rating;
  - Identify if surety company is registered in the State of Texas.
- 7.5 List projects your company has in progress. For each project listed address the following points.
- Name of project;
  - Owner's contact person and phone number;
  - Architect, Architect's contact person and phone number;
  - Contract amount;
  - Percent complete;
  - Scheduled completion date;
  - List total worth of work in progress and under contract.
- 7.6 Provide a recent financial statement for the organization that is proposing.
- 7.7 The financial statement should be attested to by a CPA, an Audit is preferred, a Review is acceptable, or a Compilation at a minimum.
- AUDIT
- provides the highest level of assurance on an organization's financial statement
- REVIEW
- provides limited assurance on an organization's financial statements
- COMPILATION
- provides no assurance on an organization's financial statement
- 7.8 The Financial Statement must address the following points:
- Your organization's latest balance and income statement showing current assets, net fixed assets, other assets, current liabilities and other liabilities;
  - Indicate name and address of firm preparing financial statement, and date thereof;
  - If the financial statement is not for the identical organization submitting offer, explain the relationship and financial responsibility of the organization whose financial statement is provided (parent, subsidiary, etc.)
- 7.9 If available, please list your company's Dunn & Bradstreet risk rating.



## 8) “SUBMIT IN BONFIRE PACKAGE "C" – “SBEP commitment”

**Texas Government Code 2269.055.b (2) Any other relevant factor specifically listed in the request for bids or proposals.**

8.0 Provide your Small Business Enterprise Program Proposal packet.

### 8.1 Small Business Enterprise Program

8.1.1 Owner has adopted a Small Business Enterprise Program to provide increased business opportunities for locally certified small businesses to competitively participate in contracting and procurement within FBISD. See FBISD Board Policy CV(Local), and the FBISD Small Business Enterprise Program.

8.1.2 Small Business Practices:

8.1.2.1 Describe your previous experience, involvement and approach in working with certified Small Business firms; including level of effort, division of duties and providing opinions. Provide a statement detailing small business participation commitment.

8.1.2.2 For this Project FBISD has a small business participation goal of Twenty-Five Percent (25%).

8.1.2.3 At a minimum, your response must include: (a) Firm’s commitment to meeting the small business participation goal for the project (b) a description of previous projects where your firm has successfully subcontracted work to small businesses including the percentage (%) of work subcontracted to these firms under each project; (c) a narrative outlining your overall approach to subcontracting and how you will solicit small businesses for participation as part of this Project; and (d) indicate what challenges you anticipate in attaining FBISD’s goal.

8.1.2.4 Describe your company’s process for the selection of subcontractors in accordance with the statutory procedures required for the solicitation of subcontractors under a Construction Manager-at-Risk delivery method, including your process for evaluating subcontractors’ performance while also incorporating a Small Business Development Program.

8.1.2.5 Provide a reference list of all customers noted in Past Performance References that included a Small Business or similar program where you have performed work similar to the type of work described in this CSP. Provide the contact person and the representative who served as the Small Business Development liaison, telephone number and email address.

8.1.2.6 If, in the opinion of the Evaluation Committee, the Proposal Response completely meets the stated small business participation goals, the total amount of eligible points will be awarded for small business participation, as indicated below.

Proposed SBE Subcontracting	Available Points
Less than 5%	0
5% - 9%	1
10% - 14%	2
15% - 19%	3
20% - 24%	4
25% or more	5

8.1.3 Points shall be awarded in accordance with the Proposal Response based on the prime vendor’s commitment to small business subcontracting stated in the solicitation document and the published point distribution sliding scale.

8.1.4 If the proposer itself is a certified Small Business who plans to self-perform work, the value of such self-performed work shall be included in calculating the eligible points for small business participation to the Small Business Proposer, in addition to the value of work subcontracted to another small business.

8.1.5 If the proposer itself is a not a certified Small Business, but has join-ventured with another certified Small Business, only the value of work to be self-performed by the certified Small Business Prime contractor will be included in calculating the eligible points for small business

- participation to the Small Business Proposer/joint venture, in addition to the value of work subcontracted to another small business.
- 8.1.6 Once selected, all prime construction contractors (“Contractor”) working with FBISD on SBEP eligible construction projects shall be required to submit the Fort Bend ISD Subcontractor Progress Assessment Form with each application for payment, requesting payment be made for Work performed by a subcontractor that qualifies as a “small business” under FBISD Board Policy CV (Local). The Contractor shall also ensure that, once Contractor makes the applicable payment to the Small Business Subcontractor, the Subcontractor completes the Fort Bend ISD Subcontractors/Subcontractors/Suppliers Payment Certification Form in its entirety. Contractor agrees to submit the completed copies to Owner with the next application for payment. The completed Fort Bend ISD Subcontractors/Subcontractors/Suppliers Payment Certification Form must be received by the Owner before any further payment will be made to Contractor for any Work performed.
  - 8.1.7 Include with your submission the SBEP Participation Report
  - 8.1.8 Include with your submission the Supplier Diversity Questionnaire

### **9.0 Award of the Contract**

- 1.1 The Bidder to whom the award is made will be promptly notified. If a Bidder (a) withdraws his bid within 45 days after the date of time fixed for the opening of bids in the Request for Competitive Sealed Bids, or (b) fails or refuses to execute the Agreement, or other required forms within ten (10) calendar days after the same are presented to him for signature, or (c) fails or refuses to furnish properly executed Performance Bond and Certification of Required Insurance within 10 calendar days of Notice of Award of the Project, the Owner may award the work to another Bidder or Bidders or, if applicable, may call for new bids.
- 2.2 The Bidder will be required to (a) submit his bid and Bid Bond, (b) execute Contract and Performance and Payment Bonds, and (c) submit Certification of required insurances.
- 1.3 Bid Bond is forfeited if bid is withdrawn after the CSP opening, or Contract Documents are not executed in accordance with the above.

### **10.0 SUBMISSION OF POST COMPETITIVE SEALED COMPETITIVE INFORMATION**

The selected Bidder shall within ten (10) days after the Board of Trustees approves the award submit the following:

- 10.1 A designation of the work to be performed by the Bidder with his own forces.
- 10.2 An experience profile of the selected Bidder's superintendent scheduled to work on this project. In addition, the apparent selected Bidder shall cooperate with the Owner, supplying requested information to substantiate the qualifications of the superintendent. If, in the opinion of the Owner, the superintendent does not qualify, the Owner may request the submission of another superintendent and more information. The Owner reserves the right to reject the apparent selected Bidder if an acceptable superintendent is not presented.
- 10.3 A list of names of subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for such portions of the work as may be designated in the bid documents or, if no portions are so designated, the names of the subcontractors proposed for the principal portions of the work.
- 10.4 The selected Bidder shall within ten (10) days thereafter submit a statement of costs for each major item of work included in the bid. Each section of specifications will be considered a major item of work and shall be shown as a separate cost item.

### **11.0 NOTICE TO PROCEED**

- 11.1 The Bidder shall not commence work under this Contract until he receives the written Notice to Proceed and the Contract is duly signed by the Owner.

### **12.0 COMPLETION TIME**

- 12.1** The Owner has a critical need for the work to begin timely and be Substantially Complete by date provided on the Bid Form.
  - 12.2** Having thoroughly familiarized himself with the conditions as they exist at the building sites and acquainted himself with the labor supply and the material market, the Bidder will state in his bid that he agrees to be substantially complete with the work by the date above.
  - 12.3** Under the Base Bid, the successful Bidder will be subject to liquidated damages.
  - 12.4** The definition of Substantial Completion, as defined in Article 9.8.1 of the AIA General Conditions and Supplementary Conditions bound herein, is as follows: "Substantial Completion is the stage in the progress of the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use".
- 13.0 RETAINAGE**
- 13.1** Contracts will bear a retainage of five (5) percent (%) on each partial disbursement.

**14.0 ASBESTOS, LEAD AND PCBs CONTAINING MATERIALS**

- 14.1 The use of any construction process or the installation of any asbestos, lead and PCBs or material containing asbestos, lead and PCBs is strictly prohibited for this Project.
- 14.2 Prior to submitting a bid, Bidders shall notify the Project Manager, in writing, of any materials in these specifications which are known to contain or are likely to contain asbestos, lead or PCBs.
- 14.3 Prior to payment of retainage and final payment the Contractor shall furnish a notarized statement certifying that no asbestos, lead and PCBs containing materials have been used in the Project.
- 14.4 In addition to the Contractor's notarized statement, the Subcontractors will be required to furnish notarized affidavits that no asbestos, lead, and PCBs containing products have been used in this Project.

**15.0 AVAILABILITY OF MATERIALS AND SYSTEMS**

- 15.1 A serious effort has been made to select only materials that are asbestos free and systems that are readily available. As far as is known at bid time all items are either available "off the shelf" or within a relatively short period of time. If during the bid period, an Bidder becomes aware of an availability or delivery problem with any of the specified systems or materials or if they contain asbestos, he should notify the Project Manager immediately. The Project Manager will promptly explore possibilities for selecting other systems or materials which would circumvent the problem and notify Bidders of any changes in an addendum, otherwise it will be understood that only specified systems and materials that are asbestos free are included in the bids.

**16.0 USE OF ASBESTOS FREE MATERIALS, PRODUCTS AND SYSTEMS**

- 16.1 The Contractor is reminded to refer to the Section above for requirements during the bid period and the following requirements during performance of the Work regarding the use of asbestos free materials, products and systems in the Project.
- 16.2 Since many materials, products and systems are proprietary, it is not possible to know all of the materials or components which go into producing such material, product or system without the manufacturer divulging trade secrets or patent information. Every effort has been made to specify materials, products or systems, which either as an "off the shelf" material, product or system or as a custom material, product or system do not contain asbestos.
- 16.3 It is the Contractor's responsibility to submit an affidavit from the manufacturer to ascertain that every material, product or system used in the Project does not contain asbestos. In the event the material, product or system is found to contain asbestos, the Contractor shall offer for the Project Manager's consideration a substitution which he knows does not contain asbestos.
- 16.4 Even though a material, product or system is specified or a specification is based on a particular material, product or system, the Contractor will not be relieved from the responsibility to ascertain that materials, products and systems used in the Project do not contain asbestos. Under no circumstances shall a material, product or system which is known, suspected or found to contain asbestos be used on the project.
- 16.5 If a material, product or system containing asbestos is used, the Contractor shall remove and replace the material, product or system with one which is asbestos free at no additional expense to the Owner, including removal and replacement of other materials affected by the removal of the asbestos bearing material, product or system, i.e. gypsum wallboard removed, replaced, and repainted on account of insulation being removed, etc

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**FORT BEND INDEPENDENT SCHOOL DISTRICT**

**GENERAL PROVISIONS  
For Purchasing Solicitations and Contracts**

July 1, 2023

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The following General Provisions are issued in accordance with the laws, rules, and policies set forth through the Texas Education Code, Chapter 44, and Fort Bend Independent School District (FBISD or “District”) policy and may be amended as required by FBISD. Prospective Vendors are cautioned to read and understand the General Provisions set forth in this document prior to responding to a FBISD Solicitation. Any exceptions to or failure to follow these General Provisions unless otherwise directed within the Solicitation, may be cause for a Vendor’s Solicitation Response to be deemed non-responsive and disqualified by FBISD. These General Provisions will take precedence over the terms and conditions within the Solicitation when they are in conflict unless specific exception is noted within the Solicitation.

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# FORT BEND INDEPENDENT SCHOOL DISTRICT

## GENERAL PROVISIONS

Reference Document Version

Effective Date of July 1, 2023

### PART I

#### DEFINITIONS, TERMS AND ACRONYMS

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The following terms may be found in this document or may be used in the normal operations of the District's Purchasing Department.

<b>Term</b>	<b>Definition</b>
Addendum	A document that has been issued by the District that has made material changes, modifications, or deletions of information or specifications of a Solicitation.
Agreement/ Contract	A contract that has been agreed upon and signed by both the District and the Vendor.
Bid	Vendor's response to a Request for Bid or RFB. The term may be used to represent all types of solicitations.
Buyer	The Buyer (FBISD Buyer) is the District's approved business representative for all matters of solicitation, evaluation, award, and administration of a Contract Award. There will be only one appointed Buyer at any time for each purchasing action. Vendors shall address all business/contract issues about a Contract Award to the Buyer.
Alternate or Substitute	A good or service substituted for another by a Vendor with approval of the FBISD Buyer.
Conflict of Interest	A Conflict of Interest shall exist when a Vendor or any affiliated person or business entity provides goods or services under a Contract Award whereby one or more personal, business, or financial interests or relationships exist which would cause a reasonable individual with knowledge of the relevant facts to question the integrity or impartiality of those who are or will be acting under a proposed or existing Contract; or any other facts that exist which may cause the District, at its sole discretion, to determine during the Solicitation or the performance of an existing Contract that the Vendor obtained an unfair competitive advantage favoring the interest of the Vendor or any person with whom the Vendor has or is likely to have a personal or business relationship. Conflicts of interest are further defined in FBISD policy and state law.
Contract Award	The acceptance of a Quote, Bid, Proposal or Offer; a Purchase Order, District Contract Agreement, or other formal notification of award issued by an authorized District official.
Contract Documents	A set of documents that create an Agreement that has been agreed upon and signed by both the District and the Vendor. Contract Documents shall include, without limitation, these General Provisions, the Contract, Purchase Orders, and Service Contracts

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Contract Term	The length of time a Contract or Agreement will be available for use by the District.
Contractor	The Vendor(s) who receive a Contract Award for a specific Solicitation.
Debarment	Action taken by the District which prevents a Vendor from participating in the solicitation process for a period of time, usually as a result of improper business practices on the part of the Vendor.
Deliverable	Goods or services which are required by a Contract Award to be provided to the District by a Vendor.
Discount Contract	An awarded Contract where pricing is based on a firm-fixed discount from a Vendor's published price list, priced catalog, or other document that is published for the majority of the Vendor's customers.
District	FBISD
District Business Day	Days the District is officially conducting business (excludes weekends, District observed holidays, etc.).
District Web Site	The official District web site, available at <a href="http://www.fortbendisd.com">http://www.fortbendisd.com</a>
FBISD	Fort Bend Independent School District
Line-Item Contract	An awarded Contract where goods or services are specified and individually priced.
Notice of Award	A formal, written document issued by an authorized official of the District's Purchasing Department informing a Vendor that it has been selected for the Contract Award based on its Solicitation Response.
Offer	Term used in conjunction with or in place of a Vendor's Solicitation Response.
Professional Services Contract	A Contract awarded for performance of technical, professional, and/or unique services by Vendors which are typically licensed such as medical or medical arts professionals, architects, engineers, or lawyers, as described in Texas Education Code 44.031(f).
Proposal	Vendor's response to a Request for Proposal (RFP).
Purchase Order	Formal order for goods, materials and/or services from a Vendor; a binding commitment for the District to remit payment to the Vendor after the specified goods and/or services, and an invoice for the same are received by the District.
Quote	Vendor's response to a Request for Quote.
RFB	Request for Bids. Solicitation method used for acquiring goods or services for one-time purchases or establishing Term Contracts for acquiring goods or services with aggregate values of \$50,000 or greater. This solicitation method is formal, and a legal notice is published at time of issuance. This purchasing method is normally used to establish annual contracts for District-wide goods or services, or major one-time purchases. Award is based on Best Value Determination.
CSP	Request for Competitive Sealed Proposal. Solicitation method used primarily for construction projects. Allows for the use of the formal evaluation process and uses the Best Value Determinations for an award. Negotiations are allowed prior to the award.
RFO	Request for Offer. Solely for technology purchases such as those issued through the State of Texas / Department of Information Resources (DIR) procurement processes. May also be used for sale or lease of property belonging to the District.



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RFQ	Request for Quote. Used for small dollar purchases valued at less than \$50,000. Solicitation method is typically informal (e.g., phone, fax or email) and solicitation requirements are minimal (no advertisement, minimal response time, etc.). May be used for one-time purchases, or to establish low-dollar Term Contracts. May also be used to compare contract pricing from several different contract vehicles such as cooperatives.
RFP	Request for Proposal. Solicitation method used to acquire highly technical, negotiated goods or services. Standard RFPs will allow for evaluations based on specific criteria established within the RFP. Used primarily for higher dollar valued purchases but may be used for smaller purchases where requirements warrant this Solicitation method. Negotiations are allowed prior to the award.
School Business Days	Days the District is officially conducting school (excludes weekends, District observed holidays, etc.)
Service Contract	An awarded Contract for performance of a service by a Vendor for a specified period of time.
Solicitation	General term used to refer to an RFB, CSP, RFO, RFQ or RFP.
Solicitation Response	Vendor's response to an RFB, CSP, RFO, RFQ, RFP or other Solicitation issued by the District
Solicitation Tabulation	Official tabulation of Solicitation Responses, issued by the Purchasing Department after Contract Award.
Subcontractor	Company or business that has contracted with the prime contractor for performing services for the District. The prime contractor is responsible to the District for the work performed by its subcontractor(s). No contract will exist between the subcontractor and the District.
Term Contract	An awarded Contract for delivery of goods or performance of services by a Vendor for a specific period of time.
Vendor	Bidder, Vendor, Offeror, Proposer, or Contractor.
Vendors of Record	The compiled bid list of Vendors for a specific Solicitation, that is to include Vendors that were selected to receive the Solicitation or have notified the District that they have an interest in the Solicitation and are added to the initial list of Vendors.

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*PART II*

*SOLICITATION INFORMATION AND INSTRUCTIONS*

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**1. DISTRICT OVERVIEW**

- 1.1. Fort Bend Independent School District spans over 170 square miles and is located in the northeast part of Fort Bend County, just southwest of Houston and Harris County. FBISD encompasses the incorporated cities of Missouri City, Sugar Land, Arcola, and Meadows Place, a small portion of Houston, and the communities of Clodine, DeWalt, Rosharon, and Fresno.
- 1.2. The District currently has eighty two (82) plus campuses and multiple other sites for administration, athletics, agriculture, and support services.

**2. TYPES OF CONTRACTS** Each Solicitation will identify the type of Contract being advertised. One of the following contracting methods will typically be used, but FBISD reserves the right to use any contracting method it deems to be in the best interest of the District:

**2.1. *Firm-Fixed Price***

- 2.1.1. Prices shall be firm fixed for the term specified in the Contract, and all extensions exercised by the District.
- 2.1.2. No increases will be allowed during the Contract term.
- 2.1.3. Price decreases are acceptable at any time during the term of the Contract.

**2.2. *Fixed-Price with a Price Adjustment Allowance***

- 2.2.1. Prices shall be firm for a term specified in the Contract.
- 2.2.2. Prices can be adjusted based on escalation provisions as identified in the Contract.
- 2.2.3. The District reserves the sole right to evaluate the applicability of any price adjustment and accept or reject any formula included in any Solicitation Response or accept or reject any Solicitation Response containing a price adjustment proposal.
- 2.2.4. FBISD recognizes this product or service has a price component that may have a commodity with changing costs. The Contractor/Supplier may request a Price Adjustment no more frequently than once each quarter (3-month period).
- 2.2.5. A Price Adjustment request must be made in writing and include the reason for the request, documentation supporting the request (i.e., commodity increases), the current pricing, and the requested revised pricing. FBISD will review the Price Adjustment request. If the Price Adjustment is deemed reasonable the Price Adjustment request will be accepted by written acknowledgement. If the request is not accepted the FBISD may entirely reject the request or may counter with revised pricing. In either case the FBISD will provide a written explanation in support of the decision. The Director of Procurement Services may use available indexes (e.g., CPI or PPI) to determine if the requested Price Adjustment is reasonable. Typically, a Price Adjustment that exceeds 5% will not be approved unless very unusual and significant changes have occurred in the industry.
- 2.2.6. In the event industry costs decline, FBISD shall have the right to request to receive, from the Contractor, a reasonable reduction in prices/pricing that reflect such cost changes in the industry. FBISD will make a written request to the Contractor for a Price Adjustment in writing with supporting documentation.

**2.3. *Firm-Fixed Discount Percentage, Discount-from-List, or Cost Markup-From-List***

- 2.3.1. Discount or cost mark-up shall be firm fixed for the period specified in the Contract, but prices may vary based upon changes in a District approved price list or other pricing document, by the method and frequency as identified in the Contract.
- 2.3.2. Used when the pricing is based on a discount or a cost-plus mark-up percentage from an established, publicly recognized price list.
- 2.3.3. Prices shall be from a current Vendor's price list or a cost-plus percentage add-on to a Vendor's distributor/producers price list.
- 2.3.4. Vendor's price list shall be the current price list published and available to and recognized by the trade. A price list specially prepared for a given Solicitation will not be accepted. FBISD, in its sole discretion, shall determine the acceptability of such price lists.

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- 2.3.5. Unless otherwise indicated within the Solicitation, the period of acceptance shall be no earlier than one-twenty (120) District Business Days from receipt and approval.
- 2.3.6. In order for a price list to be changed, if permitted by the Contract terms, a new or amended price list must be submitted to the District's Purchasing Department by the Vendor and approved in writing by the FBISD Buyer within the Contract time specified prior to the requested price change. Otherwise, the last FBISD approved price list remains in effect until such time that FBISD approves the price change. Price changes will not be approved without vendor's documentation supporting cause for increase.
- 2.3.7. All prices and discount percentages in Vendor's response shall be firm for the term of this Contract. All price changes for products and/or services provided under this Contract must be approved, in writing, by FBISD prior to taking effect and in the same format as was accepted in Vendor's original response.
- 2.3.8. If the Solicitation includes the option to extend for additional year(s), price increases for each additional year may be negotiated not to exceed the Consumer Price Index (CPI) in the FBISD area at the time of renewal. Prices may be negotiated to prices below the current pricing.
- 2.3.9. Vendor agrees to promptly lower the proportionate price of any product purchased through this Contract following a reduction in the price the Vendor is paying suppliers.
- 2.3.10. Prices for this type of Contract cannot be increased during the first year of the contract. For periods beyond year one, prices cannot be increased for 30 days after the Contract renewal commences unless otherwise specified in the Solicitation. Price reductions shall be offered immediately upon becoming available to a Vendor at any time after award.  
The following documentation shall be provided to support a request for a price change:
  - justification for change/increase
  - terms and conditions
  - market conditions
  - manufacturers'/distributors' impact if anyAll price decreases shall be allowed for all products and/or services.

**2.3.11. Pricing, Purchase Orders, Invoices, and Payments**

If pricing for products or services available under this Contract are provided at a lower price to an eligible Customer who is not purchasing those products or services under this Contract or any other entity or consortia authorized by Texas law to sell said products and services to eligible Customers, then the available Customer Price in this Contract shall be adjusted to that lower price. This requirement applies to products or services quoted by Vendor or its resellers under this contract for a quantity of one (1) under like terms and conditions and does not apply to volume or special pricing purchases. This Contract shall be amended within ten (10) business days to reflect the lower price.

**3. CONFLICT OF INTEREST**

**3.1. *Disclosure of Certain Relationships with Local Government Officials***

- 3.1.1. Any individual or business entity that contracts or seeks to contract for the sale or purchase of property, goods, or services with FBISD must file a Vendor Conflict of Interest Questionnaire with the FBISD Purchasing Office in accordance with Texas Local Government Code Chapter 176, and in the event that a conflict arises, no later than the 7th business day after the recipient becomes aware of facts that require filing.
- 3.1.2. This requirement applies to a person who is an agent of a vendor in the Vendor's business with the District. The Texas Ethics Commission's website at: [www.ethics.state.tx.us/data/forms/conflict/CIS.pdf](http://www.ethics.state.tx.us/data/forms/conflict/CIS.pdf)

**3.2. *Employee***

- 3.2.1. Pursuant to FBISD Policy CH (Local) Purchasing and Acquisition, and DBD (Local) Employment Requirements and Restrictions, all Vendors must disclose the name of any FBISD employee who owns, directly or indirectly, an interest in the Vendor's firm or any of its branches.
- 3.2.2. Failure to provide such conflict-of-interest information may be grounds for disqualification of the Solicitation Response or cancellation of a contract resulting from this Solicitation.
- 3.2.3. Purchase of services or equipment from a business owned in whole or in part by a District employee shall be permitted only when approved by the Superintendent and executed through a documented competitive process.

**4. SOLICITATION PRICING Solicitation prices must be firm for one hundred twenty (120) days from Solicitation**

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opening/bid closing date until award unless otherwise specified in the Solicitation.

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5. **QUANTITIES** Any quantities listed within the Solicitation are a close approximation based on requirements and available funds, but FBISD reserves the right to purchase more or less than the estimated quantities, at the current Contract price, for the term of the agreement unless otherwise specified in the Solicitation. Unless otherwise agreed in writing, FBISD will engage Contractor on an “as needed if needed” basis and does not guarantee the purchase of any quantity or dollar amount of Services.
6. **REQUEST FOR EXPLANATION / INTERPRETATION**
  - 6.1. Any explanation desired by a Vendor regarding the meaning or interpretation of this Solicitation must be submitted in writing to the Buyer identified in the Solicitation in accordance to the Solicitation instructions , in order to allow a response to all interested Proposers before the submission of a bid.
  - 6.2. The District has provided an email address or method of communication intended for interested Proposers to direct requests for clarification, interpretations, and/or questions of current Solicitations in each respective solicitation.
  - 6.3. All requests must include all contact and Solicitation information to be considered. Failure to provide this information may delay a response from the District. Any interpretations, corrections, additions, or changes to the Solicitation will be communicated to all interested Vendors through the issuance of an Addendum. It is the responsibility of the Vendors, prior to submitting their Solicitation Response, to determine whether an Addendum has been issued. All Vendors shall comply with the requirements specified in any Addendum(a) issued by the District.
  - 6.4. Once a request is received, a notification of receipt by the District will be forwarded to the Vendor’s contact email address.
7. **DELIVERY TERMS**
  - 7.1. All goods or products included in the Solicitation shall be F.O.B. (“Free on Board”) destination full freight allowed, unless otherwise indicated within the Solicitation.
  - 7.2. All goods or products will be considered full freight prepaid and allowed and included in the unit price.
8. **SUPPLIER DIVERSITY INITIATIVE** The FBISD Supplier Diversity Initiative (SDI) ensures that the District will use its best efforts to encourage small businesses to participate in current and future purchasing of all goods and services.
  - 8.1. **Program Definitions**
    - 8.1.1. *“Small Business”* is defined as a business entity which is independently owned and operated, and which is not dominant in its field of operation. The business employs less than 50 employees and/or has less than \$3 million in annual business volume from this local operation.
  - 8.2. **Certification**
    - 8.2.1. Any business wishing to be identified by FBISD as a small business shall be certified as such by the:
      - 8.2.1.1. Port of Houston Authority SBE Certification.
      - 8.2.1.2. Metropolitan Transit Authority of Harris County (METRO) SBE Certification.
      - 8.2.1.3. City of Houston SBE Certification; or
      - 8.2.1.4. Small Business Administration - SBA 8A (if authorized by the District for a particular procurement).
9. **SAMPLE REQUIREMENTS**
  - 9.1. The District may require a sample of a product at any time for evaluation and testing, from a Vendor participating in a Solicitation process or a Vendor supplying items to the District under contract.
  - 9.2. The Vendor should not submit a sample with the Solicitation Response unless directed to do so.
  - 9.3. **Request of Sample**
    - 9.3.1. If it is determined that a sample is required as part of the Evaluation Process, the requirement will be issued in writing to the Vendor by the Buyer.
    - 9.3.2. Samples must be received by the District’s Purchasing Office by the deadline established in the Buyer’s written notification.
    - 9.3.3. A representative sample of the item(s) offered must be provided. Award recommendations will be based on samples and any future items ordered will be of the same quality and grade of the sample submitted.
    - 9.3.4. The Vendor will cover all costs in shipping and providing the sample product to the District.
    - 9.3.5. Failure to provide a requested sample may disqualify the Vendor from further consideration in

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award of the associated Solicitation item.

- 9.3.6. If a sample is found to not meet the Solicitation specifications or the intended purpose of the product, the associated Solicitation item will be disqualified.
- 9.4. ***Sending of Samples***
  - 9.4.1. If a sample is required by the District, samples must be clearly marked with the following information:
    - 9.4.1.1. The word "Sample" in large print;
    - 9.4.1.2. The name of the company submitting the sample; and
    - 9.4.1.3. The number and title of the Solicitation or Contract.
- 9.5. ***Return of Samples***
  - 9.5.1. Unless specifically requested, all samples provided shall become the property of FBISD.
  - 9.5.2. If the sample is required by the Vendor to be returned, any and all costs associated with the return of the sample will be the responsibility of the Vendor. FBISD shall not be liable for any damage to the sample.

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*PART III*  
*SOLICITATION RESPONSE*

1. **PREPARATION OF A SOLICITATION RESPONSE** In preparation of a Solicitation Response, each Vendor shall:
  - 1.1. Furnish all information required by the Solicitation by the due date and time.
  - 1.2. Authorized Signature
    - 1.2.1. Solicitation Responses must be signed and/or submitted only by individuals who have been given authority to bind the Vendor under contract.
  - 1.3. Have all erasures or other changes initialed by the signer of the Solicitation Response.
  - 1.4. Solicitation Responses submitted on other forms or with different terms or provisions may be deemed non-responsive by FBISD and disqualified.
  - 1.5. Unless otherwise instructed by the Solicitation, Vendors shall submit the lowest and best price, F.O.B. destination, freight prepaid and allowed, on each item, including packaging and transportation.
  - 1.6. An unsigned Solicitation Response will be deemed non-responsive by FBISD and disqualified. Solicitation Responses cannot be signed after the Solicitation opening time even though the Vendor or a representative is present at the Solicitation opening.
  - 1.7. By submitting a proposal vendor you are acknowledging that you agree to the terms and conditions of the proposal and incorporated here by reference. An unsigned Solicitation Response will be deemed non-responsive by FBISD and disqualified. Solicitation Responses cannot be signed after the Solicitation opening time even though the Vendor or a representative is present at the Solicitation opening.
  - 1.8. By submitting a proposal vendor agrees to any Terms & Conditions of this solicitation and in case of
  - 1.9. conflict with other documents provided by the vendor, these Terms and Conditions take precedence and prevail unless specifically identified and changes are signed by both parties.
  - 1.10. All Solicitation Responses and accompanying samples or documents of any kind become the property of FBISD and are subject to the Texas Public Information Act The District will be under no obligation to return any part of a Solicitation Response to a Vendor.
2. **ADDENDA**
  - 2.1. Should an addition or correction become necessary after a Solicitation is issued, an Addendum or notice of the availability of such an Addendum will be posted on the District e-bidding Web Site <https://fortbendisd.bonfirehub.com/portal/openOpportunities>. Vendors of Record with FBISD are those Vendors having received a copy of the initial Solicitation or notice of the availability of a copy on-line.
  - 2.2. Vendors who do not submit a Solicitation response without receipt of all Addenda issued, may be deemed non-responsive by FBISD, and disqualified.
  - 2.3. Vendors shall acknowledge an Addendum by returning the Addendum in a separate response, or with the Solicitation, or by physically noting the change or addition on the Solicitation Response with a notation acknowledging the Addendum.
  - 2.4. Failure to return or acknowledge an Addendum may be deemed non-responsive by FBISD and result in disqualification.
3. **BRAND NAME AND PRODUCT NUMBER REFERENCE**
  - 3.1. If applicable to the Solicitation, the use of referenced brand/stock numbers in a Solicitation are for brevity in establishing minimum specifications and are not intended to be restrictive.
  - 3.2. "Buyers approved equal" indicates that the District will consider other manufacturer's product that meets or exceeds the published specifications. The District shall make the final determination of acceptable substitutions.
  - 3.3. Unless no exception is made to the reference manufacturer's product, the alternate manufacturer, trade and/or brand name and number must be indicated for each item bid. The Bidder will be required to forward any illustrations that render its equivalency. Any additional specifications must reference the line-item number that it corresponds to.
  - 3.4. Products of inferior quality will be rejected.
  - 3.5. If the bid space is left blank, the District will consider it a 'no bid'.
4. **ATTACHMENTS**
  - 4.1. Vendors may include attachments to describe goods or services being offered and/or to exhibit that products offered meet all written specifications; however, Vendors shall not submit samples unless requested to do so.
  - 4.2. Page and paragraph numbers shall properly reference each page of an attachment in the Solicitation



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Response.

- 4.3. The name of the Vendor submitting the attachment shall also be prominently displayed on each page of the attachment.
- 4.4. No terms or conditions recorded on any attachment will be considered binding unless specifically made a part of the Solicitation Response in writing and specifically incorporated into the resulting contract.
- 4.5. ***WARNING: Any added terms or conditions may result in disqualification of a Solicitation Response, e.g., Solicitation Responses subject to laws of a state other than Texas, requirements for prepayment, limitations on remedies, waiver of immunities, change in venue, etc.***

5. **SITE VISITATION**

- 5.1. The Vendor shall be responsible for fully understanding the scope of the Solicitation, and if considered applicable to the goods or services being solicited, the District recommends that Vendors visit the FBISD site and examine the space and/or equipment to be serviced. Vendors shall obtain prior FBISD Buyer approval for any site visit.
- 5.2. Pre-submittal conferences may be established by the District to allow Vendors access to the associated facility.
- 5.3. The prospective Vendor shall carefully examine the venue(s), specifications, and requirements.
- 5.4. If necessary, Vendors shall secure additional information from the FBISD Buyer that may be requisite to a clear and full understanding of the work.

6. **REFERENCES**

- 6.1. If required in the Solicitation, the Vendor is to submit references that have contracted with their company to provide like products or services. It is recommended that the Vendor include school districts or other local government organizations similar to FBISD in size and structure as references, if possible. References should include the company name, address, contact name, phone number and email address.
- 6.2. The District reserves the right to use the results of the reference check in the evaluation process, including information obtained from references other than those identified by the Vendor. A negative reference or references may cause a Solicitation Response to be rejected.

7. **CERTIFICATIONS AND REPRESENTATIONS**

- 7.1. The Vendor shall complete, sign and provide all documents as required by the Solicitation. Document must be signed by an authorized representative who may legally bind the company and is to be included with the Solicitation Response for the response to be considered. Failure to sign and submit required documents may disqualify the Solicitation Response
- 7.2. Based on the type of Solicitation, the forms that may be required are:
  - 7.2.1. Felony Conviction Notice. State of Texas Education Code, Section 44.034 requires that a person or business entity (excluding publicly held corporations) that enters into a Contract with the District give advance notice to the District if the person or an owner or operator of the business entity has been convicted of a felony.
  - 7.2.2. Proposal Submission Form (Proposals only).
  - 7.2.3. Conflict of Interest Disclosure. Prior to and as a condition of doing business with FBISD, Vendor shall complete a Conflict-of-Interest Disclosure Form, and shall disclose any business relationship, past or present, with a sitting Board member or FBISD employee. Failure to disclose the existence of any such relationship may disqualify the Solicitation Response or be grounds for termination of an award or agreement.
  - 7.2.4. Relationships with Foreign Entities.
    - 7.2.4.1. In accordance with Texas Government Code Chapter 2252, Subchapter F, Vendor shall certify that it is not a company identified on the Texas Comptroller's list of companies known to have contracts with, or provide supplies or services to, the Government of Iran, the Government of Sudan, or a foreign organization designated as a Foreign Terrorist Organization by the U.S. Secretary of State.
    - 7.2.4.2. Vendor shall certify, pursuant to Texas Government Code Chapter 2270, neither Vendor, nor any affiliate, subsidiary, or parent company of Vendor, if any (the "Vendor Companies"), boycotts Israel, and Vendor agrees that Vendor and Vendor Companies will not boycott Israel during the term of any award or agreement.
  - 7.2.5. W-9 Certificate. The Vendor is required to register in Bonfire and upload a copy of a W-9 Vendor Identification Number Certificate to expedite the payment process if awarded a Contract. A copy of the form can be found at <https://www.irs.gov/forms-pubs/about-form-w-9>.
  - 7.2.6. If you have previously submitted your W9, you are required to submit an updated version if there are



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any changes.

7.2.7. Suspension and Debarment Certification

7.2.8. EDGAR Certifications

7.2.9. Data Protection Addendum This document is required for Solicitations that involve the District's data

7.2.10. Vendor ACH/Direct Deposit Authorization Form will be requested if awarded a Contract.

7.2.11. Certification Regarding Lobbying

This certification is a prerequisite for making or entering into a transaction imposed by Section 1352, Title 31, US Code.

7.2.12. Certificate of Residency

Texas Education Code Chapter 2252, Subchapter A addresses non-resident contractors. As a result, Fort Bend ISD obtains this form as part of the Solicitation Response to determine the residency of its proposers.

**8. SUBMISSION OF SOLICITATION RESPONSES**

8.1. A Solicitation Response shall represent a true and correct statement and shall contain no cause for claim of omission or error.

8.2. If directed by the Solicitation, the Vendor shall provide any and all certifications, forms, and documents as stated within the Solicitation.

**8.3. Responses**

8.3.1. Solicitation Response must contain:

8.3.1.1. The signed proposal document page of the Solicitation;

8.3.1.2. Specification documents, if applicable;

8.3.1.3. The certifications and representations as applicable;

8.3.1.4. Any additional documents required by the Solicitation.

9. **WITHDRAWAL OF A SOLICITATION** Any Vendor who, in FBISD's sole discretion, is extended the privilege of withdrawing a Bid because of having proven mechanical error in the Solicitation Response may not be considered for an Award on similar items for a length of time deemed appropriate by the District, usually considered to be one (1) year or longer.

10. **SOLICITATION RESPONSE CERTIFICATION** By signing and submitting a Solicitation Response, the Vendor certifies and represents to FBISD that:

10.1. The Solicitation Response has been reviewed by an authorized representative of the company or firm submitting the bid, proposal, offer or other Solicitation Response document.

10.2. The Vendor's firm or any of its individuals have not colluded, conspired, connived or agreed, directly or indirectly, with an entity or person, to put in a sham Solicitation Response or bid or to refrain from responding to the Solicitation, and have not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix its Solicitation Response price, or that of any other vendor, or to fix any overhead, profit or cost element of said Solicitation Response price, or of that of any other Vendor, or to secure any advantage against FBISD or any person interested in the Solicitation, and that all statements in its Solicitation Response are true;

10.3. The contents of the Solicitation Response as to price, terms and conditions or other details of the Solicitation Response have not been communicated by the Vendor or by any employee or agent to any other person engaged in this type of business prior to the official opening of the Solicitation; and

10.4. Vendor has read and understands the Solicitation and these General Conditions (including without limitation, the Contract Terms, Conditions, and Requirements set forth in Part V, below).

**11. LATE SOLICITATION RESPONSES**

11.1. Late Solicitation Responses, or components of a solicitation response, will **NOT** be considered under any circumstances.

11.2. A Solicitation Response will be considered late if the Solicitation Response is not received at the Purchasing Department Solicitation Response Desk by the deadline provided in the Solicitation.

11.3. The Purchasing Department will not be responsible for, and no allowances will be made for, misrouting of a Solicitation Response within the District, delays caused by the Post Office, technical delays or problems, courier services, or any other delays.

11.4. The official deadline date and time is determined by the Purchasing Department.

**12. THE DISTRICT IS TAX-EXEMPT**

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12.1. FBISD is tax-exempt. Proposal prices should not include taxes.

**13. OPEN RECORDS POLICY**

13.1. FBISD is a governmental body subject to the Texas Public Information Act. Solicitation Responses submitted to FBISD as a result of this Solicitation may be subject to release as public information after contracts are executed or the procurement is terminated. If a Vendor believes that its Solicitation Response, or parts of its Solicitation Response, may be exempted from disclosure under Texas law, the Vendor must specify page-by-page and line-by-line the parts of the Solicitation Response which it believes are exempt. In addition, the Vendor must specify which exception(s) to the Texas Public Information Act are applicable and provide detailed reasons to substantiate the exception(s). Vague or general claims to confidentiality will not be accepted. FBISD assumes no obligation or responsibility relating to the disclosure or nondisclosure of information submitted by Vendor.

**14. INTERPRETATION**

14.1. A Solicitation represents the basis for any Award and supersedes all prior offers, negotiations, exceptions and understandings (whether orally or in writing). Submitted Solicitation Responses should be self-explanatory and should not require any clarification or additional information.

**15. SOLE SOURCE**

15.1. In order to become a Sole Source Vendor, a Vendor must meet the requirements of Texas Education Code § 44.031(j) Sole Source, as described below.

15.1.1. Selected purchases may be exempt from competitive procurement if they meet the established criteria for a sole source purchase:

15.1.1.1. Identification and confirmation that competition in providing the item or product to be purchased is precluded by the existence of a patent, copyright, secret process or monopoly

15.1.1.2. Identification and confirmation that the product is a film, manuscript, book, utility service (including electricity, gas, or water), or a captive replacement part or component for equipment.

15.1.1.3. Sole source does not apply to mainframe data-processing equipment and peripheral attachments with a single item purchase price in excess of \$15,000.

15.2. It is incumbent upon the District to obtain and retain documents from the Vendor which clearly delineate the reasons that qualify the purchase to be made on a sole source basis. In order to do business with FBISD as a Sole Source Vendor, FBISD must receive a notarized Sole Source Affidavit along with proof of Vendor's company qualifying as a sole source.

**16. GENERAL CORPORATE AND CONTACT INFORMATION**

Vendors are required to attach all the following in the Solicitation Response:

- Describe the company's official registered name and its principals.
- Provide a brief history of the company, including the year it was established.
- Provide the company's organizational chart.
- Provide the company's Dun & Bradstreet (D&B) number.
- Provide a description of the company's relevant market and the company's position within it.
- State whether the Vendor or the Vendor's ultimate parent company or majority owner: (A) has its principal place of business in this state; or (B) employs at least 500 persons in this state.
- Vendor agrees to provide the District with the following financial information if requested by FBISD at any point during the procurement process, including before or after contract award: If public, the Vendor's income statement, balance sheet, and cash flow for the past three (3) years; if private, the Vendor's audited financial statements for the past two years (if available). A Vendor's failure to provide this financial information may impact the FBISD administration's recommendation to the FBISD's Board of Trustees for the award of the contract.

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*PART IV*

*SOLICITATION EVALUATION AND AWARD*

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1. **RESERVATIONS** The District expressly reserves the right to:
    - 1.1. Waive minor deviations from specifications, if the District determines that overall cost of the goods or service will be lower and the overall function is improved or not impaired;
    - 1.2. Waive any minor informality or deficiency in any Solicitation procedure;
    - 1.3. Accept, reject, or negotiate modifications in any terms of a proposed Vendor's Solicitation Response, or any parts thereof;
    - 1.4. Waive any formalities or technicalities if deemed in the best interest of the District;
    - 1.5. Reject any or all Solicitation Responses;
    - 1.6. Cancel the Solicitation;
    - 1.7. Reissue a Solicitation;
    - 1.8. Extend the Solicitation opening time and date, the Contract Award date, or both;
    - 1.9. Specify approximate quantities;
    - 1.10. Increase or decrease the quantity specified in the Solicitation;
    - 1.11. Consider and accept alternate Solicitations, if specified in the Solicitation, when it is considered in the best interest of the District;
    - 1.12. Procure any goods or services by other means;
    - 1.13. Purchase no goods or services;
    - 1.14. Award one or more contracts, in part or in whole, to a single or to multiple prospective Vendors. The decision to award multiple contracts, award only one contract, or to make no awards rests solely with FBISD. FBISD may make multiple awards, and this fact should be taken into consideration by each Vendor;
    - 1.15. Award contracts for individual products or services as may appear advantageous;
    - 1.16. Negotiate separately in any manner necessary to serve the best interests of the District; and
    - 1.17. Be sole judge of quality and equality.
    - 1.18. FBISD assumes no financial responsibility for any costs incurred by prospective Vendors in developing and submitting a Solicitation Response, participating in bid conferences (if any), participating in any negotiation sessions or discussions, or any other costs incurred by Vendors prior to award of a contract pursuant to any Solicitation.
  2. **COMPETITIVE SELECTION USING BEST VALUE**
    - 2.1. **Solicitation**
      - 2.1.1. All formal Solicitations will be evaluated using the Best Value method as defined in Texas Education Code 44.031(b).
      - 2.1.2. The Solicitation will usually indicate the criteria and ranking to be used to determine Best Value. In the absence of criteria in the Solicitation, the criteria in 2.1.3 will be used.
      - 2.1.3. In determining Best Value the District will consider any or all of the following:
        - 2.1.3.1. Purchase price;
        - 2.1.3.2. Reputation of the Vendor and of the Vendor's goods or services;
        - 2.1.3.3. Quality of the vendor's goods or services;
        - 2.1.3.4. Extent to which the goods or services meet the District's needs;
        - 2.1.3.5. Vendor's past relationship with the District;
        - 2.1.3.6. Total long-term cost to the District to acquire the Vendor's goods or services;
        - 2.1.3.7. Any other relevant evaluation criteria specifically listed in the Solicitation;
    - 2.2. **Award**
      - 2.2.1. Award will not necessarily be made to the Vendor submitting the lowest priced offer.
      - 2.2.2. After Solicitation Responses are received, FBISD may make an Award or Awards without discussion with any Vendor. FBISD reserves the right to conduct interviews, oral presentation, negotiations if applicable, or any other requirements deemed appropriate with only one, with some, or with all Vendors, in compliance with applicable procurement laws. Solicitation Responses should, therefore, be submitted on the most favorable terms.
  3. **EVALUATION** The District will evaluate all Solicitations based on the following procedures:
    - 3.1. **Objective** Objective evaluation is:

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- 3.1.1. Based on a set of pre-determined criteria using formulas and/or sets of ranges; and
- 3.1.2. By normal District processes, does not include an evaluation team.
- 3.2. **Subjective** Subjective evaluation is:
  - 3.2.1. Based on a set of pre-determined criteria; and
  - 3.2.2. By normal District processes, includes the use of an evaluation team to determine the scoring.

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**4. AWARD OF CONTRACT**

- 4.1. FBISD will indicate acceptance of a Vendor's Solicitation Response by issuance of a Purchase Order, Contract, or other form of Notice of Award to awarded Vendor(s) at completion of the evaluation of Solicitation Responses and upon approval by the Board of Trustees.
- 4.2. If the Contract is issued in the form of a Purchase Order, the Purchase Order together with any other documents which the FBISD Buyer has attached and/or referenced as part of the Purchase Order, constitutes an offer by the FBISD Buyer to purchase from the Vendor the goods and/or services indicated, subject to these General Provisions. The Purchase Order, together with these General Provisions, and their attachments and/or referenced documents, is the sole and complete Contract between the District and Vendor with respect to the goods and services ordered and supersedes all prior oral and written understandings. No additional terms or modifications to the Purchase Order proposed by the Vendor in any acknowledgement, sales order, or other form of communication shall be binding on the District. The FBISD Buyer's failure to object to provisions contained in any communication from the Vendor shall not be deemed a waiver of the provisions or an approval of the terms.
- 4.3. Acceptance of the Purchase Order is conditional on Vendor's consent to the terms and conditions in these General Provisions. FBISD expressly objects to and rejects any terms or conditions in addition to or different from those contained in these General Provisions, whether previously or hereafter proposed in any form from Vendor unless the FBISD Buyer has expressly agreed to them in writing. By submitting a Solicitation Response to the District to provide goods or services, Vendor acknowledges receipt and willingness to accept all terms and conditions contained in these General Provisions.
- 4.4. **Order of Precedence**
  - 4.4.1. If a formal Contract, Agreement or Purchase Order is issued, the terms and conditions of the Contract shall be governed in the following order of importance/precedence:
    - 4.4.1.1. The formal Contract, Agreement, or purchase order;
    - 4.4.1.2. These General Provisions;
    - 4.4.1.3. Any Addenda to the Solicitation submitted prior to the opening of the Solicitation;
    - 4.4.1.4. The original Solicitation;
    - 4.4.1.5. The accepted portions of the Vendor's Solicitation Response; and
    - 4.4.1.6. Any subsequent contractual documents agreed upon by both parties.
  - 4.4.2. Failure to accept this obligation may result in the cancellation of any award;
  - 4.4.3. Any damages suffered by the District as a result of the Vendor's failure to Contract shall be recovered from the Vendor.
- 4.5. **Partnership and/or Subcontracting** If the Vendor has joined with one or more business partners or is Subcontracting any work to respond to the Solicitation, FBISD reserves the right to:
  - 4.5.1. Reject the Vendor's offer based on that/those partnerships(s) and/or Subcontractors.
  - 4.5.2. Accept, at its option, subsequent offers with new partnership(s) and or Subcontractors, should the Subcontracting Vendors in the initial offer be unacceptable for any reason.
- 4.6. **Multiple Vendors** FBISD reserves the right to award Contracts to multiple Vendors if such Vendors offer items that are unique and have value to FBISD.
- 4.7. **Formation of Contract** A response to a Solicitation is an offer to contract with FBISD based upon the terms, conditions, scope of work, and specifications contained in the Solicitation and in these General Provisions. A Solicitation Response does not become a contract unless and until it is accepted and executed by FBISD.

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*PART V*

*CONTRACT TERMS, CONDITIONS, AND REQUIREMENTS*

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**1. GENERAL TERMS**

**1.1. *Titles.*** The awarded Vendor shall be hereby known in the section as "Contractor".

**1.2. *Term of Contract, Renewals and Extensions***

1.2.1. The Contract established by the Contract Award shall be in effect from date of award or the commencement date, whichever is later, and shall continue for the term stated in the Contract. Typically, the base term is one year.

1.2.2. Any Purchase Orders dated during the term of the Contract must be honored even if received after the Contract expiration date. Contractors may not specify a "final order" receipt date.

1.2.3. Pricing is established by the date the order is placed unless otherwise stated in the Contract.

1.2.4. Renewal Contracts. In addition to the initial base contract term, the District shall have the right to renew the contract for a period described in the official solicitation. Renewals may be offered for additional terms (for example, one-year base term + 4 one-year renewals = 5/years total) provided both FBISD and Vendor are in mutual agreement.

1.2.5. Short Term Contract Extension.

1.2.5.1. If the District determines that additional time is required to avoid a Contract lapse, it may, at its sole option, extend the Contract in 30-day increments, up to 180 days, under the current Contract pricing, terms and conditions.

1.2.5.2. Such extension will be done in writing prior to the end of the current Contract term.

**1.3. *Price Escalations*** The prices in Contractor's Solicitation Response shall be firm for the term of the Contract. The District shall only allow price escalations within a Contract if such provisions were identified within the original Solicitation. Contract renewals will allow for escalation only at the time of renewal and Contractor must submit price escalation, along with a justification for such increase, on manufacturer's letterhead, using the same format used in Contractor's Solicitation Response. District shall review escalation amount and determine if escalation is acceptable or not. All price changes shall be subject to the District's prior written approval.

**1.4. *Availability of Funds***

1.4.1. Any Agreement or Purchase Order resulting from a Solicitation is contingent upon the continued availability of appropriations and is subject to cancellation by the District, without penalty, either in whole or in part, if funds are not appropriated by Fort Bend ISD's Board of Trustees or otherwise not made available to the District.

1.4.2. The District's payment obligations are payable only and solely from funds appropriated and available for the purpose of the purchase.

1.4.3. The absence of appropriated or other lawfully available funds may render the Contract Award null and void to the extent funds are not appropriated or available and any Deliverables delivered but unpaid shall be returned to the Contractor.

1.4.4. The District shall provide the Contractor written notice of the failure of the District to make an adequate appropriation for any fiscal year to pay the amounts due under the Contract Award, or the reduction of any appropriation to an amount insufficient to permit the District to pay its obligations.

1.4.5. No penalty shall accrue to FBISD in the event this provision is exercised, and FBISD shall not be obligated or liable for any future payments due or for any damages as a result of termination under this section.

**1.5. *Confidentiality*** Subject to the Texas Public Information Act and any legal requirements, neither FBISD nor the Contractor shall disclose any confidential information without prior written approval. As applicable, Contractor shall maintain and process all information it receives from the District in compliance with all applicable data protection/privacy laws and regulations and FBISD policies. Contractor and FBISD understand that the Family Educational Rights and Privacy Act (FERPA), 20 U.S.C. § 1232g, governs the privacy and security of educational records and information and agree to abide by FERPA rules and regulations, as applicable. Contractor also acknowledges that FBISD is subject to the Texas Public



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Information Act, and Contractor waives any claim against and releases from liability FBISD, its officers, employees, agents, and attorneys with respect to disclosure of information provided under or in this Contract or otherwise created, assembled, maintained, or held by Contractor and determined by FBISD, the Attorney General of Texas, or a court of law to be subject to disclosure under the Texas Public Information Act.

- 1.6. Federal Funding** The following shall be applicable to Solicitations that are funded by federal funds:
- 1.6.1. This section is applicable only for products or services to be paid with federal funds.
  - 1.6.2. If federal funds will be used to pay for products of services, the Parties understand and agree the Agreement is subject to appropriation, approval, and disbursement of such funding by the United States federal government and its funding administrators, including, but not limited to, the Texas Education Agency. As applicable, the Parties agree to comply with any terms, conditions, and policies related to the use of federal funds, including, but not limited to, the Education Department General Administrative Regulations (“EDGAR”) and any other requirements related to applying for, receiving, managing, and reporting federal funds. Contractor shall complete the required “EDGAR Certifications.” Noncompliance or misrepresentation regarding this certification may be grounds for termination of an Agreement.
  - 1.6.3. If FBISD does not receive sufficient funding, upon written notice to Contractor, FBISD may terminate an Agreement without penalty or further obligation to Contractor at the end of the period for which funding is available.
  - 1.6.4. All contracts paid with federal grants shall be effective only during the period of availability of the funds identified in the Notice of Grant Award (“NOGA”). An Agreement is effective only after the NOGA is issued.
  - 1.6.5. Federal Law (A-102) Common Rule and (A-110) OMB Circular prohibits non-federal entities, including school districts, from contracting with or making sub-awards under covered transactions to parties that are suspended or debarred or whose principals are suspended or debarred. Covered transactions include procurement Contracts for goods or services equal to or in excess of \$100,000 and all non-procurement transactions (e.g., sub-awards to sub-recipients). Contractors receiving individual awards for \$100,000 or more and all sub-recipients must certify that the organization and its principals are not suspended or debarred. By signature of the Solicitation, the Contractor affirms that neither it nor its principals are suspended or debarred by a federal agency.
- 1.7. Contract Kick-off Meeting**
- 1.7.1. The District reserves the right to require the Contractor(s) to meet with District representatives prior to the start of the Contract.
  - 1.7.2. The meeting, if any, shall include, at a minimum, discussion of the performance requirements, service specifications, expectations of professionalism, and access issues, if necessary.
- 1.8. Periodic Performance Reviews**
- 1.8.1. The District reserves the right to require periodic performance reviews with the Contractor(s).
  - 1.8.2. These reviews shall evaluate at a minimum, the Contractor’s ability to:
    - 1.8.2.1. Provide goods or perform services within the required specifications and/or performance requirements;
    - 1.8.2.2. Meet the District’s schedule; and
    - 1.8.2.3. Perform in a professional manner.
- 1.9. Usage Reports**
- 1.9.1. The District will have the right to require the Contractor to provide usage reports of the goods or services purchased from the Contractor during the Contract Period. Usage reports will be computer generated format and made available in 5-7 business days after request.
  - 1.9.2. This right may, at the District’s option, be extended beyond the end of the Contract term for a maximum of two (2) years.
  - 1.9.3. The reports shall be in a mutually agreed upon format that is useful by the District and made available by the Contractor.
- 1.10. Rights to Work(s) Made for Hire**
- 1.10.1. All Work(s) Made for Hire, as that term is defined by the U.S. Copyright Law, shall be the sole property of the District. If commissioned by the District, paid or unpaid, to create a design, artwork, or custom-made product or service, the District shall be sole owner of any copyrights available for the end product.

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- 1.10.2. Contractor hereby assigns all its rights, title and interest in any and all Work(s) Made for Hire and all drafts thereof, including all worldwide copyright ownership rights in the Work(s) Made for Hire, to the District.
- 1.10.3. The Contractor shall turn over all relevant items relating to the Work Made for Hire, physical or electronic, to the District upon request. The District has the right to legible and complete copies of any and all such work papers upon the District's request.
- 1.11. Disclosure of Intellectual Property Produced**
  - 1.11.1. Contractor shall promptly disclose to the District all copyrights, trademarks, service marks, and/or patents ("Intellectual Property") which Contractor or Contractor's employees, Subcontractors, or Subcontractor's employees may produce, either solely or jointly with others, during the course of the services performed under the Contract.
  - 1.11.2. All such Intellectual Property shall automatically become the property of the District.
  - 1.11.3. In addition, Contractor shall promptly disclose to the District all Intellectual Property to which Contractor may acquire rights in connection with the performance of the services hereunder.
  - 1.11.4. Any disclosure under this paragraph shall contain sufficient technical detail to convey a clear understanding of the Intellectual Property, and shall identify any publication, sale, public use, or impending publication thereof.
  - 1.11.5. Promptly upon request, Contractor shall supply such additional information related to the Intellectual Property as the District may require.
  - 1.11.6. Modification and Derivative Works.
    - 1.11.6.1. The District shall have the right, in its sole discretion, to independently modify and/or create derivative works of any Intellectual Property incorporated in the services for the District's own purposes and use, through the services of its own employees or independent contractors.
    - 1.11.6.2. The District shall own all Intellectual Property Rights to such modifications and/or derivative works.
    - 1.11.6.3. Contractor shall comply with all laws and regulations relating to Intellectual Property. Contractor represents and warrants to the District that Contractor shall not infringe upon any Intellectual Property Rights of any third party. **CONTRACTOR SHALL INDEMNIFY AND HOLD FBISD HARMLESS FROM ALL CLAIMS, LIABILITIES, COSTS, SUITS OF LAW OR IN EQUITY, EXPENSES, ATTORNEYS' FEES, FINES, PENALTIES OR DAMAGES ARISING FROM CLAIMED INFRINGEMENT OF ANY INTELELCTUAL PROPERTY IN CONNECTION WITH THE CONTRACT.** Contractor's obligations under this clause shall survive acceptance and payment by FBISD.
    - 1.11.6.4. Contractor shall require its employees to execute any agreements, assignments, licenses or other instruments, and to provide information related to Intellectual Property, as may be necessary to effectuate the provisions of this Contract.
    - 1.11.6.5. Contractor shall require its Subcontractors and Suppliers to execute any agreements, assignments, licenses or other instruments, and to provide information related to Intellectual Property, as may be necessary to effectuate the provisions of this Contract.
- 1.12. Gratuities and Bribes**
  - 1.12.1. The District may, by written notice to the Contractor, cancel a Contract without liability to the District if it is determined by the District that gratuities or bribes were offered or given by the Contractor or any principle, agent or representative of the Contractor to any officer or employee of the District with a view toward securing the Contract or securing favorable treatment with respect to the awarding or amending or the making of any determinations with respect to the performing of such Contract.
  - 1.12.2. In the event the Contract is canceled by the District pursuant to this provision, the District shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by the Contractor in providing such gratuities.
- 1.13. Delays by the District** The District will have the right to delay a scheduled delivery or other service performance dates by written notice to the Contractor if the District deems such is in FBISD's best interest.



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**1.15. Delays by the Contractor**

- 1.15.1. If a Contractor foresees the delay of a scheduled delivery of a product or other service performance date, Contractor shall give timely written notice to the District.
- 1.15.2. The District may, at its sole discretion, extend the delivery or service date for valid reasons.
- 1.15.3. The Contractor must keep the District advised at all times of the status of the goods or services.
- 1.15.4. If the delay will create a burden on the District, the District reserves the right, without liability, in addition to its other rights and remedies, to terminate the Contract by notice effective when received, and to use any other means available to secure the goods or services outside the Contract, and receive reimbursement from Contractor for any loss incurred by the District as a result.

**1.16. Warranties and Remedies**

- 1.16.1. Status. The Contractor warrants that any services performed under the terms of the Contract by the Contractor or persons under its employment on FBISD property shall be done as an independent contractor and the persons doing such work shall not be considered employees, agents, joint venturers, or partners of the District. As an independent contractor, Contractor will be solely responsible for determining the means and methods for performing the services and shall furnish all tools, materials, transportation, and personal incidentals necessary in the performance of the services. Contractor shall be responsible for any and all applicable social security and personal income taxes which may become due as a result of any payments made by FBISD and Contractor shall indemnify and hold FBISD harmless in this regard. FBISD and Contractor have no power or authority to assume or create any obligation or responsibility on behalf of the other. Contractor agrees that FBISD has no responsibility for any conduct of any of Contractor's employees, agents, representatives, contractors, or Subcontractors. Contractor shall perform services in accordance with the highest standards of care, skill, diligence and professional competence applicable to contractors engaged in providing similar services.
- 1.16.2. Price
  - 1.16.2.1. The Contractor warrants the prices offered to the District are no higher than the Contractor's current prices on orders by others for like Deliverables under similar terms of purchase.
  - 1.16.2.2. The Contractor certifies that the prices in the Solicitation Response have been arrived at independently without consultation, communication, or agreement for the purpose of restricting competition, as to any matter relating to such fees with any other firm or with any competitor.
  - 1.16.2.3. In addition to any other remedy available, the District may deduct from any amounts due to the Contractor, and/or otherwise recover from Contractor, any amounts paid by the District for items or services in excess of the Contractor's current prices on orders by others for like Deliverables under similar terms of purchase.
- 1.16.3. Title
  - 1.16.3.1. The Contractor warrants that it has valid title to all Deliverables furnished under the Contract, and that the Deliverables are free and clear of all liens, claims, security interests and encumbrances.
  - 1.16.3.2. **THE CONTRACTOR SHALL INDEMNIFY AND HOLD THE DISTRICT HARMLESS FROM AND AGAINST ALL ADVERSE TITLE CLAIMS TO THE DELIVERABLES.**
- 1.16.4. Deliverables
  - 1.16.4.1. The Contractor warrants and represents that all Deliverables shall be free from defects in design, workmanship or manufacture, and conform in all material respects to the specifications, drawings, and descriptions in the Solicitation, to any samples furnished by the Contractor, to the terms, covenants and conditions of the Contract, and to all applicable State, Federal or local laws, rules, and regulations, and industry codes and standards. In addition, Contractor warrants that the Deliverables are suitable for and will perform in accordance with the purposes for which they are intended.
  - 1.16.4.2. Unless otherwise stated in the Solicitation, the Deliverables shall be new or recycled merchandise, and not used or reconditioned. Recycled Deliverables shall be clearly identified as such.
  - 1.16.4.3. Contractor shall assume all liabilities incurred within the scope or consequential damages

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and incidental expenses, as set forth in the Contractor or manufacturer's warranties, which result from either delivery or use by the District of the Deliverables with does not meet the specifications of the Contract or the Solicitation.

1.16.5. Warranty Period

1.16.5.1. Unless otherwise specified in the Contract, the warranty period shall be at least one (1) year from the District's acceptance of the Deliverable.

1.16.5.2. If the manufacturer's warranty is less than the required warranty period, the Contractor shall warrant the Deliverable to the full extent as provided by the manufacturer.

1.16.5.3. If during the warranty period, one or more of the above warranties are breached, the Contractor shall promptly, upon receipt of demand, resupply the goods or re-perform the services in accordance with the above standard at no additional cost to the District.

1.16.5.4. All costs incidental to such repair or replacement, including but not limited to, any packaging and shipping costs, shall be borne exclusively by the Contractor.

1.16.5.5. The District will endeavor to give the Contractor written notice of the breach of warranty within thirty (30) days of discovery of the breach of warranty, but failure to give timely notice shall not impair the District's rights under this section.

1.16.6. Failure to Repair or Replace If the Contractor is unable or unwilling to repair or replace defective or non-conforming Deliverables as required by the District, then in addition to any other available remedy, the District may reduce the quantity of Deliverables it may be required to purchase under the Contract from the Contractor, and purchase conforming Deliverables from other sources. In such event, the Contractor shall pay to the District, upon demand, the increased cost, if any, incurred by the District to procure such Deliverables from another source.

Damage Assessment

1.16.6.1. If a Contractor is in default on an order, the District reserves the right to purchase the goods or services in default and charge the increase in price, if any, and cost of handling to the Contractor (the "Damage Assessment").

1.16.6.2. Failure by Contractor to pay a Damage Assessment is cause for Contract termination, at District's sole discretion, and/or debarment of the Contractor from the District's Solicitation list for a minimum of one year.

1.16.7. Transfer of Manufacturer's Warranty

1.16.7.1. If the Contractor is not the manufacturer, and the Deliverables are covered by a separate manufacturer's warranty, the Contractor shall transfer and assign such manufacturer's warranty to the District.

1.16.7.2. If for any reason the manufacturer's warranty cannot be fully transferred to the District, the Contractor shall assist and cooperate with the District to the fullest extent to enforce such manufacturer's warranty for the benefit of the District.

1.16.8. Services The Contractor warrants and represents that all services to be provided the District under the Contract will be fully and timely performed in a good and workmanlike manner in accordance with generally accepted industry standards and practices, the terms, conditions, and covenants of the Contract, and all applicable Federal, State and local laws, rules or regulations.

1.16.9. Limitation of Warranty The Contractor shall not limit, exclude or disclaim the foregoing warranty(ies) or any warranty(ies) implied by law, and any attempt to do so shall be without force or effect.

1.16.10. Delivery of Goods or Performance of Services *If* the Contractor is unable or unwilling to deliver goods or perform services in accordance with the terms of the Contract, then in addition to any other available remedy, the District may reduce the amount of the Contract Award due to the Contractor, and purchase conforming goods or services from other sources. In such event, the Contractor shall pay to the District upon demand the increased cost, if any, incurred by the District to procure such goods or services from another source.

**1.17. Indemnification**

1.17.1. The District shall not be required to indemnify and/or hold harmless the Contractor and/or its agents and employees.

1.17.2. **TO THE FULLEST EXTENT PERMITTED BY LAW, THE CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE DISTRICT AND ITS AGENTS, EMPLOYEES, AND TRUSTEES FROM ANY AND ALL CLAIMS, DAMAGES, LOSSES, LIABILITIES, COSTS, SUITS IN LAW OR IN**

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**EQUITY, FINES, PENALTIES, AND EXPENSES, INCLUDING BUT NOT LIMITED TO ATTORNEY'S FEES, ARISING OUT OF OR RESULTING FROM THE PERFORMANCE OF THE WORK, AND/OR THE ACTS OR OMISSIONS OF CONTRACTOR OR ITS EMPLOYEES, AGENTS, SUBCONTRACTORS, AND/OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE, REGARDLESS OF WHETHER OR NOT IT IS CAUSED IN PART BY A PARTY INDEMNIFIED HEREUNDER, INCLUDING WITHOUT LIMITATION, THOSE ARISING FROM CLAIMED INFRINGEMENT OF ANY PATENT, TRADEMARKS, COPYRIGHT, OR OTHER CORRESPONDING RIGHT(S) RELATED TO ANY ITEM OR SERVICE CONTRACTOR IS REQUIRED TO PERFORM HEREUNDER.**

Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this paragraph.

- 1.17.3. In any and all claims against the District or any of its agents or employees by any employee of the Contractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor under workers' compensation acts, disability benefits acts or other employee benefit acts.
- 1.18. No Waiver of Immunity** Contractor acknowledges FBISD is a governmental entity subject to constitutional and statutory protections and immunities. No provision in any contract document shall be construed as a waiver or relinquishment of any governmental immunities or defenses on behalf of FBISD, its trustees, officers, employees, and agents as a result of an award or resulting agreement. Further, any obligation of the District to indemnify or hold harmless is expressly conditioned only to the extent permitted by law.
- 1.19. Invoices and Payment** The Contractor shall submit separate invoices in duplicate on each Contract Award after each delivery of goods or completion of service. If the District authorizes partial shipments or deliveries it will be shown on the Purchase Order and a separate invoice must be sent for each shipment or delivery made.
- 1.19.1. Payment to Contractor shall be made only after services are performed and not before. Advance payment to Contractor is strictly prohibited.
- 1.19.2. Contractor shall submit detailed invoices to FBISD describing the Services rendered, the times when such Services were performed, compensable expenses and the amount due. Invoices shall indicate the FBISD Purchase Order number and shall be itemized and transportation charges, if any, shall be listed separately. A copy of the bill of lading and the freight waybill, when applicable, shall be attached to the invoice. Invoices shall be mailed to FBISD, P.O. Box 1004, Sugar Land, TX 77487-1004, Attention: Accounts Payables Department.
- 1.19.3. Federal excise taxes, State taxes, or District sales taxes shall not be included in the invoiced amount. The District is not liable for these taxes. The District will furnish a tax exemption certificate upon request.
- 1.19.4. In accordance with Texas Government Code § 2251.021, payments are due to Contractor within forty-five (45) days after the later of the following: (1) the date the District receives the goods; (2) the date the performance of the service is completed; or (3) the date the District receives an invoice for the goods or services.
- 1.19.5. Payment terms, including the rate of interest that shall accrue on any overdue payments, are subject to Chapter 2251 of the Texas Government Code.
- 1.20. Right to Assurance**
- 1.20.1. Whenever one party to the Contract in good faith has reason to question the other party's intent to perform, demand may be made to the other party for written assurance of the intent to perform.
- 1.20.2. In the event that no assurance is given within the time specified after demand is made, the demanding party may treat this failure as an anticipatory repudiation of the Contract.
- 1.21. Advertising** The Contractor shall not advertise or publish, without the District's prior written consent, the fact that the District has entered into a Contract with Contractor. Contractor shall not use FBISD's name, logo or other likeness in any press release, marketing material or other announcement without FBISD's prior written approval.

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**1.23. Compliance:** Contractor agrees to observe and abide by all applicable local ordinances and state and federal laws, including but not limited to, the Americans with Disabilities Act; Section 504 of the 1973 Rehabilitation Act; Executive Orders 11246 and 11375 regarding Equal Employment Opportunity, as supplemented in Department of Labor Regulations; the Family Educational Rights & Privacy Act; and Title IX of the Education Amendments of 1972. Contractor further agrees to observe and abide by all FBISD policies and procedures, which can be accessed online at <http://pol.tasb.org/Home/Index/483>.

**2. CONTRACT AGREEMENTS**

**2.1. *Inclusions***

2.1.1. The Contract shall include these General Provisions, terms and conditions included in the contract, Contract Documents, Purchase Orders and Service Contracts, and supersede any other representations, agreements, arrangements, negotiations, or understanding, oral, or written between FBISD and the Contractor regarding the Contract.

2.1.2. The Solicitation Response, when appropriately accepted by FBISD, shall constitute an integral part of any Contract, equally binding between the Contractor and FBISD. Provided, however, that no different, inconsistent, contradictory, or additional terms included in Contractor's Solicitation Response will become part of this Contract with the exception of Change Orders.

**2.2. *Interpretation***

2.2.1. The Contract Documents are intended by the Contractor and the District as a final, complete and exclusive statement of the terms of their agreement.

2.2.2. No prior arrangements, past performance, oral agreements or other factors between the Contractor and the District shall be relevant to supplement or explain any term used in the Contract Documents.

2.2.3. Although the Contract Documents may have been substantially drafted by one party, it is the intent of the Contractor and the District that all provisions be construed in a manner to be fair to both parties, reading no provisions more strictly against one party or the other.

**2.3. *Jurisdiction and Venue***

2.3.1. The Contract is made under and shall be governed by the laws of the State of Texas, including, when applicable, the Uniform Commercial Code as adopted in Texas, V.T.C.A., Business and Commerce Code, Chapter 1, excluding any rule or principle that would refer to and apply the substantive law of another state or jurisdiction.

2.3.2. All issues arising from the Contract shall be resolved in the courts of Fort Bend County, Texas and the parties agree to submit to the exclusive jurisdiction of such courts.

2.3.3. The foregoing, however, shall not be construed or interpreted to limit or restrict the right or ability of the District to seek and secure injunctive relief from any competent authority as contemplated herein.

**2.4. *Modifications***

2.4.1. The Contract Documents and their terms, covenants and conditions can be modified or amended only in writing, when executed by both parties.

2.4.2. No pre-printed or similar terms on any Contractor invoice, forms, order or other document shall have any force or effect to change the terms, covenants, and conditions of the Contract.

**2.5. *Termination for Default***

2.5.1. In the event of a default by the Contractor, the District shall have the right to terminate the Contract in whole or in part for cause, by written Notice of Termination effective in ten (10) days, unless otherwise specified, after the date of such notice, unless the Contractor, within such ten (10) day period, cures such default, or provides evidence sufficient to prove to the FBISD Buyer's reasonable satisfaction that such default does not, in fact, exist.

2.5.2. In addition to any other remedy available under law or in equity, the District will be entitled to recover all actual damages, costs, losses and expenses, incurred by the District as a result of the Contractor's default, including, without limitation, cost of recovery, reasonable attorneys' fees, court costs, and prejudgment and post judgment interest at the maximum lawful rate.

2.5.3. Additionally, in the event of a default by the Contractor, the District may debar the Contractor from the District's Vendor list.

2.5.4. All rights and remedies under the Contract are cumulative and are not exclusive of any other right or remedy provided by law.

**2.6. *No Cause Termination***

2.6.1. The District also reserves the right to terminate the Contract, with thirty (30) days' advance written notice to Vendor, if the District believes that, in its sole discretion, it is in the best interest of District

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to do so. It is understood that the District retains the option to terminate this Agreement for any reason at the end of each contract year without pecuniary risk or penalty. The termination will become effective, and this Agreement shall terminate following the written notification of intent.

2.6.2. The District will pay the Contractor, to the extent of funds appropriated or otherwise legally available for such purposes, for all goods delivered and services performed and obligations reasonably incurred by Contractor prior to the date of termination.

**2.7. Assignment – Delegation**

2.7.1. The Contract shall be binding upon and to the mutual benefit of the District and the Contractor and their respective successors and assigns, provided however, that no right or interest in the Contract shall be assigned, transferred, subcontracted, mortgaged, pledged, or otherwise disposed of or encumbered in any way by Contractor, and no obligation shall be delegated by the Contractor without the prior written consent of the District.

2.7.2. Any attempted assignment or delegation by the Contractor shall be void unless made in conformity with this paragraph

2.7.3. The Contract is not intended to confer rights or benefits on any person, firm or entity not a party hereto; it being the intention of the parties that there are no third-party beneficiaries to the Contract.

2.7.4. If the Contractor has sold its business and the Contract is conveyed to another business entity (buyer) in the purchase, the Contractor shall, within three (3) business days of such change, provide the District with documentation that can be legally recognized in a State of Texas court of law, or a public announcement stating the terms of the purchase.

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**2.9. Waiver**

- 2.9.1. No claim or right can be discharged or waived in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved party.
- 2.9.2. No waiver by either the Contractor or the District to require performance by the other party of the terms hereof shall operate as, or be construed to be, a permanent waiver of any rights or obligations under the Contract, or an express or implied waiver of any other term or breach thereof.

**2.10. Captions**

- 2.10.1. The captions herein are for convenience and identification purposes only, and are not an integral part hereof, and are not to be considered in the interpretation of any part hereof.

**2.11. Force Majeure**

- 2.11.1. Neither FBISD nor Contractor shall be deemed to have breached any provision of this Contract as a result of any delay, failure in performance, or interruption of service resulting directly or indirectly from acts of God, network failures, acts of civil or military authorities, civil disturbances, wars, energy crisis, fires, transportation contingencies, interruptions in third-party telecommunications or Internet equipment or service, other catastrophes, or any other occurrences which are reasonably beyond such party's control.
- 2.11.2. The parties to this Contract are required to use due caution and preventive measures to protect against the effects of force majeure, and the burden of proving that a force majeure event has occurred shall rest on the party seeking relief under this provision. The party seeking relief due to force majeure is required to promptly notify the other party in writing, citing the details of the force majeure event and relief sought, and shall resume performance immediately after the obstacles to performance caused by a force majeure event have been removed, provided the Contract has not been terminated. Delay or failure of performance, by either party to this Contract, caused solely by a force majeure event, shall be excused for the period of delay caused solely by the force majeure event. Neither party shall have any claim for damages against the other resulting from delays caused solely by force majeure. Notwithstanding any other provision of this Contract, in the event the Contractor's performance of its obligations under this Contract is delayed or stopped by a force majeure event, FBISD shall have the option to terminate the Contract. This section shall not be interpreted as to limit or otherwise modify any of FBISD's contractual, legal, or equitable rights.

**2.12. FBISD Property**

- 2.12.1. In the event of loss, damage, or destruction of any property owned by or loaned by FBISD that is caused by Contractor or Contractor's representative, agent, employee, or contractor, Contractor shall indemnify FBISD and pay to FBISD the full value of or the full cost of repair or replacement of such property, whichever is greater, within thirty (30) days of Contractor's receipt of written notice of FBISD's determination of the amount due. If Contractor fails to make timely payment, FBISD may obtain such money from Contractor by any means permitted by law, including, without limitation, offset or counterclaim against any money otherwise due to Contractor by FBISD.

**2.13. Notice**

- 2.13.1. Any notice provided under the terms of this Contract by either party to the other shall be in writing and shall be given by hand-delivery or by certified or registered mail, return receipt requested. Notice shall be deemed effective upon receipt. Each party may change the address at which notice may be sent to that party by giving notice of such change to the other party by certified or registered mail, return receipt requested.

**2.14. Penalties**

- 2.14.1. If Contractor is unable to provide the goods or services at the prices quoted in Contractor's Solicitation Response or if Contractor fails to fulfill or abide by the terms and conditions of the Contract, FBISD may take the following action(s), in FBISD's sole discretion, and Contractor agrees to comply with FBISD's action(s):
  - 2.14.1.1. insist that Contractor honor the quoted price(s) specified in Contractor's Solicitation Response;
  - 2.14.1.2. have Contractor pay FBISD difference between Contractor's price and the price of the next acceptable Solicitation Response (as determined by FBISD);
  - 2.14.1.3. have Contractor pay the difference between Contractor's price and the actual purchase



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price of the good or service on the open market; and/or

2.14.1.4. recommend to FBISD's Board of Trustees that Contractor no longer be given the opportunity to submit a proposal to FBISD and/or that the Contract be terminated.

**2.15. Performance**

2.15.1. Contractor agrees to use commercially reasonable best efforts to provide the Deliverable(s).

**2.16. Performance and Payment Bonds**

2.16.1. Contractor agrees to provide performance bonds and/or payment bonds as required by Texas law on specified Contracts and/or projects, as applicable. FBISD may include the performance and payment bonds requirement in the specifications section of any Solicitation if performance bonds and/or payment bonds are required.

**2.17. Prevailing Wage Rates**

2.17.1. Contractor and all subcontractors of Contractor shall comply with all laws regarding wage rates including, but not limited to, Texas Government Code Chapter 2258 and any related federal requirements applicable to the Contract.

**2.18. Title and Risk of Loss**

2.18.1. Whenever FBISD is purchasing an item under the Contract, title and risk of loss shall pass upon the later of FBISD's acceptance of the item or payment of the applicable invoice.

**2.19. Severability** In the event that any one or more of the provisions contained in the Contract shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provisions, and the Contract shall be construed as if such invalid, illegal, or unenforceable provision had never been contained in it.

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- 2.21. Dispute Resolution** Any claim, dispute, or matter in controversy arising out of or related to the award or agreement (“Dispute”) shall be discussed by the parties in good faith, in an attempt to resolve the Dispute. In the event such Dispute cannot be resolved by good faith discussion between the parties, any such Dispute shall be subject to FBISD’s complaint policy (GF Local or other policy designated by FBISD) and the timelines established in the policy. If a party is dissatisfied with the outcome of FBISD’s complaint process, then the Dispute shall be subject to mediation as a condition precedent to litigation.
- 2.22. Contractor Representations** If Contractor is a business entity, it represents that: (i) it is duly organized, validly existing and in good standing under the laws of the state of its organization; (ii) it is authorized and in good standing to conduct business in the State of Texas; (iii) it has all necessary power and has received all necessary approvals to execute and perform its obligations in this Agreement; and (iv) the individual executing this Agreement on behalf of Contractor is authorized to do so.
- 2.23. Criminal History Certification** Contractor shall ensure that its employees who (i) have or will have continuing duties related to the contracted services, and (ii) have or will have direct contact with students (substantial opportunity for verbal or physical interaction with students that is not supervised by a certified educator or other professional District employee) have submitted all information necessary for FBISD’s LEE Fast Pass process and will comply with any FBISD request for employee information in connection with completing such employee criminal history record search. If Contractor subsequently receives information an employee has a criminal history prohibited under this section, Contractor will immediately remove the employee from contract duties and notify the District in writing within 3 days. Contractor will comply with District objections to the assignment of an employee on the basis of the employee’s criminal history. To the extent no individual or employee has or will have direct contact with students, Contractor will ensure the individuals or employees will not have direct contact with students throughout the term of this agreement. Noncompliance or misrepresentation regarding this certification is grounds for immediate termination of this Agreement.
- 2.24. Conflict of Interest Disclosure** Prior to and as a condition of doing business with the District, Contractor shall disclose any business relationship, past or present, with a sitting Board member or District employee. Any such relationship shall be disclosed on Form CIQ provided by the Texas Ethics Commission and currently available at <https://www.ethics.state.tx.us/forms/CIQ.pdf>. Failure to disclose the existence of any such relationship is grounds for immediate termination of this Agreement.
- 2.25. Disclosure of Interested Parties (Form 1295)** For any agreement that requires action by the District’s Board of Trustees, unless excepted by Texas Government Code 2252.908(c), Contractor shall electronically submit a disclosure of interested parties on a form prescribed by the Texas Ethics Commission (“Form 1295”) and submit a signed copy of the form with this Agreement. The form is currently available via the Texas Ethics Commission website at <https://www.ethics.state.tx.us/tec/1295-Info.htm>.
- 2.26. Felony Conviction Notice** Texas Education Code 44.034(a) requires “a person or business entity that enters into a contract with a school district [to] give advance notice to the district if the person or an owner operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony.” This notice is not required of a publicly-held corporation. If notice is required of Contractor, then Contractor shall submit a statement providing a person or an owner operator of the business entity has been convicted of a felony and a general description of the conviction and conduct resulting in the conviction of a felony.
- 2.27. Debarment or Suspension** Federal Law (2 CFR Part 180 and Part 200) prohibits non-federal entities from contracting with or making subawards under covered transactions to parties that are suspended or debarred or whose principals are suspended or debarred. Covered transactions include procurement contracts for goods or services equal to or in excess of \$25,000 and all nonprocurement transactions (e.g., subawards to subrecipients). Contractor certifies neither Contractor nor its principals are suspended or debarred by a federal agency.
- 2.28. Entities that Boycott Energy Companies:** In accordance with Senate Bill 13, Acts 2021, 87th Leg., R.S., pursuant to Section 2274.002 of the Texas Government Code (relating to prohibition on contracts with companies boycotting certain energy companies), Contractor represents and warrants that: it does not, and will not for the duration of the Contract, boycott energy companies. If circumstances relevant to this provision change during the course of the Contract, Contractor shall promptly notify the District.
- 2.29. Entities that Discriminate Against Firearm and Ammunition Industries:** In accordance with Senate Bill 19, Acts 2021, 87th Leg., R.S., pursuant to Section 2274.002 of the Texas Government Code (relating to



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prohibition on contracts with companies that discriminate against firearm and ammunition industries), Contractor verifies that: it does not, and will not for the duration of the Contract, have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association. If circumstances relevant to this provision change during the course of the Contract, Contractor shall promptly notify the District.

**3. GOODS-RELATED CONTRACTS**

**3.1. *General***

- 3.1.1. Goods are to be delivered to the required destination(s) within the number of District Business Days as identified within the Solicitation after receipt of order (ARO).
- 3.1.2. All products shall be delivered F.O.B. destination, full freight allowed unless otherwise indicated within the Contract.
- 3.1.3. Ordering and direct delivery will involve various locations with FBISD unless otherwise specified within the Purchase Order.

**3.2. *Hours for Delivery***

- 3.2.1. District Distribution Center (warehouse) delivery hours are 8:00 a.m. to 3:30 p.m.
- 3.2.2. School campus delivery hours are 9:00 a.m. to 3:00 p.m.

**3.3. *Facilities.*** With the exception of the District Distribution Center, no other facilities have areas available dock-level deliveries.

**3.4. *Inside Delivery*** The Contractor shall make inside deliveries within a facility to a location determined by the District if required within the Solicitation.

**3.5. *Expedited Deliveries***

- 3.5.1. In case of an urgent need for an expedited delivery by the District, the Contractor is requested to supply the needed material immediately, if possible.
- 3.5.2. If the Contractor cannot respond, then the emergency requirement may be purchased on the open market. Such purchases shall not be considered a breach of Contract by FBISD or the Contractor.

**3.6. *Packaging of Goods***

- 3.6.1. The Contractor shall package all goods in accordance with good commercial practice unless otherwise instructed.
- 3.6.2. Each shipping container shall be clearly and permanently marked as follows:
  - 3.6.2.1. The Contractor's name and address.
  - 3.6.2.2. The District's name, address and purchase order or purchase release number if applicable;
  - 3.6.2.3. Box number and total number of boxes, e.g. box 1 of 4 boxes; and
  - 3.6.2.4. The number of the container bearing the packing slip. The Contractor shall bear all cost of packaging.
- 3.6.3. All packing slips must include the FBISD Purchase Order number.
- 3.6.4. Goods shall be suitably packed to secure lowest transportation costs and to conform to requirements of common carriers and any applicable specifications. The District's count or weight shall be final and conclusive on shipments not accompanied by packing lists.

**3.7. *Material Safety Data Sheets*** A Contractor must provide, at no cost to the District, at least one copy of any applicable Manufacturer's Material Safety Data Sheet(s) (MSDS) with each shipment, and upon request, during the term of the Contract. If OSHA or Federal or State laws provide for additional requirements, those requirements shall be met by Contractor, in addition to the MSDS requirement.

**3.8. *Inspection and Testing***

- 3.8.1. The District expressly reserves all rights under law, including but not limited to the Texas Business and Commerce Code, to inspect the Deliverables at delivery, and up to thirty (30) days after District's first use of the Deliverables, and to reject defective or non-conforming Deliverables.
- 3.8.2. All goods are subject to inspection and testing by FBISD for compliance with the Contract and/or Solicitation specifications by FBISD.
- 3.8.3. When products tested fail to meet or exceed all applicable specifications, the cost of the sample used and the cost of any testing shall be borne by the Contractor.
- 3.8.4. Goods, which have been delivered and rejected in whole or in part, may be, at FBISD's option, returned to the Contractor at Contractor's risk and expense or disposed of in accordance with FBISD's policies.
- 3.8.5. The Contractor may request that rejected goods be held by FBISD at Contractor's risk for a

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reasonable period of time for later disposition at the Contractor's expense.

3.8.6. Latent defects may result in revocation of acceptance of any product.

**3.9. Substitutions of Goods**

3.9.1. All substitutions of goods require prior written approval of the District.

3.9.2. The District reserves the right to require the Contractor to offer possible substitutes if any material or equipment becomes unobtainable during the term of the Contract.

3.9.3. Outstanding orders are not automatically amended by an approved substitution.

3.9.4. During the Contract term, Contractor may request a substitution of an item if the item is no longer manufactured or has been discontinued or superseded by a replacement model and is no longer available to the Contractor.

3.9.5. Substitution Approval Process. Under the forgoing or similar conditions, the Contractor may, in FBISD's sole discretion, be granted an allowance of an item substitution under the following conditions:

3.9.5.1. The Contractor provides the District Purchasing Office with written verification from the manufacturer that the product is no longer manufactured or has been discontinued or superseded by a replacement model and is no longer available to the Contractor.

3.9.5.2. All substitution requests must be submitted within ten (10) District Business Days after the material facts are known to Contractor.

3.9.5.3. If manufacturer has a substitution model, Contractor must provide product specifications along with a written letter requesting the item be substituted.

3.9.5.4. The substitution must meet or exceed all specification requirements associated with the original Solicitation.

3.9.5.5. If substitutions are made to an item that has accessories, the Contractor must also provide substitutions for accessories as applicable.

3.9.5.6. The Contractor will be expected to supply the substitute item at the same or better price than originally bid, unless the Solicitation provided a price increase provision and the substitute can meet the provision requirements.

3.9.5.7. Substitution will be in effect for the term of the Contract or until another substitution is required.

3.9.5.8. All substitutions must be approved in writing by the Purchasing Office prior to their effect.

3.9.5.9. The District reserves the right to approve and disapprove substitutions or to cancel the Contract or Purchase Order as it relates to the items in its entirety and procure the items by a separate procurement process.

**3.10. Electrical Items** All electrical items furnished shall meet all applicable OSHA standards and regulations and bear the appropriate listing from UL, FMRC or NEMA.

**4. SERVICE-RELATED CONTRACTS**

**4.1. Contractor's Obligations.** The Contractor shall fully and timely provide all Deliverables described in the Contract, Solicitation, and in the Vendor's Solicitation Response in strict accordance with the terms, covenants, and conditions of the Contract and all applicable Federal, State, and local laws, rules, and regulations.

**4.2. Competence of Contractor**

4.2.1. The Contractor warrants it shall have available the necessary personnel, organization, equipment, and facilities to perform all the services and/or provide all the goods required under a Purchase Order or this Contract.

4.2.2. Only qualified personnel adequately trained in the required services shall be employed by the Contractor.

4.2.3. The Contractor shall obtain all licenses/permits required for the performance of the services.

4.2.4. The Contractor shall employ only orderly and competent workers, skilled in the performance of the services which they will perform under the Contract.

4.2.5. The Contractor, its employees, Subcontractors, and Subcontractor's employees may not use or possess any firearms, alcoholic or other intoxicating beverages, tobacco, illegal drugs or controlled substances while on the job or on the District's property, nor may such workers be intoxicated, or under the influence of alcohol or drugs on the job.

4.2.6. The District reserves the right to prevent, forbid, and/or temporarily or permanently bar any of Contractor's employees, Subcontractors, or Subcontractor's employees from any District facility for whatever reason it determines necessary to maintain the safety, decorum, scheduling and day-to-

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day operations of the District.

**4.3. Licensing and Certification**

- 4.3.1. If the Contract requires licensing and/or certification to perform services as required, the Contractor shall provide only qualified licensed / certified individuals to perform such tasks.
- 4.3.2. The Contractor must maintain any required licenses / certification for the duration of the Contract.
- 4.3.3. The District reserves the right to require the Contractor to show proof of licensing / certification at any time during the Contract Term.

**4.4. Place and Condition of Work**

- 4.4.1. Services shall be provided/scheduled as specified or directed by the District.
- 4.4.2. The District shall provide the Contractor access to the sites where the Contractor is to provide the goods or perform the services as required.
- 4.4.3. The Contractor acknowledges that it has satisfied itself as to the nature of the District's service requirements and specifications, the location and essential characteristics of the work site(s) the quality and quantity of materials, equipment, labor and facilities necessary to provide the goods or perform the services, and any other condition or state of fact which could in any way affect performance of the Contractor's obligations under the Contract.
- 4.4.4. The Contractor releases and holds the District harmless from and against any liability or claim for damages of any kind or nature if the actual site or service conditions differ from expected conditions.

**4.5. Compliance with Laws and Safety Regulations**

- 4.5.1. The Contractor, its Subcontractors, and their respective employees, shall comply fully with all applicable federal, state, and local safety and health laws, ordinances, rules and regulations in the performance of the services, including but not limited to those imposed by the District and by the Occupational Safety and Health Administration (OSHA), as well as applicable workers' compensation laws, minimum and maximum salary and wage statutes and regulations, prompt payment and licensing laws and regulations.
- 4.5.2. In case of conflict, the most stringent safety requirements shall govern.
- 4.5.3. The Contractor shall indemnify and hold the District harmless from and against all claims, demands, suits, actions, judgments, fines, penalties and liability of every kind arising from the breach of the Contractor's obligations under this paragraph.

**4.6. Security and Background Investigations**

- 4.6.1. Prior to commencing any work under the Contract, if Contractor contracts with FBISD to provide services, Contractor must certify for each covered employee of Contractor who will have direct contact with students, Contractor has obtained, as required by Texas Education Code Section 22.0834: (a) state criminal history record information from a law enforcement or criminal justice agency or a private entity that is a consumer reporting agency governed by the Fair Credit Reporting Act (15 U.S.C. Section 1681 et seq.) for each covered employee of Contractor employed before January 1, 2008; and (b) national criminal history record information for each employee of Contractor employed on or after January 1, 2008. Contractor must also obtain similar certifications of compliance with Texas Education Code Chapter 22's requirements from any subcontractors on the form provided herein. Covered employees with disqualifying criminal history are prohibited from serving at FBISD; Contractor and any subcontracting entity may not permit a covered employee to provide services at a school if the employee has been convicted of a felony or misdemeanor offense that would prevent a person from being employed under Tex. Educ. Code § 22.085(a) (i.e., Title 5 felony or an offense requiring registration as a sex offender and victim was under 18 years of age or was enrolled in a public school at the time the offense occurred).
- 4.6.2. The Contractor shall be responsible for ensuring the District is protected from potential threats that may be created by their employees.
- 4.6.3. If directed by the laws of the State of Texas, the Contractor shall adhere to any requirements that may be legislated during the term of any Contract, or any enacted District policy.
- 4.6.4. The District will have the right to require Contractor's principles, Contractor's employees assigned to the Contract Award, Subcontractor's principles, Subcontractor's employees assigned to the Contract, and any other individuals deemed to be providing goods or services for the District to be investigated (including fingerprinting) for criminal records and/or history.
- 4.6.5. The District reserves the right to prevent, forbid, and/or temporarily or permanently bar Contractor, Contractor's employees, Subcontractors, or Subcontractor's employees from any District facility for

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whatever security reason it determines necessary to maintain the safety of District employees and operations.

- 4.7. Subcontracts** Where a Subcontract may be used, the Contractor shall be fully responsible to the District for all acts and omissions of the Subcontracts just as the Contractor is responsible for the Contractor's own acts and omissions. Nothing in the Contract shall create for the benefit of any such Subcontract any Contractual relationship between the District and any such Subcontract, nor shall it create any obligation on the part of the District to pay or to see to the payment of any moneys due any such Subcontract except as may otherwise be required by law.
- 4.8. District Policy for Work Attire.** The Contractor, its employees, and Subcontractor employees shall not wear any T-shirts or clothing that has offensive language, pictures, or signs. The District prefers Contractors, its employees and subcontractors to wear uniforms with identification badges when on District premises.
- 4.9. Insurance for Services Performed**
- 4.9.1. ACORD Certificate of Insurance. Prior to providing services as a result of a Contract Award, the Contractor shall provide the District with a completed ACORD Certificate of Insurance providing the below listed coverage or such coverage as may be required in the Solicitation.

Type	Limit
<b>Automobile Liability (Auto) -</b> Covering 'Any Auto'	\$1,000,000 Combined Single Limit (\$5,000,000 if "For-Hire" motor carrier service )
<b>Comprehensive General Liability (CGL)</b> Including Products, Completed Operations, Independent Contractors, Broad Form Property Damage, Pollution and Blanket Contractual Liability coverages. XCU exclusions to be removed when underground work is performed.	\$1,000,000 Occurrence \$2,000,000 Aggregate \$1,000,000 Personal Injury \$ 500,000 Fire Damage \$ 5,000 Medical Payments
<b>Professional Errors &amp; Omissions Liability (E &amp; O)</b> may be required from all contractors and licensed or certified as professionals; e.g., engineers, architects, insurance agents, physicians, attorneys, banks, financial consultants, etc.	One-time project amount. \$1,000,000 Occurrence and Aggregate minimum \$5,000,000 Maximum Limit Retroactive Date preceding date of contract must be shown Extended Reporting Period three (3) years past completion
<b>Workers' Compensation (WC)</b> Limits to comply with the requirements of the Texas Workers' Compensation Act Employers Liability	Statutory Limits  \$1,000,000
<b>Umbrella or Excess Liability</b>  Excess of primary General Liability, Automobile Liability and WC Coverage B May be required for prime construction contractors  May be required for non-construction contractors and licensed or certified as professionals; e.g., engineers, architects, insurance agents, physicians, attorneys, banks, financial consultants, etc.	100% of Contract Amount for all contracts exceeding \$100,000, up to \$25,000,000 max  \$5,000,000
<b>Sex Molestation/Abuse</b> Required when service performance permits direct, unsupervised access to students.	\$100,000 per claim/\$300,000 aggregate

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**Cyber/Data Liability**

Required if service involves use of or access to District-owned data. Coverage for Notification, Crisis Management, Regulatory Response and Privacy Liability.

Limit determined on per project basis.

**4.9.2. Insurance Conditions** All certificates must include:

- 1) The location or description and the bid number, CSP number or Purchase Order number
- 2) A 30 day notice of cancellation of any non-renewal, cancellation or material change to any of the policies
- 3) Additional Insured on the Property, General Liability, Automobile Liability and Umbrella (Excess) Liability policies naming the District.
- 4) A "Waiver of Subrogation" clause in favor of the District will be attached to the Workers Compensation, General Liability, Automobile Liability, Umbrella Liability and the Property insurance policies.
- 5) In addition to certificates of insurance, copies of policy endorsements must be provided (a) listing the District as Additional Insured, and (b) showing waivers of subrogation in favor of the District: CG2010, CG2037, CG2404, CA0070, CA0032, WC0003 or their equivalents.
- 6) Contractor shall not commence work until all required insurance coverages have been obtained and such insurance has been reviewed and accepted by the District. Certificates of Insurance on the current ACORD form shall be issued to the District showing all required insurance coverages.
- 7) All insurance coverages shall be issued on an Occurrence basis (except Professional Liability) by companies acceptable to District and licensed to do business in the State of Texas by the Texas Department of Insurance. Such companies shall have a Best's Key rating of at least "A- X".
- 8) The District reserves the right to review the insurance requirements during the effective period of any contract to make reasonable adjustments to insurance coverages and limits when deemed reasonably prudent by District based upon changes in statutory laws, court decisions or potential increase in exposure to loss.
- 9) Limits for primary policies may differ from those shown when Umbrella or Excess Liability insurance is provided.
- 10) Contractor shall be responsible for payment of all deductibles.
- 11) At any time during the Contract Term or any extensions thereof, prior to any lapse in the Certificate of Insurance, the Contractor shall provide to the District an updated certificate.

**4.10. Right to Audit** The District will have the right to audit the Contractor's books and records pertaining to all goods and services, and Contractor's compliance with the terms of the Contract, during the hours of the normal workday during the term of the Contract and for a period of five (5) years following expiration of the Contract.

## Clarification for **Package B** of Fort Bend ISD CSP

### Package A – Base Bid and All Documents EXCEPT Alternates and SBE Documents

Package A should include the contractor's base bid for the project on the Base Bid Form

### Package B – Alternates and Base Bid Adjustment (correction)

Package B should include the following on the Alternate Form:

- The bidder's **alternate bids** as requested by the District. If a bidder does not submit alternate pricing, they will be disqualified as a non-responsive bidder.
- The bidder's **base bid adjustment** to their original base bid submitted in Package A.
- **Deviations** should not be included in the base bid or base bid adjustment.

Bidder should enter the amount the District may ADD to or DEDUCT from their base bid submitted in Package A. For example, if the bidder submitted a base bid in Package A as \$10,000,000 but realized they should have submitted the base bid as \$10,500,000, then the bidder would insert an ADD in the Base Bid Adjustment line as \$500,000.

The **Purchasing Department** will calculate Base Bid (Package A) plus/minus Base Bid Adjustment (Package B) to obtain the FINAL Base Bid for the CSP.

- No deviations are allowed in the base bid or base bid adjustment. Any deviation from the Base Bid shall be submitted as Alternate No. 2 on the Deviations Form. Evaluation of the proposed substitutes/deviations does not constitute Owner's acceptance of the substitutes/deviations but can be considered during negotiations

#### **Form Instructions:**

**Add:** Provides the amount Purchasing should add to the original base bid reflected in Package A

**Deduct:** Provides the amount Purchasing should deduct from the original base bid reflected in Package A

**No change:** Means that there is no change to your base bid price reflected in Package A

**Not Applicable (NA):** Means that there is no change to your base bid price reflected in Package A

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## **Statute / District Required Forms:**

- **No Response Form *(Optional)***
- **Contractor Informational Form *(Required)***
- **Contractor Questionnaire *(Required)***
- **Bonding Capacity Certification Letter *(Required)***
- **Proposal Submission Form *(Required)***
- **Non-Collusion Certification *(Required)***
- **Certificate of Residency *(Required)***
- **Affidavit of Non-Discriminatory Employment *(Required)***
- **Contractor Certification *(Required)***
- **Felony Conviction Notification *(Required)***
- **Vendor Debarment Statement *(Required)***
- **Conflict of Interest Questionnaire *(Required)***
- **Certification regarding Lobbying *(Required)***
- **Confidential Copyrighted Information *(Required)***
- **Owner(s) Name of Business *(Required)***
- **Delinquent Taxpayers *(Required)***
- **Fort Bend ISD Contractor and Subcontractor Participation Form *(submit with SBE Requirements)***
- **Certificate of Interested Parties *(Required)***
  - **INSTRUCTIONS for Form 1295 (Certificate of Interested Parties)**
- **Forms Certification *(Required)***
- **Per Govt. Code 2270.002, written verification that the company does not boycott Israel and will not during the term of the contract *(Required)***
- **Addendum Acknowledgment Form *(Required)***



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**No Response Form (Optional)**

**RETURN ONLY IF YOU CHOOSE NOT TO SUBMIT A RESPONSE TO THIS SOLICITATION**

CSP \_\_\_\_\_

TITLE of CSP \_\_\_\_\_

Please Print

Whereas on the \_\_\_\_\_ day of \_\_\_\_\_, 2024 (print name of company)

\_\_\_\_\_

has reviewed FBISD’s solicitation and elects not to submit a bid:

**State Reason for no bid:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Street Address

\_\_\_\_\_  
City, State, Zip Code

\_\_\_\_\_  
Telephone/Fax Number

\_\_\_\_\_  
Name of Authorized Individual

\_\_\_\_\_  
Signature of Authorized Individual

**RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE**



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**Contractor Informational Form (Required)**

**CONTRACTOR IS:**

An Individual

By \_\_\_\_\_  
Individual's Name

A Partnership

\_\_\_\_\_

Firm Name

By \_\_\_\_\_  
General Partner Authorized to Sign

A Corporation

By \_\_\_\_\_  
Corporation Name

\_\_\_\_\_

State of Incorporation

By \_\_\_\_\_  
Name of Person Authorized to Sign

\_\_\_\_\_

Title

(Corporate Seal)

Attest \_\_\_\_\_  
Secretary

---

## Contractor Questionnaire *(Required)*

**Bidder:** \_\_\_\_\_

1. Are you using subcontractors? Yes \_\_\_\_\_ No \_\_\_\_\_
2. Have you ever performed work for Fort Bend ISD or other ISDs as a subcontractor? Yes \_\_\_\_\_ No \_\_\_\_\_.  
If the answer is yes, please provide name of Contractor and Project(s) you were subcontracted to.

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3. Can you provide proof of liability and worker's compensation coverage? Yes \_\_\_\_\_ No \_\_\_\_\_
4. Did you include the most recent up to date references in this packet? Yes \_\_\_\_\_ No \_\_\_\_\_
5. Please include similar projects that you have completed for Texas ISDs in the past 12 months.

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RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

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**PROPOSAL SUBMISSION FORM**

**CSP** \_\_\_\_\_

**Title of CSP** \_\_\_\_\_

**Please Print**

**Whereas on the** \_\_\_\_\_ **day of** \_\_\_\_\_, **2024**

**(print name of company)** \_\_\_\_\_ **has reviewed**

**CSP #** \_\_\_\_\_

**A copy may be obtained at <http://www.fortbendisd.com/docs/purchasing/general-provisions-for-purchasing-solicitations-and-contracts.pdf> or by contacting the Fort Bend ISD Buyer listed on the cover sheet. Any exception to the terms and conditions must be included in the Proposer's response.**

**Texas Education Code 44.031(a)(5); Texas Government Code 2269  
Purchasing and Acquisition, FBISD Policy CH (Legal)  
Purchasing and Acquisition, FBISD Policy CH (Local)  
Facilities and Construction, FBISD Policy CV (Legal)  
Facilities and Construction, FBISD Policy CV (Local)**

\_\_\_\_\_  
**Street Address**

\_\_\_\_\_  
**City, State, Zip Code**

\_\_\_\_\_  
**Telephone Number**

\_\_\_\_\_  
**Fax Number**

\_\_\_\_\_  
**Name of Authorized Individual**

\_\_\_\_\_  
**Signature of Authorized Individual**

**RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE**

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## Non-Collusion Certification *(Required)*

The undersigned affirms that he or she is duly authorized to execute this questionnaire, that this company, corporation, firm, partnership, or individual has not prepared this submission in collusion with any other person, firm, or entity making or considering making a submission to FBISD for any of the future District projects, and that the contents of this submission as to prices, terms or conditions of said submission have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this submission.

The foregoing is true and correct. FBISD, or any authorized representative of FBISD, is authorized by the undersigned to contact any firm, institution, or person listed above to obtain information which FBISD might determine as being desirable.

Firm:

---

Address:

---

City/State/Zip:

---

Phone No:

---

Fax No:

---

Signature:

---

Typed Name:

---

Date:

---

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

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## Certificate of Residency *(Required)*

The State of Texas has passed a law concerning non-resident contractors. This law can be found in Texas Government Code under Chapter 2252, This law makes it necessary for FBISD to determine the residency of its proposers. In part, this law reads as follows:

“Section: 2252.001

(3) ‘Non-resident bidder’ refers to a person who is not a resident.

(4) ‘Resident bidder’ refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

Section: 2252.002

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident’s principal place of business is located.”

I certify that \_\_\_\_\_  
(Name of Company Bidding)

is, under Section: 2252.002, 003 and 004, a

\_\_\_\_\_ Resident Bidder                      \_\_\_\_\_ Non-resident Bidder

My or Our principal place of business under Section: 2252.002, 003, and 004, is in the city of \_\_\_\_\_  
\_\_\_\_\_ in the state of \_\_\_\_\_

\_\_\_\_\_  
Signature of Authorized Company Representative

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

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**Affidavit of Non-Discriminatory Employment (*Required*)**  
**(Tracking purposes only)**

**FORT BEND INDEPENDENT SCHOOL DISTRICT**

This company, Contractor, or Subcontractor agrees to refrain from discrimination in terms and conditions of employment on the basis of race, color, religion, sex, or national origin, and agrees to take affirmative action as required by Federal Statutes and rules and regulations issued pursuant thereto in order to maintain and insure non-discriminatory employment practices.

---

Signature

---

Printed Name & Title

---

Company

---

## Contractor Certification (Required)

**Introduction:** Texas Education Code Chapter 22 requires entities that contract with school districts to obtain criminal history records on covered employees. Covered employees with disqualifying criminal histories are prohibited from serving at a school district. Contractors must certify to the district that they have complied and must obtain similar certifications from their subcontractors.

**Definitions:**

*Covered individuals:* Individual who have or will have continuing duties related to the service to be performed and have or will have direct contact with students. The District will be the final arbiter of what constitutes direct contact with students.

*Disqualifying criminal history:* (1) a conviction or other criminal history information designated by the District; (2) a felony or misdemeanor offense that would prevent a person from obtaining certification as an educator under Texas Education Code § 21.060, including 19 Tex. Admin. Code §249.16; or (3) one of the following offenses, if at the time of the offense, the victim was under 18 or enrolled in a public school: (a) a felony offense under Title 5, Texas Penal Code; (b) an offense for which a defendant is required to register as a sex offender under Chapter 62, Texas Code of Criminal Procedure; or (c) an equivalent offense under federal law or the laws of another state.

---

On behalf of \_\_\_\_\_ (“Contractor”), I certify that  
[check one]:

None of Contractor’s employees are *covered individuals*, as defined above. If this box is checked, I further certify that Contractor has taken precautions or imposed conditions to ensure that Contractor’s employees will not become *covered individuals*. Contractor will maintain these precautions or conditions throughout the time the contracted services are provided.

Or

Some or all of Contractor’s employees are *covered individuals*. If this box is checked, I further certify that:

1. Contractor has obtained all required criminal history record information regarding its covered individuals. None of the covered individuals has a disqualifying criminal history.
2. If Contractor receives information that a covered individual subsequently has a reported criminal history, Contractor will immediately remove the covered individual from contract duties and notify the District in writing within three business days.
3. Upon request, Contractor will provide the District with the name and any other requested information of covered individuals so that the District may obtain criminal history record information on the covered individuals.
4. If the District objects to the assignment of a covered individual on the basis of the covered individual’s criminal history record information, Contractor agrees to discontinue using the covered individual to provide services at the District.

Noncompliance or misrepresentation regarding this certification may be grounds for contract termination.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE



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## Felony Conviction Notification *(Required)*

State of Texas Legislative Senate Bill No. 1, Section 44.034, Notification of Criminal History, Subsection (a), states “a person or business entity that enters into a contract with a school district must give advance notice to the district if the person or an owner or operator of the business entity has been convicted of a felony. The notice must include a general description of the conduct resulting in the conviction of a felony”.

Subsection (b) states “a school district may terminate a contract with a person or business entity if the district determines that the person or business entity failed to give notice as required by Subsection (a) or misrepresented the conduct resulting in the conviction. The District must compensate the person or business entity for services performed before the termination of the contract”.

This Notice is Not Required of a Publicly-Held Corporation.

---

I, the undersigned agent for the firm named below, certify that the information concerning notification of felony convictions has been reviewed by me and the following information furnished is true to the best of my knowledge.

Vendor’s Name:

---

Authorized Company Official’s Name (Printed):

---

A. My firm is a publicly held corporation; therefore, this reporting requirement is not applicable.

**Signature of Company Official:**

---

B. My firm is not owned or operated by anyone who has been convicted of a felony.

**Signature of Company Official:**

---

C. My firm is owned or operated by the following individual(s) who has/have been convicted of a felony:

Name of Felon(s): \_\_\_\_\_

Details of Conviction(s): \_\_\_\_\_

---

**Signature of Company Official:** \_\_\_\_\_

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

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## Vendor Debarment Statement *(Required)*

I have read the conditions and specifications provided in the bid document attached.

I affirm, to the best of my knowledge, the company I represent has not been debarred or suspended from conducting business with school districts in the State of Texas. This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulation may be obtained by contacting the Department of Agriculture Agency with which this transaction originated.

---

NAME OF COMPANY (Please Type)

---

MAILING ADDRESS      CITY      STATE      ZIP

---

PREPARED BY (Please Type)

---

SIGNATURE      TITLE

---

TELEPHONE NUMBER      FAX NUMBER      DATE

Check here if you have an address or telephone number change: Yes  No

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

**Conflict of Interest Questionnaire (Required)** COMPLETE AND SIGN EVEN IF NO CONFLICT EXISTS

**CONFLICT OF INTEREST QUESTIONNAIRE**

**FORM CIQ**

For vendor or other person doing business with local governmental entity

**This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.**

This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

**OFFICE USE ONLY**

Date Received

**1 Name of vendor who has a business relationship with local governmental entity.**

**2  Check this box if you are filing an update to a previously filed questionnaire.**

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

**3 Name of local government officer about whom the information is being disclosed.**

\_\_\_\_\_  
Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the vendor has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the vendor?

Yes  No

B. Is the vendor of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

Yes  No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of one percent or more?

Yes  No

D. Describe each employment or business relationship with the local government officer named in this section.

\_\_\_\_\_  
Signature of vendor doing business with the governmental entity

\_\_\_\_\_  
Date

**RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE**

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## Certification regarding Lobbying *(Required)*

### CERTIFICATION FOR CONTRACTS, GRANTS, LOANS, AND COOPERATIVE AGREEMENTS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of a Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instruction.

3) The undersigned shall require that the language of this certification be included in the award documents for all sub awards at all tiers (including subcontracts, sub grants and contracts under grants, loans, and cooperative agreements) and that all sub recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, US Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

\_\_\_\_\_  
Company

\_\_\_\_\_  
Authorized Representative (Print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

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## Confidential Copyrighted Information (Required)

### General Provisions Part III Paragraph 13

FBISD is a governmental body subject to the Texas Public Information Act. Solicitation Responses submitted to FBISD as a result of this Solicitation may be subject to release as public information after contracts are executed or the procurement is terminated. If a Vendor believes that its Solicitation Response, or parts of its Solicitation Response, may be exempted from disclosure under Texas law, the Vendor must specify page-by-page and line-by-line the parts of the Solicitation Response which it believes are exempt. In addition, the Vendor must specify which exception(s) to the Texas Public Information Act are applicable and provide detailed reasons to substantiate the exception(s). Vague or general claims to confidentiality will not be accepted. FBISD assumes no obligation or responsibility relating to the disclosure or nondisclosure of information submitted by Vendor.

By signing below, the Bidder agrees, if a bid is, or parts of bid is confidential, the bidder has specified by stamping in bold letters the term “**CONFIDENTIAL**” on all or the confidential part of the bid. The bid may be considered public information even though all or parts are marked confidential. Furthermore, Bidder agrees a copyrighted bid is unacceptable and will be disqualified as unresponsive.

\_\_\_\_\_  
Company

\_\_\_\_\_  
Authorized Representative (Print)

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

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006000.01–PROJECT  
FORMS Page 14 of 20

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**Owner(s) Name of Business (Required)**

Bidder certifies the owner(s) name of the business submitting bid is/are: (Please print name(s) below. If not applicable, please indicate N/A.)

**Name**

**Title**

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

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## Delinquent Taxpayers *(Required)*

In accordance with law, the District shall not enter into a contract or other transaction with a person indebted to the District, nor shall the District award a contract to or enter into a transaction with an apparent low bidder or successful proposer indebted to the District.

I am not a delinquent taxpayer to Ft Bend ISD

I am a delinquent taxpayer to Ft Bend ISD *(your bid may be disqualified if your debt is not cleared prior to award.)*

---

Signature

---

Printed Name & Title

---

Company

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE



**CERTIFICATE OF INTERESTED PARTIES**

**FORM 1295**

Complete Nos. 1 - 4 and 6 if there are interested parties. Complete Nos. 1, 2, 3, 5, and 6 if there are no interested parties.	<b>OFFICE USE ONLY</b>
<b>1 Name of business entity filing form, and the city, state and country of the business entity's place of business.</b>	
<b>2 Name of governmental entity or state agency that is a party to the contract for which the form is being filed.</b>	

**3 Provide the identification number used by the governmental entity or state agency to track or identify the contract, and provide a description of the goods or services to be provided under the contract.**

4 Name of Interested Party	City, State, Country (place of business)	Nature of Interest (check applicable)	
		Controlling	Intermediary

**5 Check only if there is NO Interested Party.**

**6 AFFIDAVIT** I swear, or affirm, under penalty of perjury, that the above disclosure is true and correct.

\_\_\_\_\_  
Signature of authorized agent of contracting business entity

AFFIX NOTARY STAMP / SEAL ABOVE

Sworn to and subscribed before me, by the said \_\_\_\_\_, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, to certify which, witness my hand and seal of office.

\_\_\_\_\_  
Signature of officer administering oath      Printed name of officer administering oath      Title of officer administering oath

**ADD ADDITIONAL PAGES AS NECESSARY**

---

## **FBISD CERTIFICATE OF INTERESTED PARTIES – FORM 1295**

**Certificate of Interested Parties (Form 1295 – must be filled out electronically with the Texas Ethics Commission’s online filing application, printed out, signed, notarized, and attached to vendor’s response to this solicitation.)**

Fort Bend ISD (“FBISD”) is required to comply with House Bill 1295, which amended the Texas Government Code by adding Section 2252.908, Disclosure of Interested Parties. Section 2252.908 prohibits FBISD from entering into a contract resulting from this RFP with a business entity unless the business entity submits a Disclosure of Interested Parties (Form 1295) to FBISD at the time business entity submits the signed contract. The Texas Ethics Commission has adopted rules requiring the business entity to file Form 1295 electronically with the Texas Ethics Commission.

**“Interested Party”** means a person:

- a) who has a controlling interest in a business entity with whom FBISD contracts; or
- b) who actively participates in facilitating the contract or negotiating the terms of the contract, including a broker, intermediary, adviser, or attorney for the business entity.

**“Business Entity”** means an entity recognized by law through which business is conducted, including a sole proprietorship, partnership, or corporation.

**“Controlling Interest”** means (1) an ownership interest or participating interest in a business entity by virtue of units, percentage, shares, stock, or otherwise that exceeds 10 percent; (2) membership on the board of directors or other governing body of a business entity of which the board or other governing body is composed of not more than 10 members; or (3) service as an officer of a business entity that has four or fewer officers, or service as one of the four officers most highly compensated by a business entity that has more than four officers.

**As a “business entity,” all vendors must electronically complete, print, sign, notarize, and submit Form 1295 with their proposals even if no interested parties exist.**

Proposers must file Form 1295 electronically with the Texas Ethics Commission using the online filing application, which can be found at [https://www.ethics.state.tx.us/whatsnew/elf\\_info\\_form1295.htm](https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm). Proposers must use the filing application on the Texas Ethics Commission’s website to enter the required information on Form 1295. Proposers must print a copy of the completed form, which will include a certification of filing containing a unique certification number. The Form 1295 must be signed by an authorized agent of the business entity, and the form must be notarized.

The completed Form 1295 with the certification of filing must be filed with FBISD by attaching the completed form to the vendor’s solicitation response.

FBISD must acknowledge the receipt of the filed Form 1295 by notifying the Texas Ethics Commission of the receipt of the filed Form 1295 no later than the 30<sup>th</sup> day after the date the contract binds all parties to the contract. After FBISD acknowledges the Form 1295, the Texas Ethics Commission will post the completed Form 1295 to its website with seven business days after receiving notice from FBISD.

**RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE**

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## Forms Certification *(Required)*

I, the undersigned authorized agent for the company named below, certify that the information concerning notification of felony convictions, Owner(s) Name of Business and Delinquent Taxpayers has been reviewed by me and the information furnished is true to the best of my knowledge. I further certify that I agree to comply with Section 22.0834. Criminal History Record Information Review of Certain Contract Employees, Texas Education Code if awarded a contract through this solicitation, the 31 U.S.C. 6101, note, E.O. 12549, E.O. 12689, 48 CFR 9.404 in relation to the Lists of Parties Excluded from Federal Procurement or Non Procurement Program, and Copyright/Confidential Information.

**COMPANY NAME:** \_\_\_\_\_

**AUTHORIZED AGENT'S NAME (PRINTED):** \_\_\_\_\_

**SIGNATURE OF COMPANY OFFICIAL:** \_\_\_\_\_

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

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**Provision Required in Contract (Govt. Code 2270.002) (Required)**

**RELATIONSHIPS WITH FOREIGN ENTITIES**

During the 85<sup>th</sup> Legislative Session (2017), the State of Texas enacted two additional requirements affecting all government contracts for goods and services.

All government contracts for goods and services signed after September 1, 2017 must include required provisions from HB 89 (Certification Regarding Israel), and language to implement SB 252 (Verification Regarding Terrorist Organizations).

Therefore, in compliance with HB 89 and SB 252 of the 85<sup>th</sup> Texas Legislative Session, Contractor agrees that:

In accordance with Texas Government Code Chapter 2252, Subchapter F, Contractor certifies that it is not a company identified on the Texas Comptroller’s list of companies known to have contracts with, or provide supplies or services to, the Government of Iran, the Government of Sudan, or a foreign organization designated as a Foreign Terrorist Organization by the U.S. Secretary of State.

Contractor further certifies and verifies that, pursuant to Texas Government Code Chapter 2270, neither Contractor, nor any affiliate, subsidiary, or parent company of Contractor, if any (the “Contractor Companies”), boycotts Israel, and Contractor agrees that Contractor and Contractor Companies will not boycott Israel during the term of Agreement with Fort Bend ISD.

---

Name of Vendor (“Contractor”)

---

Mailing Address

City

State

Zip

---

Prepared by

Title

**RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE**

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**Addenda Acknowledgement (*Required*)**

I acknowledge the receipt of Addenda # \_\_\_ through # \_\_\_, and my submittal reflects the contents of those addenda.

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**SECTION AC**  
**PACKAGE “A” BASE BID PROPOSAL FORM – CSP STIPULATED SUM**

**CSP No:** CSP 24-058KB **BP027** - **PKG Name:** Restroom Renoavations.

**FORT BEND INDEPENDENT SCHOOL DISTRICT**

Submitted by: \_\_\_\_\_

Date: \_\_\_\_\_ Phone Number: \_\_\_\_\_

*Vendors are required to respond to all requests identified in the Solicitation and indicate their acceptance or objection to the terms of the Solicitation and these General Provisions must be clearly indicated in Vendor’s Solicitation Response. No-bid is deemed non-responsive by FBISD.*

**BP027**

Having examined Proposal and Contract Documents prepared by Fort Bend ISD and Corgan Associates, Inc. dated 4/30/2024 and having examined site conditions, the undersigned proposes to furnish all labor, equipment and materials and perform all work for the completion of the above-named project for the sum indicated below.

- I. DESCRIPTION:** FBISD is seeking a contractor to provide renovations to existing restrooms at multiple campuses (BP027). The scope of work also includes but is not limited to the selective demolition, reconfiguration and replacement of existing mechanical, electrical and plumbing systems as documented and required for the work.

Undersigned agrees to complete the work for the lump sum amounts of:

\_\_\_\_\_ Dollars  
(Amount written in words governs)

\$ \_\_\_\_\_  
(Amount in figures)

**II. PROJECT TIMELINES**

The District anticipates that this project will take five hundred eighty-two (582) calendar days to complete. Contractor agrees the work will be substantially completed within five hundred eighty-two (582) calendar days from executed contract and issuance of Notice to Proceed.

Should the Contractor anticipate **lower** calendar days to complete this project, please indicate below. The District will consider contractor proposed lower calendar days and incorporate into contract if deemed appropriate.

CONTRACTOR’S PROPOSED DAYS TO COMPLETE BP027\_\_\_\_\_

**III. LIQUIDATED DAMAGES:**

The undersigned understands that liquidated damages as defined in the Supplementary Conditions will be included in the form of Agreement Between Owner and Contractor and that the contractor will be bound thereto.

Contractor accepts the provisions of the Contract as to liquidated damages in the event of failure to complete the work on time. Liquidated damages shall be the sum of **\$1,000.00** per day for each calendar day that Substantial Completion is delayed for each project.

Further, the Contractor acknowledges that additional liquidated damages in the sum of **\$250.00** per day for each calendar day shall be imposed for non-completion of punch list items and contract close-out within sixty (60) calendar days after Substantial Completion.

**IV. ALLOWANCES:**

Allowances are to be included in the Contractor's base bid for each project in the following amounts:

- A. \$ \$5,000 per school for additional plumbing scope related piping and installation
- B. \$5,000 per school for additional architectural scope related to installation

Contractor should include allowance and markup in the base bid. Section 3.8 of the Supplementary Conditions defines the procedures for markups.

**V. UNIT PRICES – BASE BID**

**UNIT PRICES** – Provide Unit Pricing for each of the following:

- 01  Domestic Cold and Hot water lines: all sizes (3/4", 1", 1.5", 2", 2.5", 3", 3.5", 4") – ref. specifications \_\_\_\_\_ lineal foot
- 02  Domestic CW and HW pipe insulation: all sizes (3/4", 1", 1.5", 2", 2.5", 3", 3.5", 4") – ref. specifications \_\_\_\_\_ lineal foot
- 03  Drain piping: all sizes(2", 2.5", 3", 4")- ref. specifications \_\_\_\_\_ lineal foot
- 04  Saw-cutting removal and pour back of concrete \_\_\_\_\_ square foot

**VI. CHANGES IN THE WORK**

The undersigned understands that changes in the work shall be performed in accordance with the Supplementary Conditions.

**VII. PROPOSAL EVALUATION WAIVER**

By submitting a Proposal, the proposer indicated below agrees to waive any claim it has or may have against the Owner, Architect, Engineers, Consultants and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any proposal. The proposer further agrees the Owner reserves the right to waive any requirements under the proposal documents or the Contract Documents, acceptance or rejection of any proposals, and recommendation or award of the contract.



It is understood that the right is reserved by the Owner to reject any or all proposals, or waive any informalities in Receipt of Proposals.

The undersigned certifies that the amounts contained in this Competitive Sealed Proposal have been carefully checked and are submitted as correct and final; and additionally, agrees to comply with all provisions of the Proposal Form.

The undersigned CONTRACTOR proposes and agrees, if this Proposal is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to complete all work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Proposal and in accordance with the Contract Documents.

CONTRACTOR accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Proposal Security. This Proposal will remain open for sixty (60) days after the day of Proposal opening. CONTRACTOR will sign the Agreement and submit the Contract Security and other documents required by the Contract documents within ten (10) calendar days after the date of the OWNER'S Notice of Award.

In submitting this Proposal, CONTRACTOR represents, as more fully set forth in the Agreement, that:

- (a) Contractor has examined copies of all the Contract Documents and of the following addenda, receipt of which is hereby acknowledged, and also copies of the Advertisement or Invitation to Submit Proposal.

_____ <b>ADD-01</b> dated _____	Total # pgs _____	<b>ADD-02</b> dated _____	Total # pgs _____
_____ <b>ADD-03</b> dated _____	Total # pgs _____	<b>ADD-04</b> dated _____	Total # pgs _____
_____ <b>ADD-05</b> dated _____	Total # pgs _____	<b>ADD-06</b> dated _____	Total # pgs _____
_____ <b>ADD-07</b> dated _____	Total # pgs _____	<b>ADD-08</b> dated _____	Total # pgs _____

(b) CONTRACTOR has examined the site and locality where the work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions effecting cost, progress or performance of the work and has made such independent investigations as CONTRACTOR deems necessary.

(a) This PROPOSAL is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; CONTRACTOR has not directly or indirectly induced or solicited any other Contractor to submit a false or sham Proposal; CONTRACTOR has not solicited or induced any person, firm or a corporation to refrain from submitting a proposal; and CONTRACTOR has not sought by collusion to obtain for himself any advantage over any other Contractor or over OWNER.

Type of Proposer's Organization:

\_\_\_\_\_  
(Corporation, Co-Partnership, Individual, etc.)

Proposer: \_\_\_\_\_  
(Print or Type)

\_\_\_\_\_  
Signature of Proposer

Title of Office: \_\_\_\_\_  
(Print or Type)

Legal Address: \_\_\_\_\_  
(Print or Type)

Zip Code: \_\_\_\_\_ Tel:(\_\_\_\_\_) \_\_\_\_\_  
(Print or Type)

ATTEST:

\_\_\_\_\_  
(Secretary, if Proposer is a Corporation)

SEAL:  
(If Corporation)



**SECTION AC**  
**PACKAGE “B” ALTERNATE BID PROPOSAL FORM – CSP STIPULATED SUM**

**CSP No:** CSP 24-058KB **BP 027 BP Name:** FBISD BP027 Restroom Renovations

**FORT BEND INDEPENDENT SCHOOL DISTRICT**

Submitted by: \_\_\_\_\_

Date: \_\_\_\_\_ Phone Number: \_\_\_\_\_

*Vendors are required to respond to all requests identified in the Solicitation and indicate their acceptance or objection to the terms of the Solicitation and these General Provisions must be clearly indicated in Vendor’s Solicitation Response. No-bid is deemed non-responsive by FBISD.*

Having examined Proposal and Contract Documents prepared by Fort Bend ISD and Corgan Associates, Inc. dated April 30, 2024 and having examined site conditions, the undersigned proposes to furnish all labor, equipment and materials and perform all work for the completion of the above-named project for the sum indicated below.

**I. DESCRIPTION:** FBISD is seeking a contractor to provide renovations to existing restrooms at multiple campuses (PKG027). The scope of work also includes but is not limited to the selective demolition, reconfiguration and replacement of existing mechanical, electrical and plumbing systems as documented and required for the work.

Undersigned agrees to complete the work for the lump sum amounts of:

\_\_\_\_\_ Dollars  
(Amount written in words governs)

\$ \_\_\_\_\_  
(Amount in figures)

**II. PROJECT TIMELINES – Refer to Section V. for the construction calendar days associated with alternates.**

The District anticipates that this project will take five hundred eighty-two (582) calendar days to complete. Contractor agrees the work will be substantially completed within five hundred eighty-two (582) calendar days from executed contract and issuance of Notice to Proceed.

Should the Contractor anticipate **lower** calendar days to complete this project, please indicate below. The District will consider contractor proposed lower calendar days and incorporate into contract if deemed appropriate.

CONTRACTOR’S PROPOSED DAYS TO COMPLETE  
BP027 \_\_\_\_\_ Base Proposal

BP 027 \_\_\_\_\_ Alternates  
 BP 027 \_\_\_\_\_ Base Proposal and Alternates

(Enter only if LOWER than District's proposed time)

**III. LIQUIDATED DAMAGES:**

The undersigned understands that liquidated damages as defined in the Supplementary Conditions will be included in the form of Agreement Between Owner and Contractor and that the contractor will be bound thereto.

Contractor accepts the provisions of the Contract as to liquidated damages in the event of failure to complete the work on time. Liquidated damages shall be the sum of **\$1,000.00** per day for each calendar day that Substantial Completion is delayed for each project.

Further, the Contractor acknowledges that additional liquidated damages in the sum of **\$250.00** per day for each calendar day shall be imposed for non-completion of punch list items and contract close-out within sixty (60) calendar days after Substantial Completion.

**IV. ALLOWANCES:**

Allowances are to be included in the Contractor's base bid for each project in the following amounts:

- A. \$5,000.00 per campus and \$5,000.00 for the administration building for additional plumbing scope not shown in the contract documents.
- B. \$5,000.00 per campus and \$5,000.00 for the administration building for additional architectural scope not shown in the contract documents.

Contractor should include allowance and markup in the base bid. Section 3.8 of the Supplementary Conditions defines the procedures for markups.

**V. ALTERNATES**

Refer to Division 01 23 00 for administrative and procedural requirements of Alternates.

**Alternate No. 1 Base Bid Adjustment**

The undersigned agrees to complete all base bid work and adjust the final base bid lump sum amount as follows:

1. Add  Deduct  No Change  Not Applicable
2. \_\_\_\_\_ Dollars  
 (Amount written in words governs)  
 \$ \_\_\_\_\_  
 Amount written in figures
3. Add  Deduct  No. of calendar days to adjust the Contract Time for this alternate:  
 \_\_\_\_\_

**Alternate No. 2 Deviations Request Form**

If Bidder proposes to use any substitution or deviations from the base bid use Alternate No. 2 via the Deviations Form in section 00 21 13 Instructions to Bidders. If the owner elects to proceed with Alternate No. 2, the undersigned agrees to complete the ADDITIVE work for the lump sum amount of:

1. Add  Deduct  No Change  Not Applicable
2. \_\_\_\_\_ Dollars  
(Amount written in words governs)  
\$ \_\_\_\_\_  
Amount written in figures
3. Add  Deduct  No. of calendar days to adjust the Contract Time for this alternate:  
\_\_\_\_\_

**VI. UNIT PRICES – ALTERNATE BID**

**UNIT PRICES** – [Add Description](#)

01	<input type="checkbox"/>	<a href="#">add description</a>	_____ <a href="#">add unit</a>
02	<input type="checkbox"/>	<a href="#">add description</a>	_____ <a href="#">add unit</a>
03	<input type="checkbox"/>	<a href="#">add description</a>	_____ <a href="#">add unit</a>
04	<input type="checkbox"/>	<a href="#">add description</a>	_____ <a href="#">add unit</a>
05	<input type="checkbox"/>	<a href="#">add description</a>	_____ <a href="#">add unit</a>

**VII. CHANGES IN THE WORK**

The undersigned understands that changes in the work shall be performed in accordance with the Supplementary Conditions.

**VIII. PROPOSAL EVALUATION WAIVER**

By submitting a Proposal, the proposer indicated below agrees to waive any claim it has or may have against the Owner, Architect, Engineers, Consultants and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any proposal. The proposer further agrees the Owner reserves the right to waive any requirements under the proposal documents or the Contract Documents, acceptance or rejection of any proposals, and recommendation or award of the contract.

It is understood that the right is reserved by the Owner to reject any or all proposals, or waive any informalities in Receipt of Proposals.

The undersigned certifies that the amounts contained in this Competitive Sealed Proposal have been carefully checked and are submitted as correct and final; and additionally, agrees to comply with all provisions of the Proposal Form.

The undersigned CONTRACTOR proposes and agrees, if this Proposal is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to complete all work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Proposal and in accordance with the Contract Documents.

CONTRACTOR accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Proposal Security. This Proposal will remain open for sixty (60) days after the day of Proposal opening. CONTRACTOR will sign the Agreement and submit the Contract Security and other documents required by the Contract documents within ten (10) calendar days after the date of the OWNER'S Notice of Award.

In submitting this Proposal, CONTRACTOR represents, as more fully set forth in the Agreement, that:

- (a) Contractor has examined copies of all the Contract Documents and of the following addenda, receipt of which is hereby acknowledged, and also copies of the Advertisement or Invitation to Submit Proposal.

_____ <b>ADD-01</b> dated _____	Total # pgs _____	_____ <b>ADD-02</b> dated _____	Total # pgs _____
_____ <b>ADD-03</b> dated _____	Total # pgs _____	_____ <b>ADD-04</b> dated _____	Total # pgs _____
_____ <b>ADD-05</b> dated _____	Total # pgs _____	_____ <b>ADD-06</b> dated _____	Total # pgs _____
_____ <b>ADD-07</b> dated _____	Total # pgs _____	_____ <b>ADD-08</b> dated _____	Total # pgs _____

- (b) CONTRACTOR has examined the site and locality where the work is to be performed, the legal requirements (federal, state and local laws, ordinances, rules and regulations) and the conditions effecting cost, progress or performance of the work and has made such independent investigations as CONTRACTOR deems necessary.
- (c) This PROPOSAL is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; CONTRACTOR has not directly or indirectly induced or solicited any other Contractor to submit a false or sham Proposal; CONTRACTOR has not solicited or induced any person, firm or a corporation to refrain from submitting a proposal; and CONTRACTOR has not sought by collusion to obtain for himself any advantage over any other Contractor or over OWNER.

Type of Proposer's Organization:

\_\_\_\_\_  
(Corporation, Co-Partnership, Individual, etc.)

Proposer: \_\_\_\_\_  
(Print or Type)

\_\_\_\_\_  
Signature of Proposer

Title of Office: \_\_\_\_\_  
(Print or Type)

Legal Address: \_\_\_\_\_  
(Print or Type)

Zip Code: \_\_\_\_\_ Tel:(\_\_\_\_\_) \_\_\_\_\_  
(Print or Type)

ATTEST:

\_\_\_\_\_  
(Secretary, if Proposer is a Corporation)

RETURN THIS DOCUMENT IN CSP BID/PROPOSAL PACKAGE



SEAL:  
(If Corporation)

**BONDING CAPACITY CERTIFICATION LETTER**

**OWNER**

**Fort Bend Independent School District  
555 Julie Rivers Drive  
Sugar Land, TX 77478  
281-634-1803**

**CONTRACTOR**

**Firm Name** .....  
**Address** .....  
**City, State, Zip Code** .....  
**Phone** .....

***This letter serves as a certified statement that the Surety Company’s authorized bonding capacity for the referenced Contractor will not be exceeded by the inclusion of Contractor’s submitted proposal for FBISD’s CSP \_\_\_\_\_, Title of CSP \_\_\_\_\_.***

***The present limits on bonding for the referenced Contractor are as follows:***

**\$** ..... **each occurrence.**  
**\$** ..... **Aggregate**

***Percentage of bonding capacity expended with inclusion of FBISD’s CSP \_\_\_\_\_, Title of CSP .....%***

***Amount of ALL projects that the Contractor is currently preparing bid/proposals and/or have not yet been awarded: \$.....***

***(Amount indicated above must be representative of all projects inclusive of delivery methods such as the following but not limited to: Competitive Bids, Competitive Sealed Proposals, Design-Build, Construction Manager at Risk, Job Order Contracting etc.,)***

***Issuance and approval of any bond shall be predicated on the most current financial and job information available to the underwriter on the date that the bond is issued. The Surety Company hereby certifies that they are duly authorized by certificate of authority issued by the State of Texas Division of Insurance and that they are rated as follows:***

***A.M. Best Rating:*** .....

***Financial Size Category*** .....

***Notes: This is the only acceptable format for the Surety’s Bonding Capacity Certification Letter.***

RETURN THIS DOCUMENT IN FRONT OF ORIGINAL SUBMISSION PACKAGE

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***This statement must be notarized (on an original document with an embossed stamp).  
Power of Attorney form must be attached.***

**SURETY COMPANY**

**Surety Company Name** .....  
**Address** .....  
**City, State, Zip Code** .....

**Authorized Signature:** .....  
**Date:** ..... / ..... / .....

**ACKNOWLEDGMENT**

**State of** \_\_\_\_\_

**County of** \_\_\_\_\_

**Subscribed and sworn to before me this**  
\_\_\_\_\_ **day of** \_\_\_\_\_ **2024**

---

**My Commission Expires** \_\_\_\_\_

**(Notary Seal)**



**CONFLICT OF INTEREST QUESTIONNAIRE**

All vendors doing business with Fort Bend Independent School (FBISD) must complete and submit a Conflict of Interest Questionnaire (CIQ).

FBISD is required to comply with Texas Local Government Code Chapter 176, Disclosure of Certain Relationships with Local Government Officers. Any company that does business with FBISD must complete and submit a Conflict of Interest Questionnaire (CIQ) whether or not a conflict of interest exists.

Statements must be filed within seven (7) business days after the officer becomes aware a conflict of interest exists.

**FBISD Board of Trustees include:**

Ms. Kristen Davison Malone

Ms. Judy Dae, President

Dr. Shirley Rose Gilliam, Vice President

Ms. Angie Hanan

Ms. Sonya Jones

Mr. Rick Garcia

Mr. David Hamilton, Secretary

Dr. Marc Smith, Superintendent

**Current Local Government Officers includes:**

Steven Basset, Deputy Superintendent

Beth Martinez, Deputy Superintendent

Robert Scamardo, General Counsel

Glenda Johnson, Chief Human Resources Officer

David Rider, Chief of Police

Kwabena Mensah, Chief of Schools

Damian Viltz, Chief Operations Officer

Rhonda mason , Asst Superintendent Elem

Jerry Lemley, Asst Superintendent Sec

Antignolo Matthew, Exec Dir Child Nutrition

Pandit Payal, Exec Dir Collab Communities

Fuzetti Carolina, Exec Dir Design & Construction

Nunez Wendy, Exec Dir Elementary Schools

Mason Rhonda, Exec Dir Elementary Schools

Ford Ida, Exec Dir Elementary Schools

Kimberly Lawson, Chief Academic Officer

kimberly Smith, Chief Communications Officer

Bryan Guinn, Chief Financial Officer

Long Pham, Chief Information Officer

Morgan Aaron, Exec Dir Facilities

Schlacks Kelly, Exec Dir Finance

Amber Williams, Exec Dir HR

Patin Mitzi, Exec Dir Info Systems

Jacob Jojo, Exec Dir Info Tech Service

Wilbanks Coby, General Counsel

Williams Stephanie, Exec Dir Org Development

Causey Ashley, Exec Dir Secondary Schools

Lyons-Lewis, Deidra Exec Dir Secondary Schools

Westbrook Pilar, Exec Dir Sel & Comp.Health

Smith-Watson Sonya, Exec Dir Student Affairs

Hill Deena, Exec Dir Student Supp Svc

Hubbard Melissa, Exec Dir Teach & Learning

## **HOW TO COMPLETE THE CIQ FORM**

### **NO CONFLICT EXIST**

If no conflict of interest exists, you MUST:

1. Fill out Box 1
2. Type N/A on Box 3 of the CIQ form
3. Sign and date

### **CONFLICT EXIST**

If a conflict of interest exists, you MUST:

1. Name of person doing business with the District. If the business is a corporation, partnership, etc., then each person who acts as an agent for the business in dealings with Fort Bend ISD must complete the form. Also, state company name. If no conflict of interest exists, you must fill out Box 1 and type N/A on Box 3 of the CIQ form, sign and date it.
2. Check the box if you are filing an update to a previously filed questionnaire. Updates are required by law by September 1 of each year in which the person submits a proposal or bid or begins contract discussions or negotiations with the District. Updates are also required by the 7th business day after an event that makes a statement in a previously filed questionnaire incomplete or inaccurate.
3. Name the District employee or school board member with whom you have a relationship, if there is no relationship in question, state "NONE".
4. Answer questions A and B with "Yes" or "No", as applicable.
5. Describe how you are affiliated or related to a FBISD employee or school board member.
6. Check Box if applicable
7. Signature Box: Date and Sign the form. A signature is required from the person completing the form even if "No" is entered in Box 3, A, B, C, or D.

## **CONFLICT OF INTEREST QUESTIONNAIRE**

### **For vendor doing business with local governmental entity**

A complete copy of Chapter 176 of the Local Government Code may be found at <http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm>. For easy reference, below are some of the sections cited on this form.

**Local Government Code § 176.001(1-a):** "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

- (A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;
- (B) a transaction conducted at a price and subject to terms available to the public; or
- (C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

**Local Government Code § 176.003(a)(2)(A) and (B):**

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

\*\*\*

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds \$2,500 during the 12-month period preceding the date that the officer becomes aware that

- (i) a contract between the local governmental entity and vendor has been executed;
- or
- (ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than \$100 in the 12-month period preceding the date the officer becomes aware that:

- (i) a contract between the local governmental entity and vendor has been executed; or
- (ii) the local governmental entity is considering entering into a contract with the vendor.

**Local Government Code § 176.006(a) and (a-1)**

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

- (1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);
- (2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or
- (3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

- (A) begins discussions or negotiations to enter into a contract with the local governmental entity; or
- (B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

- (A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);
- (B) that the vendor has given one or more gifts described by Subsection (a); or
- (C) of a family relationship with a local government officer.

# CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

## FORM CIQ

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

### OFFICE USE ONLY

Date Received

**1** Name of vendor who has a business relationship with local governmental entity.

**2**  Check this box if you are filing an update to a previously filed questionnaire. (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

**3** Name of local government officer about whom the information is being disclosed.

\_\_\_\_\_  
Name of Officer

**4** Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

Yes       No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

Yes       No

**5** Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.

**6**  Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

**7**

\_\_\_\_\_  
Signature of vendor doing business with the governmental entity

\_\_\_\_\_  
Date



## DEVIATION REQUEST FORM

**Instructions to Bidders: No deviations are allowed in the Base Bid or Base Bid Adjustment. Deviations shall be submitted on the Deviations Form as Alternate 2. Complete this form, attach any supporting data and submit with Package B.**

Project Title and Number:		
Deviation Request No.	Date Submitted:	Specification Section, and/or Drawing No:
Item Description:		

Reason for Deviation: *(If specified product, material or detail cannot be provided, include statement indicating why and provide supporting information.):*

Differences (point-by-point comparative data) between proposed deviation and specified product, material or detail:



Proposed deviation affects other parts of the project :                    YES                    NO

Explain:

Time Impact due to Deviation:                    YES                    NO                    ADD                    DEDUCT                    Days

**Anticipated deviation savings and/or benefit to the District:**

\$ \_\_\_\_\_

**Date:**

**Printed Name of Authorized Representative:**

**Signature of Authorized Representative:**

**A/E Recommendation:**

Deviation Request approved to proceed with deviation:

Deviation Request rejected:  
Use specified product

Notes:

Date:

**Additional Information if Applicable**

Reason for Deviation: *(If specified product, material or detail cannot be provided, include statement indicating why and provide supporting information.)*

Differences (point-by-point comparative data) between proposed deviation and specified product, material or detail:

**FORT BEND I.S.D. CONSTRUCTION BOND & INSURANCE REQUIREMENTS**

*It is suggested that this Exhibit be provided to the Contractor's insurance provider.*

Contractor shall not commence work until all required bonds and insurance coverages have been obtained and such insurance has been reviewed and accepted by the District. Certificates of Insurance on the current ACORD form shall be issued to the District showing all required insurance coverages.

**Bonds Required**

Construction, installation and service contracts (including repair and alteration) exceeding \$100,000 requires that a 100% Performance Bond be furnished by the successful bidder (contractor). Contracts exceeding \$25,000 require that a 100% Payment Bond be furnished by the successful bidder (contractor). All such bids must include a 5% Bid Bond.

Bonds shall be issued by a company authorized to do business in the State of Texas with an A.M. Best Company rating of at least A- X and included on the U.S. Department of the Treasury Listing of Approved Sureties (Dept. Circular 570). The contractor shall be responsible for obtaining bonds and shall absorb any and all costs of such Bonds.

<b><u>Insurance Required</u></b>	<b><u>Limit Required</u></b>
<b>Automobile Liability</b> insurance covering Any Auto	\$1,000,000 Combined Single Limit
<b>Comprehensive (Commercial) General Liability</b> insurance including Products, Completed Operations, Independent Contractors, Broad Form Property Damage, Pollution and Blanket Contractual Liability coverages. XCU exclusions to be removed when underground work is performed.	\$1,000,000 Occurrence \$2,000,000 Aggregate \$1,000,000 Personal Injury \$ 500,000 Fire Damage \$ 5,000 Medical Payments  Per Project Aggregate (CG 70 49)  Evidence of coverage must be shown on certificates of insurance.
<b>Professional Errors &amp; Omissions Liability</b> insurance may be required from all contractors and licensed or certified as professionals; e.g., engineer architects, insurance agents, physicians, attorneys, banks, financial consultants, etc.	One time project amount; \$1,000,000 Occurrence & Aggregate minimum, \$5,000,000 Maximum Limit  Retroactive Date preceding date of contract must be shown  Extended Reporting Period three years past completion of contract
<b>Workers Compensation</b> insurance with limits to comply with the requirements of the Texas Worker Compensation Act  Employers Liability insurance	Statutory Limits  \$1,000,000
<b>Umbrella or Excess Liability</b> insurance (excess of primary General Liability, Automobile Liability and WC Coverage B)  Applicable to minimum contract amounts of <b>\$100,000</b>	100% of Contract Amount up to a maximum of \$25,000,000. For construction contracts in excess of \$25,000,000 higher limits may be required.

Limits for primary policies may differ from those shown when Umbrella or Excess Liability insurance is provided.

<p><b>All Risk Builders Risk Property Insurance</b> shall be required for all construction contracts when property of the owner is at risk or in the care, custody and control of the Contractor. Builders Risk insurance shall be required for all construction contracts requiring a bond. All Property insurance shall include coverage against the perils of Flood and Earthquake. (Installation Floater may be substituted when contract involves installation only.)</p>	<p>Contract Limit or Replacement Cost Value of Scope of Work whichever is greater</p> <p>Permission to Occupy granted</p> <p>Deductible: 1% of contract, \$50,000 maximum, unless otherwise approved by the Owner.</p>
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**Insurance Conditions**

All insurance coverages shall be issued on an Occurrence basis (except Professional Liability) by companies acceptable to District and licensed to do business in the State of Texas by the Texas Department of Insurance. Such companies shall have a Best's Key rating of at least "A- X".

All certificates must include:

1. The location or description and the bid number, CSP number or Purchase Order number
2. A 30 day notice of cancellation of any non-renewal, cancellation or material change to any of the policies
3. "Additional Insured" on the Property, General Liability, Automobile Liability and Umbrella (Excess) Liability policies naming the District.
4. A "Waiver of Subrogation" clause in favor of the District will be attached to the Workers Compensation, General Liability, Automobile Liability, Umbrella Liability and the Property insurance policies.
5. In addition to certificates of insurance, copies of policy endorsements must be provided (a) listing the District as Additional Insured, and (b) showing waivers of subrogation in favor of the District: CG2010, CG2037, CG2404, CA0070, CA0032, WC0003 or their equivalents.

All insurance must be maintained for one year following substantial completion with Certificates of Insurance provided.

Contractor shall be responsible for payment of all deductibles; the District shall approve the deductibles selected.

If any policy has aggregate limits, a statement of claims against the aggregate limits is required.

The District reserves the right to review the insurance requirements during the effective period of any contract to make reasonable adjustments to insurance coverages and limits when deemed reasonably prudent by District based upon changes in statutory laws, court decisions or potential increase in exposure to loss.

FORT BEND Independent School District  
C/o Director – Design & Construction Department  
2323 Texas Parkway  
Missouri City, TX 77489

SECTION 01 10 00

SUMMARY OF WORK

**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:

- 1. Project information
- 2. Work covered by Contract Documents
- 3. Phased construction
- 4. Access to site
- 5. Coordination with occupants
- 6. Work restrictions

- B. RELATED SECTIONS:

- 1. Division 00 FBISD Procurement Forms
- 2. Division 01 Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities
- 3. Division 01 Section 01 52 14 "Temporary Facilities for Students" for specifications and procedures regarding the use of temporary swing space that the Contractor may furnish and install to accommodate the Work

1.3 PROJECT INFORMATION

- A. Refer to Section 00 FBISD Procurement Forms

1.4 SCOPE OF WORK. The Work consists of:

- 1.5 FBISD is seeking a contractor to provide renovations to existing restrooms at multiple campuses (PKG027). The scope of work also includes but is not limited to the selective demolition, reconfiguration and replacement of existing mechanical, electrical and plumbing systems as documented and required for the work. MULTIPLE PROJECT SITE REPRESENTATION FOR BID PACKAGES. If multiple project sites are identified in the Work, the contractor shall employ and designate one qualified full-time Superintendent who shall oversee the performance for the overall work performed under the contract. The daily work is required to have a qualified supervisor for the duration of the work. Any deviation from this will need to be approved by FBISD and the Owner's representative.

- 1.6 SCHEDULE OF VALUES FOR BID PACKAGES. If multiple project sites are identified in the Work, the contractor shall provide one Schedule of Values for each project site attached to each application for payment. In addition, each school site shall have a separate schedule of values in current CSI format for Renovation Work and for Addition Work, identifying the labor and material components separately.

- 1.7 CONCURRENT CONSTRUCTION FOR BID PACKAGES. Work (additions and renovations) at each school site will be performed concurrently with the other school sites unless otherwise indicated by FBISD.

- 1.8 PHASING. If the school buildings will be in use during construction, the Work shall be conducted in such a manner as to not interrupt or disturb school activities. Phasing plans are guidelines and are used to identify a possible approach to the work. *The contractor may* submit a phasing plan for all scopes of work taking place when requested. Any deviation from the suggested plan contained in the contract documents must be approved by the A/E, owner or owner's representative, and Principal prior to implementation.
- A. Some work may need to be performed after normal school operating hours, nights and weekends. If an owner's representative is required outside normal hours of school operation, FBISD will incur overtime costs for FBISD staff presence at the school site, including weekends and holidays. Such overtime costs incurred may become the financial responsibility of the General Contractor and will be credited to the Owner. Determination of need for reimbursement will be made by FBISD and the owner's representative prior to the start of construction. FBISD and owner's representative reserve the right to alter the decision based on contractor performance.
  - B. Refer to the School Operations Parameter Statement Section for details of the regular working hours, holidays and procedures for custodial overtime, etc.
  - C. Work cannot start in a particular Phase until preceding phases on the campus are substantially complete.
    - 1. Close coordination with the A/E, Program Manager, and the School Staff, will be required of the Contractor.
  - D. The Contractor shall allow sufficient time to accommodate the Abatement Contractor's work. This activity shall be shown as a separate activity on the Construction Schedule. General Contractor shall coordinate the abatement scheduling with FBISD's selected Environmental Consultant and the Owner Representative.

#### 1.9 PHASING REQUIREMENTS

- A. All work must be scheduled to occur outside of school hours (no work to occur while classes are in session).
- B. A minimum of sixty-six percent of all faculty restrooms and a minimum of sixty-six percent of all student restrooms must remain in operation (with no construction activities on-going) during the school year (while classes are on-going).
  - 1. Each restroom that is renovated during the school year must be substantially complete to be included in the sixty-six percent of restrooms that are to remain in operation during the school year.
  - 2. Phasing for all scope of work is to be approved by the Owner for coordination with scopes of work by others that may be on going at each campus.
  - 3. Delivery of materials into restrooms under construction is not allowed to occur while classes are on-going. Exact delivery times available before and after classes are to be coordinated with the Owner.

- 1.10 HVAC AND WATER TREATMENT REQUIREMENTS Contractor will coordinate with FBISD for water treatment and HVAC maintenance. Please

refer to the plumbing and mechanical specifications for the contractor's responsibilities related to these requirements.

- 1.12 PHASE ACCEPTANCE. Upon certification by the Contractor and recommendation of the A/E, FBISD will accept the Work of each individual phase as it is completed. Architectural acceptance shall be called "phase acceptance". The HVAC, electrical, plumbing and roofing systems will be accepted by FBISD when the entire project has been completed; at that point, upon completion of all relevant contractual requirements, Architect will issue substantial completion. The contractor will operate and maintain the HVAC, electrical and plumbing systems that are a part of his scope of work until substantial completion. The contractor's warranty for any new HVAC, electrical, plumbing and roofing systems shall commence at substantial completion for each school project, barring any deviations that have been pre-approved by owner's representative/FBISD. The contractor will install new filters and record date of replacement on each filter upon substantial completion.
- 1.13 USE OF TECHNOLOGY FOR PROJECT MANAGEMENT. FBISD will furnish information related to accessing web-enabled project management applications for this contract. FBISD and the owner's representative will implement project management software, Kahua, which will be easily accessible through the Internet. Contractor will cooperate with the owner's representative for the implementation and use of this tool.

Contractor will be required to create and post several types of documents into Kahua via the Internet. Request for Information (RFIs) will be posted by the Contractor and responded to by the A/E(s) in Kahua via the Internet, thereby facilitating communication among all parties and expediting resolution of issues. Any meeting minutes and field reports required to be created by the Contractor or A/E(s) will be posted to Kahua. FBISD and the Program Manager reserve the right to require additional documents to be entered into Kahua as shown below. Additional requirements may be identified.

#### **Project Management Control System (PMCS) - Kahua**

- The District and Owners Representative have agreed to use Kahua as the tool to manage projects between District, Owners Representative, and vendors (general contractors and architects).
- The following modules will be implemented:
  - Budget
  - Contracts
  - Invoices
  - Payments
  - Change Orders
  - Close Out
  - Issues
  - Meeting Minutes
  - Requests for Information
  - Submittals
  - Transmittals
  - Field Details
  - Field Work Directives
  - Punch List
  - Safety Notices



1.14 HAZARDOUS MATERIAL DESIGN AND CONSTRUCTION. FBISD has retained a separate environmental consultant to prepare contract documents including design drawings and specifications for the removal of hazardous materials from the schools and the air monitoring services (as applicable).

It shall be the responsibility of the Contractor to coordinate with the scheduled work performed by any of FBISD's separate Contractors including the hazardous materials abatement contractor. Contractor shall coordinate all aspects of the hazardous material abatement contractor's work with the Work under this Agreement. The Contractor shall always keep the Program Manager informed of all coordination issues with FBISD separate contractors. Other Contractor responsibilities in relation to the hazardous material design and construction coordination are per Article 6 of the General Contractor's Contract.

1.15 Permitting: Contractors are responsible for the costs of acquiring the building permits. The Contractor will obtain and pay for all trade permits and other miscellaneous permits that may be required by the City/County. Tap fees for connections to off-site water and sewer lines will be paid by unless specified differently by contract documents.

1.16 Storm Water Pollution Prevention Plan: Once the Notice to Proceed has been issued, the Contractor is obligated to comply with the applicable municipalities and applicable SWPPP codes and protocol. The Contractor assumes full responsibility for any complaints, citations, maintenance and complete management of the SWPPP plan including any and all documentation. For new schools with demolition scope by a separate contractor, Contractor shall coordinate with the separate contractor for a seamless transfer / transition of an existing SWPPP. Contractor will then submit all documentation to the District at closeout.

1.17 Construction Specification Index: All construction documentation will follow the 2016 Construction Specification Index format.

1.18 The contractor shall tag locations of all equipment within the scope of work to comply with FBISD construction standards.

## **PART 2 PRODUCTS (Not Used)**

## **PART 3 EXECUTION (Not Used)**

### **3.1 USE OF PREMISES**

- A. Contractor shall coordinate work of all trades with assistance by owner's representative for all subcontractors or consultants retained by FBISD. Contractor shall sequence, coordinate, and perform the Work to impose minimum hardship on the operation and use of the existing facilities and/or Project site. Contractor shall install all necessary protection for existing improvements, Project site, property, and new Work against dust, dirt, weather, damage, vandalism, and maintain and relocate all protection to accommodate progression of the Work.
- B. Contractor shall confine entrance and exiting to the Project site and/or facilities to routes approved by the Owner.



- C. Contractor shall secure building entrances, exits, and Work areas with locking devices as required by the Owner.
- D. Contractor assumes custody and control of Owner property, both; fixed and portable, remaining in existing facilities vacated during the work.
- E. Contractor shall cover and protect surfaces of rooms and spaces in existing facilities turned over for the work, including Owner property remaining within as required to prevent soiling or damage from dust, dirt, water, and/or fumes. Contractor shall protect areas adjacent to the Work in a similar manner. Prior to Owner occupancy, Contractor shall clean all surfaces including OWNER property.
- F. Within existing facilities, the Owner will remove or request the contractor to remove portable equipment, furniture, and supplies from work areas prior to the start of Work. CONTRACTOR shall cover and protect remaining items in areas of the Work.
- G. Contractor is advised that school may be in session during performance of the work. Contractor shall utilize all available means to prevent generation of unnecessary noise and maintain noise levels to a minimum. When required by the Owner, Contractor shall immediately discontinue noise-generating activities and/or provide alternative methods to minimize noise generation. Contractor shall install and maintain air compressors, tractors, cranes, hoists, vehicles, and other internal combustion engine equipment with mufflers, including unloading cycle of compressors. Contractor shall discontinue operation of equipment producing objectionable noise as required by the Owner.
- H. Contractor shall protect all surfaces, coverings, materials, and finished Work from damage. Mobile equipment shall be provided with pneumatic tires.
  - I. Contractor shall furnish, install, and maintain adequate supports, shoring, and bracing to preserve structural integrity and prevent collapse of existing improvements and/or Work modified and/or altered as part of the Work.
  - J. Contractor shall not use or allow anyone other than Owner employees to use facility equipment, except in an emergency.

**End of Section**

**PART 1 CERTIFICATION OF COMPLIANCE**

**1.1 REQUIREMENTS**

- A. Work related to this section “Certification of Compliance” is in accordance with Texas Government Code (411.0845), Texas Administrative Code (153.1101), Texas Education Code (22.0834 & 44.034), and Board Policy (CJA).

**1.2 CRIMINAL HISTORY IN GENERAL**

- A. Before entering into a contract with the District, a person or business must give notice to the District if the person or an owner or operator of the business has been convicted of a felony. The District may terminate a contract with a person or business if the District determines that the person or business failed to give such notice or misrepresented the conduct resulting in the conviction.

**PART 2 DEFINITIONS**

- A. “Contracting entity” is an entity that contracts directly with the District to provide services to the District.
- B. “Subcontracting entity” is an entity that contracts with another entity that is not a district to provide services to a school district.
- C. “Direct contact with students” is the contact that results from activities that provide substantial opportunity for verbal or physical interaction with students that is not supervised by a certified educator or other professional District employee.
  - 1. Contact with students that results from services that do not provide substantial opportunity for unsupervised interaction with a student or students, such as addressing an assembly, officiating a sports contest, or judging an extracurricular event, is not, by itself, direct contact with students.
  - 2. However, direct contact with students does result from any activity that provides substantial opportunity for unsupervised contact with students, which might include, without limitation, the provision of coaching, tutoring, or other services to students.

**PART 3 EMPLOYMENT / CONTRACT**

- A. A person who, on or after January 1, 2008, is offered employment by an entity that contracts with the District or any subcontractor of the entity must submit to a national criminal history record information review if:
  - 1. The employee or applicant has or will have continuing duties related to the contracted services; and
  - 2. The employee or applicant has or will have direct contact with students.
- B. An entity contracting with the District and any subcontractor of the entity shall obtain all criminal history record information that relates to a person described above through the criminal history clearinghouse as provided by Government Code 411.0845.

- C. A contracting entity shall require that a subcontracting entity obtain all criminal history record information that relates to a person described above.

**PART 4 CERTIFICATION TO DISTRICT**

- A. Contractor Certification
  - 1. The entity and any subcontractor of the entity shall certify to the District that it received all of the criminal history record information required above. The entity and any subcontractor of the entity shall also certify that it will take reasonable steps to ensure that the conditions or precautions that have resulted in a determination that any person is not a covered contract employee continue to exist throughout the time that the contracted services are provided.
- B. Sub-Contractor Certification
  - 1. The subcontracting entity must certify to the District and the contracting entity that the subcontracting entity has obtained all criminal history record information that relates to an employee described above at EMPLOYMENT / CONTRACT, and has obtained similar written certifications from the subcontracting entity's sub-contractors.
- C. Contractor and Sub-Contractor
  - 1. The contracting entity and any subcontractor of the entity shall provide the District, at its request, the information necessary for the District to obtain criminal history record information for all covered contract employees.
- D. COMPLIANCE WITH REQUIREMENT
  - 1. The contracting entity complies with the requirements of this section if the contracting entity obtains a written statement from each sub-contracting entity certifying that the subcontracting entity has obtained the required criminal history record information for employees of the subcontracting entity and the subcontracting entity has obtained certification from each of the subcontracting entity's subcontractors.
- E. DISQUALIFYING CONVICTION
  - 1. The contracting entity shall not permit a covered contract employee to provide services at the District if the employee has a disqualifying conviction under Texas Education Code 22.085.

**PART 5 CRIMINAL HISTORY RECORD INFORMATION**

- 5.1 Each person as described above (PART 3), performing work on site under this contract (including Contractors, Project Managers and/or Job Foreman) is required to obtain a background check through the DPS criminal history clearinghouse.
- 5.2 The Contractor shall pay all associated processing fees for this history and clearance.
- 5.3 The Contractor shall, prior to commencement of any work at the site. Certify that the firm has obtained, reviewed and verified the criminal history for each person

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 14 13 Certification of Compliance / Contractor Identification

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described above (PART 3).

- 5.4 The contractor shall, prior to commencement of any work at the site. Certify that no person described above (PART 3) have been convicted of any offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy.
- 5.5 In addition the contractor shall, obtain from each Sub contractor, prior to commencement of any work at the site. Certify that the firm has obtained, reviewed and verified the criminal history for each person described above (PART 3).
- 5.6 In addition the contractor shall, obtain from each Sub contractor, prior to commencement of any work at the site. Certify that no person described above (PART 3) have been convicted of any offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy.
- 5.7 The background checks shall remain confidential in a file located in the Contractors / Sub-Contractors possession.
- 5.8 The Contractor shall be advised that the background checks may take longer than a week to obtain from the Texas Department of Public Safety.

**PART 6 ISSUANCE OF CLEARANCE IDENTIFICATION/ACCESS BADGES**

- 6.1 Only after an individual criminal history has been obtained, reviewed and verified by the Contractor / Sub Contractor, a badge, hardhat emblem, or other visible identification identifier should be issued to the individual.
- 6.2 On request by the district, the Contractor / Sub Contractor must make available to law enforcement (District Police Department) a list off all persons that a criminal history has been obtained, reviewed and verified and that have been issued clearance identification/access badges for this project.
  - A. SUBMITTAL
    1. Submit sample Identifier for project record.
- 6.3 RESPONSIBILITY
  - A. All work and expenses required to obtain clearance identification/access badges or for other activities required in this section shall be borne by the Contractor as part of the Contract.
- 6.4 RULES AND REGULATIONS REGARDING IDENTIFICATION BADGES
  1. Clearance identification/access badges provide access to the campus.
  2. Any employee found on the campus without an -issued clearance identification/access badge will be escorted from the site and not be allowed to return until wearing a proper clearance identification/access badge.
  3. All clearance identification/access badges are the property of the Contractor and must be immediately returned under the following conditions:
    - a. Upon expiration; Upon separation of employment (for any reason);
    - b. If convicted of, any disqualifying conviction under Texas Education Code 22.085

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 14 13 Certification of Compliance / Contractor Identification

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- c. The Contractor shall immediately notify the District of personnel, Suppliers or Subcontractors whose work is terminated or completed and shall ensure badges are returned within 30 days of notification.

6.5 Escorting:

1. Any district staff, may escort any individual(s). THE ESCORT MUST REMAIN WITH THE INDIVIDUAL(S) BEING ESCORTED AT ALL TIMES WHILE ON THE SITE.
2. Escorts shall be limited to five (5) individuals, or less, depending on the circumstances to ensure positive control is maintained at all times.
3. A non-badged person can be escorted a maximum of five (5) times in a calendar year, starting the day of the first escort.

6.6 All badges that are lost, stolen, or otherwise unaccounted for must be immediately reported to the District.

6.7 Unsecured Doors: Contractors and their employees will be held accountable for doors located within their work sites that provide direct or indirect access to the campus. Doors that provide such access must NOT under ANY circumstances be left open and unattended. Individuals who have been issued Contractor badges are required to challenge any individual attempting unauthorized access to the campus.

6.8 Contractors requiring access through vehicle gates must make arrangements for access through the General Contractor/Campus.

**PART 7 SPECIAL REQUIREMENTS**

- 7.1 Each campus has specific access procedures which may include campus specific verification software and other visitor management requirements.
- 7.2 Coordinate and comply with each campus' requirements prior to start of work for their individual process.

**PART 8 KEYS AND ACCESS CARD**

- 8.1 Contractors that require keys and/or access card to perform work at the project site shall coordinate with the assigned FBISD Project Manager.
- 8.2 Keys should never be issued to Sub Contractors.

**PART 9 FORMS (attached for your use)**

- 9.1 Certification of Criminal History Record Information Review by Contractor
- 9.2 Certification of Criminal History Record Information Review by Sub-Contractor

**End of Section 01 14 13**

**CERTIFICATION OF CRIMINAL HISTORY RECORD INFORMATION REVIEW BY  
CONTRACTOR**

**Certifying Affidavit submitted to:**

**Name of School District:** \_\_\_\_\_

**Mailing Address:** \_\_\_\_\_

**Project/Agreement:** \_\_\_\_\_

STATE OF TEXAS §

COUNTY OF \_\_\_\_\_ §

(1) The undersigned representative, on behalf of the contracting firm identified below, swears and affirms to \_\_\_\_\_ Independent School District (the "District") that such firm has obtained, reviewed and verified, from a law enforcement or criminal justice agency, the criminal history record information of all employees of the contracting firm hired *before January 1, 2008*, who (i) have or will have continuing duties related to the contracted services, and (ii) have or will have direct contact with students (substantial opportunity for verbal or physical interaction with students that is not supervised by a certified educator or other professional District employee). The undersigned further certifies that no employees of the contracting firm who meet the requirements of (i) and (ii) herein have been convicted of any offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy.

(2) The undersigned representative, on behalf of the contracting firm identified below, swears and affirms to the District, that such firm has obtained, reviewed and verified, from the Texas Department of Public Safety criminal clearinghouse, the national criminal history record information of all employees of the contracting firm hired *on or after January 1, 2008*, who (i) have or will have continuing duties related to the contracted services, and (ii) have or will have direct contact with students. The undersigned further certifies that no employees of the contracting firm, who meet the requirements of (i) and (ii) herein have been convicted of any offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy.

(3) The undersigned firm swears and covenants that no present or future employee of the contracting firm, no present or future independent contractor, and no present or future employee or independent contractor of any subcontractor of the contracting firm, will provide services to the Project on a continuing basis that involve direct contact with students unless and until such employee's or independent contractor's national criminal history record information has been reviewed, cleared and certified, as required herein. In the event of an emergency, an employee or independent contractor who has not been previously certified may only provide services that involve direct contact with students if such employee is escorted by a District employee.

(4) The undersigned firm swears and covenants that, upon receipt of information, directly or indirectly, that any employee or independent contractor of the contracting firm has been convicted of an offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy, the contracting firm will immediately remove or cause the removal of such employee from the Project or scope of the Agreement and notify the District.

\_\_\_\_\_, being duly sworn, affirms and certifies that he/she is the \_\_\_\_\_ (position) of \_\_\_\_\_ (contracting firm), and that all statements and acknowledgements contained herein are true and correct, and that he/she has the authority to bind such firm to the covenants set out above. \_\_\_\_\_

SUBSCRIBED AND SWORN TO BEFORE ME this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Notary Public \_\_\_\_\_ State of \_\_\_\_\_

My Commission expires \_\_\_\_\_

**CERTIFICATION OF CRIMINAL HISTORY RECORD INFORMATION REVIEW BY  
SUBCONTRACTOR**

**Certifying Affidavit submitted to:**

**Name of School District:** \_\_\_\_\_

**Mailing Address:** \_\_\_\_\_

\_\_\_\_\_

**Name of Contractor:** \_\_\_\_\_

**Mailing Address:** \_\_\_\_\_

\_\_\_\_\_

**Project/Agreement:** \_\_\_\_\_

STATE OF TEXAS                    §

COUNTY OF \_\_\_\_\_            §

(1) The undersigned representative, on behalf of the subcontracting firm identified below, swears and affirms to \_\_\_\_\_ Independent School District (the "District") and to the Contractor identified above that such firm has obtained, reviewed and verified, from the Texas Department of Public Safety criminal clearinghouse, the national criminal history record information of all employees of the subcontracting firm who (i) have or will have continuing duties related to the subcontracted services, and (ii) have or will have direct contact with students (substantial opportunity for verbal or physical interaction with students that is not supervised by a certified educator or other professional District employee). The undersigned further certifies that no employees of the subcontracting firm who meet the requirements of (i) and (ii) herein have been convicted of any offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy.

(2) The undersigned representative, on behalf of the subcontracting firm identified below, swears and covenants that no present or future employee of the subcontracting firm, no present or future independent contractor, and no present or future employee or independent contractor of any sub-subcontractor of the subcontracting firm, will provide services to the Project on a continuing basis that involve direct contact with students unless and until such employee's or independent contractor's national criminal history record information has been reviewed, cleared and certified as required herein. In the event of an emergency, an employee or independent contractor who has not been previously certified may only provide services that involve direct contact with students if such employee is escorted by a District employee.



(3) The undersigned firm swears and covenants that, upon receipt of information, directly or indirectly, that any employee or independent contractor of the subcontracting firm has been convicted of an offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy, the subcontracting firm will immediately remove or cause the removal of such employee from the Project or scope of the Agreement and notify the District.

(4) The undersigned firm further certifies that it has obtained certifications from all subcontractors whose employees (i) have or will have continuing duties related to the subcontracted services, and (ii) have or will have direct contact with students (substantial opportunity for verbal or physical interaction with students that is not supervised by a certified educator or other professional District employee), that such subcontractors have obtained, reviewed and verified, from the Texas Department of Public Safety criminal clearinghouse, the national criminal history record information of all employees of the subcontracting firm assigned to perform services to under the Project or Agreement, and that no employees have been convicted of any offense identified in Section 22.085 of the Texas Education Code or prohibited by District policy.

\_\_\_\_\_, being duly sworn, affirms and certifies that he/she is the \_\_\_\_\_ (position) of \_\_\_\_\_ (contracting firm), and that all statements and acknowledgements contained herein are true and correct, and that he/she has the authority to bind such firm to the covenants set out above.

\_\_\_\_\_

SUBSCRIBED AND SWORN TO BEFORE ME this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Notary Public \_\_\_\_\_ State of \_\_\_\_\_

My Commission expires \_\_\_\_\_

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 21 00 Allowances

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.

Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. Refer to the AIA A201 General Conditions and the Supplementary Conditions for additional requirements concerning allowances. If necessary additional requirements will be issued by Change Order (CO).

1. Allowances shall cover the cost to the Contractor of materials, all labor costs, and equipment delivered at the site, overhead, profit, bonds, insurance and all applicable taxes, less applicable trade discounts.
2. PCO (Potential Change Order) will be issued by the A/E via Kahua (Potential Change Order Module) to document and gain authorization to utilize allowance on a particular campus for items not covered in the original contract scope of work.
3. AEA (Allowance Expenditure Authorization) is used for authorization and tracking of use of contract allowances. A separate AEA series is used for each defined allowance.
4. Any needs beyond the means of the contract shall require Change Order(s).
5. CAEA (Contingency Allowance Expenditure Authorization ) shall only be used for necessary work authorized by the District and in addition to the contracts defined scope of work or to credit work deleted from the contract as authorized by the District.
6. The contingency allowance (if provided) is not an entitlement to the GC. Unused portions shall be removed from the contract via a final Change Order during contract closure.
7. A CO is only used when no other funding sources are available within the contract and contract value must be increased.
8. A CO is the only method for adding funding or to change the contract work or time (when funding from the contingency allowance included in the Contract is depleted). Types of allowances include the following:
  - a. Types of allowances include the following:
    - i. Lump-sum allowances.
    - ii. Unit-Cost allowances
    - iii. Quantity allowances
    - iv. Contingency allowances.
    - v. CSI Division allowances

- B. Related Sections:

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 21 00 Allowances

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1. Division 00 Competitive Sealed Proposal Form - Base Bid.
  2. Division 01 Section "Unit Prices" for procedures for using unit prices.
  3. Divisions 02 through 49 Sections for items of Work covered by allowances.

#### 1.3 SELECTION AND PURCHASE

- A. Contractor shall advise Architect and owner's representative of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work. All specific allowance scope shall be included in the schedule provided by the contractor.
- B. At Architect's or Program Manager's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Once the proposal is approved by the Owner, purchase products and systems selected by the Architect.

#### 1.4 SUBMITTALS

- A. Submit proposals for approval of purchase of products or systems included in allowances, in the form specified for Contingency Allowance Expenditure Authorization (CAEA), Allowance Expenditure Authorization (AEA), or as specified in Change Order.
- B. Submit all necessary backup per the contract requirements for approval of PCOs and AEAs.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

#### 1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

### **PART 2 PRODUCTS (Not Used)**

### **PART 3 EXECUTION**

#### 3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

#### 3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

#### 3.3 SCHEDULE OF ALLOWANCES

- A. Contingency Allowance Expenditure Authorization (CAEA) is a request for utilization of a specified portion of the contingency allowance included in the GC contract.
- B. An Allowance Expenditure Authorization (AEA) is a request for utilization of a specified portion of an allowance included in the GC contract.
- C. Each CAEA, AEA and CO must be listed separately on the schedule of values (SOV) in the pay application under the appropriate funding category or at the bottom of the SOV.

DIVISION 1 – GENERAL REQUIREMENTS

Section 01 21 00 Allowances

- 
- D. Change Orders (CO) are a request for utilization of a specific portion of contingency dollars outside the GC contract and it is used when no other funding sources are available within the contract.

**End of Section 01 21 00**

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 22 00 Unit Prices

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Sections:
  - 1. Division 00 Competitive Sealed Proposal Form – Alternates and Unit Pricing.
  - 2. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
  - 3. Division 01 Section "Quality Requirements" for general testing and inspecting requirements

#### 1.3 DEFINITIONS

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract documents are either increased or decreased.

#### 1.4 PROCEDURES

- A. A Unit Price is a cost for a unit of work, as described in the Proposal Documents. The Owner may add or deduct Unit Price work at the amounts stated on the Proposal Form and such amounts shall not be subject to additional mark-up by the Contractor or his Subcontractors.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. If the quantities of the items listed in the Schedule of Unit Prices are increased, the Unit Prices set forth by the Contractor shall apply to such increased quantities. Unit Prices for adjusting the Contract Sum for less work or material installation will be 95% of these amounts.

### **PART 2 PART 2 - PRODUCTS (Not Used)**

### **PART 3 EXECUTION (Not Used)**

**End of Section 1 22 00**

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 23 00 Alternates

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

#### 1.3 DEFINITIONS

- A. Alternate: An amount proposed by Proposers and stated on the Proposal Form for certain work defined in the Proposal Requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the total addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum. Pricing for alternates may not be submitted or listed in the form of an allowance amount on the proposal form.

#### 1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
  1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
  2. Cost listed for each Alternate includes cost of related coordination, modification or adjustment.
- B. Notification: Immediately following award of the Contract, Contractor shall prepare and distribute to each entity or person to be involved in the performance of the Alternate Work, a notification of the status of each Alternate scheduled herein. Indicate which alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates if any.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Contractor shall be responsible for any changes in the Work affected by acceptance of Alternates. Claims for additional costs or time extensions resulting from changes to the Work as a result of the Owner's election of any or all Alternates will only be considered if it is a deferred for later consideration.
- E. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

### **PART 2 PRODUCTS (Not Used)**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 23 00 Alternates

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**PART 3 EXECUTION**

3.1 SCHEDULE OF ALTERNATES

- A. Refer to section 00 Competitive Sealed Proposal forms for Schedule of Alternates

**End of Section 01 23 00**

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 25 00 Substitution Procedures

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
  - 1. Division 01 Section "Allowances" for products selected under an allowance.
  - 2. Division 01 Section "Alternates" for products selected under an alternate.
  - 3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
  - 4. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

#### 1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor and Owner.

#### 1.4 SUBMITTALS

- A. Substitution Requests: General Contractor to submit a copy of each request for consideration to be reviewed by A/E and owner. Identify product or fabrication or installation method to be replaced. Include related Specification Section number and title, Drawing numbers and titles and complete documentation for substitution Include the following information with each request:
  - 1. Certification by the Contractor to the effect that, in the Contractor's opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal to or better than the work required by the Contract Documents, and that it will perform adequately in the application indicated.
    - a. Include in a certification the Contractor's waiver of right to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.



## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 25 00 Substitution Procedures

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2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
  - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
  - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
  - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
  - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - e. Samples, where applicable or requested.
  - f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, where applicable or requested.
  - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated, where applicable or requested.
  - i. Research reports evidencing compliance with building code in effect for Project, from IBC, where applicable or requested.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum
3. Acceptance of substitutions will be delivered in writing by A/E, owner's representative or owner. Upon acceptance contractor will follow Section 01 33 00 Submittal Procedures and/or CSI division specifications for accepted substitutions.
4. Substitutions may be considered only when specified product or material is no longer available in the market; or if the product or

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 25 00 Substitution Procedures

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material provides a better value to the Owner and is within, or less than the project budget.

5. This Substitution procedure is not allowed during the Procurement Phase.
6. During the Construction Phase, all substitutions proposed by the GC shall be approved in writing by the A/E and the Owner.
7. Approval: If necessary, Architect will request additional information or documentation for evaluation within a reasonable amount of time from receipt of a request for substitution. Architect will recommend to the owner's representative acceptance or rejection of proposed substitution within a reasonable amount of time from receipt of all required documentation. Owners' representative will recommend to the District acceptance or rejection of proposed substitution within a reasonable amount of time from receipt of all required documentation. Upon recommendation from the owner's representative, the District will provide acceptance or rejection of proposed substitution within a reasonable amount of time from receipt of all required documentation.
  - a. Forms of Acceptance: Owner Provided Substitution Request Form, which can be attached to any of the following (as applicable): Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work with Design Manager and Owner written approval.
  - b. Rejection will include a statement giving reason for rejection from AE or Owner's representative.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

#### 1.6 PROCEDURES

- A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.
- B. The Owner may not consider the request if the Contractor cannot provide the product or method because of failure to pursue work promptly or coordinate activities properly.

## PART 2 PRODUCTS

### 2.1 SUBSTITUTIONS

Approval process for both types of substitutions shall be as described above.

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.
  1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 25 00 Substitution Procedures

- 
- requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - b. Substitution request is fully documented and properly submitted.
  - c. Requested substitution will not adversely affect Contractor's construction schedule.
  - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - e. Requested substitution is compatible with other portions of the Work.
  - f. Requested substitution has been coordinated with other portions of the Work.
  - g. Requested substitution provides specified warranty.
  - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- A. Substitutions for Convenience: Architect will consider requests for substitution if received within twenty (20) days after the Notice to Proceed. Requests received after that time may be considered or rejected at the discretion of Architect, only when there is an advantage to the Owner.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities that Owner may assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
    - b. Requested substitution does not require extensive revisions to the Contract Documents.
    - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - d. Substitution request is fully documented and properly submitted via Owner provided Substitution Request Form.
    - e. Requested substitution may not adversely affect Contractor's construction schedule.
    - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - g. Requested substitution is compatible with other portions of the Work.
    - h. Requested substitution has been coordinated with other portions of the Work.
    - i. Requested substitution provides specified warranty.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 25 00 Substitution Procedures

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- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
  - B. System Substitution: No changes should be anticipated in major building system types or approved manufactures in pricing of schedule; the Owner has standardized materials in place in existing buildings, and will not change for the convenience of the contractor.

PART 3 - **EXECUTION (Not Used)**

PART 4- **FORMS (attached for your use)**

4.1 Substitution Request Form

**End of Section 01 25 00**



<b>Substitution Request</b> (Must be submitted within 15 days after date of contract, unless special circumstances exist)
To: <u>Carolina Fuzetti – Executive Director Design and Construction</u> Date: _____
AE Firm: _____ Project Manager: _____
BP #: ____ Org No: ____ Project Name: _____
Submission #: ____ Contractor: _____
Project Type:    ____ Addition            ____ Renovation            ____ New Construction

*SUBSTITUTIONS MUST BE ORIGINATED BY CONTRACTOR & EVALUATED BY A/E / DESIGN AND CONSTRUCTION PRIOR TO SUBMITTAL TO BOND OFFICE.*

**Description of Substitution:**

**Reasons for Request:** (specified product no longer available, extended warranty, lower initial cost, reduced maintenance cost, better quality, available immediately, schedule improvement, other): \_\_\_\_\_

**Credit due to District, if any:** \$ \_\_\_\_\_.

**Reduced Contract Time, if any:** \_\_\_\_\_ days

**Product Listing Schedule:** (Attach any required documentation)

Related unit-of-work Specifications Section #	
Generic name as used in the Contract Documents	
Proprietary name, model number, and similar product designation	
Prime Contractor Name / Phone #	
Sub-Contractor Name / Phone #	
Rationale: (Why is change needed?)	
Features & Benefits: (What is the benefit to FBISD?)	

Potential Issues: (What are the drawbacks or negative impacts?)	
Construction Impact: (What is the potential impact to cost or schedule?)	
O&M Impacts: (What are the potential impacts to parts & labor maintenance cost, spare parts inventory, and current maintenance practices?)	
Utility Cost Impact: (What is the potential impact on electric, gas and water utility consumption and cost to FBISD?)	
Drawing #	

Page 1 of 2	<b>MODULE: CONSTRUCTION PHASE</b>	<b>4.07</b>
Date Issued: January 7, 2019	<b>SECTION: 4.07 Submittals and Substitutions</b>	
Revision Date: April 17, 2020	<b>TASK/DOCUMENT: 4.07.1 Substitution Request Form Sample</b>	



**Contractor’s Certification:**

In the Contractor’s opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal to or better than the work required by the Contract Documents, and it will perform adequately in the application indicated. The Contractor waives the rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.

\_\_\_\_\_

General Contractor’s or Representative Signature

Date

	APPROVED	REJECTED	DATE	REASON
A/E’s Recommendation (within 2 wks. of receipt)				
FBISD Facilities Recommendation				

Pending Information Noted below:

**Final Response to Substitution Request:**    \_\_\_\_ Approved    \_\_\_\_ Not Approved

\_\_\_\_\_ Date

\_\_\_\_\_ Date

\_\_\_\_\_ Date

Refer to Specifications Section 01 60 00 for additional provisions and GC Agreement 3.4.2.1 and 3.5.1.

A/E, PM and/or District are not authorized to waive any code requirements. If the Request is approved, when signed by the District and Project Manager and received by the Contractor, this document becomes effective immediately as a FBISD Approved substitution and the GC Firm shall proceed with the change(s) described above. If the Request is not approved, no changes can be implemented

Page 2 of 2	<b>MODULE: CONSTRUCTION PHASE</b>	<b>4.07</b>
Date Issued: January 7, 2019	<b>SECTION: 4.07 Submittals and Substitutions</b>	
Revision Date: April 17, 2020	<b>TASK/DOCUMENT: 4.07.1 Substitution Request Form Sample</b>	



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 26 00 CONTRACT MODIFICATION PROCEDURES

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections:
  - 1. Changes to the Contract may involve close coordination between this Section and Section listed below. Retain Section in subparagraph below that contains requirements Contractor might expect to find in this Section but are specified in other Sections.
  - 2. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 PROPOSAL REQUESTS –

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
- B. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change without Owner approval
- C. Within time specified in Proposal Request or five (5) days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
  - 1. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 2. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 3. Include costs of labor and supervision directly attributable to the change.
  - 4. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- D. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to the Architect.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 26 00 CONTRACT MODIFICATION PROCEDURES

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1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

- A. The A/E will issue a work change proposal request using the district's program management information system (PMIS). A potential change order (PCO) will be issued in the PMIS under the PCO module. The contractor will upload all appropriate backup per the requirements in the AIA 201 under section 7. Upon execution of workflow and approval of the PCO the contractor will be provided approval via email or PMIS notification and work can begin. A CO will be issued at a later date to be agreed upon by A/E, contractor and owner's representative.
  1. Construction - PCOs: This category is used to capture any Potential Change anticipated during the life of the projects. All AEA's, CAEA's, and COs are initiated with a PCO as well as any potential item identified by the owner's representative that may end up being voided.
  2. PCOs Reports: Several Prolog Report are available. The categorization established allows reports to be provided for specific categories depending on the request or the audience.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 26 00 CONTRACT MODIFICATION PROCEDURES

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C. PROCESS:

1. CCDs will be issued by the A/E via Prolog (Potential Change Order Module) and the documents will be signed via DocuSign.
2. The Project Team will review the GC Construction Schedule for evidence of potential time impact to the Construction Schedule, contract or related contracts. The GC will be required to demonstrate that the change impacts specific critical activities in the overall schedule, and to what extent. Determination of impact to fees and other costs resulting from schedule delays to be provided to owner's representative and the District for review, approval or rejection.
3. The Project Team will conduct a CPM review, and may include preparation of independent fragment analysis where necessary to verify the criticality of the proposed changed work.
4. The PMT may produce a partial CPM schedule that displays any significant time impact of the proposed change for further analysis.
5. The PMT will keep these analyses confidential in a restricted access file.
6. The GC will be required to prepare recovery schedules to minimize delays.
7. Negotiations: The PM will schedule and coordinate the negotiation sessions. Attendees will include the GC, the representatives from the District, the PM and A/E.
8. The Negotiation Team will meet with the GC with the intent to negotiate an agreement. The number of negotiating sessions will be based on the complexity of the issues and the scope of the change.
9. If there is no agreement with the GC during negotiations, and it is determined that the Change is required, the A/E will prepare an AIA Form G714 Construction Change Directive (CCD).
10. If there is an agreement, the A/E will initiate a CO as appropriate.
11. The PM will monitor all CCDs and report the status to the District.
12. Document Control collects required signatures via DocuSign, ensures that files are saved electronically and files the original CCD in the hardcopy files.

**PART 2 PRODUCTS (Not Used)**

**PART 3 EXECUTION (Not Used)**

**End of Section 01 26 00**

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 29 00 Payment Procedures

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Provisions established within the General, Supplementary and Other Conditions of the Contract, Division 1 – General Requirements, and Drawings are collectively applicable to this Section.

#### 1.2 REQUIREMENTS

- A. By the 25th of the month, the Project Manager (PM), the Architect (A/E), and the General Contractor (GC) meet to conduct a quality control of the current month Payment Application with attachments.
- B. The A/E and PM perform visual observations of the work in order to verify GC estimates of job progress, including verification of stored materials in bonded warehouses. The GC, PM and A/E meet to determine appropriate percentages of completion on all items on the Schedule of Values (SOV).
- C. Upon agreement by the PM and A/E, the GC submits Payment Application (Pay App) in District approved format via Kahua, as per GC Agreement with all necessary supporting material. The GC includes any required back-up documents (PDF format) to substantiate work completed, at minimum: SOV, Monthly Schedule with baseline, SBE report.
- D. The A/E reviews the pay application. If there is need for clarification or additional information, the A/E discusses with the GC and obtains the needed information. Upon approval, the A/E approves certifies the Pay Application (Pay App) and approves the workflow in Kahua and notifies PM (via workflow). If the Pay App is not approved, the A/E sends it back to the GC for resubmission.
- E. The PM reviews the pay App. If not approved, sends back to GC for resubmission. If the workflow is approved, Kahua workflow notifies District's Design & Construction (D&C) Construction Manager for review.
- F. D&C Construction Manager reviews and approves the Pay App in Kahua, notifies Controls Manager via Kahua workflow. If the Pay App is not approved, Construction Manager sends Pay App to PM for resubmission.
- G. Controls Manager reviews and approves the Pay App in Kahua, notifies District's Design & Construction (D&C) Director. If the Pay App is not approved, Controls Manager sends Pay App to PM for resubmission.
- H. The District's D&C Executive Director approves the Pay App in Kahua and notifies D&C Budget Accounting Associate (via workflow). If not approved, send Pay App to PM for resubmission.
  - I. D&C Accounting Associate reviews and inputs Pay App in PeopleSoft. If not approved send Pay App back to PM for resubmission. If approved send to District's accounting for processing.
  - J. District's Accounting processes payment to GC in People Soft and notifies GC. Checks are cut on Tuesdays and Thursdays and issued via Automated Clearing House (ACH) system for electronic checks transfer.
- K. Wednesday and Friday the GC receives payment.

#### 1.3 RELATED SECTIONS/DOCUMENTS

- A. General Conditions: Progress Payment, and Final Payment.
- B. Section 013300 – Shop Drawings, Product Data and Samples

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 29 00 Payment Procedures

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- C. Section 012973 – Schedule of Values
- D. Section 013120 – Small Business Enterprise Procedure
- 1.4 FORMAT
  - A. AIA G702 – Application and Certificate for Payment
  - B. For continuation sheet, use AIA G703 in format at Section 012973 for schedule of values.
- 1.5 PREPARATION OF PAY APPLICATIONS
  - A. Type required information or use media printout.
  - B. Execute certification by authorized officer.
  - C. Use data on approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for products.
  - D. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for original item of Work.
  - E. Prepare one application with a schedule of values for each school with a breakdown in the current CSI format. Payment Application format may be provided by the PM.
  - F. Each school shall have a separate schedule of values for Renovation Work and for Addition Work.
- 1.6 SUBMITTAL PROCEDURES
  - A. Schedule meeting (20) days prior to submitting first pay request, to review schedule with Architect and Project Manager.
  - B. Submit one (1) original copy of each Application for Payment at times stipulated in Agreement.
  - C. Submit Pay Application via Owners designated software (Kahua). Include with the submission:
    - 1. G702, G703
    - 2. SBE Utilization Report
    - 3. Contractor Release of Liens
    - 4. Sub-contractor Release of Liens
    - 5. Projected Contractor Invoicing schedule (Cashflow) for the next 6 months
    - 6. Updated construction schedule (complying with contract dates)
  - D. Payment Period: Submit at intervals stipulated in the Agreement.
- 1.7 SUBSTANTIATING DATA
  - A. When Architect requires substantiating information, submit data justifying line item amounts in questions. On Owner controlled allowance items, submit actual invoices from supplier of product or service.
- 1.8 FORMAT AND SUBMITTAL REQUIREMENTS
  - A. Set-up format and submittal requirements include but are not limited to the following:
    - 1. Contractor must use AIA G702 and AIA G703 forms for Application for Payment or form provided by PM.
    - 2. All values should be taken to the hundredth (dollar).
    - 3. All items must be broken down by school, by addition/renovation (where applicable). This break down must

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 29 00 Payment Procedures

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- match the breakdown as specified in the GC Contract or established with the Program Manager.
  4. All items must be organized by the current CSI division.
  5. All items must be broken down by material and labor.
  6. All applicable current CSI divisions must be sub-totaled.
  7. Each addition/renovation (where applicable) and school must be sub-totaled.
  8. The Owner's Contingency Allowance (O.C.A.) should occupy one line item at the bottom of each addition/renovation and match the amount specified in the GC contract. This line item should be separated from any other CSI division.
  9. All other contract allowances (pre-bid or post-bid) should be specified per the GC contract.
  10. General Conditions, P&P Bonds, Insurances, Fees, Building Permits, Mobilization, and De-mobilization must be identified.
- B. Post-set-up format and submittal requirements include but are not limited to the following:
1. Contractor may not change the "scheduled values" after approval of the Schedule of Values (SOV) by the A/E, PM, and FBISD (at first Application for Payment).
  2. Include FBISD P.O. number on AIA G702.
  3. Include FBISD P.O. number in application number. For example, "222123-3" would be the third Application for Payment for P.O. 222123.
  4. Certified by A/E.
  5. Previous invoice totals match previous invoice.
  6. Attach an SBE Pay Sub Contractor/Sub Consultant Utilization Report, signed or acknowledged by e-mail or waiver by all SBE subcontractors. (Acknowledgment must include amount paid during current period.)
  7. Attach an SBE Pay Sub Contractor/Sub Consultant / Suppliers Payment Certification Form, signed or acknowledged by e-mail or waiver by all SBE subcontractors. (Acknowledgment must include amount paid during current period.)
  8. Attach a schedule for each project, updated for the billing period, with Substantial Completion dates per GC contract or applicable CO.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 EXECUTION (Not Applicable)**

**End of Section 01 29 00**

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 29 73 Schedule of Values

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Provisions established within the General, Supplementary and Other Conditions of the Contract, Division 01 – General Requirements, and the Drawings are collectively applicable to this Section.

#### 1.2 REQUIREMENTS INCLUDED

- A. Procedures for preparation and submittal of Schedule of Values (SOV).

#### 1.3 RELATED SECTIONS/DOCUMENTS

- A. General Conditions.
- B. Section 01 29 00 – Payment Procedures.

#### 1.4 FORMAT

- A. Print SOV on AIA Documents G703 – Continuation Sheet for Application and Certificate for Payment.
- B. Follow Table of Contents of Project Manual for listing components parts. Identify each line item by number and title of major Specifications Section.

#### 1.5 CONTENT

- A. Using the current Master Format™ Edition, in CSI format, each school shall have a separate SOV for Renovation Work and for Addition Work, as applicable.
- B. In CSI format, list installed value of each major item of Work to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar. All values should be taken to the Dollar.
- C. List Owner Controlled Contingency Allowance and other allowances with the specified monetary amount for each allowance in separate divisions.
- D. Contractor to use separate lines for bonds, insurance, temporary facilities and controls, superintendents, mobilization, and demobilization. Each item shall include prorated portion of overhead and profit.
- E. Provide line item for safety on the SOV.
- F. Provide line item for closeout on the SOV.
- G. The sum of the values listed shall equal total Contract Sum.

#### 1.6 SUBMITTAL

- A. GC prepares and submits a SOV timely prior to the submittal of the first pay application and that the A/E and PMT reviews and responds prior to the approval of the first pay application.
- B. Upon resolution of issues, the PM is responsible for providing a letter accepting the SOV.
- C. Payment against the approved SOV is based on earned value which is derived from the status of the construction as observed by the A/E and PM.
- D. Submit a copy via Kahua transmittal of the SOV within ten (10) days of award of contract and prior to Pre-Construction Meeting or first pay application.
- E. Identify Project by title and number.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 29 73 Schedule of Values

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F. Secure the A/E and owner's representative (PM) approval of the SOV prior to submitting the first Pay Application.

G. The activities on the SOV are to reflect construction by area or phase.

H. Breakdown all costs into equipment, materials, and labor.

#### 1.7 SUBSTANTIATING DATA

A. When the A/E or the PM requires substantiating information, submit data justifying line item amounts in question.

B. Provide one (1) copy of data with cover letter for each copy of Pay Application. Show Pay Application number and date and line item by number and description.

**PART 2 PRODUCTS (Not Applicable)**

**PART 3 PART 3 – EXECUTION (Not Applicable)**

**End of Section – 01 29 73**



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 31 00 Project Management and Coordination

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings, specifications, and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General project coordination procedures.
  - 2. Administrative and supervisory personnel.
  - 3. Requests for Information (RFIs).
  - 4. Project meetings.
  - 5. Closeout Procedures
- B. Related Sections:
  - 1. Division 01 Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Division 01 Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during construction.

1.4 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Pre-installation conferences.

DIVISION 1 – GENERAL REQUIREMENTS  
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7. Project closeout activities.
8. Startup and commissioning of systems.

1.5 KEY PERSONNEL

- A. Key Personnel Names: Within ten (10) days following Notice to Proceed, submit a list of key personnel per submittal procedures in 01 33 00, including superintendent and other personnel in attendance at Project site. Identify individuals; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses.
  1. Post copies of list in project meeting room, in temporary field office, in construction safety manual, and provide copies electronically to AE, owner's representative or others upon request. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified using the Program Manager's electronic project management software.
  1. Architects will respond to RFIs that are initiated by the contractor and not by other entities controlled by Contractor.
  2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
  3. Contractor uses the RFI to request direction and/or clarification resulting from, but not limited to the following:
    - a. Conflicts, omissions, ambiguities, or discrepancies within the Contract Documents
    - b. Conflicts between the Contract Documents and any provision of code or regulation applicable to the performance of the work
    - c. Conflicts between the Contract Documents and any standard specification or instruction of a manufacturer
    - d. Conflicts with differing existing conditions.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.

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11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form generated using Owner's designated software with substantially the same content as indicated above.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received on the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing via the owner's designated software within seven (7) days of receipt of the RFI response.
- E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit on a weekly basis a log of RFI's organized by the RFI number. The log should be generated using the Owner's designated software.

## 1.7 PROJECT MEETINGS

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 31 00 Project Management and Coordination

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- A. Preconstruction Conference: Architect and Project Manager will schedule and conduct a preconstruction conference at the earliest possible date after the execution of the Agreement and before starting construction, at a time convenient to Owner, PM and Architect.
1. Purpose of the conference will be to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner, PM, Architect, and their consultants; Contractor and its superintendent; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect progress, including any or all of the following:
    - a. Introductions
    - b. Submission of Post Proposal Information if any outstanding
    - c. Tentative Construction schedule.
    - d. Meetings: dates, locations, attendees, types, agendas
    - e. Communication: Owner's representative electronic project management software, correspondence flow
      - 1) Lines of communications
    - f. Schedule:
      - 1) Phasing
      - 2) Critical work sequencing and long-lead items
    - g. Designation of key personnel and their duties
    - h. Procedures for processing field decisions and Change Orders
    - i. Procedures for RFIs
    - j. Consultant / Lab Notification Requirements
      - 1) HazMat
      - 2) Roofing
      - 3) Envelope
      - 4) Test & Balance
      - 5) Materials Testing
      - 6) Commissioning
      - 7) Other Inspections as applicable.
    - k. Procedures for processing Applications for Payment
      - 1) AIA G702 and G703 (Schedule of Values)
      - 2) Cash flow
      - 3) Updated Schedule
      - 4) AE Review
      - 5) SBE
    - l. Distribution of the Contract Documents.
    - m. Submittal procedures.

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Section 01 31 00 Project Management and Coordination

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- n. Preparation of record documents.
  - o. Use of the premises and existing building
  - p. Work restrictions.
  - q. Working hours.
  - r. Owner's occupancy requirements.
  - s. Responsibility for temporary facilities and controls.
    - 1) Site access
    - 2) Signage
    - 3) Dumpsters
    - 4) Fencing
    - 5) SWPPP
    - 6) Parking availability
    - 7) Office, work and storage areas
    - 8) Equipment deliveries and priorities
  - t. Procedures for disruptions and shutdowns.
  - u. Safety
    - 1) Emergency Contact List
    - 2) First aid.
    - 3) Site Security.
  - v. Progress cleaning.
4. Minutes: Architect will record and distribute meeting minutes using the Program Manager's electronic project management software.
- B. Progress Meetings: The architect and the Project Manager will schedule and administer progress meetings at weekly intervals.
- 1. Contractor shall make physical arrangements at site for the progress meetings.
  - 2. Location of meetings: Contractor's field office, unless agreed upon mutually by the Architect, Contractor and PM.
    - a. Determine at the Pre-construction Meeting if space in the existing facility or facilities is available for meetings.
    - b. For multiple school Bid Packages, weekly progress meetings will be held at each school site on a rotating basis. Site specific meetings will be held at the discretion of the PM.
  - 3. AE will prepare agenda, distribute notice of the meeting, PM will preside at meetings. AE will record minutes and distribute copies within five (5) days after meeting to participants, and to entities affected by decisions at meetings. Distribution will come from owner's software or email.
  - 4. Coordinate dates of meetings with preparation of payment requests.
  - 5. Attendees:  
In addition to representatives of Owner, Owner's representative, Professional Consultants, as appropriate to the agenda, and Architect, each contractor, job superintendent, subcontractor,

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supplier, and other entities as appropriate to the agenda shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

6. Agenda will contain some or all of the content below:
  - a. Review and correct or approve minutes of previous progress meeting.
  - b. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - 1) Safety (lost time, accidents, violations, etc.)
    - 2) Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time including PCOs.
      - a) Review schedule for next period.
    - 3) New Business (Field observations, problems, decision, identification of problems which impeded planned progress, non-confirming work, etc.)
    - 4) RFI's and RFI log review
    - 5) Submittals and submittal log review
    - 6) PCOs, CAEAs and related log reviews
    - 7) Review of draft Application for Payment, as necessary.
    - 8) For new schools: LEED Certification status and strategy.
  - c. Review present and future needs of each entity present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Access.
    - 4) Site utilization.
    - 5) Temporary facilities and controls.
    - 6) Progress cleaning.
    - 7) Quality and work standards.
    - 8) Status of correction of deficient items.
    - 9) Field observations.
    - 10) Pending claims and disputes.

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Section 01 31 00 Project Management and Coordination

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7. Minutes: Using the Owner's designated software, the entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner, PM, and Architect of scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following as applicable:
    - a. Contract Documents.
    - b. Related RFIs.
    - c. Submittals.
    - d. Review of mock-ups.
    - e. Possible conflicts.
    - f. Compatibility problems.
    - g. Time schedules.
    - h. Weather limitations.
    - i. Manufacturer's written recommendations.
    - j. Warranty requirements.
    - k. Compatibility of materials.
    - l. Acceptability of substrates.
    - m. Space and access limitations.
    - n. Testing and inspecting requirements.
    - o. Installation procedures.
    - p. Coordination with other work.
    - q. Required performance results.
    - r. Protection of adjacent work.
    - s. Protection of construction and personnel.
    - t. For new schools: LEED Certification status and strategy.
  3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions. The meeting minutes will be documented by the GC.
  4. Reporting: GC shall distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Reinstallation Conference: When required in individual Specification Sections, convene a reinstallation conference at work site prior to commencing work of the section.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 31 00 Project Management and Coordination

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1. Require attendance of entities directly affecting or affected by Work of the Section.
  2. Notify Owner, PM and Architect at least seven (7) days in advance of meeting date.
  3. GC shall prepare agenda, preside at conference, record minutes, and distribute copies within five (5) days after conference to participants.
  4. Review conditions of reinstallation, preparation and installation procedures, and coordination with related work.
- E. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner, Owner's representative and Architect, but no later than thirty (30) days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Owner's representative, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following: Preparation of record documents.
    - a. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - b. Submittal of written warranties.
    - c. Requirements for preparing operations and maintenance data.
    - d. Requirements for demonstration and training.
    - e. Preparation of Contractor's punch list.
    - f. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - g. Submittal procedures.
    - h. Responsibility for removing temporary facilities and controls.
    - i. Review of General Contractor Close Out Checklist (see Part 3 – Execution)
    - j. Commissioning
    - k. Testing and Balancing.
  4. Minutes: Architect will record and distribute meeting minutes using the Owner's designated software.

**PART 2 PRODUCTS (Not Used)**

**PART 3 EXECUTION**

- 3.1 The General Contractor Close-out checklist will be completed by the owner's representative, architect, and general contractor. A copy will be submitted with the substantial completion AIA G704 and the certificate of final completion. The checklist can be found under section 01 77 00.



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 31 00 Project Management and Coordination

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**End of Section 01 31 00**

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 31 13 Project Coordination

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### **PART 1 GENERAL**

#### 1.1 SECTION INCLUDES

- A. This Section specifies administrative and procedural requirements necessary for coordinating Work operations including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.

#### 1.2 RELATED REQUIREMENTS

- A. Section 01 32 16: Construction Schedule.
- B. Section 01 33 00: Submittal Procedures.
- C. Section 01 45 23: Test and Balance and Commissioning for HVAC.
- D. Section 01 77 00: Contract Closeout.

### **PART 2 PRODUCTS (Not used)**

### **PART 3 EXECUTION**

#### 3.1 COORDINATION

- A. Contractor shall coordinate operations included in various sections of Contract Documents to assure efficient and orderly installation of each part of Work. Coordinate Work operations included under related sections of Contract Documents that depend on each other for proper installation, connection, and operation of Work, including but not limited to:
  - 1. Schedule construction operations in sequence required where installation of one part of Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
  - 3. Provide provisions to accommodate items scheduled for later installation.
  - 4. Prepare and administer provisions for coordination drawings.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required in notices, reports, attendance at meetings, and:
  - 1. Prepare similar memoranda for Owner and Separate Work Contract where coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of Work. Such administrative activities include, but are not limited to, following:
  - 1. Preparation of schedules.
  - 2. Installation, relocation, and removal of temporary facilities.
  - 3. Delivery and processing of submittals.
  - 4. Progress meetings.
  - 5. Project closeout activities.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 31 13 Project Coordination

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- D. Conservation: Coordinate Work operations to assure operations are carried out with consideration given to conservation of energy, water, materials, and:
    - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into Work.

#### 3.2 SUBMITTALS

- A. Coordination Drawings: Contractor shall prepare coordination drawings to coordinate the installation of products and materials fabricated, furnished and installed by separate entities, under different parts of the Contract. Contractor shall notify Owner and Architect of all major conflicts in writing in a timely manner so that the design team can respond without construction delays. Coordination drawings shall address the following at a minimum:
  - 1. Limitations in available space for installation or service. Contractor shall overlay plans of each trade and verify space requirements and conflicts between trades. Minor changes and adjustments that do not affect design intent shall be made by Contractor and shall be highlighted for Architect's review.
  - 2. Incompatibility between items provided under different trades (such as difference in voltage between equipment specified under Divisions)
  - 3. Inconsistencies between drawings, specifications and codes (between trades and within each trade).
  - 4. Additional items required for existing facilities construction projects shall be designed and prepared from available as-built drawings that are verified through non-invasive and non-destructive, visual observation only. Contractor shall field verify actual existing conditions during and upon completion of demolition work and incorporate findings into preparation of co-ordination drawings. Minor changes and adjustments that do not affect design intent shall be made by Sub-Contractor and shall be highlighted for Owner and Architect's reviews.
- B. Prepare coordination drawings in CAD with each trade on a separate layer, in specified color and scale. Contractor and each Subcontractor shall provide and forward reproducible copies and CAD drawing files in the order described here:
  - 1. Structural shop drawings shall indicate location and sizes of columns, beams and other structural members, as well as wall, roof and slab penetrations, and will be provided to mechanical, electrical, low voltage and plumbing Sub-contractors for co-ordination. Structural items shall be indicated using black lines.
  - 2. HVAC Subcontractor will indicate all ductwork, piping and equipment complete with installation and dimensioned service clearances, duct and pipe sizes, fitting types and sizes, top or bottom of duct and pipe elevations, distances of ducts, pipes and equipment from building reference points and hanger and support locations. Minor changes and adjustments that do not affect design intent shall be made by Subcontractor and shall be

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 31 13 Project Coordination

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- highlighted for Owner and Architect's reviews. Forward drawings to plumbing, electrical and low voltage Subcontractor for further coordination. HVAC items shall be indicated using orange lines.
3. Plumbing Subcontractor will indicate all plumbing lines, and equipment complete with installation and dimensioned service clearances, pipe sizes, fitting types and sizes, top or bottom of pipe elevations, distances of pipes and equipment from building reference points and hanger/support locations. Coordinate with HVAC Subcontractor. Minor changes and adjustments that do not affect design intent shall be made by Sub-contractor and shall be highlighted for Owner and Architect's reviews upon completion drawings shall be forwarded to Fire Sprinkler Subcontractor for further coordination. All Plumbing items shall be indicated using blue lines.
  4. Fire Sprinkler Subcontractor will indicate fire sprinkler piping and equipment complete with installation and dimensioned service clearances, pipe sizes, fitting types and sizes, top or bottom of pipe elevations, distances of pipes and equipment from building reference points and hanger or support locations. Coordinate with Plumbing and HVAC Subcontractors. Minor changes and adjustments that do not affect design intent shall be made by sub-contractors and shall be highlighted for Owner and Architect's reviews. Upon completion drawings shall be forwarded to Electrical and Low Voltage Contractor for further coordination. Fire sprinkler equipment shall be indicated using red lines.
  5. Electrical and Low Voltage Subcontractors will indicate service and feeder conduit runs and other electrical equipment complete, including low voltage with installation and dimensioned service clearances, sizes, top or bottom of conduit and rack elevations, distances of conduits and equipment from building reference points and hanger and support locations. Coordinate with Fire Sprinkler, Plumbing and HVAC Subcontractors. Minor changes and adjustments that do not affect design intent shall be made by sub-contractors and shall be highlighted for Owner and Architect's reviews. Upon completion drawings shall be forwarded to Contractor for further coordination. Electrical work shall be indicated in dark green lines. Low voltage work shall be indicated in light green lines.
  6. Contractor will be responsible for the overall coordination review. As each coordination drawing is completed, Contractor will meet with Owner to review and resolve all conflicts on coordination drawings.
  7. Coordination meetings will be held in Project field office of Contractor. Contractor is required to distribute Shop Drawings, cut sheets and submittals to Subcontractors where appropriate. Reviewed coordination drawings will be maintained in Project field office of Contractor. Meeting minutes shall be developed by Contractor and submitted to Owner within 5 days.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 31 13 Project Coordination

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8. GC will provide coordination effort for Owner provided consultants (included, but not limited to, Material Testing, Roofing Commissioning, Testing and Balancing) to ensure that activities meet contractual and schedule requirements.

**End of Section 01 31 13**



Fort Bend Independent School District

Small Business Enterprise Program Procedures  
Spring 2023

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## I. SUMMARY OF FORT BEND INDEPENDENT SCHOOL DISTRICT'S SMALL BUSINESS ENTERPRISE PROGRAM

Fort Bend Independent School District's Small Business Enterprise Program ("SBEP" or the "Program") was created to provide increased business opportunities for locally certified small businesses to participate in contracting and procurement at Fort Bend Independent School District (FBISD).

Shown below are the key features of the Program.

- The SBEP is a goal-oriented program, requiring contractors to whom FBISD awards prime contracts for design services or construction services to use "Good Faith Efforts" to utilize certified small businesses.
- The Program applies only to SBEP Eligible contracts, defined as all contracts for architectural design services, engineering design services or construction services valued at \$50,000 or greater, except contracts for sole-source items, federally funded contracts, contracts with other governmental entities, and those contracts that are otherwise prohibited by applicable law or expressly exempted by FBISD. The SBEP shall not apply to contracts for goods and non-construction services.
- The SBEP is a race and gender-neutral program.
- FBISD has set an annual SBEP participation goal of twenty-five (25%) percent of the dollar amount of all SBEP-Eligible contracts. FBISD recognizes that individual actual participation may vary based on subcontracting opportunities, availability of small businesses, and price competitiveness. The participation goal may change from year to year based on all relevant factors considered.
- To participate, small businesses must be certified by an agency or organization whose certification is recognized by FBISD. Certification is based on the firm's gross revenues or number of employees averaged over the past five years, inclusive of any affiliates as defined by 13 C.F.R. § 121.103, does not exceed the size standards as defined pursuant to Section 3 of the Small Business Act and 13 C.F.R. § 121.201.
- The U.S. Small Business Administration-SBA.gov website [Qualifying as a Small Business](#).

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The Small Business Enterprise Program provides benefits to the small business including:

- Providing assistance to small businesses, by providing information and support.
- Assisting small businesses by offering training and information regarding insurance and surety bonding.
- Requiring prospective vendors to provide written assurance of small business participation in their proposals for SBEP Eligible contracts.
- Providing workshops on issues frequently encountered by small businesses during the proposal process and generally while performing work at FBISD.
- Maintaining an updated small business directory and source list(s) to help identify qualified and available small businesses; providing information on the FBISD website about opportunities to do business with FBISD.
- Providing information on the FBISD website about SBEP Eligible procurements.

## **II. OPERATIONAL PROCEDURES**

The procedures herein are established to govern the program components of the SBEP, including, without limitation, program compliance, certification, specific implementation measures, small business status verification, and reporting of small business participation.

### **A. SCOPE**

These procedures apply to all FBISD Departments, architectural/engineering firms, and general contractors performing work on SBEP Eligible contracts, and all certified Small Business Enterprises. These procedures apply to those SBEP-Eligible contracts as defined herein.

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## **B. OVERALL ANNUAL SBEP GOAL**

1. An overall annual goal for small business participation in architectural design services, engineering design services, and construction services at FBISD is set at twenty-five (25%) percent of the dollar amount of all SBEP-Eligible contracts.

FBISD staff shall provide updates/reports, when needed, to the FBISD Board of Trustees calculating small business utilization.

2. An SBEP-Eligible contract may otherwise be exempt from a small business goal if it is determined that one or more of the following is present:
  - a. A public or administrative emergency exists that requires the goods or services to be provided with unusual immediacy; or
  - b. The goods or services requested are of such a specialized, technical, or unique nature as to require FBISD to be able to select its contractor without application of small business provisions; or
  - c. The application of small business provisions would impose an unwarranted economic burden or risk on FBISD, would unduly delay acquisition of the labor, goods or services, or would otherwise not be in the best interest of FBISD; or
  - d. The possible small business participation level based on small business availability would produce negligible or no small business participation.

All SBEP exemptions must be approved by an authorized FBISD representative.

## **C. PROGRAM ACTIVITIES AND RESPONSIBILITIES**

In an effort to maximize the Program's activities, the following procedures are in place to maximize opportunities for small business participation:

1. FBISD has designated the Small Business Enterprise Program Coordinator to implement the District's structured small business program under the direction of the FBISD Design and Construction Department.
2. FBISD may designate staff members to act as advisors and to work directly with small businesses and contractors to provide information, assistance, and support. FBISD's Small Business Enterprise Program Coordinator and/or staff will undertake various tasks to make the Program workable, including the following:
  - Coordinate workshops and/or training sessions for small businesses on challenges frequently encountered by small businesses during the proposal process and generally when performing work for FBISD;

- In coordination with the Purchasing Department, provide specifications and requests for proposals to the small business community in a timely manner, to allow small businesses adequate opportunity to develop responsible and responsive quotations and proposals;
- Enhance the FBISD database to identify SBEP-Certified Small Businesses and assist Contractors in identifying SBEP-Certified Small Businesses with which to subcontract;
- Participate in pre-proposal seminars, when needed, to explain small business requirements, including explanation of the forms that must be submitted with a proposal;
- Coordinate outreach activities for small businesses to ensure access and opportunity to compete;
- Conduct internal information sessions to inform and acquaint FBISD staff with the goals and objectives of the SBEP and to sensitize them to the problems of small businesses;
- Maintain lists of SBEP-Certified Small Businesses and coordinate with listings from other agencies, e.g., Port of Houston Authority SBE Certification, Metropolitan Transit Authority of Harris County (METRO) SBE Certification, and City of Houston SBE Certification. These lists will be offered to contractors and FBISD staff to assist in program implementation;
- Maintain records showing specific efforts to identify and award Contracts to small businesses and establish a monitoring system to ensure that all Contractors, Subcontractors, consultants, and vendors comply with Contract specifications related to small business enterprise utilization;
- Maintain and update the FBISD website on the SBEP proposals and on other opportunities to do business with FBISD; and
- In coordination with the Purchasing Department, inform small businesses of proposal notices and specifications related to their capabilities by placing proposal notices in the appropriate trade bulletins, local newspapers, and other periodicals and informing local trade associations, technical assistance agencies, economic development groups, and small businesses with capabilities relevant to the proposal.

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3. FBISD shall update the website to assist small businesses and Contractors. The website will contain the following:
  - Procedures outlining specific steps regarding how to submit a proposal;
  - Prerequisites for submitting proposals on contracts;
  - Information regarding how plans and specifications can be obtained;
  - Names of persons to contact concerning questions on proposal documents; and
  - Names of Procurement officers and office hours
4. FBISD will maintain and have available an updated small business directory and source list(s) per proposal solicitation to facilitate identifying small businesses with capabilities relevant to general contracting requirements and to particular solicitations. FBISD will make the directory and source list(s) available to contractors to assist their efforts to meet the small business requirements.

#### **D. PURCHASING METHODS**

Purchasing methods used by FBISD for construction services may include Competitive Sealed Proposals, Design-Build, Construction Manager-at-Risk, Construction-Manager -Agent and Job Order Contracting. In deciding which purchasing method to utilize, FBISD will determine which purchasing method provides the best value to FBISD, in accordance with the law and Board Policy.

Offeror's who tender a Statement of Qualifications response are required to provide evidence of their intent and ability to fulfill the goals of the Small Business Enterprise Program.

NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, NO CONTRACTOR OR ANY OTHER PERSON OR FIRM IS INTENDED TO OR SHALL DERIVE ANY LEGAL OR EQUITABLE RIGHTS, DIRECTLY OR AS A THIRD PARTY BENEFICIARY, FROM FBISD'S SBEP. NOTHING IN THE SBEP SHOULD BE CONSTRUED TO GIVE A CONTRACTOR OR SUBCONTRACTOR A PROPERTY INTEREST IN A BID, PROPOSAL OR CONTRACT PRIOR TO THE FBISD BOARD OF TRUSTEES' AWARD OF THE CONTRACT AND COMPLIANCE WITH ALL STATUTORY AND OTHER LEGAL REQUIREMENTS.

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## **E. CERTIFICATION PROCEDURES**

Fort Bend Independent School District's SBEP requires prior certification of a small business in order to count the participation of that small business toward program goals.

### **1. Eligibility Requirements for Certification**

To be eligible for certification as a small business, each applicant must do the following:

- Demonstrate that the firm's gross revenues or number of employees averaged over the past five years, inclusive of any affiliates as defined by 13 C.F.R. § 121.103, does not exceed the size standards as defined pursuant to Section 3 of the Small Business Act and 13 C.F.R. § 121.201;
- Complete an SBEP application form for one of the FBISD approved certifying agencies.
- Obtain certification from one of the FBISD recognized certifying agencies.

### **2. Certification Process**

- a. To be eligible to participate in the SBEP, a small business must have certification of its small business status. Certifications may be obtained from public and private agencies that certify small businesses. FBISD does not represent that any particular agency employs the same definition of "small business" as that used by FBISD. It is the responsibility of the applicant to choose an agency for certification that uses FBISD's definitional criteria for small business.

FBISD recognizes certification by the following agencies:

Port of Houston Authority SBE Certification;

Metropolitan Transit Authority of Harris County (METRO) SBE Certification;

City of Houston SBE Certification; and

Small Business Administration—SBA 8a (if authorized by the District for a procurement)

FBISD has the right to revoke acceptance of a business as a certified or qualifying small business and to conduct certification reviews in accordance with these Procedures. If a small business experiences any change in its certification status with its certifying agency (i.e. amendments, decertification, termination, graduation), the small business shall immediately notify FBISD of such change.

When an SBE certificate expires, a notification will be generated and submitted to the business. The business should obtain recertification through one of the certifying agencies accepted by FBISD, and forward the recertification certificate to the FBISD Small Business office within 10 business days.

3. Recertification Requirement

A small business application is valid through the certification date provided by the certifying agency. To reapply, a business must submit a renewal application and evidence of continuing eligibility and certification to the FBISD certifying agency.

4. Revocation

FBISD may revoke a previously approved application if it determines that the business does not meet the definition of a small business, or if the business fails to provide requested information in connection with an application review conducted by FBISD. A business may be disqualified from participation in the SBEP if the business fails to provide evidence of certification to FBISD. FBISD may also revoke a previously approved application if it determines that the small business is operating as a pass-through business or a non-small business affiliate. If a question arises regarding certification, FBISD will continue to count the previously certified small business as a SBEP Certified Small Business until the business's small business certification expires or is officially revoked.

5. Certification Reviews

FBISD may conduct random certification reviews of certified businesses by auditing them to verify that the information submitted by the business is accurate and that the business remains eligible after certification has been granted. An application approval is subject to revocation if it is determined that a business does not qualify as a SBEP Certified Small Business under the terms of this Program. Certification reviews maybe conducted for any business that FBISD determines a certification review is warranted.

6. Limitations

Notwithstanding any other provision of this Program, except upon a finding of good cause by FBISD, a firm shall be eligible to participate in the program until it can no longer qualify for reasons of growth or change in status.

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## **F. PROCEDURES FOR DETERMINING SATISFACTION OF GOOD FAITH EFFORTS REQUIREMENT**

1. Each bidder, proposer, or respondent (hereinafter collectively referred to as “Proposer”) must acknowledge FBISD’s Non-Discrimination and Harassment Policy, which will be published in all solicitation documents. Said acknowledgment must include a statement evidencing the Proposer’s awareness of FBISD’s policy of nondiscrimination and affirmatively state that the Proposer has not and will not discriminate against any person or company on the basis of age, color, ethnic background, disability, family status, gender, national origin, race, religion, sex, sexual orientation, or veteran status in its participation in any aspect of the SBEP.
2. The Proposer must submit a Contractor’s Small Business Plan (the “Plan”) setting out how the SBEP goal for the proposed project is to be met. The Plan is to be submitted with the proposal response or within a period designated within the solicitation document, or upon notification of finalist or successful Proposer status. The Plan should be a simple, short statement of small business participation in the SBEP Eligible Contract. The Plan must include a list of SBEP Certified Small Businesses proposed as Subcontractors and suppliers. All small businesses listed must be approved as SBEP Certified Small Businesses by FBISD.

The Plan must also include an SBE Participation Report for all listed small businesses, including the name of each small business, description of the scope of work to be performed, and the dollar value and percentage amount for each small business Contract.

Agreements between a Proposer and a small business in which the small business promises not to provide subcontracting quotations to other Proposers shall be prohibited.

3. The Proposer shall adhere to the Plan submitted unless a waiver is received from the Small Business Enterprise Program Coordinator or FBISD authorized representative.
4. If the Proposer is unable to meet the SBEP goal, the Proposer must submit documentation of Good Faith Efforts to meet the small business participation goal. Such documentation shall be presented to the Small Business Enterprise Program Coordinator for review.
5. FBISD may consider future procurements, if a contractor failed to make Good Faith Efforts to meet the contract small business participation goal.

**G. PROCEDURES FOR EVALUATING SMALL BUSINESS PARTICIPATION**

Prior to any consideration of a bid or proposal for contract award, FBISD staff shall review submitted bids and proposals for verification of SBEP participation.

The staff evaluation process may utilize a point system based on evaluation criteria set forth in the procurement methods. A designated number of points will be set aside for small business participation, if applicable. Proposers may receive none, some, or all of the designated small business participation points, based on the Proposer’s plan to satisfy small business participation goals. If, in the opinion of FBISD staff, the Proposer’s response completely meets the stated small business participation goals, the total amount of eligible points will be awarded for small business participation.

The following is a sample point distribution sliding scale to be included in solicitation documents. FBISD reserves the right to adjust the sliding scale values published in a given solicitation, as deemed in the best interest of FBISD for that particular solicitation.

Proposed SBE Subcontracting Goal	Available Points
Less than 5%	0
5% - 9%	1
10% - 14%	2
15% - 19%	3
20% - 24%	4
25% or more	5

Points shall be awarded in accordance with the Proposer’s response based on the architectural firm, engineering firm, or general contractor’s commitment to small business subcontracting stated in the solicitation document and the point distribution sliding scale.

If the Proposer itself is a Certified Small Business who plans to self-perform work, the value of such self-performed work shall be included in calculating the eligible points for small business participation to the Certified Small Business Proposer, in addition to the value of work subcontracted to another small business.

If the Proposer itself is not a Certified Small Business, but has joint-ventured with another Certified Small Business, only the value of work to be self-performed by the Certified Small Business architectural firm, engineering firm, or general contractor will be included in calculating the eligible points for small business participation to the Small Business Proposer/joint venture, in addition to the value of work subcontracted to another small business.



## H. PROCEDURES FOR REPORTING SMALL BUSINESS PARTICIPATION

1. Once the contract is awarded, the following guidelines should be utilized to report small business participation in the awarded contract, as the measure of its progress in meeting SBEP goals:
  - a. If the small business is a subcontractor, FBISD will count toward applicable small business goals the portion of the total dollar value of a contract that is subcontracted to the small business.
  - b. If the small business subcontractor is a part of a joint venture, FBISD will count toward applicable small business goals a portion of the total dollar value of a contract with an SBEP-eligible joint venture equal to the percentage of the ownership of the small business partner in the joint venture, or the participation of the small business partner in the contract.
  - c. If the solicitation contemplates the use of small business subcontractors and a small business is the prime contractor, FBISD may require the prime contractor small business to utilize other small businesses as subcontractors, and count toward applicable small business goals as provided below.
  - d. If the solicitation contemplates the use of small business subcontractors and a small business is the firm or general contractor, FBISD will count small business participation in two separate ways as follows:
    - i. FBISD will count the total dollar value of the contract awarded to the SBEP eligible firm or general contractor toward applicable small business goals if the firm or general contractor small business performs 100% of the work itself or subcontracts with other SBEP Certified Small Businesses to complete 100% of the work. However, if the firm or general contractor small business utilizes a non-small business subcontractor, FBISD will count the total dollar value of the awarded contract to the firm or general contractor small business, minus the dollar amount subcontracted to non-small businesses. FBISD will count toward applicable small business goals contract awards where good or services are procured from a small business in the form of a prime contractor and without additional small business subcontracting.
    - i. FBISD will count toward applicable small business goals only expenditures to small businesses that perform a commercially acceptable function in the work of a contract. FBISD will count toward the applicable small business goals only expenditures to SBEP Certified firm or general contractors or SBEP Certified first-tier subcontractors. Expenditures to subcontractors below the first-tier subcontract level will not be counted toward an applicable small business goal.

- e. FBISD will count toward applicable small business goals contract expenditures for materials and supplies obtained from small business distributors and small business manufacturers, provided that these businesses assume the actual and contractual responsibility for the provision of the materials and supplies, and are a first-tier subcontractor/supplier.
- f. FBISD will count toward applicable small business goals the following expenditures to small business firms that are not manufacturers or distributors:
  - i. The fees or commissions charged for providing a bona fide service, such as professional, technical, consultant, or managerial services, and assistance in the procurement of essential personnel, facilities, equipment, materials, or supplies required for performance of the contract, provided that the fee or commission is determined by FBISD to be reasonable and not excessive as compared with fees customarily allowed for similar services.
  - ii. The fees charged for delivery of materials and supplies required on a job site (but not the cost of the materials and supplies themselves) when the hauler, trucker, or delivery service is not also the manufacturer of, or a regular dealer in, the materials and supplies, provided that the fee is determined by FBISD to be reasonable and not excessive as compared with fees customarily allowed for similar services.
  - iii. The fees or commissions charged for providing any bonds or insurance specifically required for the performance of the contract, if the fee or commission is determined by FBISD to be reasonable and not excessive as compared with fees customarily allowed for similar services. SBEP Certified Small Business subcontractors, and shall assure that all such contracts contain the terms set out in all required SBEP provisions.
- 2. Prior to award, the firm or general contractor shall designate a SBEP contact person who will administer the firm or general contractor's SBEP commitments and who shall be responsible for maintenance of records of Good Faith Efforts to subcontract with SBEP Certified Small Businesses.
- 3. After award, the firm or general contractor shall (1) submit FBISD Small Business Enterprise Program Utilization Reports to the SBEP office; and (2) make timely payments to all persons and entities supplying labor, materials, or equipment for the performance of the contract.

4. In the event a SBEP Certified Small Business is suspended or removed for any reason, the firm/contractor shall make a Good Faith Effort to replace the small business with another SBEP Certified Small Business.
5. Non-discrimination and Legal Compliance. The SBEP adheres to the FBISD's Non-Discrimination and Harassment Policy. A firm/contractor or SBEP Certified Small Business may be found to have failed to satisfy the Good Faith Efforts of the SBEP if the firm/contractor or SBEP Certified Small Business violates FBISD's Non-Discrimination and Harassment Policy. Furthermore, violations of federal or state law or significant ordinances or regulations of any governmental unit may be deemed a failure to satisfy the Good Faith Efforts of the SBEP.

## **I. QUALITY CONTROL/QUALITY ASSURANCE**

- Architect/Engineer Firm or General Contractor will provide notification to FBISD of SBE subconsultant/subcontractor change.
- Architect/Engineer Firm or GC will provide final SBE Utilization form listing all SBE's used on the project to the FBISD Small Business office.
- Contractor Utilization Report demonstrates the Bidder/Proposer's commitment to prompt payment, non-discrimination practices, the release of retain- age and the inclusion of these clauses in its subcontractor agreements.

The Pledge must set forth:

- A pledge that all subcontractors will be paid within FBISD guidelines from the Bidder/Proposer receiving payment from FBISD for amounts previously invoiced.
- An affirmative statement by the Bidder/Proposer that it has adhered to FBISD Non-discrimination Mandate.
- For construction contracts only retainage will be released to all sub-contractors within 30 days after satisfactory completion and approval of work performed.
- Confirmation that the Bidder/Proposer will include the above clauses in its subcontractor agreements.
- Score Card to constitute SBE Participation goal met.



**FORT BEND INDEPENDENT SCHOOL DISTRICT  
SUB-CONTRACTOR/SUB-CONSULTANT (INCLUDING SMALL BUSINESS ENTERPRISES) UTILIZATION REPORT**

1. Project Name	2. Project Number	3. Application Number	4. Application Date	5. Reporting Period From:                      To:	6. SBE Goal	7. Scheduled Completion
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This report is required by Fort Bend ISD – Failure to comply may result in FBISD commencing proceedings to impose sanctions on the Contractor/Consultant. In addition to pursuing other legal remedies, sanctions may include the withholding of payments for work committed to Small Business Enterprises (SBE) participants and a negative recommendation on future bids by the Contractor/Consultant for Fort Bend ISD.

**Note: SBE reporting for this pay period not applicable.**

8. Prime Contractor/Consultant's Name					9. Phone (    )	10. Fax (    )
11. Contractor/Consultant's Street Address / Suite #	City	State	Zip	12. Project Manager (Prime)	13. PM's Phone # (    )	14. PM.'s Fax (    )
15. Current Contract Amount	16. Total Draw This Month	17. % SBE Billed to Date	18. Total Draw on Project to Date	19. % Complete to Date		

20. Federal ID Number	21. Sub-contractor / Sub-consultant	22. SBE Status	23. Work Description	24. Amount for Project	25. Amount of Current Draw	26. Total Billed to Date	27. Actual Start Date	28. Scheduled Completion Date

Commencing contract award, partial release of lien is expected from each Sub-contractor / Sub-consultant and shall accompany any application and certification for payment. Prompt payment to CONTRACTOR/CONSULTANT is dependent on appropriate documentation. The signature below of corporate officer attests to the accuracy of the information.

Company Seal

\_\_\_\_\_  
Signature of Company Officer

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title

\_\_\_\_\_  
Telephone Number

STATE OF TEXAS, \_\_\_\_\_ COUNTY  
IN WITNESS WHEREOF, I have hereunto set my hand and official seal this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public, State of Texas

My Commission Expires \_\_\_\_\_

PROJECT NAME	CONTRACTOR'S NAME
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20. Federal ID Number	21. Sub-contractor / Sub-consultant	22. SBE Status	23. Work Description	24. Amount for Project	25. Amount of Current Draw	26. Total Billed to Date	27. Actual Start Date	28. Scheduled Completion Date
<b>Total Small Business Sub-contractor(s)/Sub-consultant(s)</b>				\$	\$	\$		
<b>Total Non-Small Business Sub-contractor(s)/Sub-consultant(s)</b>				\$	\$	\$		
<b>Total Sub-contractor(s)/Sub-consultant(s)</b>				\$	\$	\$		

**INSTRUCTIONS**

- |  |   |
|--|---|
| <p>1. Name of Project</p> <p>2. Project Number – (If applicable)</p> <p>3. Application Number – from AIA document G702</p> <p>4. Application Date is same date as on draw application</p> <p>5. Reporting Period – from AIA document G702 “From: To:”</p> <p>6. SBE Goal as set by the prime contractor for this project as applicable</p> <p>7. Scheduled Completion date for your project per the approved contract or approved change order</p> <p>8. – 10. Business name of prime contractor – phone &amp; fax</p> <p>11. Prime contractor mailing address</p> <p>12.-14. Project Manager’s name - phone &amp; fax</p> <p>15. Amount of contract including original contract amount, change orders and approved alternatives</p> <p>16. The total of this draw or invoice as authorized on the AIA document G702</p> <p>17. Percentage of project completed to this date by SBE Sub-contractor/Sub-consultant (Total SBE from Box 26 divided by Box 15)</p> <p>18. The total amount invoiced on this project to date</p> <p>19. Total percentage of project completed to date</p> <p>20. Federal Identification Number</p> | <p>21. Business name of Sub-contractor / Sub-consultant</p> <p>22. Sub-contractor’s / sub-consultant’s SBE Certification Designation as applicable (SBE=Small Business Enterprise; N=Non-Small Business Enterprise)</p> <p>23. Brief description of work each sub will perform. (Roofing, HVAC, trash removal, consulting, etc)</p> <p>24. List project value total contracted with each sub-contractor / sub-consultant</p> <p>25. This month’s draw amount for each sub-contractor/ sub-consultant</p> <p>26. To date total billed to each sub-contractor / sub-consultant. The total amount summation must equal the % value listed in box number 17</p> <p>27. Start date for each sub-contractor / sub-consultant contract</p> <p>28. Scheduled completion date for each sub-contractor / sub-consultant contract</p> <p><b>NOTE:</b></p> <p><b>1. This form must be submitted with every pay application</b></p> <p><b>2. You must submit the partial release of liens with the pay application</b></p> <p><b>3. You must have a copy of the SBE certification for <u>every</u> certified SBE sub-contractor/ sub-consultant on the job</b></p> <p><b>4. If no SBE for reporting period is required, check the box indicating: “Note: SBE reporting for this pay period not applicable”</b></p> <p><b>5. <u>This form must be notarized for each pay application or invoice submitted. The pay application can not be processed without this required certification</u></b></p> |
|--|---|



**FORT BEND INDEPENDENT SCHOOL DISTRICT**

**SUB-CONTRACTORS/SUB-CONSULTANTS/SUPPLIERS PAYMENT CERTIFICATION FORM**

- Instructions:**
1. This form shall be completed and signed by an officer of the Sub-contractor's/Sub-consultant's company for each payment received from the Prime Contractor and shall be returned to the Prime Contractor for its submission to FBISD.
  2. The Prime Contractor shall attach this completed form to each application for payment submitted to FBISD.

PROJECT NO./TITLE: \_\_\_\_\_

NAME OF SUB-CONTRACTOR: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

I hereby certify that the above firm has received payment on \_\_\_\_\_ from \_\_\_\_\_  
**(Date)** **(Prime Contractor)**

in the amount of \$ \_\_\_\_\_ as full payment of our Invoice No. \_\_\_\_\_ dated \_\_\_\_\_

for work performed during \_\_\_\_\_ under Contract/Project No. \_\_\_\_\_  
**(Enter Time Period)**

Signature: \_\_\_\_\_

Name (Print or Type): \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Telephone: \_\_\_\_\_

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 00 Construction Progress Documentation

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Daily construction reports.
  - 2. Material and equipment delivery status reports.
- B. Related Sections:
  - 1. Division 01 Section "Construction Progress Schedule".
  - 2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
  - 3. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format. These documents are to be uploaded into the Owners designated software (Kahua/ Kahua):
  - 1. PDF electronic file. Submit and upload into owner's designated software.
- B. Daily Construction Reports: GC to submit Daily Construction Reports. These reports are to inform the Owner and Owner's Program Manager the progress of the work being performed and work being completed. The GC shall report known deviations from the Contract Documents, any defects and deficiencies observed in the work. Reports and any required supporting documents such as photographs, test reports, etc. must be submitted in Owner designated Software.
- C. Material and Equipment Delivery Status Reports: Submit at weekly construction progress meetings.
- D. Request For Information (RFI): Submit at time of discovery of differing conditions.
- E. Special Reports: Submit at time of unusual event

**PART 2 PRODUCTS**

2.1 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report using the Owners designated software (Kahua/ Kahua) recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. Approximate count of personnel at Project site.
  - 3. Equipment at Project site.
  - 4. Material deliveries.
  - 5. High and low temperatures and general weather conditions, including presence of rain, adverse weather conditions, high winds, impending tropical storms, or hurricanes.



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 00 Construction Progress Documentation

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6. Accidents.
  7. Meetings and significant decisions.
  8. Defects and Deficiencies
  9. Photographs
  10. Test Reports
  11. Unusual events (refer to special reports).
  12. Stoppages, delays, shortages, and losses.
  13. Meter readings and similar recordings.
  14. Emergency procedures.
  15. Orders and requests of authorities having jurisdiction.
  16. Change Orders received and implemented.
  17. Construction Change Directives received and implemented.
  18. Services connected and disconnected.
  19. Equipment or system tests and startups.
  20. Partial completions and occupancies.
  21. Substantial Completions authorized.
- B. Material and Equipment Delivery Status Reports: Weekly prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

**PART 3 EXECUTION – Not Used**

**End of Section 01 32 00**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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**PART 1 GENERAL**

1.1 Description

- A. Section includes administrative and procedural requirements for developing, submitting and updating a Critical Path Method (CPM) schedule.

1.2 Quality Control and Quality Assurance

- A. The Contractor shall develop and maintain a Project Schedule for each project site (School) in accordance with the requirements of this Section. The requirement for a Project Schedule is included to:
  - 1. Ensure adequate planning before and during the execution and progress of the Work in accordance with the allowable number of working days and milestones.
  - 2. Assure coordination and execution of the work among various trades of the Contractor, subcontractors, suppliers, third party utility companies or other related entities that may be involved in the Project.
  - 3. Assist the Contractor, architect and the Owner in evaluating:
    - a. Contract performance relative to the required contract schedule milestones.
    - b. Monthly progress.
    - c. Proposed Contract Modifications.
    - d. Documenting anticipated, requested and or approved time extensions.
    - e. The documentation of unplanned events, time extensions and other impacts arising from such events.
- B. The project schedule shall show the sequence and interdependencies of activities required for complete performance of the work. The Contractor shall be responsible for assuring all work sequences are logical and show a coordinated plan of the work. The project schedule shall employ computerized CPM planning, scheduling and progress reporting of the work as described in this specification. The Contractor shall create and maintain the schedule using project scheduling software that utilizes the fundamentals of CPM for scheduling. New schools or projects with a value of \$5M dollars or more will be required to use P6 scheduling. A variance can be given by owner's representative if requested in writing prior to the NTP.
- C. New schools or projects of \$5M or more: Within seven (7) calendar days after issuance of Notice to Proceed unless otherwise noted the Contractor shall designate in writing a schedule representative who shall be responsible for coordinating with the PM during development and maintenance of the Project Schedule. The Contractor's representative shall have the expertise to operate the CPM software and be capable of rapidly evaluating alternate scenarios to optimize management capabilities. The Contractor has the option to utilize qualified outside scheduling consultation for the assistance of developing and maintaining the Project Schedule, however, the use of an outside consultant does not relieve the Contractor of responsibilities for compliance of this specification. The Contractor's schedule

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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- representative shall have complete authority to act for the Contractor in fulfilling the schedule requirements of the Contract.
- D. All activities shall have at least one predecessor and one successor unless approved by the PM. The exceptions are no predecessor is needed for the Notice To Proceed (NTP) milestone and no successor is needed for the Project Completion milestone.
  - E. With the exception of the specified contract substantial completion milestone, the contractor shall not use any constraints of any type without prior approval of the Owner.
  - F. The Baseline Schedule project substantial completion milestone for each campus shall be assigned a “Finish on or Before” constraint. The required contract finish date shall be assigned to track project delivery related to contract requirements. The progress schedule submitted shall not have any constraints without approval from the owner.
  - G. Each activity’s “Activity ID” and “Activity Description” or “Task Name” shall remain unchanged throughout the duration of the project, subsequent to the acceptance by the Owner.
  - H. An activity’s “Activity Description” may only be revised to clarify an activity’s original scope. If the scope of an activity increases or decreases, a replacement activity shall be created.
  - I. PM acceptance shall be obtained prior to making any changes or revisions to an activity’s “Activity Description”.

1.3 Submittals

- A. All CPM Schedules (preliminary and baseline) shall be presented submitted per specification 01 33 00 at review meeting.. One electronic copy in pdf and an accessible format not pdf to be uploaded to Kahua per submittal procedures 01 33 00. The substantial completion date in the detailed CPM schedule shall coincide with the substantial completion date on the contract.
- B. Schedule Update: The Contractor shall submit with every payment application a copy of the approved baseline CPM Schedule with a narrative of the progress or delay of scheduled activities.
- C. Recovery or Revision to the CPM Schedule: The Contractor shall provide a Recovery CPM Schedule within seven (7) calendar days of any CPM schedule update meeting or at the request of the architect or owner’s representative. A recovery schedule to the baseline will be requested if any milestone, completion date or end of Period Performance falls seven (7) calendar days or greater behind scheduled completion of the activity on the CPM schedule(negative float).

**PART 2 PRELIMINARY CPM SCHEDULE**

2.1 Preliminary CPM Schedule

- A. The preliminary CPM schedule will be delivered to the owner’s representative and architect within three (3) days of NTP. The preliminary CPM Schedule shall be the basis for the sequence of work during the first sixty (60) calendar days of the Contract while the Project Schedule is being developed, submitted, reviewed and accepted. If the acceptance of the Project baseline CPM Schedule

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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extends beyond sixty (60) days, the Preliminary CPM Schedule shall be updated according to the requirements stated in paragraph 3.3.

2.2 Schedule Review and Acceptance

- A. The PM, Architect/Engineer and the Contractor shall meet within seven (7) calendar days of receipt of any CPM Schedule for joint review. The Contractor shall revise any areas, which, in the opinion of the owner's representative and/or Architect/Engineer, conflict with either the intent of this specification or the timely completion and acceptable coordination of the Project. In the event the Contractor fails to define any element of work activity or logic currently designed and the owner's representative review does not detect this omission or error, such omission or error, when discovered by the Contractor, architect or the owner's representative, shall be corrected by the Contractor.
- B. Within seven (7) calendar days after the joint review between the architect, contractor and the owner's representative, the Contractor shall revise the CPM Schedule in accordance with agreements reached during the joint review and submit the revised schedule as project CPM schedule per the deliverable requirements.
- C. Acceptance of the CPM project schedule by the architect and owner's representative does not relieve the contractor of any of its responsibility for the accuracy or feasibility of the project schedule. However, to the extent that the accepted Project Schedule is reasonable, it becomes a part of this Contract.
- D. Submission and final acceptance by architect and owner's representative of the CPM schedule will be a condition precedent to the application or payment of any progress payments under the contract, unless otherwise agreed upon by the Owner. The owner's representative shall notify the contractor of the Owner's acceptance of the CPM Schedule in writing.

**PART 3 PROJECT CPM SCHEDULE**

3.1 Project Schedule

- A. The Project Schedule shall begin at the project NTP and incorporate the accepted Preliminary CPM Schedule including all required revisions and applicable progress updating as warranted. The baseline project schedule shall indicate a logical sequence of work for each project site (school). Utilize the schedule in planning, scheduling, coordinating and performing the work under this Contract (including all activities of subcontractors, equipment vendors and suppliers). The Project Schedule shall indicate the sequence and interdependencies of activities required for complete performance of the Work.

Proposed durations assigned to each activity shall not exceed ten (10) days unless approved by owner's representative in writing. In developing the baseline project schedule, the Contractor shall be responsible for ensuring that subcontractor work scope and sequencing at all tiers, as well as its own work, is included. If a contract for a subcontractor has not yet been awarded for a certain portion of the work, the Contractor is responsible for the development of the schedule for the

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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work as described under this section. After the subcontractor award of contract, the Contractor shall modify the current accepted schedule to reflect any changes or revisions for the subcontractor sequence of work and submit for approval to architect and owner's representative. Under no circumstance or event, shall a schedule modification or revision under this paragraph extend a milestone. The baseline project schedule shall comply with the various limits imposed by the scope of work and by any contractually specified intermediate milestone dates and completion dates. The degree of detail shall be to the satisfaction of the architect and the owner's representative.

- B. Provide sufficient detail and clarity of form and technique so that all work can be properly controlled and progress monitored by the owner's representative and architect. The project schedule shall consist of, but not be limited to, the following criteria:
1. Full detail of all major procurement activities including the activities and information contained within the baseline CPM Schedule. Break up all procurement activities for major components and long lead items to include submittal dates, fabrication duration, and expected delivery dates.
  2. Full detail of all major construction activities including the activities and information contained within the CPM Schedule. Add column for responsible party (i.e. owner, subcontractor trade, 3<sup>rd</sup> party, etc.) for all construction activities.
  3. Multiple Calendars shall be used for establishing Holidays and periods of non-work based on the School Operations Parameter Statement in the Project Information Section of Division 0, concrete curing activities, other weather or ambient temperature sensitive construction activities, and or other work requiring overtime or double shift work.
  4. Seasonal weather conditions shall be considered and included in the planning and scheduling of all work influenced by high or low ambient temperatures, precipitation and/or saturated soil to ensure recognition, planning and anticipation of intermittent inclement weather throughout the project duration on a monthly basis. In addition, activities of similar nature shall be assigned to independent calendars based on this weather data. Contractor to provide a Weather Log each month as part of their Schedule Submittal.
  5. Activity duration in whole working days with a maximum duration of ten (10) working days each, unless otherwise approved by the owner's representative, except for non-construction activities including mobilization, procurement and concrete curing activities.
  6. For projects where hazardous materials are present and require abatement by the Owner, such abatement activities may take place prior to the Contractor's mobilization and start of any work or they may take place concurrently with the Contractor's work. In cases where abatement activities must take place concurrently with Contractor's work, the Contractor shall

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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- allow for these activities to be incorporated into the Project CPM Schedule as separate activity line items. The Contractor shall allow time for these activities to take place at the appropriate time within the project schedule and shall coordinate their work with such abatement activities.
7. At a minimum, the following guidelines, intermediate and final milestones shall be included in the project schedules for each individual project site (school)-
- a. Notice to Proceed
  - b. Required Periodic Inspections (examples: rebar, utilities, electrical and mechanical rough-in, overhead and architectural
  - c. Time allotted for coordination with and execution of abatement activities
  - d. Specific Phase start and finish dates – renovations and additions
  - e. CPM Schedule submission and acceptance
  - f. Building dry-in
  - g. Permanent power
  - h. Conditioned air available
  - i. Completed testing and acceptance of Life Safety Systems and other critical building components
  - j. Completion of ADA upgrades in restrooms
  - k. Commissioning, when project requires
  - l. Building Flush out, when project requires
  - m. Ten percent (10%) minimum float for the project
  - n. Substantial Completion
  - o. Final Completion
  - p. Owner Turn-Over / Start-Up / Project Closeout Activity / Warranty Period / Owner Testing/Training
  - q. Earliest Date that Owner can occupy the affected portion of the building (by phase, by complete project, etc.). This shall include all necessary approvals, permits (Fire Marshall Acceptance, Certificate of Occupancy, etc.).
- C. The Contractor shall prepare a written narrative explaining the Contractor's approach to construction for the entire project. The narrative shall elaborate on the basis for durations, major equipment to be used, calendars utilized, activity coding applied, smart ID descriptions and all major assumptions used to develop and support the schedule. The narrative shall also include the Contractor's description of the critical path work activity as represented in the baselined project schedule.
- D. Deliverable: Within fourteen (14) calendar days after the Notice to Proceed, the project CPM schedule deliverable will be submitted by the Contractor and uploaded to Kahua shall include the following:
1. Two (2) copies (preferably 11 x 17) of the project schedule delivered at the review meeting. The critical path shall be readily discernible in red ink.
  2. Two (2) copies of the written narrative as described in paragraph 3.1.C.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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3. One (1) electronic copy in pdf and an accessible format, not pdf, to be uploaded to Kahua per 01 33 00.

3.2 Schedule Review and Acceptance

- A. The architect, owner's representative, and the Contractor shall meet within seven (7) calendar days of submitted CPM project schedule on a date selected by the owner's representative and agreed upon by all. The meeting will be to discuss review the submitted project schedule. If a revision or justification is requested, the Contractor shall re-submit the proposed project schedule within seven (7) calendar days and address all issues to the satisfaction of the architect or owner's representative. Any and all disagreements or interpretations of the meaning or intent of this specification shall be solely dictated by the Owner.
- B. The architect, owner's representative and the Contractor shall meet within seven (7) calendar days of receipt of the Contractor's response, if needed, to review, corrections or adjustments of the Contractor's proposed project schedule. Any area, in the opinion of the architect and/or owner's representative, conflicts with timely completion of the project, shall be subject to revision by the Contractor.
- C. Within seven (7) calendar days after the joint review meeting and no acceptance of the project schedule, the Contractor shall incorporate revisions as directed by the architect and owner's representative and re-submit the proposed project schedule per the deliverable requirement as stated in paragraph 3.1.D. All further review by the architect and owner's representative and shall be within seven (7) calendar days of receipt of revised schedule by the contractor. This will continue until the architect and owner's representative are satisfied.
- D. The owner's representative shall notify the Contractor in writing of final acceptance of the Contractor's Project Schedule using submittal approval procedures stated in section 01 33 00 and the project schedule will become baseline for the project. The baseline schedule will not be changed through the life of the project unless requested by owner or owner's representative in writing.
- E. In the event the Contractor fails to define any element of work, activity or logic in the project schedule during the review and the owner or owner's representative does not detect this omission or error, when discovered it shall be corrected by the Contractor and amended to the project schedule as soon as possible. The process of approving Contractor's schedules and updates to Contractor's schedule shall not constitute a warranty by the Owner that any non-Contractor milestones or activities will occur as set out on Contractor's schedule.

3.3 Schedule Updates

- A. After the Project Schedule is accepted by the architect and owner's representative and the Contractor, it shall be "baselined" and used as a comparison for future progress updates.
- B. If the Contractor's schedule reflects or the architect and/or owner's representative determines, that the Contractor is at least ten percent (10%) or at least negative seven (-7) calendar days behind the "baselined" schedule, the Contractor shall provide a revised or recovery schedule. The Contractor's revised or recovery schedule must

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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incorporate a proposed plan for bringing the work back on schedule and completing the work by the contract completion date at no additional expense to the Owner. A narrative indicating the revised approach to schedule recovery is to accompany the recovery schedule submittal. The revised or recovery schedule shall be in accordance to paragraph 1.3.B.

- C. Out-of-Sequence progress logic shall be reviewed by the contractor's scheduler and corrected before submitting the progress update.
- D. The percentage of all work shall be calculated by estimating the actual remaining duration time for each progressed activity. The data date of each schedule update shall be determined by the owner's representative. Contractor prepared estimates of the percent completion of each scheduled activity and the necessary supporting data shall be submitted.
  - 1. One (1) original baseline schedule indicating actual activity start and/or finish dates and revised (current) remaining durations.
  - 2. A narrative report shall be included that indicates in writing those activities the Contractor knows to be seven (7) days beyond the baseline schedule completion date and current or anticipated conditions that have delayed or may delay the work in order to discuss remedial action. The Contractor shall also explain, for work that reflects less than satisfactory progress, whether any uncompleted and/or upcoming work will (or will not) be affected in a like manner and the Contractors method of correction. Any additional written information necessary to support the updated schedule including explanations of revisions to activities: logic, durations, resources, etc.
- E. In case of disagreements at the project progress meeting concerning actual progress to date, the Owner or owner's representative determination shall govern. Upon completion of the schedule update meeting, the Contractor shall revise the schedule update to reflect progress as of the date of the schedule update meeting and any approved revisions to the schedule update and carry out a computer produced calculation to determine the status of the project schedule.
- F. Each Schedule Update shall be forwarded to the architect and owner's representative using the owner's project management software per section 1.3.A of this specification within seven (7) calendar days after the schedule update meeting and shall include a narrative report with the following information:
  - 1. Activities that have been added to the project schedule update.
  - 2. Activities that have been deleted from project schedule update.
  - 3. Activities that have "Actual Starts" prior to the month of this project schedule update and remain unfinished.
  - 4. Activities that have "Actual Starts and Actual Finishes" in the month of this project schedule update.
  - 5. A description of any approved revisions to the activity descriptions, schedule logic, or initial activity durations.



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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6. One (1) electronic copy of the updated CPM schedule update indicating the progress made up to the date of the schedule update and indication of any revisions to the CPM schedule update uploaded to Kahua per 1.3.A of this specifications.
7. One (1) electronic pdf format written narrative as described in paragraph 3.3.F and uploaded to Kahua with the updated schedule.
8. One (1) native “xer” electronic file with the native updated schedule for the owner’s review. Transmittal by Email to the PM with a transmittal cover sheet uploaded to Kahua with the schedule pay application files.
9. A list of all days occurring for the life of the project that may have impacted the schedule. Determination on the validity of the impact will be established at the recovery schedule meeting. If all parties cannot agree the owner’s representative’s determination shall govern.

3.4 Revisions to the Project Schedule

- A. The Contractor may also request revisions to the project schedule in the event the contractor’s planning for the work is revised. If the Contractor desires to make changes in the project schedule to reflect revisions in his method of operating and scheduling of the work, the contractor shall notify the architect and owner’s representative in writing, stating the reason for the proposed revision. If revision to the schedule is contemplated, the architect or owner’s representative shall so advise the other in writing at least seven (7) calendar days. A schedule update meeting will be requested by the contractor describing the revision and setting forth the reasons thereof.

3.5 Project Float Time

- A. Float time is not for the exclusive use or benefit of either the contractor or the Owner. Contractor’s work shall proceed according to early start dates, and the Owner shall have the right to reserve and apportion float time according to the needs of the project. The contractor acknowledges and agrees that actual delays, affecting paths of activities containing float time, will not have any affect upon contract completion times, providing that the actual delay does not exceed the float time associated with those activities.

3.6 Impact Analysis for Change Orders, Delays, and Contractor Requests:

- A. When changes are initiated or the Contractor desires to revise the project schedule, the contractor shall submit to the architect and owner’s representative a narrative explaining the time impact to the project. The narrative will be sent to the architect and owner’s representative via transmittal from Kahua and a schedule review meeting will be scheduled within seven (7) days or at the convenience of the architect and owner’s representative.
- B. Activity delays shall not automatically mean that an extension of time of any milestones is warranted or due to the contractor. A change or delay may not affect existing critical activities or cause non-critical activities to become critical. A change or delay may result in only absorbing a part of

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 16 Construction Progress Schedule

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- the available total float that may exist within an activity chain of the network, thereby not causing any effect on any milestone.
- C. A comprehensive narrative of each time impact shall be submitted within seven (7) calendar days after the commencement of a delay or the notice for a change is given to the contractor.
  - D. Recommendation to the Owner for the acceptance or rejection of each time impact will be made by the architect and/or the owner's representative. Recommendations shall be made within seven (7) calendar days after a schedule review meeting has taken place, unless subsequent meetings or negotiations are necessary. After a decision has been made by the Owner an acceptance notification will be sent by the owner via change order with approved time if accepted. All approved changes shall be incorporated into the baselined schedule prior to the next pay application by the contractor.

**End of Section 01 32 16**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 32 33 - Photographic Documentation

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
1. Preconstruction photographs.
  2. Periodic construction photographs.
  3. Final completion construction photographs.
  4. Periodic construction video recordings.
  5. Owner designated software
- B. Related Sections:
1. Division 01 Section "Unit Prices" for procedures for unit prices for extra photographs.
  2. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
  3. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
  4. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
  5. Division 02 Section "Structure Demolition" for photographic documentation before building demolition operations commences.
  6. Division 02 Section "Selective Structure Demolition" for photographic documentation before selective demolition operations commence.
  7. Division 31 Section "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph or video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files in the quantities and at the intervals described in paragraph 3.1 of this section.
1. Digital Camera: Minimum sensor resolution of 10 mega pixels.
  2. Format: Unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
  3. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Name of Contractor.
    - c. Date photograph was taken.

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Section 01 32 33 - Photographic Documentation

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- d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
        - e. Unique sequential identifier keyed to accompanying key plan.
      - C. Construction Photographs: The project requires comprehensive documentation of construction progress and post inspection milestones. Submit electronic copies of each photographic view in the quantities and at the intervals described in paragraph 3.1 of this Section.
        - 1. "Progression" photo sets are to be performed at periodic intervals throughout the duration of construction, as applicable to the scope and as follows:
          - a. Site survey (Pre-construction): A one-time shot that provides coverage of site and immediate surroundings.
          - b. Interior progression shots: Broadly track the improvements from logical perspectives, to be performed at regular intervals and coordinated with pace of erection.
          - c. Pre-slab/Pre-Chase/Interior record shots: Underground or concealed utilities will be documented post inspection/pre-insulation and prior to pouring slabs, backfilling or closing chases/walls/ceilings.
      - D. Video Recordings: Submit video recordings in accordance with paragraph 3.2 of this Section.
        - 1. Submit video recordings in digital electronic format.
        - 2. Identification: With each submittal, provide the following information:
          - a. Name of Project.
          - b. Name of Contractor.
          - c. Date recording was recorded.
          - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
          - e. Weather conditions at time of recording.
- 1.4 QUALITY ASSURANCE
  - A. Photographer Qualifications: An individual who has the basic skills necessary to record digital photographs and electronic recordings.
- 1.5 COORDINATION
  - A. Auxiliary Services: Provide auxiliary services necessary, including temporary lighting required to produce clear, well-lit photographs.
- 1.6 USAGE RIGHTS
  - A. Contractor will transfer copyright usage rights if necessary to Owner for unlimited reproduction of photographic documentation.

**PART 2 PRODUCTS**

**2.1 PHOTOGRAPHIC MEDIA**

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 10 mega pixels.
- B. Digital Video Recordings: Provide high-resolution, digital video recordings.

**PART 3 EXECUTION**

**3.1 CONSTRUCTION PHOTOGRAPHS**

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
  - 1. Taking photographs or video recordings with students and schools staff included on the photograph is strictly prohibited.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date in file name for each image.
- C. Preconstruction Photographs: Before starting demolition or construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, or as directed by Architect.
- D. Periodic Construction Photographs: Take photographs and submit with daily field report in Kahua. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take a minimum of 20 color photographs after date of Substantial Completion for submission as project record documents.

**3.2 CONSTRUCTION VIDEO RECORDINGS**

- A. Owner's Training: Record video during the manufacturer's training session. Deliver the recordings with the O&M Manual(s).
- B. Submit videos in electronic format on flash drives. Label all videos according to the equipment the training is about.

**End of Section 01 32 33**

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 33 00 Submittal Procedures

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections but not limited to:
  - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment.
  - 2. Division 01 Section "Schedule of Values" for submitting the schedule of values.
  - 3. Division 01 Section "Project Management and Coordination" key personnel.
  - 4. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
  - 5. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 6. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 7. Division 01 Section "Demonstration and Training" for submitting video recordings of equipment demonstration and training of Owner's personnel.
- C. Refer to other Division 1 Sections and other Contract Documents for Specifications on administrative submittals. Such submittals include, but are not limited to the following:
  - 1. Permits.
  - 2. Payment Applications.
  - 3. Inspection and Test Reports.
  - 4. Schedule of Values
  - 5. Progress Reports.
  - 6. Listing of Subcontractors
- D. Shop Drawings are technical drawings and data that have been specially prepared for this Project, including but not limited to the following items:
  - 1. Fabrication and installation drawings.
  - 2. Setting diagrams.
  - 3. Shop-work manufacturing instructions.
  - 4. Templates.
  - 5. Patterns.
  - 6. Coordination drawings (for use on-site).
  - 7. Schedules.
  - 8. Design mix formulas.
  - 9. Contractor's engineering calculations.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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- Standard information prepared with specific reference to a Project is not considered to be shop drawings.
- E. Product Data includes standard printed information on manufactured products that has not been specially prepared for this Project, including but not limited to the following items:
1. Manufacturer's product specifications and installation instructions.
  2. Standard color charts.
  3. Catalog cuts.
  4. Rough-in diagram and templates.
  5. Standard wiring diagrams.
  6. Printed performance curves.
  7. Operational range diagrams.
  8. Mill reports.
  9. LEED specific information (as applicable)
  10. Standard product operating and maintenance manuals.
- Modify standard product data, drawings and diagrams to delete information not applicable to the project, and / or supplement standard information to provide specific data that is applicable to the work.
- F. Samples are physical examples of Work, including but not limited to the following items:
1. Partial sections of manufactured or fabricated work.
  2. Small cuts or container of materials.
  3. Complete units of repetitively used materials.
  4. Swatches showing color, texture and pattern.
  5. Color range sets.
  6. Units of work to be used for independent inspection and testing.
- G. Miscellaneous Submittals are work-related, non-administrative submittals that do not fit in the three previous categories, including but not limited to the following:
1. Specially prepared and standard printed warranties.
  2. Maintenance agreements.
  3. Workmanship bonds.
  4. Survey data and reports.
  5. Project photographs.
  6. Testing and certification reports.
  7. Record Drawings.
  8. Field measurement data.
  9. Operating and maintenance manuals.
  10. Keys and other security protection devices.
  11. Maintenance tools and spare parts.
  12. Overrun stock.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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#### 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and/or Contractor's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that may or may not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format

#### 1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections. Submittal schedule will be delivered by contractor within 7 days of NTP.
  - 1. Coordinate submittal schedule with list of subcontracts and Contractor's construction schedule.
  - 2. Submit revised submittal schedule monthly to reflect changes in current status and timing for submittals.
  - 3. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal category: i.e. Action, informational, shop drawing.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Architect's final release or approval.

#### 1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Contractor must process Submittals using the Owners designated software (Kahua).
- B. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
  - 1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings. Architect will use transmittal in owner's



## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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- designated software to record distribution of CAD drawings or other electronic files.
- a. Digital Drawing Software Program: The Contract Drawings may be in AUTOCAD format.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
    - b. Coordination/ approval of certain submittals may be required by either owner or owner designated consultants.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 14 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 14 calendar days for review of each resubmittal.
  4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 calendar days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- E. Identification and Information: Place a permanent label or title block on each paper copy submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Include the following information for processing and recording action taken:
    - a. Project name

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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- b. Date
  - c. Name of Architect
  - d. Name of Contractor
  - e. Name of subcontractor
  - f. Name of supplier
  - g. Name of manufacturer
  - h. Submittal number or other unique identifier, including revision identifier.
    - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
  - i. Number and title of appropriate Specification Section.
  - j. Drawing number and detail references, as appropriate.
  - k. Location(s) where product is to be installed, as appropriate.
  - l. Other necessary identification.
- F. Identification and Information: Identify and incorporate information in each electronic submittal file as follows:
- 1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
  - 2. Name file with submittal number or other unique identifier, including revision identifier.
    - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
  - 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
  - 4. Include the following information on an inserted cover sheet as applicable:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name of Contractor.
    - e. Name of subcontractor.
    - f. Name of supplier.
    - g. Name of manufacturer.
    - h. Number and title of appropriate Specification Section.
    - i. Drawing number and detail references, as appropriate.
    - j. Location(s) where product is to be installed, as appropriate.
    - k. Related physical samples submitted directly.
    - l. Other necessary identification.
  - 5. Include the following information as keywords in the electronic file metadata:
    - a. Project name.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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- b. Number and title of appropriate Specification Section.
- c. Manufacturer name.
- d. Product name.
- G. Options: Identify options requiring selection by the Architect.
- H. Deviations: Identify deviations from the Contract Documents on submittals.
- I. Transmittal: Assemble each submittal individually and upload to owner's designated software. Use submittal procedures to direct submittals to the party or parties responsible for review and approval of submittal. Reviewers will return submittals using the owner's designated software submittal reviewer procedure.
- J. Resubmittals: Make resubmittals in same form as initial submittal and use owner's designated software submittal procedure.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities.
- L. Use for Construction: Use only final submittals that are marked with approval notation from Architect's action stamp.

## **PART 2 PRODUCTS**

### 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Post electronic submittals as PDF electronic files directly to the appropriate location within the Owners designated software
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
  - 2. Submit electronic submittals via the Owners designated software as PDF electronic files.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
  - 3. Action Submittals: Submit informational submittal with request for Architect to review action submittal and provide date and time for event.
    - a. Create individual action submittal using owner's designated software. Provide cover page per section F.4. Provide pictures, copies of emails or other proof Architect and contractor have reviewed action submittal.
  - 4. Informational Submittals: submit as PDF electronic files directly to the appropriate location within the Owners designated software.

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### Section 01 33 00 Submittal Procedures

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5. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."
  6. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  7. Test and Inspection Reports Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before or concurrent with Samples.
  6. Submit Product Data in the following format:
    - a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based upon Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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- f. Relationship and attachment to adjoining construction clearly indicated.
      - g. Seal and signature of professional engineer if specified.
    2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
    3. Submit Shop Drawings in the following format:
      - h. PDF electronic file.
      - i. Primitive native file if requested by architect or owner.
  - D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
    1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
    2. Identification: Attach label on unexposed side of Samples that includes the following:
      - a. Generic description of Sample.
      - b. Product name and name of manufacturer.
      - c. Sample source.
      - d. Number and title of applicable Specification Section.
    3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
      - a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
    4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
      - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
    5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Architect to approve sample size.
      - a. Number of Samples: Submit three sets of Samples. Architect will retain one with option to provide owner a sample; Sample sets; remainder will be returned.
        - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

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### Section 01 33 00 Submittal Procedures

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- 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
  2. Number and title of related Specification Section(s) covered by subcontract.
  3. Drawing number and detail references, as appropriate, covered by subcontract.
  4. Submit subcontract list in the following format:
    - a. PDF electronic file.
    - b. Number of Copies: Three paper copies of subcontractor list, unless otherwise indicated. Architect will return two copies.
- F. Qualification Data: Prepare written in pdf format information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, and other information specified.
- G. Welding Certificates: Prepare written in pdf format certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.
- H. Installer Certificates: Submit written in pdf format statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- I. Manufacturer Certificates: Submit written in pdf format statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- J. Product Certificates: Submit written in pdf format statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- K. Material Certificates: Submit written in pdf format statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- L. Material Test Reports: Submit reports in pdf format written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- M. Product Test Reports: Submit written reports in pdf format indicating current product produced by manufacturer complies with requirements in

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- N. Research Reports: Submit written in pdf format evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
1. Name of evaluation organization.
  2. Date of evaluation.
  3. Time period when report is in effect.
  4. Product and manufacturers' names.
  5. Description of product.
  6. Test procedures and results.
  7. Limitations of use.
- O. Preconstruction Test Reports: Submit reports written in pdf format by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- P. Compatibility Test Reports: Submit reports written in pdf format by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- Q. Field Test Reports: Submit reports in pdf format indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents. Submit reports in owner's designated software
- R. As pdf file upload in owner's designated software with daily report for the work by contractor.
- S. Design Data: Prepare and submit written in pdf format and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version

#### 2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect using owner's designated software in RFI module.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit in pdf format a copy of certificate, signed and sealed by the responsible design professional,

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 33 00 Submittal Procedures

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for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

### **PART 3 EXECUTION**

#### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### 3.2 ARCHITECT/ENGINEER'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
  1. Action Stamp: The Architect/Engineer will stamp each submittal to be returned with a uniform, self-explanatory stamp, appropriately marked and executed to indicate the status of the submittal.
- C. Informational Submittals: Architect will review each submittal. Architect will upload each submittal to owner's designated software in the RFI module following the reviewer procedure.
- D. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review. Architect will notify contractor through owner's designated software via the RFI module or via email the submittal is incomplete.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- F. Submittals that are required per contract agreements may be reviewed and approved by owner or owner's representative.

**End of Section 01 31 00**



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 35 23 Project Safety and Loss Prevention

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, FBISD Safety Program Guidelines Manual, apply to this Section.

1.2 CONSTRUCTION SAFETY AND LOSS CONTROL PROGRAM

- A. Contractor, along with the Subcontractors of all tiers, shall develop a composite Safety Program. The safety plan establishes minimum standards of performance regarding safety during the course of the work on the project. The prevention of job-related injuries and illnesses may require additional safety devices and/or procedures beyond these minimum standards. This Safety Program will include enforcement of safe practices, instructions, and direction in the use of safety equipment and personal protective equipment, and other such activities as may be necessary and appropriate to maintain job safety and accident prevention. A copy of the site-specific plan shall be submitted to the FBISD Project Manager for review prior to starting work onsite following submittal procedures outlined in 01 33 00.
- B. Implementation and enforcement of the Safety and Loss Prevention Program for the work force of Contractor and all Subcontractors shall be responsibility of Contractor. Owner or representatives of the owner may conduct periodic jobsite safety inspections to monitor compliance with the Safety and Loss Prevention Program. If Contractor activities are not in compliance with their Safety and Loss Prevention Program, Owner or owner's representative will inform the Contractor in writing of the observed noncompliance, or safety hazards using owner's designated software. These items must be corrected in a timely manner. If the Contractor fails to correct any safety non-compliance or hazard, the Owner shall have the right but not the obligation to perform the correction action and withhold costs associated with the corrective action from the Contractors next or final payment. The owner or owner's representative reserve the right to shut down the job until corrections have been initiated and documented.
- C. It is not the intent of this Contract to require the Owner, to provide services, assume responsibility or accept liability for the safety of work sites or any aspect of the work by Contractors or Subcontractors. Each contractor shall bear sole and exclusive responsibility for safety in all phases of their work. Nothing contained herein shall relieve such responsibility.
- D. The Owner's role in achieving construction safety and health objectives include overall supervisory management for site safety. This responsibility does not supersede, override or take precedence over that of construction Contractors, who are ultimately responsible for the safety and health of their employees, Subcontractors, visitors, students, staff, the public and protection of property. The primary functions of the Owner as it relates to construction safety and health are to monitor Contractor compliance with the safety and health standards required by law and to

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- administer and enforce the conditions of the contract pertaining to safety, health, and security.
- E. Each Contractor and Subcontractor shall comply with all applicable safety related laws, including the following:
1. Walsh-Healy Public Contracts Act 9 (Title 41 CFR, Part 50-2-3) and the included rules and regulations contained in the Occupational Safety and Health Standards, and Established Federal Standards (Title 20 CFR, Part 1910 and CFR, Part 1926).
  2. U.S. Department of Transportation Safety Requirements – Federal Highway Projects, 1968, including the requirements referred to in Appendix A therein.
  3. State and local codes and regulations.
- F. Safety Documentation Reporting: Contractor shall submit to Owner and owner's representative the following reports upon request:
1. All accident investigation reports shall be submitted no more than 24 hours after occurrence. The Contractor must maintain accurate records of personal injury and property loss, cooperate and aid in investigation of cases, and implement appropriate actions to prevent recurrence. Owner's representative shall be notified immediately following all accidents.
  2. A binder shall be maintained on site documenting safety orientation of new hire employees and shall be submitted when requested.
  3. Weekly Contractor-held safety meeting reports shall be logged in a binder on site and submitted upon request.
  4. Weekly site safety inspection reports performed by Contractor shall be logged in a binder on site weekly.
  5. Safe Plans of Action (SPA) shall be completed by the contractor prior to each task if required by loss and safety prevention plans and submitted upon request.
  6. Task Safety Awareness (TSA) meeting documents shall be maintained by the contractor if required by loss and safety prevention plans for review by the FBISD Project Manager upon request.
  7. A summary log of all accidents and injuries including first-aid treatments is to be maintained on site and submitted upon request.
  8. Crane re-certifications on an occurrence basis and proof of certification prior to beginning work shall be maintained in a log on site and submitted upon request.
  9. A Job Safety Analysis (JSA) shall be performed, signed off by all crewmembers, job superintendent; and Contractors competent person prior to all lifting activities using any means.
  10. Crane Safety – all crane operations will require a JSA for all hoisting operations; copy of the crane lift chart marked with longest and heaviest lifts; all crew members to sign off on JSA; barricade tape around crane at all times; need crane crew to

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indicate on a copy of the crane's lift chart where the highest and heaviest pick is located; tail swing location, etc.

11. A summary of contractor's OSHA Safety Violations and Citations for the site will be submitted to owner or owner's representative 4 working days prior to the opening Inspection Conference.
12. A notice of work termination shall be submitted via transmittal in owner's software to owner or owner's representative by the Contractor within 10 calendar days of a Subcontractor completing work under its Contract and leaving the jobsite.
13. A site-specific safety plan must be submitted via submittal procedure 01 33 00 within thirty (30) days of NTP. The final site-specific safety plan must be accepted by Owner prior to approval of first pay application.
14. Name and qualifications of an on-site safety person will be documented within the site-specific safety plan prior to approval of plan.
15. List of Hazardous Substances brought on site and SDS for each item.
16. Copy of OSHA 300 log for their project.
17. Accident and injury reports within 24 hours of occurrence.

1.3 SITE SAFETY DEVICES

- A. Contractor and its Subcontractors performing work at project site maintain responsibility for providing all safety related equipment such as, but not limited to, testing equipment, safety valving, chains, locks, alarms, signal, signage, and personal protective equipment necessary to protect site workers, students, staff, and the general public.
- B. Employees on walking and/or working surfaces with unprotected sides or edges six feet (6') or higher above a lower level shall be protected from falling by the use of guardrails, nets or personal fall arrest systems. This shall include, but is not limited to employees on the face of formwork, reinforcing steel or structural steel during and after erection, exterior and interior masonry work, roofing work, window installation, electrical work, mechanical work, and all other trades that require crafts/workers to work in areas where the height exceeds six feet (6') above the ground or work surface.
- C. One hundred percent (100%) personal eye wear and head wear protection is required in all construction work areas and shall be worn at all times by employees of both the contractor and subcontractors (regardless of subcontractor tier). Protective eye wear shall conform and meet requirements stated in ANSI 287.1-1968.
- D. Clean-Up and Waste Disposal. Contractor shall perform a daily site cleanup and otherwise keep the Project Site free from accumulation of waste materials, rubbish and other debris resulting from the performance of the Work. The Contractor shall also be responsible for providing mowing / grass cutting services for areas inside of the construction areas weekly. Contractor shall, in compliance with Applicable Laws, remove, transport, and dispose of any Hazardous Substance transported onto the Project Site by or on behalf of Contractor or any Subcontractor's activities

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at the Project Site. Contractor shall notify the Project Company immediately upon the discovery of the presence of any Hazardous Substance on, or the release of any set forth above, Contractor shall not be responsible for the transportation, handling, storage or removal of any Hazardous Substances which existed at, on or in the Project Site prior to commencement by Contractor of the Work.

1.4 RESPONSIBILITY

- A. Each participant involved in the construction of the project is individually responsible for conducting their activities to ensure compliance with all applicable project safety and health requirements. The owner and owner's representative are on site as observers and will help to monitor the approved contractor's loss and safety prevention plan and enforce federal, state, and local regulations or codes. The Contractor and the Contractor's Site Safety Manager is responsible for detailed monitoring of construction activities.

1.5 CONTRACTOR SITE SAFETY MANAGER RESPONSIBILITIES

- A. The Contractor's Site Safety Manager is responsible for implementing the safety and health plan at the project level. The following specific safety and health plan guide will be followed:
1. Pre-plan work activities through the use of Safe Plans of Action (SPA) in order to identify and control and safety and health issues, which may pose a hazard to employees or others.
  2. Contractors are responsible for completing Safe Plans of Action (SPA) and communicating them to employees prior to beginning each work task. This communication of safe work practices will be documented through the Task Safety Awareness meeting and form.
  3. Establish and maintain a safe and healthy work environment by adhering to the guidelines and procedures issued in the latest document of the Federal, State, local code, and site-specific requirements.
  4. Ensure that all Contractor employees and Subcontractors implement and abide by the safety, health, and security rules and regulations set forth by all regulatory agencies as well as those established by this plan.
  5. Hold, at minimum, weekly meetings with Subcontractors to discuss accident prevention measures, review any accident prevention measures, review any accidents which might have occurred since the last meeting, and institute any additional safety measures necessary to prevent future accidents. Meetings will include incidents, which may pose potential third party claim exposures to the District.
  6. Assure that Owner's staff is knowledgeable of all Contractor Subcontractor safety and health programs. The safety manager will give special attention to those operations, which require a coordinated effort by the Contractor and Owner.
  7. Maintain open and continuing communications between the Owner and the Contractors on safety and health issues.

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8. Assure that the safety program general requirements apply to visitors entering the project sites. A visitor's log will be established and maintained at each project.
9. Arrange for specific job safety training for Owner's staff members using or operating special equipment or entering confined spaces and/or the use of other personal protective equipment or other analysis instruments.
10. Require the Contractor personnel complete a thorough investigation of all accidents, occurrences. Reports shall be completed and submitted to the FBISD Project Manager within 24 hours after the occurrences.
11. Assure that safety is the FIRST subject of EVERY Contractor/Subcontractor meeting.
12. Review all safety inspection reports with the Subcontractors during the weekly progress meeting.
13. Prior to the construction activity by any Contractor and/or Subcontractor the Safety Manager will assure that all pre-work job safety analysis submittals have been reviewed.
14. Verify the Contractor has no outstanding safety deficiencies that could result in the delay of payment.
15. Assign and manage additional Contractor safety personnel as warranted.
16. Conduct weekly Contractor safety records and performance audits.
17. Attend safety training sessions as required by the Owner.

1.6 OWNER'S RESPONSIBILITIES

- A. Review Contractors/Subcontractors safety plan.
- B. Make recommendations for administrative action when Contractors fail to correctly identify safety, health, or environmental deficiencies.
- C. Attend Contractor/Subcontractor toolbox safety meetings as deemed necessary.

1.7 CONTRACTOR SITE SAFETY SUPERINTENDENT (for projects exceeding \$10 million dollars)

- A. The Contractor shall appoint a Competent Site Safety Superintendent. The site safety superintendent may have other responsibilities on the project. Contactor shall submit, in writing, the name and qualifications of the proposed individual to serve as Site Safety Superintendent to FBISD for approval, prior to beginning work. The Site Safety Superintendent shall be qualified to serve in this capacity and shall not be changed without written notice to the FBISD Project Manager. All employee substitutions into this position must be approved by the FBISD Project Manager. The Owner shall have right to require removal of the Site Safety Superintendent should he/she be deemed incompetent, obstructive or ineffective in carrying out the work.
- B. The Site Safety Superintendent employed by the Contractor shall have full authority to act and make decisions for the Contractor in safety and loss control related matters.
- C. The Contractor's Site Safety Superintendent shall monitor all work to assure that it is being performed in accordance with the requirements of

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the Safety Program and site specific Contactor Safety Program. This person shall be present at the work site during regular and other work hours acting the capacity of Site Safety Superintendent.

D. Smoking shall be prohibited on all FBISD jobsites

1.8 SAFETY

A. Conduct weekly safety sessions.

B. Attendance: Mandatory for superintendent and foreman for Contractor and each Subcontractor.

**End of Section 01 35 23**

## **SECTION 01 35 91 - HISTORIC TREATMENT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes general protection and treatment procedures for the entire Project and the following specific work:
  - 1. Historic removal and dismantling.
- B. Related Sections:
  - 1. Division 04 Section "Maintenance of Unit Masonry" for specific requirements for cleaning and repairing clay masonry.
  - 2. Division 04 Section "Maintenance of Stone Assemblies" for specific requirements for cleaning and repairing stone.
  - 3. Division 05 Section "Maintenance of Decorative Metal" for specific requirements for cleaning and repairing ornamental metal.
  - 4. Division 08 Section "Historic Treatment of Wood Windows" for specific requirements for cleaning and repairing wood windows.
  - 5. Division 09 Section "Maintenance of Painting and Coating" for specific requirements for the stripping and repainting of decorative paint finishes.

#### **1.3 DEFINITIONS**

- A. Consolidate: To strengthen loose or deteriorated materials in place.
- B. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.
- C. Existing to Remain: Existing items that are not to be removed or dismantled.
- D. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by the Architect.

- E. Refinish: To remove existing finishes to base material and apply new finish to match original or as otherwise indicated.
- F. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
- G. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- I. Replicate: To reproduce in exact detail, materials, and finish, unless otherwise indicated.
- J. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.
- K. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.
- L. Retain: To keep existing items that are not to be removed or dismantled.
- M. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials, unless otherwise indicated.
- N. Salvage: To protect removed or dismantled items and deliver them to the Owner ready for reuse.
- O. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
- P. Strip: To remove existing finish down to base material, unless otherwise indicated.

#### 1.4 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property. Carefully dismantle and salvage each item or object.
- B. Coordinate with Owner's representative who will establish special procedures for dismantling and salvage.

#### 1.5 SUBMITTALS



- A. Construction Schedule for Historic Treatments: Indicate for the entire Project the following for each activity to be performed in historic spaces, areas, and rooms, and on historic surfaces:
  - 1. Detailed sequence of historic treatment work, with starting and ending dates, coordinated with Owner's continuing operations and other known work in progress.
  - 2. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
  - 3. Coordination of the continuing occupancy of the Owner and others in portions of the existing building and of the Owner's partial occupancy of completed Work.
  - 4. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use. Do not use such equipment without Contractor's professional engineer's certification that the structure can support the imposed loadings without damage.
- B. Qualification Data: Provide qualifications as specified in appropriate section for historic treatment specialist.
- C. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by historic treatment operations.

## 1.6 QUALITY ASSURANCE

- A. Historic Treatment Specialist Qualifications: An experienced firm regularly engaged in historic treatments similar in nature, materials, design, and extent to this work as specified in each section, and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrate the firm's qualifications to perform this work.
  - 1. Field Supervisor Qualifications: Full-time supervisors experienced in historic treatment work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on Project site during times that historic treatment work is in progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
  - 2. Worker Qualification: Persons who are experienced in historic treatment work of types they will be performing.
- B. Historic Treatment Program: Prepare a written plan for historic treatment for the whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other sections.
  - 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
  - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices

during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.

- D. Mockups: Prepare mockups of specific historic treatment procedures specified in this Section to demonstrate aesthetic effects and set quality standards for materials and execution.
- E. <<Edit these items to include those that apply to project(s)>>
1. Typical Removal Work: Remove typical [wall area] [suspended ceiling assembly] <Insert description> as shown on Drawings.
  2. Typical Dismantling Work: Dismantle typical [fluorescent lighting fixture from ornamental plaster surface] [historic light fixture] <Insert description> as shown on Drawings.
  3. Typical Removal Work: Remove an [approximately 50 sq. ft.] <Insert dimension> area of typical [wall] [suspended ceiling assembly] <Insert description>, but not less than [10] <Insert quantity> adjacent whole [masonry] [stone] [ceiling tile] <Insert item> units:
  4. Typical Dismantling Work: Dismantle an [approximately 50 sq. ft.] <Insert dimension> area of typical [composition tile from mosaic tile substrate] <Insert description>, but not less than [10] <Insert quantity> adjacent whole [composition tile] <Insert item> units:
  5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- F. Regulatory Requirements: Comply with governing EPA notification regulations before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.
- G. Standards: Comply with ANSI/ASSE A10.6.
- H. Historic Treatment Preconstruction Conference: Conduct conference at [Project site] <Insert location>.
1. General: Review methods and procedures related to historic treatment including, but not limited to, the following:
    - a. Review manufacturer's written instructions for precautions and effects of historic treatment procedures on materials, components, and vegetation.
    - b. Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
    - c. Review qualifications of personnel assigned to the work and assign duties.
    - d. Review material application, work sequencing, tolerances, and required clearances.
    - e. Review areas where existing construction is to remain and requires protection.
  2. Removal and Dismantling:
    - a. Inspect and discuss condition of construction to be removed or dismantled.
    - b. Review requirements of other work that relies on substrates exposed by removal and dismantling work.

## 1.7 STORAGE AND PROTECTION OF HISTORIC MATERIALS

PART 2 - << Edit this to describe any exploratory work>>

- A. Salvaged Historic Materials:
  - 1. Clean only loose debris from salvaged historic items unless more extensive cleaning is indicated.
  - 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area [on-site] [off-site] [designated by Owner] [indicated on Drawings].
  - 5. Protect items from damage during transport and storage.
  
- B. Historic Materials for Reinstallation:
  - 1. Repair and clean historic items as indicated and to functional condition for reuse.
  - 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.
  
- C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.
  
- D. Storage and Protection: When taken from their existing locations, catalog and store historic items within a weather-tight enclosure where they are protected from wetting by rain, snow, condensation, or ground water, and from freezing temperatures.
  - 1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
  - 2. Secure stored materials to protect from theft.

2.2 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to removal and dismantling area. Conduct removal and dismantling work so Owner's operations will not be disrupted.
  
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. Hazardous materials will be removed by Owner before start of the Work.
  - 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Program Manager. Owner will remove hazardous materials under a separate contract.
    - a. In the case of asbestos, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Re-assign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.
- E. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

### PART 3 - PRODUCTS - (Not Used)

### PART 4 - EXECUTION

4.1 <<Edit these paragraphs as they apply to project>>

#### 4.2 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

- A. Removal Equipment: Use only hand-held tools except as follows or unless otherwise approved by the Architect on a case-by-case basis:
  - 1. Light jackhammers are allowed subject to Architect's approval.
  - 2. Large air hammers are not permitted.
- B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by the Architect on a case-by-case basis:
  - 1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
  - 2. Pry bars over 18 inches long and hammers weighing over 2 lb are not permitted for dismantling work.

#### 4.3 EXAMINATION

- A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be

removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.

1. Verify that affected utilities have been disconnected and capped.
2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

C. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.

#### 4.4 PROTECTION, GENERAL

A. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.

B. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
3. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment work.
4. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
5. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
6. Protect floors and other surfaces along haul routes from damage, wear, and staining.
7. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.

C. Temporary Protection of Historic Materials:

1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Architect.

D. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

- E. Utility and Communications Services:
  1. Notify the Owner, Architect, and authorities having jurisdiction, owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.
  2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
  3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.
  
- F. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.
  1. Prevent solids such as stone or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from historic treatment work.
  2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
  
- G. Existing Roofing: Prior to the start of work in an area, install roofing protection as indicated.

#### 4.5 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following.
  1. Comply with NFPA 241 requirements unless otherwise indicated.
  2. Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.
    - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
  3. Prohibit smoking by all persons within the Project work and staging areas.
  
- B. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watch are trained in fire-extinguisher and blanket operation.

#### 4.6 GENERAL HISTORIC TREATMENT

- A. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.
  
- B. Halt the process of deterioration and stabilize conditions, unless otherwise indicated. Perform work as indicated on Drawings. Follow the procedures in subparagraphs below and procedures approved in historic treatment program.
  1. Retain as much existing material as possible; repair and consolidate rather than replace.

2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
  3. Use reversible processes wherever possible.
  4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
  5. Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs.
- C. Notify Architect of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.
1. Do not proceed with the work in question until directed by Architect.
- D. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to the approval of Architect.
- E. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.
- F. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on Record Drawings.

#### 4.7 HISTORIC REMOVAL AND DISMANTLING

- A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.
- B. Perform work in accordance with the historic treatment program and approved mockup(s).
1. Provide supports or reinforcement for existing construction that becomes temporarily weakened by the work, until the work is completed.
  2. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
  3. Do not operate air compressors inside building, unless approved by Architect in each case.
  4. Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
  5. Do not use explosives.
- C. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.
- D. Removing and Dismantling Items On or Near Historic Surfaces:

1. Use only dismantling tools and procedures within [12 inches] <Insert dimension> of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
  2. Unfasten items to be removed, in the opposite order from which they were installed.
  3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
  4. Dismantle anchorages.
- E. <<< Retain and revise remaining paragraphs to suit Project(s). Paragraphs below are examples only. >>>
- F. Masonry Walls:
1. Remove masonry carefully and erect temporary bracing and supports as needed to prevent unexpected collapse of materials being removed.
  2. Dismantle top edge and sides before removing wall. Stop removal work and immediately inform the Architect if any structural elements above or adjacent to the work show signs of distress or dislocation during any phase of removal work.
  3. Remove wall in easily managed pieces.
  4. During removal, the Contractor is responsible for the stability of the partially remaining wall. Notify the Architect of the condition of temporary bracing for wall if work is temporarily stopped during the wall's removal.
- G. Steelwork:
1. Expose all structural steel for examination by the Architect and the Contractor's professional engineer before proceeding with removal or dismantling.
  2. If any distress is shown by the structure during performance of the work, stop work and take immediate precautionary measures to ensure safety of the structure. Inform the Architect of the problem, the steps taken and proposed corrective actions.
  3. Brace and support structural steel being removed and remaining during all phases of the work.
  4. Concrete-Encased Steel: Where steel is known to be encased by concrete that will be removed, saw cut with blades that will cut no deeper than the thickness of the concrete cover with an adequate margin for error in the location of the steel. Isolate sections of concrete by saw cutting before beginning removal.
- H. Loose Plaster: Identify loose, non-historic plaster and separate it from its substrate by tapping with a hammer and prying with a chisel or screwdriver. Do not use pry bars. Leave sound, firmly adhered plaster in place. Do not damage, remove, or dismantle historic plasterwork except where indicated or where it is an immediate hazard to personnel and as approved by the Architect.
- I. Concrete Floor Surface Removal: Remove floor surfaces, fill, and topping, to the indicated lower elevations or cleavage planes as indicated on Drawings. Use dismantling methods when removing floor surfaces [12 inches] <Insert dimension> or less away from historic walls. Take away material to a uniform surface at the indicated level.



4.9 <<Edit the following paragraphs to include only those applicable to project(s). >>

- A. Existing Construction to Be [Removed] [Dismantled]: <Insert description of items and construction to be removed>.
- B. Existing Items to Be [Removed] [Dismantled] and Salvaged: <Insert description of items to be dismantled and salvaged>.
- C. Existing Items to Be [Removed] [Dismantled] and Reinstalled: <Insert description of items to be removed or dismantled and reinstalled>.
- D. Existing Items to Remain: <Insert description of items to remain>.

**END OF SECTION 01 35 91**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 40 00 Quality Requirements

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control. Testing and Inspection documentation should be generated using the Owner's designated software.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. Owner will employ and pay for the service of an Independent Testing Laboratory to perform specified testing and laboratory services.
  - 1. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 2. Contractor shall cooperate with the Laboratory to facilitate the execution of its required services.
  - 3. Contractor shall pay for additional samples and tests required for Contractor's convenience or when initial tests indicate work does not comply with Contract Documents.
  - 4. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 5. Specified tests, inspections, and related actions do not limit Contractor's other quality- assurance and -control procedures that facilitate compliance with the Contract Document requirements.
  - 6. Requirements for Contractor to provide quality-assurance and - control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this section.
- C. Related Sections:
  - 1. Division 01 Section "Allowances" for testing and inspecting allowances.
  - 2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
  - 3. Division 01 Section "Execution" for cutting and patching.
  - 4. Divisions 02 through 49 Sections for specific test and inspection requirements.
  - 5. Division 01 Section "Testing, Adjusting, and Balancing for HVAC" (TAB provided by owner)

1.3 DEFINITIONS

- A. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 40 00 Quality Requirements

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- B. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
  - C. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
  - D. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
  - E. Testing Agency: An entity engaged by the Owner to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
  - F. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
    - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
  - G. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.
- C. Conflicts between the specifications and the construction documents. The most stringent requirement will govern.
- D. Conflicts on specification requirements. The most stringent requirement will govern.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following, as applicable:
  - 1. Specification Section number and title.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 40 00 Quality Requirements

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2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

#### 1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following as applicable:
  1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and re-inspection.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  1. Name, address, and telephone number of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
  1. Name, address, and telephone number of factory authorized service representative making report.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 40 00 Quality Requirements

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2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

#### 1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329, 'Standards of Recommended Practices for Inspection and Testing Agencies for Concrete and Steel as Used in Construction'; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  1. NRTL: A Nationally Recognized Testing Laboratory according to 29 CFR 1910.7.
  2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's

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### Section 01 40 00 Quality Requirements

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products that are similar in material, design, and extent to those indicated for this Project.

- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

#### 1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Costs for retesting and re-inspection of construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

- B. Contractor Responsibilities:

1. For tests and inspections performed by the Owner's Testing Laboratories:

- a. Cooperate with Laboratory personnel; provide access to Work and to manufacturer's operations.
- b. Secure and deliver to the Laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- c. Furnish to the Laboratory proposed concrete design mixes, and other material mixes which require evaluation by the Testing Laboratory, a minimum of fourteen (14) days prior to use on the Project.
- d. Furnish incidental labor and facilities
  - 1) To provide access to Work to be tested.
  - 2) To obtain and handle samples at the Project site or at the source product to be tested.
  - 3) To facilitate inspections and tests.
  - 4) For safe storage and curing of test samples.
  - 5) Notify Laboratory, PM and Architect sufficiently in advance of operations to allow for Laboratory assignment of personnel and scheduling of tests.
    - a) When test or inspections cannot be performed after such notice, reimburse Laboratory for personnel and travel expenses incurred due to Contractor's negligence.
  - 6) Make arrangements with Laboratory and pay for additional samples, tests, or inspections as required for the Contractor's convenience.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 40 00 Quality Requirements

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- 7) Make arrangements with Laboratory and pay for additional samples and tests required when initial test indicate non-compliance with Contract Documents, including load test.
2. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
    - a. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
    - b. Retain first subparagraph below if some Specification Sections require an independent testing agency to perform certain tests and inspections.
    - c. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - d. Retain first subparagraph below to assure validity of agencies' reports.
    - e. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.
    - f. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  4. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
  - D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
  - E. Retesting/Re-inspection: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspection, for construction that replaced Work that failed to comply with the Contract Documents.
  - F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 40 00 Quality Requirements

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delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses. .
1. Distribution: Distribute schedule to Owner, PM, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

## **PART 2 EXECUTION**

### 2.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Architect.
  4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's reference during normal working hours. Provide a copy of the log at completion of the project upon request of Architect, owner or owner's representative.

### 2.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**End of Section 01 40 00**



# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 42 00 References

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 DESCRIPTION OF WORK REQUIREMENTS

- A. General: This Section specifies procedural and administrative requirements for compliance with governing regulations and codes and standards imposed upon the Work. These requirements include the obtaining of permits, licenses, inspections, releases, and similar statements, as well as payments, associated with regulations, codes, and standards.
- B. "Regulations" is defined to include laws, statutes, ordinances, and lawful orders issued by governing authorities, as well as those rules, conventions and agreements within the construction industry which effectively control the performance of the Work regardless of whether they are lawfully imposed by governing authority or not.
- C. Governing Regulations: Refer to General and Supplementary Conditions for requirements related to compliance with governing regulations.

#### 1.3 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized", "selected", "required", and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown", "noted", "scheduled", and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 42 00 References

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- J. “Testing Agencies”: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and , if required, to interpret results of those inspections or tests.

#### 1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference. Individual Specification Sections indicate which codes and standards the Contractor must keep available at the project site for reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified, and where these standards establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents specifically indicate a less stringent requirement. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect/Engineer for a decision before proceeding.
- D. Minimum Quantities or Quality Levels: In every instance the quantity or quality level shown or specified is intended to be the minimum for the work to be provided or performed. Unless otherwise indicated, the actual work may either comply exactly, within specified tolerances, with the minimum quantity or quality specified, or may exceed that minimum within reasonable limits. In complying with these requirements, the indicated numeric values are either minimum or maximum values, as noted, or as appropriate for context of the requirements. Refer instances of uncertainty to the Architect/Engineer for decision before proceeding.

#### 1.5 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction or other entity applicable to the context of the text provision.
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the.
- C. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations

#### 1.6 SUBMITTALS

- A. Permits, Licenses and Certificates: For the Owner’s records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 42 00 References

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conjunction with compliance with standards and regulations bearing upon performance of the Work. Submit all applicable records via transmittal using owner designated software.

**End of Section 01 42 00**

## SECTION 01 45 23.01

### HVAC TESTING, ADJUSTING, AND BALANCING

#### PART 1 - GENERAL

##### 1.1 REQUIREMENTS INCLUDED

- A. Owner will employ and pay for the service of an Independent Testing Agency for testing and balancing of HVAC systems.
  - 1. The testing, adjusting and balancing (TAB) of air conditioning systems will be performed by an impartial Independent Technical Firm whose operations are limited only to the field of professional TAB. TAB work shall be done under direct supervision of a professional engineer employed by the TAB firm.
  - 2. The Contractor shall cooperate with the Owner provided TAB firm; provide necessary data on design and proper application of system components; furnish labor and materials required to eliminate any deficiencies or mal-performance.

##### 1.2 RELATED WORK

- A. Drawings and General Provisions of the Contract, including General, Supplementary and Other Conditions and Division – 1 Specifications Sections, apply to work of this Section.
- B. Refer to Division 23 and Division 26 for testing in conjunction with Mechanical and Electrical work.

##### 1.3 QUALIFICATION OF HVAC TESTING, ADJUSTING AND BALANCING FIRM

- A. Minimum Qualification of HVAC Testing, Adjusting and Balancing Firm:
  - 1. General:
    - a. Each professional firm desiring to submit proposals for testing and balancing HVAC systems for Project shall submit necessary brochures describing history of firm and qualifications of personnel to Architect.
    - b. Each professional firm shall have a minimum of five years' experience.
    - c. Each submittal shall contain a listing of similar projects.
    - d. Each professional firm submitting such information on its qualifications and personnel shall keep information current by submitting supplemental data a minimum of once every six (6) months or when professional or technical personnel who shall perform the work may change.
    - e. Each professional firm warrants by submittal of its personnel qualifications that such personnel shall be used in the performance of the work. In the event of personnel change, professional firm submitting proposal shall submit complete qualifications and experience of new personnel. Owner, upon acceptance of proposal, expects work to be performed by the personnel whose experience is so described.

- f. Guidelines from NEBB or AABC shall be followed for Water Source Heat Pump.
2. Qualifications of Firm:
  - a. Firm shall be one which is licensed to do professional services of this specified type and as a minimum have one professional engineer with current registration to perform such professional services.
  - b. Firm shall be capable of performing services at location of facility described within time specified, preparing and submitting the detailed report of actual field work as may be required.
  - c. Firm shall be a member in good standing of Associated Air Balance Council (AABC) and listed in its current directory.

#### 1.4 LABORATORY DUTIES AND RESPONSIBILITIES

##### A. HVAC Testing and Balancing:

1. TAB firm shall act as liaison between Owner, Architect, and Contractor and inspect installation of mechanical piping systems, sheet metal work, temperature controls, and other component parts of heating, air conditioning and ventilating systems. Inspection of work shall cover that part relating to proper arrangement and adequate provisions for testing and balancing.
2. Upon completion of installation and start-up on mechanical equipment, check, adjust and balance system components to obtain optimum conditions in each conditioned space in building. Prepare and submit to Owner, or Owner's delegated representative, complete reports on the balance and operation of systems.
3. Permanent employed technicians or engineers of firm must do measurements and recorded readings of air, water and electricity that appear in reports.
4. Make a total of three (3) inspections within ninety (90) days after occupancy of building to insure that satisfactory conditions are being maintained throughout and to satisfy any unusual conditions.
5. Make an inspection in building during opposite season in which initial adjustments were made, and at that time make any necessary modifications to initial adjustment required to produce optimum operation of system components to produce proper conditions in each conditioned space. At time of opposite season checkout, Owner's representative shall be timely notified before any readings or adjustments.

#### 1.5 CONTRACTOR'S RESPONSIBILITIES

##### A. HVAC Testing, Adjusting and Balancing

1. Have all systems complete in operational readiness prior to notifying TAB firm that Project is ready for their services, and so certify in writing to Owner that such a condition exists.
2. Make any changes in sheaves, belts and dampers or the addition of dampers required for correct balance as required by TAB firm, at no additional cost to the Owner.
3. Provide and coordinate services of qualified, responsible subcontractors, suppliers and personnel as required to correct, repair or replace any and all deficient items or conditions found during that testing, adjusting and balancing period.

4. In order that systems may be properly tested, balanced and adjusted as required by these specifications, operate said systems for length of time necessary to properly verify their completion and readiness for TAB and pay costs of operations during TAB period.
5. Provide time frame allowance in Contract completions schedule to permit completion of TAB services prior to Owner occupancy.
6. Should TAB be so notified and TAB work commences and the systems are found to not be in readiness or a dispute occurs regarding the readiness of systems, Contractor shall request an inspection be made by a duly appointed representative of Owner, Architect, TAB firm and Contractor. This inspection shall establish to the satisfaction of represented parties whether or not systems meet basic requirements for TAB services. Should inspection reveal TAB services notification to have been premature, Contractor shall pay for costs of the inspection and work previously accomplished by TAB firm. Furthermore, such items as are not ready for TAB services shall be completed placed in operations readiness and TAB services shall again be required.
7. Complete operational readiness, prior to commencement to TAB services shall include the following:
  - a. Construction status of building permits closing of doors, windows and ceilings installed to obtain projected operational conditions.
8. Air Distribution Systems:
  - a. Verify installation for conformity to design. Supply, return and exhaust ducts terminated and pressure tested for leakage as required by Specifications.
  - b. Volume and fire dampers properly located and functional. Dampers serving requirements of minimum and maximum outside air, return and relief, shall provide tight closure and smooth operation.
  - c. Supply, return, exhaust and transfer grills, registers, diffusers and terminal units installed.
  - d. Air handling systems, units and associated apparatus, such as filter sections and access doors, shall be blanked or sealed to eliminate excessive bypass or air leakage.
  - e. Fans (supply, return, and exhaust) operating and verified for freedom from vibration, proper fan rotation and belt tension; heater elements shall be proper size and rating; record motor amperage and voltage and verify name plate ratings are not exceeded.
9. Water Circulating Systems:
  - a. Check and verify pump alignment and rotation.
  - b. Position and valves pertinent to system design and require operation to permit full flow of water through system components. Operate hydronic systems under full flow conditions until circulating water is clean. Strainers shall be removed and cleaned as required during this cycle of operation.
  - c. Record each pump motor amperage and voltage. Readings shall not exceed nameplate rating.
  - d. Verify electrical heater elements to be of proper size and rating.
  - e. Water circulating systems shall be full of water and free of air, expansion tanks set for proper water level and air vents installed at high points of systems and operating freely.

- f. Check and set operating temperature of heat exchangers to design requirements.
  - g. Contractor to provide labor and chemical to clean and flush all chill water piping system. Contractor to coordinate with treatment provider to be sure chemicals used are compatible with owner's providers.
10. Automatic Controls:
- a. Verify that control components are installed in accordance with Project requirements and functional, including electrical interlocks, damper sequences, firestats, CO2 sensors, and smoke detectors.
  - b. Controlling instruments shall be functional and set for designed operating conditions. Factory pre-calibration of thermostats will not be acceptable.
  - c. Temperature regulation will be adjusted for proper relationship between controlling instruments and calibrated by control subcontractor using data submitted by TAB firm. The correctness of final setting shall be proved by taking hourly readings for a period for three (3) successive 8-hour days in a typical room on each separately controlled zone. Total variation shall not exceed two (2) degrees from present median temperature during entire temperature survey period.
11. TAB firm will not instruct or direct Contractor in any of the work, but will make such reports as are necessary direct to Owner. Plans and miscellaneous adjustment devices for purpose of adjustment to obtain optimum operation conditions; install these devices in a manner that will leave them accessible and readily accessible, provide access as required by TAB firm.
12. Provide Plans, Specifications, and Change Orders to TAB firm.
13. Provide approved submittal data on equipment installed and related changes required to accomplish test procedures outlined in this Section of the Specification.
14. Transmit one (1) copy of the following 'Record for Owner' to TAB firm for review and comments:
- a. 'As installed' drawings.
  - b. Approved Fixture Brochure.
  - c. Approved Wiring Diagrams.
  - d. Approved Control Diagrams.
  - e. Approved Sequence of Operations
  - f. Shop Drawings.
  - g. Instructions.
  - h. Valve Charts.
  - i. Approved submittals for equipment, devices and accessories

## 1.6 HVAC TESTING, ADJUSTING AND BALANCING

### A. Testing and Balancing Air Systems:

1. Test and adjust air systems to conditions set forth in Plans and Specifications. Air systems include:
  - a. Supply Air Systems.
  - b. Return Air Systems.
  - c. Exhaust Air Systems.

2. In fan systems, air quantities indicated on Plans may be varied as required to secure a maximum temperature variation of two (2) degrees within each controlled space, but total air quantity indicated for each zone must be obtained.
3. Test and adjust blowers and fan to deliver CFM required by systems with concurrent recording of RPM, supply voltage and full load amperes. Report any changes of belts and sheaves required.
4. Mark pitot tube traverses of main supply, return and exhaust ducts and adjust fans and dampers to achieve specified air volumes. Patch and cover the pilot tube holes after air balancing is complete.
5. Test and adjust fresh air intake and return air dampers and louvers to conditions scheduled or required.
6. Test and record static pressure on entering and leaving side of each supply fan, exhaust fan filter, coil and balancing dampers and other components of the system.
7. Test and adjust supply air diffusers, grills, and return air registers to Specification requirements and as shown on Drawings. Adjust supply diffuser patten blades for proper air distribution in each room or space.
8. Measure temperature in each space and concurrent outside temperature.

B. Testing and Adjusting of Water System:

1. Flow of water through water coils shall be adjusted by adjusting valves until rated pressure drop across each coil is obtained and water flow verified by veturi readings. On those with three-way valves, rated pressure drop shall first be adjusted though coils in each of several systems and the temperature differential between inlet and outlet shall be determined to be in accordance with its rating. Bypass valves shall then be adjusted on each coil until an equal pressure drop between supply and return connections is obtained with three-way valves set to bypass all coils in each of the several systems.
2. Geothermal Heat Pumps TAB shall be performed with a single unit per well field operating. This single unit balancing shall include both the air side, particularly the outside air, and the water side.

C. Testing and Adjusting of Automatic Controls:

1. Test automatic controls, controlled devices, interlocks, safety devices associated with HVAC system for proper operation and sequence during heating, cooling, intermediate and smoke removal modes of operation. Adjust automatic controls to deliver required quantities of air at temperatures specified or scheduled on Plans and to maintain proper conditions in each room of the building.
2. Report deficiencies or malfunctions to Owner or owner's representative.

D. Marking of Settings:

1. Before final acceptance of reports is made, TAB firm shall furnish Owner the following data:
  - a. Summary of main supply, return and exhaust dust pilot tube traverses and fan settings indicating minimum value required to achieve specified air volumes.
  - b. A tabulated record of temperature in all spaces on each separately controlled zone, together with outside temperature at time of measurement.



- c. A list of measured air quantities at each outlet corresponding to temperature tabulation specified above.
  - d. Air quantities at each return and exhaust air-handling devices.
  - e. Supply pressure readings entering and leaving each supply fan, exhaust fan, filter, balancing dampers and other components of system. These readings shall be related to fan curves in terms of CFM handled.
  - f. Motor current readings per phase at each equipment motor. Voltage at time of reading shall be listed.
  - g. Water pressure reading at gauge connections. Pressure readings at coils and pumps shall be related to coil and pump curves in terms of GPM flow through metering stations at each coil if applicable.
  - h. Water temperature readings entering and leaving each coil and heat exchanger under maximum load conditions in each case.
2. The final report shall certify test methods and instrumentation used, final velocity ready obtained, air quantities at each outlet supply, return, exhaust, temperature, pressure drops, RPM of equipment, amperage of motors, air balancing problems encountered, recommendations and uncompleted punch list items.
  3. A summary of actual operating conditions shall be included on each system outlining normal and/or ventilation cycles of operation. The intent of final report will provide a reference of actual operating conditions for Owner's operating personnel.
  4. 'Certificate of Substantial Completion' will not be signed by the Dallas Independent School District (FBISD) unless an acceptable TAB report has been provided and accepted by FBISD.
  5. Insure that all systems area balanced at the proper time in the opposite season.

## PART 2 - PRODUCTS

NOT USED

## PART 3 - EXECUTION

NOT USED

**END OF SECTION**

## SECTION 01 45 2302

### TESTING AND INSPECTION SERVICES

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDES

- A. This Section specifies administrative and procedural requirements for testing and inspection services.
- B. Services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
  - 1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
  - 2. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
  - 3. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

##### 1.2 RESPONSIBILITIES

- A. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.
  - 1. The Contractor shall employ and pay an independent agency, to perform specified quality control services specified in PART 1 – GENERAL Article QUALITY ASSURANCE. The cost for these services is not borne by the testing allowance.
  - 2. The Owner will engage the services of an independent agency to perform inspections and tests specified in PART 3 – EXECUTION Article QUALITY CONTROL, QUALITY CONTROL TESTING DURING CONSTRUCTION or FIELD QUALITY CONTROL.

3. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
  4. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
  5. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
  6. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
    - a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
    - b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
    - c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
    - d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
    - e. Security and protection of samples and test equipment at the Project site.
- B. Owner Responsibilities: The Owner will provide inspections, tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum.
1. The Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.
  2. The Owner will employ and pay for the services of an independent Commissioning Agent and TAB services.
- C. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
1. The agency shall notify the Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.

3. The agency shall not perform any duties of the Contractor unless informed in writing by the owner or owner's representative.
- D. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. Additionally, Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
  1. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

### 1.3 SUBMITTALS

- A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Architect, in duplicate or pdf format, unless the Contractor is responsible for the service. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate and pdf format.
- B. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
- C. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
  1. Date of issue.
  2. Project title and number.
  3. Name, address and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making the inspection or test.
  6. Designation of the Work and test method.
  7. Identification of product and Specification Section.
  8. Complete inspection or test data.
  9. Test results and an interpretation of test results.
  10. Ambient conditions at the time of sample-taking and testing.
  11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting.

### 1.4 QUALITY ASSURANCE

- A. Qualification for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

#### 1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements at no additional cost to the Owner.
- B. If, in the opinion of the Architect/Engineer or Owner, it is not practical to remove and replace the Work, the Architect or owner's representative will direct appropriate remedy or adjust payment.
- C. The defective Work may remain, but sum/price will be adjusted to new sum/price at the discretion of Architect or Owner.
- D. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.
- E. Authority of Architect/Engineer, or other appropriate agent identified to perform assessment by the Architect/Engineer or Owner, to assess defects and identify payment adjustments, is final.
- F. Non-Payment For Rejected Products: In addition to replacement of rejected Work, payment will not be made for rejected products for any of the following:
  1. Products wasted or disposed of in a manner that is not acceptable.
  2. Products determined as unacceptable before or after placement.
  3. Products not completely unloaded from transporting vehicle.
  4. Products placed beyond lines and levels of required Work.
  5. Products remaining on hand after completion of the Work.
  6. Loading, hauling, and disposing of rejected products.

#### PART 2 - PRODUCTS

NOT USED

#### PART 3 - EXECUTION

##### 3.1 SCHEDULE OF INSPECTIONS AND TESTS

- A. Any conflicts with the information below with current best practices, building code requirements, jurisdictional requirements or other agreements the more stringent applies.
- B. Soils Tests:

1. Soil Analysis Method: Make one test for each type of soil used under structures and paving.
    - a. Liquid Limit ASTM 04318.
    - b. Plastic Limit: ASTM 04318.
    - c. Plasticity Index: ASTM 04318.
    - d. Moisture-Density Relationship: ASTM 0698 or ASTM D4253, 04254 as applicable.
    - e. In-Place Density: ASTM 02922.
    - f. One laboratory maximum density test.
  2. Quantity of Analysis: One set for each 5000 sf for each lift
    - a. Perform in-place density tests on fill material at building, paving, and utility trenches.
- C. Soil Stabilization:
1. Required Analyses for Fill
    - a. Liquid Limit ASTM 04318.
    - b. Plastic Limit, Plasticity Index ASTM 04318.
    - c. Moisture-Density Relationship: ASTM 0698 or ASTM 04253, 04254 as applicable.
    - d. In-Place Density: ASTM 02922.
  2. Quantity of Analyses: One set for each 5000 square feet.
- D. Portland Cement Concrete Paving:
1. Three (3) concrete test cylinders will be taken for every 100 or less cubic yards of concrete placed.
  2. One (1) additional test cylinder will be taken during cold weather concreting, and be cured on jobsite under same conditions as concrete it represents.
  3. One (1) slump test will be taken for each set of test cylinders taken.
  4. One (1) set of manufacturer's test data will be required of Contractor for each type reinforcing steel purchased directly from a United States mill.
  5. One (1) set of tension and bending tests on three separate samples for each bar size of each 5 tons of each type reinforcing steel specified.
  6. Cylinder Curing: ASTM C31.
  7. Testing Cylinders: ASTM C39. Test one cylinder for compression at 7 days, one at 28 days, hold one cylinder for testing at 56 days if 25 day test does not meet specified compression strength.
  8. Report test results promptly. ASTM C94 governs acceptance of tested concrete.
  9. Drill and test cores as required when 28-day test results fall below specified strengths. Contractor shall pay for drilling and testing cores.
- E. Asphalt Pavement:
1. Verify Contractor's mix design for compliance.
  2. Required Plant Sampling and Testing
    - a. Sieve Analysis of Aggregates ASTM C136.

- b. Sampling Mineral Aggregates: ASTM D75.
  - c. Sieve Analysis of Mineral Filler: ASTM D546.
  - d. Specific Gravity of Coarse Aggregate: ASTM C127.
  - e. Specific Gravity of Fine Aggregate: ASTM C128.
  - f. Sampling Bituminous Materials: ASTM D140.
  - g. Sampling Bituminous Mixtures: ASTM D979.
  - h. Determination of Bitumen Content: ASTM D2172.
  - i. Liquid Limit, Plastic Limit, Plasticity Index: ASTM D4318.
  - j. Percentage of Coated Particles: ASTM D2489.
  - k. Recovery of Extracted Asphalt: ASTM D1856
  - l. Penetration of Recovery Asphalt: ASTM D5
  - m. Percent of Air Voids in a Compacted Bituminous Paving Mixture: ASTM D3203.
  - n. Absolute Viscosity of Asphalts: ASTM D2171.
  - o. Cohesion, Resistance to Deformation: ASTM D1560.
- F. Field Density Tests: ASTM D2950.
- 1. Locations: Subgrade, base courses, surface course.
  - 2. Number: One for each 1,000 square yards or fraction thereof.
  - 3. Field Thickness: ASTM D3549.
- G. Drilled Footing Inspection:
- 1. Soil Shear Strength Test: Test sample of cuffing from each drilled footing with a pocket penetrometer to determine shear strength and compare with anticipated strength presented in the soil report.
  - 2. Visual Inspection: Determine that cutting tool is set for the correct size. Inspect each drilled footing to determine if the bottom of the excavation is in intended strata of soil type and is free of loose dirt and sand. Notify Architect and Geotechnical Engineer if water is encountered.
  - 3. Reinforcing Steel: Inspect the reinforcing steel to determine if the size and number of reinforcing bars complies with the specifications and drawings.
  - 4. Maintain record of footing depth and variations of installation if footing placement requires deviation from Contract Documents.
- H. Structural Concrete:
- 1. Aggregate Tests:
    - a. Typical: Check the proposed aggregate in accordance with ASTM C33.
    - b. For concrete 6000 psi and higher, perform ASTM 0799 also.
  - 2. Mix Design: Check the proposed mixes for proportions, water cement ratio and slump in accordance with ACI 301 and 318.
  - 3. Slump Tests: Take slump tests per ASTM C143 at the beginning of each day's placing operations and whenever water adjustments or noticeable change of slump occurs, with a minimum of one for each set of test cylinders.
  - 4. Sampling:

- a. Make five standard cylinders at the beginning of each placement, and five more standard cylinders for every 50 cubic yards placed. Take extra samples at noticeable change in the concrete makeup. Cure per ASTM C192.
  - b. Determine and report air content per ASTM C231, 0173, or 0138 for each set of test cylinders.
  - c. Perform sampling in compliance with ASTM 0172.
  - d. Samples for pumped concrete to be taken at end of line, at location of placement.
5. Testing:
- a. Test cylinders for compression in accordance with ASTM 039.
  - b. Test two lab cured cylinders at 7 days and two field cured cylinders at 28 days averaging test results. Store one (1) cylinder for testing at 56 days in the event the 28 days strength tests do not meet strength requirements.
- I. Reinforcing Steel:
1. Visual Inspection: Inspect reinforcing steel in structural concrete to determine if the size, type, splices, laps, clearances, and number of reinforcing bars complies with the specifications and drawings.
- J. Bolted Connections:
1. Types:
    - a. Calibrated torque wrench if washers are used.
    - b. If turn of nut method is used without washers, observe the set of every bolt.
  2. Number for Torque Wrench Test: Test minimum two bolts of every third connection between floor beams, girders and columns.
  3. Analysis: If insufficient torque occurs on any tested bolt, test all bolts at that connection at the Contractor's expense.
- K. Steel Weld Tests:
1. Types: One of the following testing procedures may be used on any field or shop weld.
    - a. Liquid penetrant.
    - b. Magnetic particle.
    - c. Radiographic.
    - d. Ultrasonic.
    - e. Visual inspection at small welds.
  2. Number of Tests: 100% of full penetration and field welds, 10% of other shop welds. Test of shop welds shall be done at fabricator's shop prior to painting and shipping.
  3. Number of Retests: Number of welds to be retested will be determined by the number of welds that fail the initial testing.
  4. All welds that fail shall be re-welded and retested until they pass the test. 5. Test two additional welds for every weld failure at the Contractor's expense.



5. Weld Quality: Comply with the quality requirements of the American Institute of Steel Construction Manual of Steel Construction.
  6. Testing Laboratory shall obtain and review copy of certification of all welders.
- L. Insulating Concrete:
1. Type of Tests:
    - a. Field Wet Density: ASTM C138.
    - b. Laboratory Tests: Dry density and compressive strength ASTM C495.
  2. Number of Test Sets:
    - a. One per 5,000 square feet.
    - b. Not less than one for each day's work.

**END OF SECTION**

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**PART 1 GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
  - 1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.
  - 2. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

**1.3 DESCRIPTION OF REQUIREMENTS.**

- A. Connections for temporary and permanent utilities and payment for temporary utilities services required for the Work are the responsibility of the Contractor. Contractors performing renovation work or additions to existing campuses may request a variance on usage to be delivered in writing from the owner or owner's representative via email. Cost or use charges for temporary services or facilities will not be accepted as a basis of claims for a Change Order. Temporary utilities services required for use at the project site include but are not limited to the following:
  - 1. Water service.
  - 2. Temporary electric power and light.
  - 3. Telephone service.
  - 4. Provide adequate utility capacity at each stage of construction.
  - 5. Prior to availability of temporary utilities at the site, provide trucked-in-services for start-up of construction operations.
- B. Temporary construction and support facilities required for new construction and additions to existing campuses include but are not limited to the following:
  - 1. Temporary heat.
  - 2. Field offices and storage sheds.
  - 3. Sanitary facilities, including drinking water, handwashing.
  - 4. Dewatering facilities and drains.
  - 5. Temporary enclosures.
  - 6. First aid station, including eye wash station.
  - 7. Project identification, bulletin boards and signs.
  - 8. Waste disposal services.
  - 9. Rodent and pest control.
  - 10. Construction aids and miscellaneous general services and facilities.
  - 11. Alternate temporary services and facilities, equivalent to those specified, may be used, subject to acceptance by the Architect/Engineer and owner's representative.
- C. Security and protection facilities and services required for Project include but are not limited to the following:

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1. Temporary protected interior walkway between occupied building areas.
2. Dust barricade between occupied building areas and work areas.
3. Temporary fire protection.
4. Barricades, warning signs, lights.
5. Sidewalk bridge or enclosure fence for the site.
6. Environmental protection.
7. Alternate security and protection methods or facilities, equivalent to those specified, may be used, subject to acceptance by the Architect/Engineer and owner's representative.
8. The Contractor shall provide a temporary barrier whenever a certain area of the school is sealed off for remodeling work for phasing purposes. The barrier shall be made of 3/4" plywood or drywall, and it shall extend from floor to ceiling, wall to wall. The temporary barrier shall have a door which can be locked. This barrier will remain until work in the specified area is completely finished. The barrier may subsequently be moved to a different location, provided that it still meets the requirements. Proper signage should be displayed near the temporary barrier, according to safety regulations. Any temporary barriers will need to be coordinated with the emergency egress plan of the building.
9. Barrier requirements for minor renovation work will be discussed and agreed upon at weekly progress meetings.

1.4 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner, Program Manager, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.5 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, temporary barricades, site entrance, utility hookups, staging areas, and parking areas for construction personnel. Submit for approval within 7 days of NTP by Architect/Engineer and/or owner's representative using specification 01 33 00 submittal procedures.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent. Submit for information to Architect/Engineer and/or owner's representative using specification 01 33 00 submittal procedures.
- C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials. Submit for

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information to Architect/Engineer and/or owner's representative using specification 01 33 00 submittal procedures.

1. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- D. Dust-Control and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust-control and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Submit for approval by Architect/Engineer and/or owner's representative using specification 01 33 00 submittal procedures. Include the following:
1. Locations of dust-control partitions at each phase of the work.
  2. HVAC system isolation schematic drawing.
  3. Other dust-control measures.
  4. Waste management plan.

#### 1.6 QUALITY ASSURANCE

- A. Regulations: Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities, including but not limited to the following:
1. Building Codes, including local requirements for permits, testing and inspections.
  2. Health and safety regulations.
  3. Utility company regulations and recommendations governing temporary utility services.
  4. Police and Fire Department rules and recommendations.
  5. Environmental protection regulations governing use of water and energy, and the control of dust, noise and other nuisances.
  6. In addition, comply with "Environmental Impact" commitments the Owner or previous Owners of the site may have made to secure approval to proceed with construction of the Project.
- B. Standards: Comply with the requirements of NFPA Code 241, "Safeguarding Construction, Alterations, and Demolition Operations", the ANSI A10.6 "Safety Requirements for Construction and Demolition", and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".
- C. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", as prepared jointly by QUOIN and ASC for industry recommendations.
- D. Inspections: Inspect and test each service before placing temporary utilities in use. Arrange for required inspections and tests by governing authorities, and obtain required certifications, and permits for use.
- E. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

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1.7 PROJECT CONDITIONS

- A. General: Provide each temporary service and facility ready for use at each location when the service or facility is first needed to avoid delay in performance of the Work. Maintain, expand as required and modify temporary services or facilities as needed throughout the progress of the Work. Do not remove until services or facilities are no longer needed, or are replaced by the authorized use of completed permanent facilities.
- B. Conditions of Use: Operate temporary services and facilities in a safe and efficient manner. Do not overload temporary services or facilities, and do not permit them to interfere with the progress of the Work. Do not allow unsanitary conditions, public nuisances or hazardous conditions to develop or persist on the site.
- C. Temporary Utilities: Do not permit the freezing of pipes, flooding or the contamination of water sources.
- D. Security and Protection: Maintain site security and protection facilities in a safe, lawful and publicly acceptable manner. Take necessary measures to prevent erosion of the site.
- E. The roof removal and new roof installation shall proceed on a phased basis to minimize risk to the School's ongoing operations and its property. The GC shall be responsible for protection of interior spaces from damage during roofing work.
- F. Distribute material, debris, and equipment over the roof deck to avoid damage to the structural deck. Not more than two weeks supply of material shall be stored on a roof at any given time. Place materials and equipment to be stored on the roof as nearly direct over structural members as can be determined. Secure equipment, material, and debris on the roof to prevent movement by wind or other elements. Contractor assumes full responsibility for loading on the structural deck or roofing materials during roof replacement operations.
- G. Consult with the A/E and the owner's representative regarding permission for the use of selected areas of the building. Coordination will also be held with the Principal and / or site staff.
- H. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- I. The projects requiring new paved entries, parking lots, or other paving work in excess of 10,000 square feet will consider the work to be critical path. A phasing schedule for installation will be submitted by contractor within seven (7) days of NTP for review by Architect/Engineer and/or owner's representative using the owner's designated software via a transmittal.

**PART 2 PRODUCTS**

2.1 MATERIALS

- A. General: Provide new materials and equipment for temporary services and facilities; used materials and equipment that are undamaged and in serviceable condition may be used, if acceptable to the Architect/Engineer and/or owner's representative. Provide only materials

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and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards.

- B. Portable Chain-Link Fencing: Minimum 2-inch 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized steel bases for supporting posts.
- C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.
- D. Dust Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60.

## 2.2 TEMPORARY FACILITIES

Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

- A. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, PM, Architect, and construction personnel office activities and to accommodate project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
  - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room of sufficient size to accommodate meetings of 8 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table that will seat 10 attendees, chairs, and 4-foot-square tack and marker boards.
  - 3. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
  - 4. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. These shall be weather tight, structurally sound, compliant with applicable codes and shall be secure
  - 2. Store combustible materials apart from building.
- C. Temporary Construction and Support Facilities: Provide facilities that can be maintained properly throughout their use at the Project site.
- D. Self-Contained Toilet Units:
  - 1. Sanitary facilities include temporary toilets, with facilities and drinking water fixtures. Comply with governing regulations including safety and health codes for type, number, location, operation, and maintenance of fixtures and facilities; provide not less than specified requirements. Install in locations that will best serve the Project's needs.
  - 2. Provide single-occupant self-contained toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or

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similar non-absorbent material. Provide at least one for every thirty (20) employees.

**2.3 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures. Provide quantity and type to comply with all local, state, and federal safety codes.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction. All return grilles will be replaced upon completion of project if used during construction.

**PART 3 EXECUTION**

**3.1 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

**3.2 TEMPORARY UTILITY INSTALLATION**

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition better than or equal to existing before initial use. If services do not exist Contractor shall provide.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 50 00 Temporary Facilities and Controls

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- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
  - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.
    - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    - b. Cover all supply and return grills left in place with plastic to prevent dust intrusion.
    - c. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
  - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
  - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
  - 4. Fire alarm system may be required to be put in test mode temporarily, if site conditions warrants it.
- G. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
  - 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- H. Electric Power Service: Connect to Owner's existing electric power service if available with written permission from owner or owner's representative. Maintain equipment in a condition acceptable to Owner. Electrical power service to the project office trailer and other elements and areas of the Contractor's office and staging area is to be provided by the Contractor by means of a temporary power service with a temporary account separate from the facility electrical power service for new construction projects.
- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  - 2. Install lighting for Project identification sign.



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 50 00 Temporary Facilities and Controls

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- J. Telephone Service: Provide Wi-Fi service in common-use facilities for use by contractor, architect, owner and owner's representative. Passwords will be provided at first OAC meeting following installation and setup of Wi-Fi system.
  - 1. Provide superintendent and other contractor management staff with cellular telephone or portable two-way radio for use when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
  - 1. Provide construction temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Parking: Provide five (5) designated, accessible, and secure parking spaces nearest to the project or job trailer for the A/E, owner, and/or owner's representative. Provide temporary parking areas for construction personnel.
- C. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated in this section.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform the public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
    - b. Provide warning signs to students, staff, pedestrians, visitors and others for any closed or impeded paths to access and egress in or around the immediate site.
  - 3. Maintain and touchup signs so they are legible at all times.
  - 4. No other signs shall be allowed on site with the exception of those that are safety oriented. No signs serving as advertisement shall be allowed.
- D. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
  - 1. Do not load elevators beyond their rated weight capacity.
  - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 50 00 Temporary Facilities and Controls

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- in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- E. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to better than or equal to condition existing before initial use.
    - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
  - F. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.
  - G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
  - H. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings. Provide coordination drawings when applicable with locations of proposed areas to A/E and/or owner's representative via transmittal in owners designated software.
    - 1. Construct covered walkways using scaffold or shoring framing.
    - 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
    - 3. Paint and maintain appearance of walkway for duration of the Work.
  - I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather tight enclosure for building exterior.
    - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
  - J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate occupied areas fumes and noise. Provide coordination drawings when applicable with locations of proposed areas to Architect and/or owner's representative via transmittal in owners designated software.
    - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
    - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
    - 3. Insulate partitions to control noise transmission to occupied areas.

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Section 01 50 00 Temporary Facilities and Controls

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4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  5. Protect air-handling equipment.
  6. Provide walk-off mats at each entrance through temporary partition.
- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241. Provide coordination drawings when applicable with locations of proposed areas to Architect and/or owner's representative via transmittal in Kahua .
1. Prohibit smoking on school property per State Law.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.4 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  1. Protect porous materials from water damage.
  2. Protect stored and installed material from flowing or standing water.
  3. Keep porous and organic materials from coming into prolonged contact with concrete.
  4. Remove standing water from decks.
  5. Keep deck openings covered or dammed.
- C. Any new construction materials with visible moisture damage or mold contamination will be removed from the project and replaced at contractors cost.
- D. Any existing surfaces suffering moisture damage or mold contamination during construction will be the responsibility of the contractor. Surfaces will be cleaned, replaced, or remediated to owner's satisfaction.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 50 00 Temporary Facilities and Controls

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- C. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

**End of Section 01 50 00**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 52 14 Temporary Facilities for Students

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 00 and 01 Specification Sections, apply to this section.

1.2 SUMMARY

- A. Section includes requirements for temporary facilities (Swing Space) for the purpose of relocating students to provide temporary classroom facilities during construction activities.
- B. Related Sections:
  - 1. Division 00 Section titled “Technical Proposal”
  - 2. Division 01 Section title “Temporary Facilities and Controls”

1.3 DESCRIPTION OF REQUIREMENTS

- A. The project management team are to determine whether Swing Space is necessary in order to accommodate the phasing and construction of the project. If students must be displaced from classroom areas due to the phasing and execution of the work according to the Contractor’s work plan, the Contractor shall be responsible for providing, on a turn-key basis, temporary facilities for those displaced students. It will be the responsibility of the Contractor to determine the size and layout of the space based on the particular need and in a manner that will create an adequate classroom facility for the students displaced. Every effort shall be made to avoid temporary portables as swing space, unless there are already in existence at the school, unused. Contractor, PM, and Architect must work with School Principal to find swing space within the school by accommodating school master schedule and space allocation.
- B. If the Contractor elects to utilize Swing Space, they must include all costs associated with the procurement including, but not limited to:
  - 1. Equipment purchase or leasing
  - 2. Transport and setup
  - 3. Maintenance of the temporary facilities for the duration of their use (i.e. HVAC, electrical, and other building repair and maintenance needed, not custodial maintenance)
  - 4. Site work and utilities
  - 5. ADA/TAS Accessible ramps and sidewalks
  - 6. Stairs
  - 7. Skirting
  - 8. Interior finish-out
  - 9. Miscellaneous specialties (i.e. marker boards, tack boards, flag holders, map clips, fire extinguishers)
  - 10. Signage
  - 11. Wall Clock and bell to interface with the existing system at the school
  - 12. Furnishings, Fixtures, and Equipment (FF&E)
  - 13. Breakdown, removal, and transport of the Swing Space at the completion of its use
  - 14. Restoration of the site following removal of facilities
  - 15. P.A. to interface with the existing system at the school

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 52 14 Temporary Facilities for Students

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16. Data cabling from existing school network electronics sufficient to provide two data drops at each Teacher's desk location.

1.4 SCOPE OF WORK

Provide turnkey services for delivery, set-up, maintenance, removal, and restoration of the site for temporary classroom buildings to accommodate phased construction.

- A. Engineering: The Contractor will provide site engineered civil, utility, blocking plan/foundation plan, sidewalk design and deck/ramp design sufficient to receive a Building Permit from the municipality having jurisdiction, for each site for the installation of all temporary classroom buildings.
- B. Architectural: The Contractor will provide the building manufacturer's shop drawings approved by the Texas Department of Licensing and Regulation (TDL&R). The Contractor will coordinate T.A.S. submittals to the State and the City as they relate to this scope of work.
- C. Permits: The Contractor will coordinate and obtain the permits as required by the City for placement of the classroom buildings at each site. This includes the permits required for the transportation of the classroom buildings.
- D. Temp. Facilities: Roll off dumpsters will be provided by the Contractor as required for clean-up during installation and removal of swing space.
- E. Clean up: Final broom sweep of the building(s) and removal of trash and debris from each site will be provided by the Contractor prior to occupancy of the swing space by the students and staff. Floor waxing or shampooing will be provided by the Contractor prior to occupancy by the students and staff if needed. Provisions for site restoration upon completion of the delivery of the modules and/or completion of the scope of work will be provided by the Contractor. Upon the removal of the buildings all underground utilities and/or structures associated with the temporary classroom buildings will be removed and discarded. The concrete sidewalks will be removed and discarded. Rough grading will be performed and new sod will be placed to restore the area to its original condition.
- F. Site Prep: FBISD has made no provisions for any site preparation and/or demolition as may be required for the delivery and/or installation of the portable buildings. Any site preparation and/or demolition that might be required of for installation of the temporary classrooms will be included in the Contractor's scope.
- G. Construction Fencing: The contractor will maintain a clean and safe site environment within the limits of the temporary classroom construction area. Temporary chain link construction fencing 6' high will be installed around the perimeter of the limits of construction.
- H. Sodding: Upon the removal of the buildings, the Contractor will provide sod within the limits of construction associated with the temporary classroom scope of work. Any irrigation of the new sod will be provided by FBISD.
- I. Site Utilities (if applicable): The Contractor will provide the site utility connections as required for the temporary classroom buildings. If needed,

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 52 14 Temporary Facilities for Students

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- PM shall negotiate with municipalities having jurisdiction obtaining a variance to the FBISD in which the swing space facilities are not required to have restroom facilities. If required by those municipalities, the Contractor must provide restroom services and utilities as required by local code.
- J. Storm: All storm water management and any sedimentation control will be the responsibility of the Contractor. Gutters and downspouts will be installed as needed by the Contractor.
  - K. Sanitary (if applicable): The Contractor will install all fixtures, stub all sanitary lines below the floor and manifold to one location at the edge of the building(s). All final connections, utility company charges and impact fees that might be required will be included in the Contractor's scope of work. If needed, PM shall negotiate with municipalities having jurisdiction obtaining a variance to the FBISD in which the swing space facilities are not required to have restroom facilities. If required by those municipalities, the Contractor must provide restroom services and utilities as required by local code.
  - L. Water (if applicable): The Contractor will install all fixtures and stub all water lines to one location at the edge of the building(s). All final connections, utility company charges and impact that might be required will be included in the Contractor's scope of work. If needed, PM shall negotiate with municipalities having jurisdiction obtaining a variance to the FBISD in which the swing space facilities are not required to have restroom facilities. If required by those municipalities, the Contractor must provide restroom services and utilities as required by local code.
  - M. Natural Gas: No provisions for any gas service are anticipated for FBISD Projects.
  - N. Life Safety: Building(s) will be approved and inspected by the Texas Department of Licensing and Regulation. Any provisions for fire suppression, fire sprinkler system or fire rated assemblies that might be required will be included in the Contractor's scope of work.
  - O. Fire Alarm: The contractor will provide and install fire detection systems as required by the building code and the City.
  - P. Electrical: The contractor will provide and install electrical systems as required by the building code and the City. Temporary electricity costs associated with the swing space will be the financial responsibility of the Contractor unless otherwise directed by the owner in writing.
  - Q. Mechanical: The Contractor will supply and install the standard end mount HVAC units as provided by the portable building manufacturer. The condensate from both HVAC units of a classroom building will be harnessed together and discharged into a 24" diameter by 36" deep french drain filled with gravel. All condensate piping will be PVC but will be protected where directly exposed to UV radiation.
  - R. Skirting: After the modules are installed, the Contractor will install full perimeter skirting around the building(s) using the same material and finish as that of the building siding to provide a consistent finish down to grade. Sections of skirting will be perforated as required for proper crawl

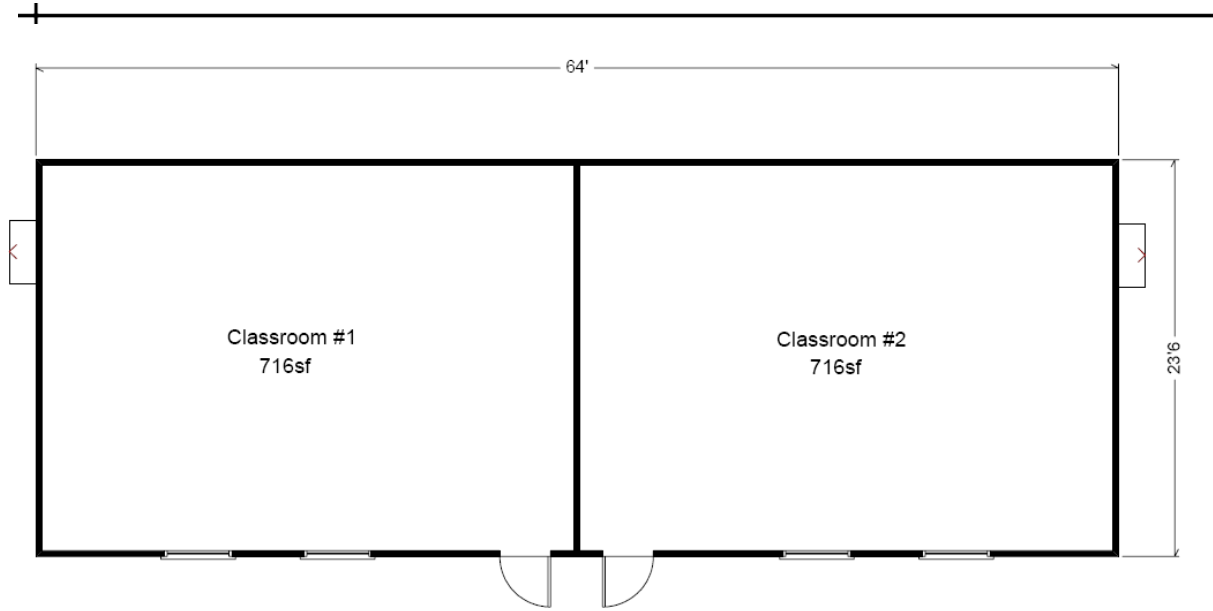
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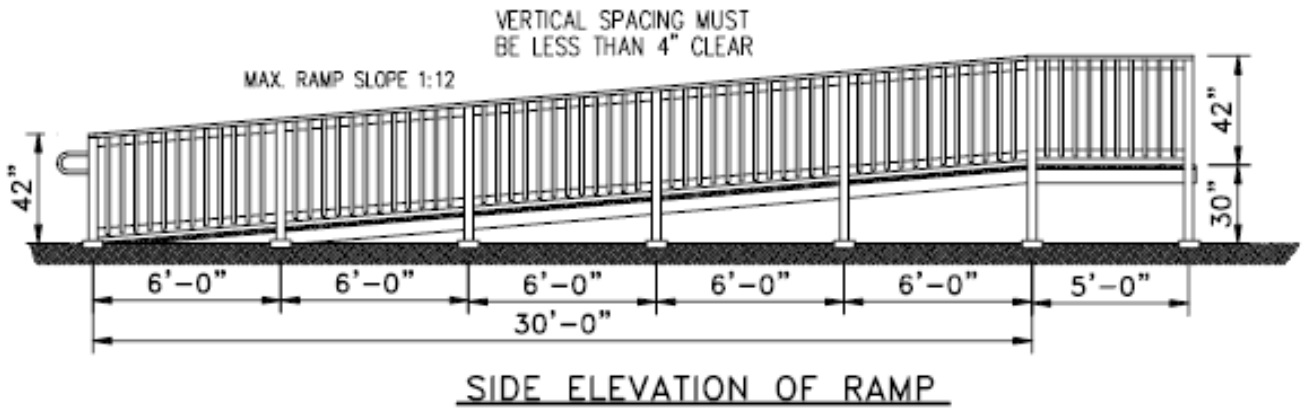
- space ventilation. Access to the crawl space will be accomplished by removing sections of the skirting.
- S. Decks/Stairs: The Contractor will install landings at the exit doors of the building(s) within the limits of construction as required by code and the City. Landings will utilize pressure treated wood construction with slip resistant surface treatment and handrails.
  - T. Ramps: The Contractor will install handicapped accessible ramps at the exit doors of the building(s) within the limits of construction as required by code and the Local City. Ramps will utilize pressure treated wood construction with slip resistant surface treatment and handrails.
  - U. Sidewalks: The Contractor will install 4' wide, 4" thick, 3,000 psi concrete sidewalks using 6x6 welded wire reinforcing to service the building(s) within the limits of construction. Sidewalks will receive a light broom finish and be poured on select fill and/or sand bed.
  - V. Foundation and Anchorage: The swing space facilities should be securely anchored to a foundation system which utilizes some means of structural support, as determined by a certified structural engineer. Provide construction documents that depict the foundation system as designed and certified by a structural engineer. The portable buildings shall be anchored to the foundation components in a manner that is structurally sound and that is acceptable to the building manufacturer and the structural engineer.
  - W. Hitch/Tires/Axles: Hitches will be removed and stored under building while tires and axles are to remain on the modules. Tires and axles will be removed only if necessary to complete the building installation due to site constraints and will also be placed under the modules.
- 1.5 Furniture, Fixtures, and Equipment (FF&E)
- A. The Contractor shall furnish and set in place all FF&E items necessary for a functional classroom. The furniture may be provided by FBISD, but will be the full responsibility of the contractor to move to site and back to origin. These items should include, at a minimum: student desks and chairs, teacher desk and chair, one 4-drawer vertical file cabinet, one portable teacher storage cabinet for coat and other storage, student storage cubbies/shelving and coat hooks, and computer station desks and chairs.
- 1.6 Drawings
- A. The following is a typical floor plan design guideline drawing:



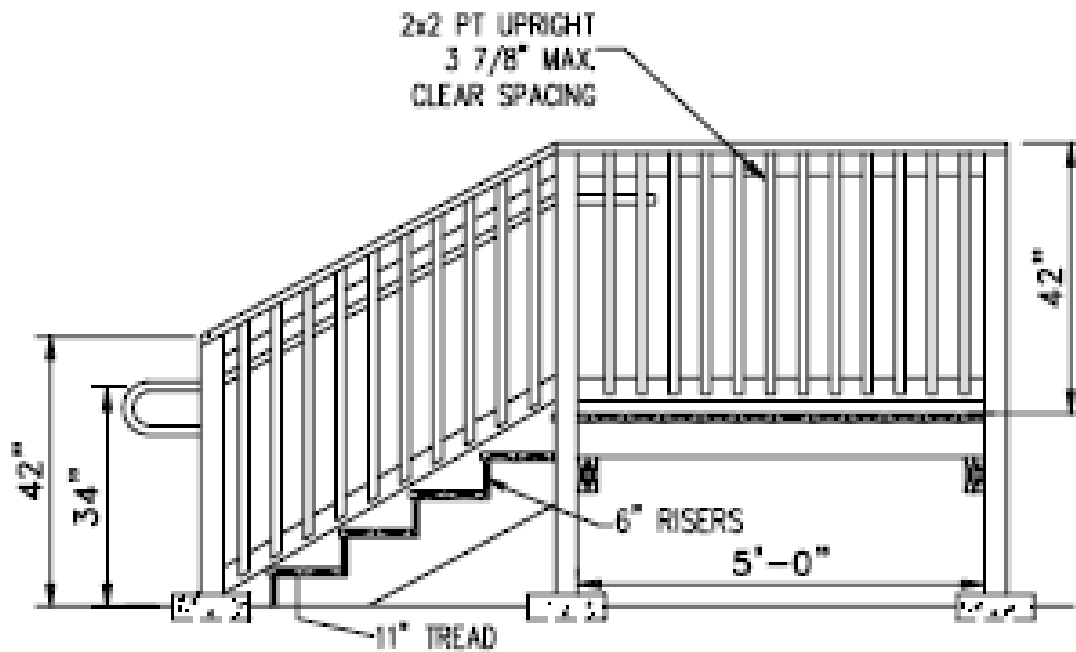
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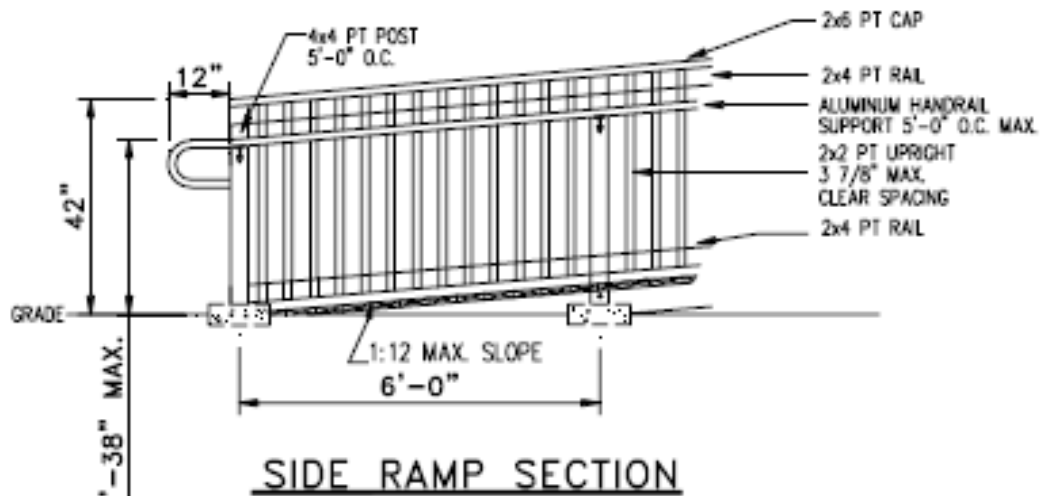
A. The following design guideline drawings are to be used for ramps/walkways:



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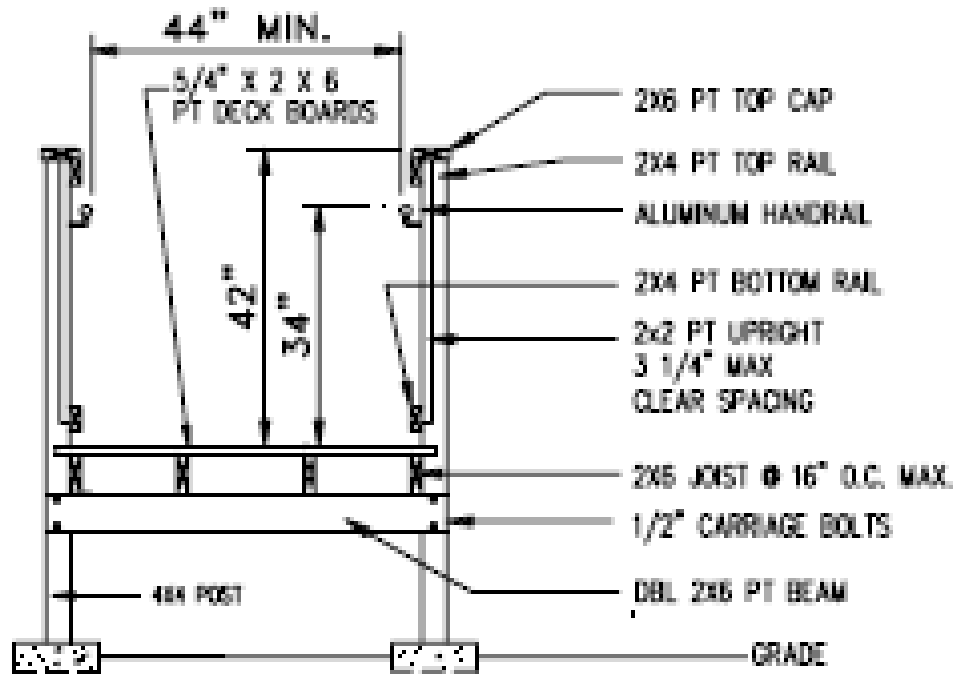


SIDE ELEVATION OF STEP



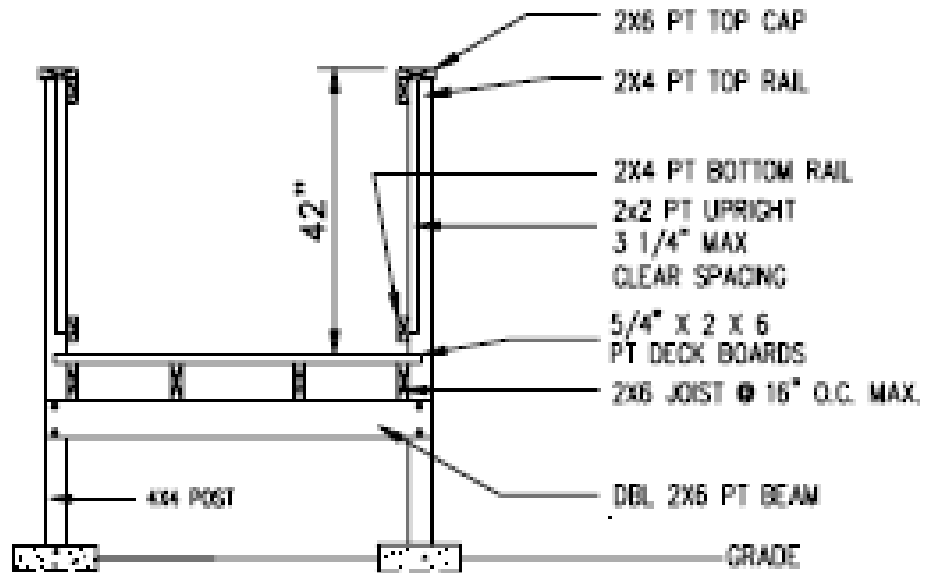
SIDE RAMP SECTION

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STEP/RAMP SECTION

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ELEV. WALKWAY SEC 'A'

End of Section 01 52 14

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 55 26 Traffic Control

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### **PART 1 GENERAL**

#### 1.1 SECTION INCLUDES

- A. Requirements for signs, signals, control devices, traffic barriers, flares, lights and traffic signals; construction parking control, designated haul routes, and bridging of trenches and excavations.
- B. Qualifications and requirements for use of flagmen.

#### 1.2 MEASUREMENT AND PAYMENT

- A. Unit Price Contracts.
  - 1. Traffic control and regulation. Payment will be based on Contractor's Schedule of Values for traffic control and regulation. Include preparation and submittal of traffic control plan if different than shown on Drawings, and provision of traffic control devices, equipment, and personnel necessary to protect the Work and public.
  - 2. Flagmen. Payments will be based on Contractor's Schedule of Values for flagmen.
  - 3. Refer to Division 1 for unit price procedures.
- B. Stipulated Price Contracts. Include payment for work under this section in the total Stipulated Price.

#### 1.3 REFERENCES

- A. Texas Manual on Uniform Traffic Control Devices (TMUTCD).
- B. Article 4413 (29bb), commonly referred to as Private Investigators and Private Security Agencies Act, and Article 2.12, Texas Code of Criminal Procedure.
- C. Areas having jurisdiction feedback and comments related to traffic control.

#### 1.4 SUBMITTALS

- A. Conform to requirements of Division 1.
- B. Traffic control plan:
  - 1. If using traffic control plan contained in the Contract without modification no additional information required.
  - 2. If using a different traffic control plan, submit the plan for approval to the local Governing Jurisdiction, Owner and Engineer. The plan must conform to TMUTCD requirements and be sealed by a Registered Texas Professional Engineer. The Contractor is responsible for obtaining approval from the Governing entity if using an alternate plan.
- C. Submit copies of approved lane closure permits issued by all governmental authorities via owners designated software.
- D. Submit Schedules of Values for traffic control plan and flagmen within 30 10 days following Notice to Proceed.
- E. Submit records verifying qualifications of Uniformed Peace Officers and Certified Flagmen proposed for use on the Work via transmittal in owners designated software.

#### 1.5 SUSTAINABLE DESIGN (LEED) REQUIREMENTS

- A. New Schools shall be LEED Certified Projects.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 55 26 Traffic Control

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#### 1.6 FLAGMEN

- A. Use Uniformed Peace Officers and Certified Flagmen to control movement of vehicular and pedestrian traffic when construction operations encroach on public traffic lanes.
- B. Uniformed Peace Officer: Individual employed full-time as a peace officer who receives separate compensation as a privately employed flagman. Private employment may be an employee-employer relationship or on an individual basis. Flagman may not be in the employ of another peace officer nor be a reserve peace officer.
  - 1. Uniformed Peace Officers may be:
    - a. Sheriffs and their deputies;
    - b. Constables and deputy constables;
    - c. Marshals or police officers of an incorporated city, town or village; or
    - d. As otherwise provided by Article 2.12, Code of Criminal Procedure.
  - 2. The Uniformed Peace Officer must be a full-time peace officer, must work a minimum average of 32 paid hours per week, and must be paid a rate not less than the prevailing minimum hourly wage rate set by the federal Wage and Hour Act. The individual must be entitled to vacation, holidays, and insurance and retirement benefits.
- C. Certified Flagman: Individual who receives compensation as a flagman and meets the following qualifications:
  - 1. Formally trained and certified in traffic control procedures by the City's E. B. Cape Center.
  - 2. Speaks English. Ability to speak Spanish is desirable but not required.
  - 3. Paid for flagman duty at an hourly rate not less than the wage rate set for Rough Carpenter under the City of Houston's Wage Scale for Engineering Construction.
- D. Certified Flagmen must wear a distinctive uniform, bright-colored vest, and be equipped with appropriate flagging and communication devices while at the Work site. They must also have in their possession while on duty, a proof of training identification card issued by the appropriate training institute.

## PART 2 PRODUCTS

### 2.1 SIGNS, SIGNALS, AND DEVICES

- A. Comply with TMUTCD requirements.
- B. Traffic cones and drums, flares and lights: Conform to local jurisdictions' requirements.

### 2.2 PORTABLE LOW PROFILE CONCRETE BARRIERS

- A. The low profile concrete barrier is a patented design. Information concerning this barrier may be obtained from Texas Transportation Institute, Texas A&M University System, College Station, Texas 77843-3135, (409) 845-1712.

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 55 26 Traffic Control

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### **PART 3 EXECUTION**

#### **3.1 PUBLIC ROADS**

- A. Submit requests forms for lane closure and sidewalk closure to the appropriate governmental authority prior to need for blocking vehicular lanes or sidewalks. Do not block lanes or sidewalks without approved permits.
- B. Follow laws and regulations of governing jurisdictions when using public roads. Pay for and obtain permits from jurisdiction before impeding traffic or closing lanes. Coordinate activities with Owner's Representative.
- C. Give Owner's Representative one-week notice before implementing approved traffic control phases. Inform local businesses of impending traffic control activities.
- D. Notify police department, fire department, METRO, and local schools, churches, and businesses in writing a minimum of five business days prior to beginning work.
- E. Maintain 10-foot-wide all-weather lanes adjacent to the Work for emergency vehicle use. Keep all-weather lanes free of construction equipment and debris.
- F. Do not obstruct normal flow of traffic from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. on designated major arterials or as directed by Owner's Representative.
- G. Maintain local driveway access to residential and commercial properties adjacent to work areas at all times. Use all-weather materials approved by architect or Owner's Representative to maintain temporary driveway access to commercial and residential driveways.
- H. Keep streets entering and leaving job site free of excavated material, debris, and foreign material resulting from construction operations in compliance with applicable ordinances.
  - I. Remove or cover existing signage and striping that conflict with construction activities or that may cause driver confusion.
  - J. Provide safe access for pedestrians along major cross streets.
  - K. Alternate closures of cross streets so that two adjacent cross streets are not closed simultaneously.
  - L. Do not close more than two consecutive esplanade openings at a time without prior approval from Owner's Representative.

#### **3.2 CONSTRUCTION PARKING CONTROL**

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and the Owner's operations.
- B. Monitor and control parking of construction personnel's vehicles in existing facilities. Provide a layout plan designating construction personnel parking for approval by owner's representative using submittal procedures in 01 33 00 in kahua. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

#### **3.3 FLARES AND LIGHTS**

- A. Provide lights or reflectors during hours of low visibility to delineate traffic lanes and to guide traffic.

#### **3.4 HAUL ROUTES**

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 55 26 Traffic Control

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- A. Utilize haul routes designated by authorities or shown on Drawings for construction traffic.
  - B. Confine construction traffic to designated haul routes.
  - C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

#### 3.5 TRAFFIC SIGNS AND SIGNALS

- A. Construct necessary traffic control devices for temporary signals required to complete the Work including loop detectors, traffic signal conduits, traffic signal wiring and crosswalk signals. Notify the governmental agency having jurisdiction in advance of need for control boxes and switchgear. The Contractor will pay for all necessary service, programming or adjustments, to signal boxes and switchgear if required during construction.
- B. Install and operate traffic control signals to direct and maintain orderly traffic flow in areas under Contractor's control affected by Contractor's operations. Post notices, signs and traffic controls before moving into next phase of traffic control.
- C. Relocate traffic signs and signals as the Work progresses to maintain effective traffic control.
- D. Unless otherwise approved by Owner's Representative, provide driveway signs with name of business that can be accessed from each crossover. Use two signs for each crossover.
- E. Replace existing traffic control devices in Project area.
- F. Owner's Representative may direct Contractor to make minor adjustments to traffic control signage to eliminate driver confusion and maintain orderly traffic flow during construction at no additional cost to the Owner.

#### 3.6 BRIDGING TRENCHES AND EXCAVATIONS

- A. When necessary, construct bridges over trenches and excavation to permit an unobstructed flow of traffic across construction areas and major drives. Use steel plates of sufficient thickness to support H-20 loading and install to operate with minimum noise. All bridging provided for vehicular or equipment traffic will be approved by an engineer at contractor's expense.
  - 1. Shore trench or excavation to support bridge and traffic.
  - 2. Secure bridging against displacement with adjustable cleats, angles, bolts or other devices when:
    - a. Bridging is placed over existing bus routes,
    - b. More than five percent of daily traffic is comprised of commercial or truck traffic,
    - c. More than two separate plates are used for bridging, and
    - d. When bridge is to be used for more than five consecutive days.
  - 3. Extend steel plates used for bridging a minimum of 1 foot beyond edges of trench or excavation. Use temporary paving materials such as premix to feather edges of plates to minimize wheel impact on secured bridging.

#### 3.7 REMOVAL

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.
- C. Remove post settings to a depth of 2 feet.



## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 55 26 Traffic Control

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#### 3.8 TRAFFIC CONTROL, REGULATION AND DIRECTION

- A. Use Flagmen to control, regulate and direct an even flow and movement of vehicular and pedestrian traffic, for periods of time as may be required to provide for public safety and convenience, where:
  - 1. Multi-lane vehicular traffic must be diverted into single lane vehicular traffic,
  - 2. Vehicular traffic must change lanes abruptly,
  - 3. Construction equipment must enter or cross vehicular traffic lanes and walks,
  - 4. Construction equipment may intermittently encroach on vehicular traffic lanes and unprotected walks and crosswalks,
  - 5. Traffic regulation is needed due to rerouting of vehicular traffic around the Work site, and
  - 6. Where construction activities might affect public safety and convenience.
- B. Use of Flagmen to assist in the regulation of traffic flow and movement does not relieve Contractor of responsibility to take other means necessary to protect the Work and public.

#### 3.9 INSTALLATION STANDARDS

- A. Place temporary pavement for single lane closures, in accordance with TMUTCD.
- B. Reinstall temporary and permanent pavement markings as approved by Owner's Representative. When weather conditions do not allow application according to manufacturer's requirements, alternate markings may be considered. Submit proposed alternate to AHJ's or Owner's Representative for approval prior to installation. No additional payment will be made for use of alternate markings.

#### 3.10 MAINTENANCE OF EQUIPMENT AND MATERIAL

- A. Submit name, address and telephone number of individual designated to be responsible for maintenance of traffic handling at construction site to Owner's Representative. Individual must be accessible at all times to immediately correct deficiencies in equipment and materials used to handle traffic including missing, damaged, or obscured signs, drums, barricades, or pavement markings.
- B. Inspect signs, barricades, drums, lamps and temporary pavement markings daily to verify that they are visible, in good working order, and conform with traffic handling plans as approved by Owner's Representative. Immediately repair, clean, relocate, realign, or replace equipment or materials that are not in compliance.
- C. Keep equipment and materials, signs and pavement markings, clean and free of dust, dirt, grime, oil, mud, or debris.
- D. Obtain approval of Owner's Representative to reuse damaged or vandalized signs, drums, and barricades.

**End of Section 01 55 26**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 56 39 Temporary Tree and Plant Protection

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the work, whether temporary or permanent construction.
- B. Related Sections.
  - 1. Division 01 Section “Temporary Facilities and Controls” for temporary site fencing.
  - 2. Division 03 Section “Site Clearing” for removing existing trees and shrubs.
  - 3. Division 32 Section “Turf and Grasses” for turf (lawn) and meadow planting, hydro seeding and erosion control materials.
  - 4. Division 32 Section “Plants” for border edgings.

1.3 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100 mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100 mm) size.
- B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a perimeter rigid fence established two (2) feet outside the tree dripline.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
  - 1. Species and size of tree
  - 2. Location on site plan. Include unique identifier for each.
  - 3. Reason for pruning.
  - 4. Description of pruning to be performed.
  - 5. Description of maintenance following pruning.
- C. Qualification Data: For qualified arborist and tree service firm.
- D. Certification: For arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees are promptly and properly treated and repaired when damaged.
- E. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- F. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
  - 1. Use sufficiently detailed photographs or videotape.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 56 39 Temporary Tree and Plant Protection

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2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.5 QUALITY ASSURANCE

- A. Arborist Qualifications: Licensed arborist in jurisdiction where Project is located.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Pre-installation Conference: Conduct conference at Project Site.
  1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
    - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    - b. Enforcing requirements for protection zones.
    - c. Arborist's responsibilities
    - d. Field Quality Control.

1.6 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
  1. Storage of construction materials, debris, or excavated material
  2. Parking vehicles or equipment
  3. Foot traffic
  4. Erection of sheds or structures
  5. Impoundment of water
  6. Excavation or other digging unless otherwise indicated
  7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

**PART 2 PRODUCTS**

2.1 Materials

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) in diameter, and free of weeds, roots, and toxic and other non-soil materials.
  1. Obtain topsoil only from well-drained sites where topsoil is 4 inches (100 mm) deep or more; do not obtain from bogs or marshes.
- B. Topsoil: Complying with plant material notes as indicated on the drawings.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 56 39 Temporary Tree and Plant Protection

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- C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
  - 1. Type: Pine Straw
  - 2. Color: Natural
  - 3. Application: Four (4) inches thick
- D. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements:
  - 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2 inch (50 mm) opening, 0.148 inch (3.76 mm) diameter wire chain-link fabric; with pipe posts, minimum 2 -318 inch (60 mm) OD line posts, and 2-718 inch (73 mm) OD corner and pull posts; with 1-518 inch (42 mm) OD top rails, with 0.177 inch (4.5 mm) diameter top tension wire and 0.177 inch (4.5 mm) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
  - 2. Height: 6 feet (1.8 m)
  - 3. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches (914 mm)
- E. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
  - 1. Size and Text: 18"x 24"
  - 2. Lettering: 3 inch (75 mm) high minimum, white characters on red background

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

**3.2 PREPARATION**

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a 1 inch (25 mm) blue-vinyl tape around each tree trunk at 54 inches (1,372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
  - 1. Apply 4 inch (100 mm) average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.

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Section 01 56 39 Temporary Tree and Plant Protection

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2. In those instances where a proposed vehicular drive occurs within the tree protection zone, 1 inch thick plywood shall be placed a top 6 inch thick organic mulch within the affected area. This application shall remain in place until roots within drive area are pruned under supervision of a licensed arborist for installation of pavement.

3.3 TREE AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
  1. Chain-Link Fencing: Install to comply with ASTM F567 and with manufacturer's written instructions.
  2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
  3. Access Gates: Install as described in Section 2.1.D.2; adjust to operate smoothly, easily and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 35 feet (10.5 m) on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
- E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
  1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
  2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 31 Section "Earth Moving".

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 56 39 Temporary Tree and Plant Protection

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- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as directed and under the supervision of an arborist licensed in the jurisdiction of the construction activity.
- B. Root pruning at Edge of Protection Zone: Prune roots as directed by arborist licensed in the jurisdiction of the construction activity.
- C. Root Pruning within Protection Zone.

3.6 CROWN PRUNING

- A. Prune branches that affected by temporary and permanent construction. Prune branches as directed by an arborist licensed in the jurisdiction of the construction activity.
  - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
  - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
  - 3. Cut branches with sharp pruning instruments; do not break or chop.
  - 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
  - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 56 39 Temporary Tree and Plant Protection

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- D. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single un-compacted layer and hand grade to required finish elevations.

3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
  - 1. Submit details of proposed root cutting and tree and shrub repairs.
  - 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
  - 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
  - 4. Perform repairs within 24 hours.
  - 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable or restoring to normal growth pattern. Consult with Architect if tree is a live oak.
  - 1. Provide new trees of same size and species as those being replaced for each tree that measures 4 inches (100 mm) or smaller in caliper size.
  - 2. Provide two (2) new trees of 6 inch (150 mm) caliper size for each tree being replaced that measure more than 4 inches (100 mm) in caliper size.
    - a. Species: All trees.
  - 3. Plant and maintain new trees as specified in Division 32 Section "Plants".

3.10 DISPOSAL OR SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

**End of Section 01 56 39**

## SECTION 01 56 40

### TEMPORARY TREE AND PLANT PROTECTION

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the work, whether temporary or permanent construction.
- B. Related Sections.
  - 1. Division 01 Section "Temporary Facilities and Controls" for temporary site fencing.
  - 2. Division 03 Section "Site Clearing" for removing existing trees and shrubs.
  - 3. Division 32 Section "Turf and Grasses" for turf (lawn) and meadow planting, hydro seeding and erosion control materials.
  - 4. Division 32 Section "Plants" for border edgings.

##### 1.2 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100 mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100 mm) size.
- B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a perimeter rigid fence established two (2) feet outside the tree dripline.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
  - 1. Species and size of tree
  - 2. Location on site plan. Include unique identifier for each.
  - 3. Reason for pruning.
  - 4. Description of pruning to be performed.
  - 5. Description of maintenance following pruning.
- C. Qualification Data: For qualified arborist and tree service firm.



- D. Certification: For arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees are promptly and properly treated and repaired when damaged.
- E. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- F. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

#### 1.4 QUALITY ASSURANCE

- A. Arborist Qualifications: Licensed arborist in jurisdiction where Project is located.
- B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.
- C. Pre-installation Conference: Conduct conference at Project Site.
  - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
    - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    - b. Enforcing requirements for protection zones.
    - c. Arborist's responsibilities
    - d. Field Quality Control.

#### 1.5 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material
  - 2. Parking vehicles or equipment
  - 3. Foot traffic
  - 4. Erection of sheds or structures
  - 5. Impoundment of water
  - 6. Excavation or other digging unless otherwise indicated
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.

- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch (25 mm) in diameter, and free of weeds, roots, and toxic and other non-soil materials.
  - 1. Obtain topsoil only from well-drained sites where topsoil is 4 inches (100 mm) deep or more; do not obtain from bogs or marshes.
- B. Topsoil: Complying with plant material notes as indicated on the drawings.
- C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
  - 1. Type: Pine Straw
  - 2. Color: Natural
  - 3. Application: Four (4) inches thick
- D. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements:
  - 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2 inch (50 mm) opening, 0.148 inch (3.76 mm) diameter wire chain-link fabric; with pipe posts, minimum 2 -318 inch (60 mm) OD line posts, and 2-718 inch (73 mm) OD corner and pull posts; with 1-518 inch (42 mm) OD top rails, with 0.177 inch (4.5 mm) diameter top tension wire and 0.177 inch (4.5 mm) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
  - 2. Height: 6 feet (1.8 m)
  - 3. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches (914 mm)
- E. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
  - 1. Size and Text: 18"x 24"
  - 2. Lettering: 3 inch (75 mm) high minimum, white characters on red background

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

### 3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Tie a 1 inch (25 mm) blue-vinyl tape around each tree trunk at 54 inches (1,372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
  - 1. Apply 4 inch (100 mm) average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.
  - 2. In those instances where a proposed vehicular drive occurs within the tree protection zone, 1 inch thick plywood shall be placed atop 6 inch thick organic mulch within the affected area. This application shall remain in place until roots within drive area are pruned under supervision of a licensed arborist for installation of pavement.

### 3.3 TREE AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
  - 1. Chain-Link Fencing: Install to comply with ASTM F567 and with manufacturer's written instructions.
  - 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
  - 3. Access Gates: Install as described in Section 2.1.D.2; adjust to operate smoothly, easily and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire

operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 35 feet (10.5 m) on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
- E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
  - 1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
  - 2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

### 3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 31 Section "Earth Moving".
- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

### 3.5 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as directed and under the supervision of an arborist licensed in the jurisdiction of the construction activity.

- B. Root pruning at Edge of Protection Zone: Prune roots as directed by arborist licensed in the jurisdiction of the construction activity.
- C. Root Pruning within Protection Zone.

### 3.6 CROWN PRUNING

- A. Prune branches that affected by temporary and permanent construction. Prune branches as directed by an arborist licensed in the jurisdiction of the construction activity.
  - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
  - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
  - 3. Cut branches with sharp pruning instruments; do not break or chop.
  - 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

### 3.7 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
  - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single un-compacted layer and hand grade to required finish elevations.

### 3.8 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

### 3.9 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed root cutting and tree and shrub repairs.
2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
4. Perform repairs within 24 hours.
5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable or restoring to normal growth pattern. Consult with Architect if tree is a live oak.

1. Provide new trees of same size and species as those being replaced for each tree that measures 4 inches (100 mm) or smaller in caliper size.
2. Provide two (2) new trees of 6 inch (150 mm) caliper size for each tree being replaced that measure more than 4 inches (100 mm) in caliper size.
3. Species: All trees.
4. Plant and maintain new trees as specified in Division 32 Section "Plants".

### 3.10 DISPOSAL OR SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

**END OF SECTION**

**SECTION 01 57 10**  
**TPDES REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Documentation to be prepared and signed by Contractor before conducting construction operations, in accordance with the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit Number TXR 150000 (the Construction General Permit).
- B. Implementation, maintenance, inspection, and termination of storm water pollution prevention control measures including, but not limited to, erosion and sediment controls, storm water management plans, waste collection and disposal, off-site vehicle tracking, and other appropriate practices shown on the Drawings or specified elsewhere in the Contract.
- C. Review of the Storm Water Pollution Prevention Plan (SWP3) implementation in a meeting with the Owner's Representative prior to start of construction.

**1.2 DEFINITIONS**

- A. Commencement of Construction Activities: The exposure of soil resulting from activities such as clearing, grading, and excavating.
- B. Large Construction Activity: Project that:
  - 1. Disturbs five acres or more, or
  - 2. Disturbs less than five acres but is part of a larger common plan of development that will disturb five acres or more of land.
- C. Small Construction Activity: Project that:
  - 1. Disturbs one or more acres but less than five acres, or
  - 2. Disturbs less than one acre but is part of a larger common plan of development that will ultimately disturb one or more acres but less than five acres.
- D. TPDES Operator:
  - 1. The person or persons who have day-to-day operational control of the construction activities which are necessary to ensure compliance with the SWP3 for the site or other Construction General Permit conditions.

**PART 2 - PRODUCTS-**  
Not Used

## PART 3 - EXECUTION

### 3.1 SITE SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWP3)

- A. Prepare a SWP3 following Part III of the Construction General Permit and the applicable local code. If conflicts exist between the Construction General Permit and the local regulations, the more stringent requirements will apply.
- B. Update or revise the SWP3 as needed during the construction following Part III, Section E of the Construction General Permit.
- C. Submit the SWP3 and any updates or revisions to the Owner's Representative for review and address comments prior to commencing, or continuing, construction activities.

### 3.2 NOTICE OF INTENT FOR LARGE CONSTRUCTION ACTIVITY

- A. Fill out, sign, and date TCEQ Form 20022 Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity under the TPDES Construction General Permit (TXR 150000). Contractor shall provide NOI forms for both himself and Owner.
- B. Transmit the signed Contractor's copy of TCEQ Form 20022, along with a check for the required fee, made out to Texas Commission on Environmental Quality (TCEQ).
- C. Submission of the Notice of Intent form by the Contractor to TCEQ is required a minimum of fourteen days before Commencement of Construction Activities.

### 3.3 CONSTRUCTION SITE NOTICE FOR SMALL CONSTRUCTION ACTIVITY

- A. Fill out, sign, and date the Construction Site Notice, Attachment 2 to TPDES General Permit TXR 150000, "Construction Site Notice."
- B. Transmit the signed Construction Site Notice to the Engineer and Owner at least seven days prior to Commencement of Construction Activity.

### 3.4 CERTIFICATION REQUIREMENTS

- A. Conduct inspections in accordance with TCEQ requirements. Ensure persons or firms responsible for maintenance and inspection of erosion and sediment control measures read, fill out, sign, and date the Erosion Control Contractor's Certification for Inspection and Maintenance. Use the EPA NPDES Construction Inspection Form.

### 3.5 RETENTION OF RECORDS

- A. Keep a copy of this document and the SWP3 in a readily accessible location at the construction site from Commencement of Construction Activity until submission of the Notice of Termination (NOT) for Storm Water Discharges Associated with Construction Activity under TPDES Construction General Permit (TXR 150000). Contractors with day-to-day operational control over SWP3 implementation shall have a copy of the SWP3 available at a central location, on-site, for the use of all operators and those identified as having responsibilities under the SWP3. Upon



submission of the NOT, submit all required forms and a copy of the SWP3 with all revisions to the Owner's Representative.

### 3.6 REQUIRED NOTICES

- A. Post the following notices from effective date of the SWP3 until date of final site stabilization as defined in the Construction General Permit:
  - 1. Post the TPDES permit number for Large Construction Activity or a signed TCEQ Construction Site Notice for Small Construction Activity. A signed copy of the Contractor's NOI must also be posted.
  - 2. Post notices near the main entrance of the construction site in a prominent place for public viewing. Post name and telephone number of Contractor's local contact person, brief project description and location of the SWP3.
    - a. If posting near a main entrance is not feasible due to safety concerns, coordinate posting of notice with the Owner's Representative to conform to requirements of the Construction General Permit.
    - b. If Project is a linear construction project (e.g.: road, utilities, etc.), post notice in a publicly accessible location near active construction. Move notice as necessary.
  - 3. Post a notice to equipment and vehicles operators, instructing them to stop, check, and clean tires of debris and mud before driving onto traffic lanes. Post at each stabilized construction exit area.
  - 4. Post a notice of waste disposal procedures in a readily visible location on site.

### 3.7 ON-SITE WASTE MATERIAL STORAGE

- A. On-site waste material storage shall be self-contained and shall satisfy appropriate local, state, and federal rules and regulations.
- B. Prepare list of waste material to be stored on-site. Update list as necessary to include up-to-date information. Keep a copy of updated list with the SWP3.
- C. Prepare description of controls to reduce pollutants generated from on-site storage. Include storage practices necessary to minimize exposure of materials to storm water, and spill prevention and response measures consistent with best management practices. Keep a copy of the description with the SWP3.

### 3.8 NOTICE OF TERMINATION (NOT)

- A. Submit a NOT to TCEQ and the Engineer within 30 days after:
  - 1. Final stabilization has been achieved on all portions of the site that are the responsibility of the Contractor; or
  - 2. Another operator has assumed control over all areas of the site that have not been stabilized; and

3. All silt fences and other temporary erosion controls have either been removed, scheduled to be removed as defined in the SWP3, or transferred to a new operator if the new operator has sought permit coverage.

**END OF SECTION**

## SECTION 01 57 19

### CONTROL OF GROUND SURFACE WATER

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Dewatering, depressurizing, draining, and maintaining trenches, shaft excavations, structural excavations and foundation beds in stable condition, and controlling ground water conditions for tunnel excavations.
2. Protecting work against surface runoff and rising floodwaters.
3. Trapping suspended sediment in the discharge from the surface and ground water control systems.

##### 1.2 SUSTAINABLE DESIGN (LEED) REQUIREMENTS

- ###### A. New School Projects shall be LEED Certified Projects.

##### 1.3 MEASUREMENTS AND PAYMENT

###### A. Unit Prices

1. Measurement for control of ground water, if included in Bid Form, will be on either a lump sum basis or a linear foot basis for continuous installations of well points, eductor wells, or deep wells.
2. If not included in Bid Form, include the cost to control ground water in unit price for work requiring such controls.
3. No separate payment will be made for control of surface water. Include cost to control surface water in unit price for work requiring controls.
4. Follow Division 1 for unit price procedures.

##### 1.4 REFERENCES

- ###### A. ASTM D 698 - Standard Test Methods for Laboratory Compaction of Soils Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600kN-m/m<sup>3</sup>).
- ###### B. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).
- ###### C. Storm Water Management Handbook for Construction Activities prepared by Cities having jurisdiction authority.

## 1.5 DEFINITIONS

- A. Ground water control system: system used to dewater and depressurize water-bearing soil layers.
  - 1. Dewatering: lowering the water table and intercepting seepage that would otherwise emerge from slopes or bottoms of excavations, or into tunnels and shafts; and disposing of removed water. Intent of dewatering is to increase stability of tunnel excavations and excavated slopes, prevent dislocation of material from slopes or bottoms of excavations, reduce lateral loads on sheeting and bracing, improve excavating and hauling characteristics of excavated material, prevent failure or heaving of bottom of excavations, and to provide suitable conditions for placement of backfill materials and construction of structures and other installations.
  - 2. Depressurization: includes reduction in piezometric pressure within strata not controlled by dewatering alone, necessary to prevent failure or heaving of excavation bottom or instability of tunnel excavations.
- B. Excavation drainage: includes keeping excavations free of surface and seepage water.
- C. Surface drainage: includes use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines necessary to protect Work from any source of surface water.
- D. Monitoring facilities for ground water control system: includes piezometers, monitoring wells and flow meters for observing and recording flow rates.

## 1.6 PERFORMANCE REQUIREMENTS

- A. Conduct subsurface investigations to identify groundwater conditions and to provide parameters for design, installation, and operation of groundwater control systems. Submit proposed method and spacing of readings for review prior to obtaining water level readings.
- B. Design ground water control system, compatible with requirements of Federal Regulations 29 CFR Part 1926 and Division 2 to produce following results:
  - 1. Effectively reduce hydrostatic pressure affecting:
  - 2. Excavations.
  - 3. Tunnel excavation, face stability or seepage into tunnels.
  - 4. Develop substantially dry and stable subgrade for subsequent construction operations.
  - 5. Preclude damage to adjacent properties, buildings, structures, utilities, installed facilities and other work.
  - 6. Prevent loss of fines, seepage, boils, quick condition, or softening of foundation strata.
  - 7. Maintain stability of sides and bottom of excavations.

- C. Provide ground water control systems that include single-stage or multiple-stage well point systems, eductor and ejector-type systems, deep wells, or combinations of these equipment types.
- D. Provide drainage of seepage water and surface water, as well as water from other sources entering excavation. Excavation drainage may include placement of drainage materials, crushed stone and filter fabric, together with sump pumping.
- E. Provide ditches, berms, pumps and other methods necessary to divert and drain surface water from excavation and other work areas.
- F. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.
- G. Assume sole responsibility for ground water control systems and for any loss or damage resulting from partial or complete failure of protective measures and settlement or resultant damage caused by ground water control operations. Modify ground water control systems or operations if they cause or threaten to cause damage to new construction, existing site improvements, adjacent property, adjacent water wells, or potentially contaminated areas. Repair damage caused by ground water control systems or resulting from failure of system to protect property as required.
- H. Install an adequate number of piezometers installed at proper locations and depths, necessary to provide meaningful observations of conditions affecting excavation, adjacent structures and water wells.
- I. Install environmental monitoring wells at proper locations and depths necessary to provide adequate observations of hydrostatic conditions and possible contaminant transport from contamination sources into work area or ground water control system.

#### 1.7 SUBMITTALS

- A. Conform to requirements of Division 01.
- B. Submit Ground Water and Surface Water Control Plan for review by Owner's Representative prior to start of excavation work. Include the following:
  - 1. Results of subsurface investigations and description of extent and characteristics of water bearing layers subject to ground water control.
  - 2. Names of equipment Suppliers and installation Subcontractors.
  - 3. Description of proposed ground water control systems indicating arrangement, location, depth and capacities of system components, installation details and criteria and operation and maintenance procedures.
  - 4. Description of proposed monitoring facilities indicating depths and locations of piezometers and monitoring wells, monitoring installation details and criteria, type of equipment and instrumentation with pertinent data and characteristics.
  - 5. Description of proposed filters including types, sizes, capacities and manufacturer's application recommendations.

6. Design calculations demonstrating adequacy of proposed systems for intended applications. Define potential area of influence of ground water control operation near contaminated areas.
  7. Operating requirements, including piezometric control elevations for dewatering and depressurization.
  8. Excavation drainage methods including typical drainage layers, sump pump application and other means.
  9. Surface water control and drainage installations.
  10. Proposed methods and locations for disposing of removed water.
- C. Submit following records upon completion of initial installation:
1. Installation and development reports for well points, eductors, and deep wells.
  2. Installation reports and baseline readings for piezometers and monitoring wells.
  3. Baseline analytical test data of water from monitoring wells.
  4. Initial flow rates.
- D. Submit the following records weekly during control of ground and surface water operations:
1. Records of flow rates and piezometric elevations obtained during monitoring of dewatering and depressurization. Refer to Paragraph 3.02, Requirements for Eductor, Well Points, or Deep Wells.
  2. Maintenance records for ground water control installations, piezometers and monitoring wells.

## 1.8 ENVIRONMENTAL REQUIREMENTS

- A. Comply with requirements of agencies having jurisdiction.
- B. Comply with Texas Commission on Environmental Quality regulations and Texas Water Well Drillers Association for development, drilling, and abandonment of wells used in dewatering system.
- C. Obtain necessary permits from agencies with jurisdiction over use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Since review and permitting process may be lengthy, take early action to obtain required approvals.
- D. Monitor ground water discharge for contamination while performing pumping in vicinity of potentially contaminated sites.

## PART 2 - PRODUCTS

### 2.1 EQUIPMENT AND MATERIALS

- A. Select equipment and materials necessary to achieve desired results for dewatering. Selected equipment and materials are subject to review by Owner's Representative through submittals required in Paragraph 1.06, Submittals.
- B. Use experienced contractors, regularly engaged in ground water control system design, installation, and operation, to furnish and install and operate eductors, well points, or deep wells, when needed.
- C. Maintain equipment in good repair and operating condition.
- D. Keep sufficient standby equipment and materials available to ensure continuous operation, where required.
- E. Portable Sediment Tank System: Standard 55-gallon steel or plastic drums, free of hazardous material contamination.
  - 1. Shop or field fabricate tanks in series with main inlet pipe, inter-tank pipes and discharge pipes, using quantities sufficient to collect sediments from discharge water.

## PART 3 - EXECUTION

### 3.1 GROUND WATER CONTROL

- A. Perform necessary subsurface investigation to identify water bearing layers, piezometric pressures and soil parameters for design and installation of ground water control systems. Perform pump tests, if necessary to determine draw down characteristics. Present results in the Ground Water and Surface Water Control Plan submittal.
- B. Provide labor, material, equipment, techniques and methods to lower, control and handle ground water in manner compatible with construction methods and site conditions. Monitor effectiveness of installed system and its effect on adjacent property.
- C. Install, operate, and maintain ground water control systems in accordance with the Ground Water and Surface Water Control Plan. Notify Owner's Representative in writing of changes made to accommodate field conditions and changes to Work. Provide revised drawings and calculations with notification.
- D. Provide continuous system operation, including nights, weekends, and holidays. Arrange appropriate backup if electrical power is primary energy source for dewatering system.
- E. Monitor operations to verify systems lower ground water piezometric levels at rate required to maintain dry excavation resulting in stable subgrade for subsequent construction operations.

- F. Depressurize zones where hydrostatic pressures in confined water bearing layers exist below excavations to eliminate risk of uplift or other instability of excavation or installed works. Define allowable piezometric elevations in the Ground Water and Surface Water Control Plan.
  - G. Removal of ground water control installations.
    - 1. Remove pumping system components and piping when ground water control is no longer required.
    - 2. Remove piezometers, including piezometers installed during design phase investigations and left for Contractor's use, upon completion of testing, as required in accordance with Part 3 of applicable specification.
    - 3. Remove monitoring wells when directed by Owner's Representative.
    - 4. Grout abandoned well and piezometer holes. Fill piping that is not removed with cement-bentonite grout or cement-sand grout.
  - H. During backfilling, maintain water level a minimum of 5 feet below prevailing level of backfill. Do not allow the water level to cause uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place. Do not allow water levels to rise into cement-stabilized sand until at least 48 hour after placement.
  - I. Provide uniform pipe diameter for each pipe drain run constructed for dewatering. Remove pipe drains when no longer required. If pipe removal is impractical, grout connections at 50- foot intervals and fill pipe with cement-bentonite grout or cement-sand grout after removal from service.
  - J. The extent of ground water control for structures with permanent perforated underground drainage systems may be reduced, for units designed to withstand hydrostatic uplift pressure. Provide a means to drain affected portions of underground systems, including standby equipment. Maintain drainage systems during construction operations.
  - K. Remove systems upon completion of construction or when dewatering and control of surface or ground water is no longer required.
  - L. Compact backfill to not less than 95 percent of maximum dry density in accordance with ASTM D 698.
  - M. Foundation Slab: Maintain saturation line at least 3 feet below lowest elevations where concrete is to be placed. Drain foundations in areas where concrete is to be placed before placing reinforcing steel. Keep free from water for 3 days after concrete is placed.
- 3.2 REQUIREMENTS FOR EDUCTOR, WELL POINTS, OR DEEP WELLS
- A. For above ground piping in ground water control system, include a 12-inch minimum length of clear, transparent piping between each eductor well or well point and discharge header to allow visual monitoring of discharge from each installation.
  - B. Install sufficient piezometers or monitoring wells to show that trench or shaft excavations in water bearing materials are pre-drained prior to excavation. Provide separate piezometers for monitoring of dewatering and for monitoring of depressurization. Install



piezometers and monitoring wells for tunneling as appropriate for selected method of work.

- C. Install piezometers or monitoring wells at least one week in advance of the start of associated excavation.
- D. Dewatering may be omitted for portions of under drains or other excavations, where auger borings and piezometers or monitoring wells show that soil is pre-drained by existing systems and that ground water control plan criteria are satisfied.
- E. Replace installations that produce noticeable amounts of sediments after development.
- F. Provide additional ground water control installations, or change method of control if, ground water control plan does not provide satisfactory results based on performance criteria defined by plan and by specifications. Submit revised plan according to Paragraph 1.6B.

### 3.3 SEDIMENT TRAPS

- A. Install sediment tank as shown on approved plan if required.
- B. Inspect daily and clean out tank when one-third of sediment tank is filled with sediment.

### 3.4 SEDIMENT SUMP PIT

- A. Install sediment sump pits as shown on approved plan if required.
- B. Construct standpipe by perforating 12 inch to 24-inch diameter corrugated metal or PVC pipe.
- C. Extend standpipe 12 inches to 18 inches above lip of pit.
- D. Convey discharge of water pumped from standpipe to sediment trapping device.
- E. Fill sites of sump pits, compact to density of surrounding soil and stabilize surface when construction is complete.

### 3.5 EXCAVATION DRAINAGE

- A. Use excavation drainage methods if well-drained conditions can be achieved. Excavation drainage may consist of layers of crushed stone and filter fabric, and sump pumping, in combination with sufficient ground water control wells to maintain stable excavation and backfill conditions.

### 3.6 MAINTENANCE AND OBSERVATION

- A. Conduct daily maintenance and observation of piezometers or monitoring wells while ground water control installations or excavation drainage is operating at the site, or water is seeping into tunnels, and maintain systems in good operating condition.

- B. Replace damaged and destroyed piezometers or monitoring wells with new piezometers or wells as necessary to meet observation schedules.
- C. Cut off piezometers or monitoring wells in excavation areas where piping is exposed, only as necessary to perform observation as excavation proceeds. Continue to maintain and make specified observations.
- D. Remove and grout piezometers inside or outside of excavation area when ground water control operations are complete. Remove and grout monitoring wells when directed by Owner's Representative.

### 3.7 MONITORING AND RECORDING

- A. Monitor and record average flow rate of operation for each deep well, or for each wellpoint or eductor header used in dewatering system. Also, monitor and record water level and ground water recovery. Record observations daily until steady conditions are achieved and twice weekly thereafter.
- B. Observe and record elevation of water level daily as long as ground water control system is in operation, and weekly thereafter until Work is completed or piezometers or wells are removed, except when Owner's Representative determines more frequent monitoring and recording are required. Comply with Owner's Representative's direction for increased monitoring and recording and take measures necessary to ensure effective dewatering for intended purpose.

### 3.8 SURFACE WATER CONTROL

- A. Intercept surface water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. Requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.
- B. Divert surface water and seepage water into sumps and pump it into drainage channels or storm drains, when approved by agencies having jurisdiction. Provide settling basins when required by agencies.

**END OF SECTION**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 57 21 Indoor Air Quality Controls

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**PART 1 GENERAL**

1.1 SUMMARY

- A. Construction procedures to promote adequate indoor air quality after construction.
- B. Building flush-out after construction and before occupancy.
- C. Testing indoor air quality before commencement of construction; existing building areas only.
- D. Testing indoor air quality after completion of construction.
- E. Testing air change effectiveness after completion of construction.

1.2 PROJECT GOALS

- A. New Schools shall be LEED Certified Projects.
- B. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
  - 1. Cleaning of ductwork is not contemplated under this Contract.
  - 2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
  - 3. Establish condition of existing ducts and equipment prior to start of alterations.
- C. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
  - 1. Furnish products meeting the specifications.
  - 2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.
- D. Ventilation: HVAC system has been designed to achieve the minimum requirements for ventilation specified in ASHRAE 62.1.

1.3 RELATED REQUIREMENTS

- A. LEED Certification Procedures: LEED credits relating to indoor air quality.
- B. Section 01 40 00 - Quality Requirements: Testing and inspection services.
- C. Section 23 41 00 – Particulate Air Filtration.

1.4 REFERENCE STANDARDS

- A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012.
- B. ASHRAE Std 62.1 - Ventilation For Acceptable Indoor Air Quality; 2013.
- C. ASHRAE Std 129 - Measuring Air-Change Effectiveness; 1997 (Reaffirmed 2002).
- D. ASTM E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization; 2010.
- E. SMACNA (OCC) - IAQ Guideline for Occupied Buildings Under Construction; 2007.

1.5 DEFINITIONS

- A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- C. Particulates: Dust, dirt, and other airborne solid matter.
- D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 57 21 Indoor Air Quality Controls

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1.6 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. LEED Submittals: Submit all submittals required in this section in accordance with procedures specified in Section 01 35 15.
- C. NEW Construction or Additions - Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA IAQ Guidelines for Occupied Buildings Under Construction as a guide.
  - 1. Submit not less than 60 days before enclosure of building.
  - 2. Identify potential sources of odor and dust.
  - 3. Identify construction activities likely to produce odor or dust.
  - 4. Identify areas of project potentially affected, especially occupied areas.
  - 5. Evaluate potential problems by severity and describe methods of control.
  - 6. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
  - 7. Describe cleaning and dust control procedures.
  - 8. Describe coordination with commissioning procedures.
- D. NEW Construction or Additions- Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.
- E. Duct and Terminal Unit Inspection Report.
- F. Air Contaminant Test Plan: Identify:
  - 1. Testing agency qualifications.
  - 2. Locations and scheduling of air sampling.
  - 3. Test procedures, in detail.
  - 4. Test instruments and apparatus.
  - 5. Sampling methods.
- G. Air Contaminant Test Reports: Show:
  - 1. Location where each sample was taken, and time.
  - 2. Test values for each air sample; average the values of each set of
  - 3. HVAC operating conditions.
  - 4. Certification of test equipment calibration.
  - 5. Other conditions or discrepancies that might have influenced results.
- H. Ventilation Effectiveness Test Plan: Identify:
  - 1. Testing agency qualifications.
  - 2. Description of test spaces, including locations of air sampling.
  - 3. Test procedures, in detail; state whether tracer gas decay or step-up will be used.
  - 4. Test instruments and apparatus; identify tracer gas to be used.
  - 5. Sampling methods.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 57 21 Indoor Air Quality Controls

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- I. Ventilation Effectiveness Test Reports: Show:
  1. Include preliminary tests of instruments and apparatus and of test spaces.
  2. Calculation of ventilation effectiveness, E.
  3. Location where each sample was taken and time.
  4. Test values for each air sample.
  5. HVAC operating conditions.
  6. Other information specified in ASHRAE 129.
  7. Other conditions or discrepancies that might have influenced results.

1.7 QUALITY ASSURANCE

- A. Testing and Inspection Agency Qualifications: Independent testing agency having minimum of 3 years' experience in performing the types of testing specified.

**PART 2 PRODUCTS**

2.1 MATERIALS

- A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.
- B. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE 52.2.

**PART 3 EXECUTION**

3.1 CONSTRUCTION PROCEDURES

- A. Prevent the absorption of moisture and humidity by adsorptive materials by:
  1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
  2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
  3. Provide sufficient ventilation for drying within reasonable time frame.
- B. Begin construction ventilation when building is substantially enclosed.
- C. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.
- D. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area.
- E. HVAC equipment and supply air ductwork may be used for ventilation during construction:
  1. Operate HVAC system on 100 percent outside air, with 1.5 air changes per hour, minimum.
  2. Ensure that air filters are correctly installed prior to starting use; replace filters when they lose efficiency.
  3. Where return air ducts must be used for ventilation, install auxiliary filters at return inlets, sealed to ducts; use filters with at least the equivalent efficiency as those required at supply air side; inspect and replace filters when they lose efficiency.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 57 21 Indoor Air Quality Controls

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- F. Do not store construction materials or waste in mechanical or electrical rooms.
  - G. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
    - 1. Inspect duct intakes, return air grilles, and terminal units for dust.
    - 2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
    - 3. Clean tops of doors and frames.
    - 4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
    - 5. Clean return plenums of air handling units.
    - 6. Remove intake filters last, after cleaning is complete.
  - H. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.
  - I. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.
- 3.2 BUILDING FLUSH-OUT – REQUIRED FOR NEW CONSTRUCTION
- A. Perform building flush-out before occupancy.
  - B. Do not start flush-out until:
    - 1. All construction is complete.
    - 2. HVAC systems have been tested, adjusted, and balanced for proper operation.
    - 3. Inspection of inside of return air ducts and terminal units confirms that cleaning is not necessary.
    - 4. New HVAC filtration media have been installed.
  - C. Building Flush-Out: Operate all ventilation systems at normal flow rates with 100 percent outside air until a total air volume of 14,000 cubic feet per square foot (4500 cubic meters per square meter) of floor area has been supplied.
    - 1. Obtain Owner's concurrence that construction is complete enough before beginning flush-out.
    - 2. Maintain interior temperature of at least 60 degrees F (15 degrees C) and interior relative humidity no higher than 60 percent.
    - 3. If additional construction involving materials that produce particulates or any of the specified contaminants is conducted during flush-out, start flush-out over.
    - 4. If interior spaces must be occupied prior to completion of the flush-out, supply a minimum of 25 percent of the total air volume prior to occupancy, and:
      - a. Begin ventilation at least three hours prior to daily occupancy.
      - b. Continue ventilation during all occupied periods.
      - c. Provide minimum outside air volume of 0.30 cfm per square foot (0.0015 cubic meters) or design minimum outside air rate, whichever is greater.
  - D. Install new HVAC filtration media after completion of flush-out and before occupancy or further testing.

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3.3 AIR CONTAMINANT TESTING – OWNER’S OPTION: NEW CONSTRUCTION

- A. Perform air contaminant testing before starting construction, as base line for evaluation of post- construction testing.
- B. Perform air contaminant testing before occupancy.
- C. Do not start air contaminant testing until:
  - 1. All construction is complete, including interior finishes.
  - 2. HVAC systems have been tested, adjusted, and balanced for proper operation.
  - 3. New HVAC filtration media have been installed.
- D. Indoor Air Samples: Collect from spaces representative of occupied areas:
  - 1. Collect samples while operable windows and exterior doors are closed, HVAC system is running normally as if occupied, with design minimum outdoor air, but with the building unoccupied.
  - 2. Collect samples from spaces in each contiguous floor area in each air handler zone, but not less than one sample per 25,000 square feet (2300 square meters); take samples from areas having the least ventilation and those having the greatest presumed source strength.
  - 3. Collect samples from height from 36 inches (915 mm) to 72 inches (1830 mm) above floor.
  - 4. Collect samples from same locations on 3 consecutive days during normal business hours; average the results of each set of 3 samples.
  - 5. Exception: Areas with normal very high outside air ventilation rates, such as laboratories, do not need to be tested.
  - 6. When retesting the same building areas, take samples from at least the same locations as in first test.
- E. Outdoor Air Samples: Collect samples at outside air intake of each air handler at the same time as indoor samples are taken.
- F. Analyze air samples and submit report.
- G. Air Contaminant Concentration Determination and Limits:
  - 1. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.
  - 2. Airborne Mold and Mildew: Measure in relation to outside air; not higher than outside air.
  - 3. Formaldehyde: Not more than 27 parts per billion.
  - 4. Total Volatile Organic Compounds (TVOC): Not more than 500 micrograms per cubic meter.
  - 5. 4-Phenylcyclohexene (4-PCH): Not more than 6.5 micrograms per cubic meter.
  - 6. Particulates (PM10): Not more than 50 micrograms per cubic meter.
  - 7. Total Particulates (PM): Measure in micrograms per cubic meter, in relation to outside air; not more than 20 micrograms per cubic meter higher than outside air.
  - 8. Regulated Pollutants: Measure in relation to outside air; not more than contained in outside air.

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- H. If air samples show concentrations higher than those specified, ventilate with 100 percent outside air and retest at no cost to Owner, or conduct full building flush-out specified above.

3.4 VENTILATION EFFECTIVENESS TESTING

- A. Perform ventilation effectiveness testing before occupancy.
- B. Do not begin ventilation effectiveness testing until:
  - 1. HVAC testing, adjusting, and balancing has been satisfactorily completed.
  - 2. Building flush-out or air contaminant testing has been completed satisfactorily.
  - 3. New HVAC filtration media have been installed.
- C. Test each air handler zone in accordance with ASHRAE 129.
- D. If calculated air change effectiveness for a particular zone is less than 0.9 due to inadequate balancing of the system, adjust, and retest at no cost to Owner.

**End of Section 01 57 21**



# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 60 00 Product Requirements

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Sections:
  - 1. Division 01 Section "Allowances" for products selected under an allowance.
  - 2. Division 01 Section "Alternates" for products selected under an alternate.
  - 3. Division 01 Section "Substitution Procedures" for requests for substitutions.
  - 4. Division 01 Section "References" for applicable industry standards for products specified.

#### 1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 60 00 Product Requirements

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1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
  2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 10 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
  - B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.
- 1.5 QUALITY ASSURANCE
- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING
- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
  - B. Delivery and Handling:
    1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
    2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
    3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
    4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
  - C. Storage:
    1. Store products to allow for inspection and measurement of quantity or counting of units.
    2. Store materials in a manner that will not endanger Project structure.
    3. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 60 00 Product Requirements

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4. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

#### 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  1. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  2. Refer to Divisions 02 through 49. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

## PART 2 PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 60 00 Product Requirements

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6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product. Contractor to obtain approval for use of products listed.
- B. Product Selection Procedures:
1. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered, unless otherwise indicated.
  3. Manufacturers:
    - b. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered, unless otherwise indicated.
    - c. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  4. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

#### 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 60 00 Product Requirements

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2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  5. Samples, if requested.

### **PART 3 EXECUTION (Not Used)**

**End of Section 01 60 00**

## **PART 1 GENERAL**

### **1.1 SECTION INCLUDES**

- A. VOC restrictions for product categories listed below under "DEFINITIONS."
- B. All products of each category that are installed in the project must comply; Owner's project goals do not allow for partial compliance.

### **1.2 DEFINITIONS**

- A. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site in the building interior:
  - 1. Adhesives, sealants, and sealer coatings.
  - 2. Carpet.
  - 3. Carpet cushion.
  - 4. Carpet tile.
  - 5. Resilient floor coverings.
  - 6. Wood flooring.
  - 7. Paints and coatings.
  - 8. Insulation.
  - 9. Gypsum board.
  - 10. Acoustical ceilings and panels.
  - 11. Cabinet work.
  - 12. Student and teacher desks, tables, and chairs.
  - 13. Systems furniture and seating.
  - 14. Wall coverings.
  - 15. Composite wood and agrifiber products used either alone or as part of another product.
  - 16. Other products when specifically stated in the specifications.
- B. Interior of Building: Anywhere inside the exterior weather barrier.
- C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

### **1.3 REFERENCE STANDARDS**

- A. LEM - Low-Emitting Materials Product List; Collaborative for High Performance Schools
- B. VOC - Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers
- C. CRI (GLP) - Green Label Plus Carpet Testing Program - Approved Products; Carpet and Rug Institute; Current Edition.
- D. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at [www.greenguard.org](http://www.greenguard.org).
- E. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at [www.scs-certified.com](http://www.scs-certified.com).

### **1.4 SUBMITTALS**

- A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
- B. Evidence of Compliance: Submit for each different product in each applicable category.
  - 1. Identify evidence submittals with the words "LEED Report".

- C. Product Data: For each VOC-restricted product used in the project, submit product data showing compliance, except when another type of evidence of compliance is required.
- D. Installer Certifications for Accessory Materials: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of their products, or 2) that such products used comply with these requirements.

#### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

### **PART 2 PRODUCTS**

#### 2.1 MATERIALS

- A. All VOC-Restricted Products: Provide products having VOC content of types and volume not greater than those specified.
  - 1. Product data submittals showing VOC content are NOT acceptable forms of evidence.

### **PART 3 EXECUTION**

#### 3.1 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. All additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

End of Section 01 61 16

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 73 00 Execution

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### **PART 1 GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  1. Construction layout.
  2. Installation of the Work.
  3. Cutting and patching.
  4. Coordination of Owner-installed products.
  5. Progress cleaning.
  6. Starting and adjusting.
  7. Protection of installed construction.
  8. Correction of the Work.
- B. Related Sections:
  1. Division 01 Section "Submittal Procedures" for submitting surveys.
  2. *Division 02 Section "Selective Structure Demolition" for demolition and removal of selected portions of the building.*
  3. Division–07 Section "Penetration Firestopping" for patching penetrations in fire-rated construction.

#### 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures prior to the time cutting and patching will be performed. Include the following information:
  1. Extent: Describe reason for and extent of each occurrence of cutting and patching if not part of the original scope of work.
  2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
  3. Products: List products to be used for patching and firms or entities that will perform patching work.
  4. Dates: Indicate when cutting and patching will be performed.
  5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate how long services and systems will be disrupted.

#### 1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.



## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 73 00 Execution

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1. Structural Elements: When cutting and patching structural elements, notify Architect and district representative of locations and details of cutting. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that will result in increased maintenance or decreased operational life or safety. Operational elements may include the following but not be limited to:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Conveying systems.
    - i. Electrical wiring systems.
    - j. Operating systems of special construction.
  3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, reduce their capacity to perform as intended, or that will result in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Exterior curtain-wall construction.
    - d. Equipment supports.
    - e. Piping, ductwork, vessels, and equipment.
    - f. Noise- and vibration-control elements and systems.
  4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment when applicable.

# DIVISION 1 – GENERAL REQUIREMENTS

## Section 01 73 00 Execution

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### 1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Architect and owner for the visual and functional performance of in-place materials.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping, underground electrical services, and other utilities.
  - 2. Furnish location data for work related to project that must be performed by public utilities serving project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the work, examine substrates, areas, and conditions, with installer or applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 4. *Proceed with installation only after unsatisfactory conditions have been corrected.* Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing utility information: Furnish information to local utility company that is necessary to adjust, move, or relocate existing utility structures, utility poles,

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### Section 01 73 00 Execution

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lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

- B. Space requirements: Verify space requirements and dimensions of items shown diagrammatically on drawings.
- C. Review of contract documents and field conditions: Immediately on discovery of the need for clarification of the contract documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."
- D. Surface and Substrate Preparation: Comply with manufacturer's recommendations for preparation of substrates to receive subsequent work.

#### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect or owner's representative promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 3. Inform installers of lines and levels to which they must comply.
  - 4. Check the location, level and plumb, of every major element as the Work progresses.
  - 5. *Notify Architect when deviations from required lines and levels exceed allowable tolerances.*
  - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and owner's representative. Submit log at project completion for project records.

## DIVISION 1 – GENERAL REQUIREMENTS

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#### 3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- F. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

#### 3.5 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

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1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
  2. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

## DIVISION 1 – GENERAL REQUIREMENTS

### Section 01 73 00 Execution

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1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
  - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
  - b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or re-hang in-place ceilings as necessary to provide an even- plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.
6. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

#### 3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the work with work performed by owner's construction personnel.
  1. Construction Schedule: Inform owner of contractor's preferred construction schedule for owner's portion of the work. Adjust construction schedule based on a mutually agreeable timetable. Notify owner or **owner's representative fourteen (14) days prior to the start of owner's contractor** if changes to schedule are required due to differences in actual construction progress.
  2. Pre-installation Conferences: Include owner's construction personnel at pre-installation conferences covering portions of the work that are to receive owner's work. Attend pre- installation conferences conducted by owner's construction personnel if portions of the work depend on owner's construction.

## DIVISION 1 – GENERAL REQUIREMENTS

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#### 3.7 PROGRESS CLEANING

- A. General: *Clean Project site and work areas daily, including common areas.* Enforce requirements strictly. Dispose of materials lawfully.
1. Provide necessary daily cleaning during construction to maintain premises and adjoining public properties free from construction waste, debris and rubbish, and dust caused by operations.
  2. At completion of each day, remove waste materials and rubbish; store tools, equipment, machinery and surplus materials; and clean all sight exposed surfaces.
  3. If Contractor fails to clean up each day and at the completion of his Work, the Owner may do so and charge the cost thereof to the Contractor. At his next pay application a deductive change order will be processed and there is no appeal for back charges due to clean up.
  4. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  5. Do not hold waste materials more than seven (7) days during normal weather or three (3) days if the temperature is expected to rise above 80 deg. F.
  6. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Utilize containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Cleaning Materials: Use only cleaning materials recommended by manufacturer of the surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.
- F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- G. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to insure freedom from damage and deterioration at time of Substantial Completion.
- H. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective

## DIVISION 1 – GENERAL REQUIREMENTS

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covering where required to ensure protection from damage or deterioration at Substantial Completion.

- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, whether completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- L. During Construction:
  - 1. Oversee cleaning and ensure that building(s) and ground(s) are maintained free from accumulations of waste materials and rubbish.
  - 2. Sprinkle dusty debris with water.
  - 3. During progress of Work, clean-up site and access and dispose off waste materials, rubbish and debris at least once every week.
  - 4. Provide dump containers and locate on site for collection of waste materials, rubbish and debris on a daily basis.
  - 5. Do not allow waste materials, rubbish and debris to accumulate and become an unsightly or hazardous condition.
  - 6. Remove waste materials, rubbish and debris from site and legally dispose off at public or private dumping area.
  - 7. Lower waste materials in controlled manner with as few handlings as possible; do not drop or throw materials from heights.
  - 8. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

#### 3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

#### 3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.



## DIVISION 1 – GENERAL REQUIREMENTS

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#### 3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

**End of Section 01 73 00**



Template Revised  
8/10/2022

### General Contractor - Closeout Checklist

Not Applicable Items are to be Noted in the Remarks Column

To: <<Name>>, Director of Design and Construction Date: \_\_\_\_\_  
 GC: \_\_\_\_\_ A/E Firm: \_\_\_\_\_  
 BP#: \_\_\_\_\_ PM: \_\_\_\_\_  
 School Name: \_\_\_\_\_

Project Type:     Addition         Renovations         New Construction

Item #	Document Description	Primary Responsibility	Date Received by PM	Remarks
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**SUBSTANTIAL COMPLETION REQUIREMENTS - Closeout and Punch List Items are NOT to be billed at Substantial Completion**

a.	Fire Alarm System Components Completed	GC		
b.	Local Fire Marshal Approval Certificate	GC		
c.	HVAC Air and Water Balancing Completed	GC		
d.	Energy Management Systems Completed	GC		
e.	Communications Equipment and Telephone Systems Completed	GC		
f.	Final Lockset Cores Installed	GC		
g.	Room Plaques and Exterior Signage Completed	GC		
h.	Owner Demonstrations and Training Completed	GC		
i.	Exterior Clean-up and Landscaping Completed	GC		
j.	Final Interior Clean-up Completed	GC		
k.	Certificate of Occupancy	GC		
l.	Punch List Report	GC, A/E		

**FINAL COMPLETION REQUIREMENTS: CLOSEOUT ITEMS TO BE SUBMITTED WITH FINAL PAYMENT - Allowed billable amount on G702: 100% of contract**

1 SUBSTANTIAL COMPLETION				
a.	Certificate of Substantial Completion	PM		
b.	Signed Off Punchlist	GC		
2 WARRANTIES				
a.	List of Subcontractors and Suppliers	GC		Include Name, Address, Phone Number and Discipline
b.	Contractor's 1 year Warranty	GC		
c.	Subcontractors' 1 year Warranties	GC		
d.	Manufacturers' Warranties	GC		A separate "Warranties" manual should be provided for guarantees, warranties, etc.

Item #	Document Description	Primary Responsibility	Date Received by PM	Remarks
<b>3 EVIDENCE OF PAYMENT OF DEBTS AND CLAIMS</b>				
a.	"Contractor's Affidavit of Payment of Debts and Claims" (Confirm GC and Sub Lien Waivers are attached to form.)	GC		
b.	"Contractor's Final Affidavit of Release of Liens"; (Confirm GC and Sub Lien Waivers are attached to form.)	GC		
c.	"Consent of Surety Company to Final Payment"; (Confirm that Power of Attorney is attached to form.)	GC		
<b>4 INSURANCE</b>				
a.	Certificate(s) of Insurance, All insurance must be maintained for one year following substantial completion	GC		
b.	Written Statement that the Contractor Knows of no Substantial Reason that the Insurance will not be Renewable to Cover the Required Period	GC		
<b>5 OPERATIONS AND MAINTENANCE MANUALS AND EVIDENCE OF TRAINING</b>				
a.	O&M Manuals submitted by GC to A/E	GC		Per detailed list developed by GC and reviewed by A/E and PM. One Manual per each school to be split by CSI Divisions. Electronic Copy and 1 Hard Copy.
b.	Training Matrix, Sign-In sheet(s) and Videos.	GC		GC is to provide a sign-in sheet for each system for which training has been provided to indicate the person, title and date of completion of the training. 1 digital copy of Training Videos.
<b>6 ATTIC STOCK / SPARE MATERIAL / KEY TRANSFER</b>				
a.	Signed off Transmittal of Extra (Attic) Stock	GC		Provided by GC and received by Principal or Campus Facilities Supervisor or Maintenance, as applicable
b.	Signed off Transmittal Key transfer (Accessory keys)	GC		Provided by GC and received by Principal or Campus Facilities Supervisor, as applicable.
<b>7 LOCAL AGENCIES APPROVALS (as applicable)</b>				
a.	Certificate of Occupancy	GC		
b.	Final Building Inspections/Closed Construction Permits	GC		Green tags colored copies
c.	State Fire Marshal's Fire Alarm Inspection Certificate & Testing	GC		
d.	Storm Water Prevention Pollution Plan (SWPPP)	GC		
e.	Elevator Inspection Certificate	GC		
f.	Boiler Inspection Certificate	GC		
g.	Health Department Inspection Certificate	GC		
<b>8 RECORD DOCUMENTS (DRAWINGS, SPECIFICATIONS, ETC.)</b>				
a.	Record Documents, Submit 1 Hard Copies and 1 PDF Copy	GC		
<b>9 GC DESIGNED DOCUMENTS (as applicable)</b>				
a.	Fire Alarm drawings	GC		Need AHJ approved documents.
b.	Security drawings	GC		Need AHJ approved documents (if applicable)

Item #	Document Description	Primary Responsibility	Date Received by PM	Remarks
c.	HVAC Controls drawings	GC		
d.	Fire Sprinkler System drawings	GC		Need AHJ approved documents.
e.	Data Cabling drawings	GC		
<b>10 CERTIFICATIONS</b>				
a.	Certification of Asbestos Free Project: Letter from GC and A/E, Letters from Subs	GC, A/E		
b.	Certification of Lead-Free Potable Water System: Letters from GC and Subs	GC		
c.	Certification of PCB-Free Project: Letters from GC and Subs	GC		
<b>11 FINAL SYSTEM REPORTS</b>				
a.	Final Test & Balance Report	T&B		
b.	Final Roof Inspection Report	Roof Inspector		
<b>12 LEED CONSTRUCTION SUBMITTAL</b>				
a.	Sustainable Sites <i>SSp1</i> - Construction Activity Pollution Prevention: <b>Erosion &amp; Sedimentation Control Plan</b>	GC		
b.	Materials and Resources <i>MRp2</i> & <i>MRC5</i> - Construction Waste Management: <b>Const. Waste Mgmt. Plan</b>	GC		
c.	Materials and Resources <i>MRC3</i> - Sourcing of Raw Materials: <b>Building Product Disclosure &amp; Optimization Calculator (BPDO)</b>	GC		
d.	Environmental Quality <i>EQc3</i> - <b>IAQ Management Plan for Construction and Preoccupancy Phases</b>	GC		
e.	Environmental Quality <i>EQc2</i> - Low Emitting Materials: <b>Low Emitting Materials Calculator</b>	GC		
<b>13 FINAL COMPLETION</b>				
a.	Copy of Final Change Order	A/E, GC, PM		
b.	TEA - Certification of Project Compliance	A/E, GC, FBISD, PM		
c.	TAS/TDLR Certification (if applicable)	AE		
d.	Complete Set of Approved Submittals Log from Prolog	GC		Include Prolog Summary Log in Binder
e.	Final Completion Certificate	A/E, GC, PM		
<b>RETAINAGE</b>				
a.	FBISD Retention Release Reduction Worksheet	PM		
b.	Purchase Order Closure	PC		
<b>WARRANTY INSPECTIONS</b>				
a.	11 month inspection after Date of Substantial Completion	PM		

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**CONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT**

Project \_\_\_\_\_

Job No. \_\_\_\_\_

On receipt by the signer of this document of a check from \_\_\_\_\_ (maker of check) in the sum of \$ \_\_\_\_\_ payable to \_\_\_\_\_ (payee or payees of check) and when the check has been properly endorsed and has been paid by the bank on which it is drawn, this document becomes effective to release any mechanic's lien right, any right arising from a payment bond that complies with a state or federal statute, any common law payment bond right, any claim for payment, and any rights under any similar ordinance, rule, or statute related to claim or payment rights for persons in the signer's position that the signer has on the property of \_\_\_\_\_ (owner) located at \_\_\_\_\_

(location) to the following extent: \_\_\_\_\_ (job description).

This release covers the final payment to the signer for all labor, services, equipment, or materials furnished to the property or to \_\_\_\_\_ (person with whom signer contracted).

Before any recipient of this document relies on this document, the recipient should verify evidence of payment to the signer.

The signer warrants that the signer has already paid or will use the funds received from this final payment to promptly pay in full all of the signer's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or services provided for or to the above referenced project up to the date of this waiver and release.

Date \_\_\_\_\_  
\_\_\_\_\_  
By \_\_\_\_\_ (Company name)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(Signature)  
\_\_\_\_\_  
(Title)

=====

**NOTE:** Section 53.281(b)(2), Texas Property Code, requires that the above form be notarized. See Chapter 121, Texas Civil Practice & Remedies Code, regarding Acknowledgments &

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Proofs of Written Instruments, or consult an attorney. For short acknowledgement forms that might be suitable, see Section 121.008 in Chapter 121. Click [here](#) to go there.

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**NOTICE:**

**This document waives rights unconditionally and states that you have been paid for giving up those rights. It is prohibited for a person to require you to sign this document if you have not been paid the payment amount set forth below. If you have not been paid, use a conditional release form.**

**UNCONDITIONAL WAIVER AND RELEASE ON FINAL PAYMENT**

Project \_\_\_\_\_

Job No. \_\_\_\_\_

The signer of this document has been paid in full for all labor, services, equipment, or materials furnished to the property or to \_\_\_\_\_ (person with whom signer contracted) on the property of \_\_\_\_\_ (owner) located at \_\_\_\_\_ (location) to the following extent: \_\_\_\_\_ (job description). The signer therefore waives and releases any mechanic's lien right, any right arising from a payment bond that complies with a state or federal statute, any common law payment bond right, any claim for payment, and any rights under any similar ordinance, rule, or statute related to claim or payment rights for persons in the signer's position.

The signer warrants that the signer has already paid or will use the funds received from this final payment to promptly pay in full all of the signer's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or services provided for or to the above referenced project up to the date of this waiver and release.

Date \_\_\_\_\_

\_\_\_\_\_ (Company name)

By \_\_\_\_\_(Signature)

\_\_\_\_\_(Title)

=====  
=====

**NOTE:** Section 53.281(b)(2), Texas Property Code, requires that the above form be notarized. See Chapter 121, Texas Civil Practice & Remedies Code, regarding Acknowledgments & Proofs of Written Instruments, or consult an attorney. For short acknowledgement forms that might be suitable, see Section 121.008 in Chapter 121. Click [here](#) to go there.



**WARRANTY LETTER**  
**PLEASE PRINT ON YOUR COMPANY LETTERHEAD**

**WARRANTY FOR:**

Fort Bend ISD BOND 2023:

We, the undersigned, hereby warrant that Work described above which we have furnished and/or installed for the following project:

**PROJECT TITLE: Job #** \_\_\_\_\_,

**PROJECT ADDRESS:**

\_\_\_\_\_

The project is in accordance with the Contract Documents, including guaranteeing all of the work under the contract to be free from faulty materials in every particular, and free from improper workmanship, and against injury except from proper and usual wear and tear; and agreeing to replace or re-execute without cost to the Owner such work as may be found to be improper, imperfect or of unsatisfactory material and/or workmanship, without cost to the Owner, and to make good all damage caused to other work or materials, or to the Owner's property, real and personal, due to such improper, imperfect or faulty material and/or workmanship, and/or due to the required replacement or re-execution. Such warranty periods shall be maintained notwithstanding that certain systems may be activated prior to Substantial Completion as required for the satisfactory completion of the project. This guarantee shall be made to cover a period of one (1) year from the date of Substantial Completion as certified by the Architect under this Contract.

**CONTRACTOR:**

Company Name: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Contact Name & Title)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Phone Number)

(PROJECT NAME)  
AFFIDAVIT  
FBISD PROJECT NO:

ASBESTOS FREE

**ASBESTOS FREE AFFIDAVIT**

I understand that the Fort Bend Independent School District, in order to protect the students, staff and public in general from any unnecessary exposure to asbestos fibers, and to comply with the Asbestos Hazard Emergency Response Act prohibits the use of asbestos containing materials in all forms in the construction and operation of their facilities.

I certify that I am familiar with the materials used in the construction of, and incorporated into, the construction described below. I further certify that to the best of my knowledge and belief, no asbestos containing building materials (ACBM) either friable or otherwise were used in the process of construction or incorporated into the construction of the building.

CAMPUS LOCATION:

SCOPE OF WORK:

\_\_\_\_\_

SPECIFICATION SECTION(S):

\_\_\_\_\_

SUBCONTRACTOR:

\_\_\_\_\_

\_\_\_\_\_  
General Contractor's Signature

Date

\_\_\_\_\_  
General Contractor's Printed Name & Title

Failure to complete this waiver constitutes non-compliance with the job specifications and an unacceptable job.

\_\_\_\_\_, 20\_\_\_\_

Signed before me this \_\_\_\_ day of

\_\_\_\_\_

Notary Public:

\_\_\_\_\_

My commission expires:

As the architect and/or project engineer responsible for the above said project I certify that no asbestos containing building materials were specified as a building material in the building as specified in 40 CFR 763.99(a)(7).

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Architect's or Project Engineer's Stamp

Signature

Date

(PROJECT NAME)  
FBISD PROJECT NO:

LEAD FREE AFFIDAVIT

**LEAD FREE AFFIDAVIT**

I understand that the Fort Bend Independent School District, in order to protect the students, staff and public in general from any unnecessary exposure to Lead, and to comply with the U.S. Code for a "LEAD FREE" drinking water system. "No person may use any pipe, any pipe or plumbing fitting or fixture, any solder, or any flux, after June 19, 1986, in the installation or repair of- (i) any public water system; or (ii) any plumbing in a residential or nonresidential facility providing water for human consumption, that is not LEAD FREE (within the meaning of subsection (d) of this section). [42 USC§ 300g-6]"

I certify that I am familiar with the materials used in the construction of, and incorporated into, the construction described below. I further certify that to the best of my knowledge and belief, no lead containing building materials were used in the process of construction or incorporated into the construction of the drinking water system in the building.

CAMPUS(ES):

SCOPE OF WORK:

\_\_\_\_\_

SPECIFICATION SECTION(S):

\_\_\_\_\_

SUBCONTRACTOR:

\_\_\_\_\_

\_\_\_\_\_

General Contractor's Signature

Date

\_\_\_\_\_

General Contractor's Printed Name & Title

Failure to complete this waiver constitutes non-compliance with the job specifications and an unacceptable job.

\_\_\_\_\_, 20\_\_\_\_

Signed before me this \_\_\_\_ day of

\_\_\_\_\_

Notary Public:

\_\_\_\_\_

My commission expires:

As the architect and/or project engineer responsible for the above said project I certify that no lead containing building materials were specified as a building material in the building as specified in 42 U.S. Code§ 300g-1 - National drinking water regulations.

\_\_\_\_\_  
Architect's or Project Engineer's Stamp

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

(PROJECT NAME)  
FBISD PROJECT NO:

PCB FREE AFFIDAVIT

**PCB FREE AFFIDAVIT**

I understand that the Fort Bend Independent School District, in order to protect the students, staff and public in general from any unnecessary exposure to polychlorinated biphenyls (PCB's), and to comply with the U.S. Environmental Protection Agency's recommendation for schools to eliminate PCB containing building material in all forms in the construction and operation of their facilities. I certify that I am familiar with the materials used in the construction of, and incorporated into, the construction described below. I further certify that to the best of my knowledge and belief, no polychlorinated biphenyls containing building materials (PCBs) were used in the process of construction or incorporated into the construction of the building.

CAMPUS(ES):

SCOPE OF WORK:

\_\_\_\_\_

SPECIFICATION SECTION(S):

\_\_\_\_\_

SUBCONTRACTOR:

\_\_\_\_\_

\_\_\_\_\_

General Contractor's Signature

Date

\_\_\_\_\_

General Contractor's Printed Name & Title

Failure to complete this waiver constitutes non-compliance with the job specifications and an unacceptable job.

\_\_\_\_\_, 20\_\_\_\_

Signed before me this \_\_\_\_ day of

\_\_\_\_\_

Notary Public:

\_\_\_\_\_

My commission expires:

As the architect and/or project engineer responsible for the above said project I certify that no PCB containing building materials were specified as a building material in the building as specified in 40 CFR 761.20.

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Architect's or Project Engineer's Stamp

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Signature

Date

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 78 23 Operation and Maintenance Data

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
1. Operation and maintenance documentation directory.
  2. Operation manuals for systems, subsystems, and equipment.
  3. Product maintenance manuals.
  4. Systems and equipment maintenance manuals.
- B. Related Sections:
1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
  2. Division 02 Section "Demonstration and Training" for instructing Owner's personnel in the maintenance of the products and in the operation of equipment and systems.
  3. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or sub-systems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual specification sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
1. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Architect and owner's representative.
    - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - b. Enable ~~inserted~~ reviewer comments on draft submittals.
  2. One (2) paper copy and (2) electronic copies on separate usb devices delivered at substantial completion.
  3. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 calendar days before commencing demonstration and training. Architect



DIVISION 1 – GENERAL REQUIREMENTS  
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will comment on whether general scope and content of manual are acceptable.

- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion. Architect will return copy with comments.
  - 1. Correct or modify each manual to comply with Architect and owner's representative Comments. Submit copies of each corrected manual within 10 days of receipt of Comments and prior to commencing demonstration and training.

**PART 2 PRODUCTS**

**2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Organization: Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

**2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS**

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Architect.
  - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.

DIVISION 1 – GENERAL REQUIREMENTS  
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- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
  - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of content. Indicate volume number for each of the three required multiple-volume sets.
  - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 78 23 Operation and Maintenance Data

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4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor is delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
  1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
  1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.

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Section 01 78 23 Operation and Maintenance Data

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- D. Systems and Equipment Controls: Describe the sequence of operation and diagram controls as installed.
  - E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in the manual, identify them by product name, and arrange to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in the manual, identify by product name and arrange to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 78 23 Operation and Maintenance Data

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- number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
    - 1. Standard maintenance instructions and bulletins.
    - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
    - 3. Identification and nomenclature of parts and components.
    - 4. List of items recommended to be stocked as spare parts.
  - D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
    - 1. Test and inspection instructions.
    - 2. Troubleshooting guide.
    - 3. Precautions against improper maintenance.
    - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    - 5. Aligning, adjusting, and checking instructions.
    - 6. Demonstration and training video recording, if available.
  - E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
    - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
    - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
  - F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
  - G. Provide transmittal from district's construction management software for transmittance of extra parts.
  - H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
  - I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
    - 1. Include procedures to follow and required notifications for warranty claims.

**PART 3 EXECUTION**

**3.1 MANUAL PREPARATION**

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

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Section 01 78 23 Operation and Maintenance Data

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- B. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- C. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- D. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of operation and maintenance manuals.
  - 2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."
- E. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**End of Section 01 78 23**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 78 39 Project Record Documents

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Sections:
  - 1. Division 01 Section "Execution" for final property survey.
  - 2. Division 01 Section "Closeout Procedures" for general closeout procedures.
  - 3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 4. Divisions 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints.
  - 2. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal: Submit one paper copy set as well as PDF electronic files of marked-up record prints and two sets of plots from corrected record digital data files on a single usb device. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
    - b. Final Submittal: Submit one paper copy set, a PDF electronic files of marked-up record prints on a single usb device.
- B. Record Specifications: Submit as PDF electronic file of Project's Specifications, including addenda and contract modifications on a single usb device.
- C. Record Product Data: Submit as PDF electronic file of each approved submittal.
  - 1. Submit where record Product Data are required as part of operation and maintenance manuals. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy set as well as PDF electronic files of each submittal.

**PART 2 PRODUCTS**

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 78 39 Project Record Documents

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1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding archive photographic documentation.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, submit marked-up record prints to Architect. The Architect will then prepare a full set of corrected digital data files of the Contract Drawings, as follows:



DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 78 39 Project Record Documents

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1. Format: Annotated PDF electronic file.
  2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to Architect for resolution.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file.
  3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
  4. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark specifications to indicate the actual product installation where installation varies from that indicated in specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  5. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit record Specifications as a paper copy as well as in scanned PDF electronic file(s) of marked up paper copy.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, record Specifications, and record Drawings where applicable.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 78 39 Project Record Documents

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- B. Format: Submit record Product Data as a paper copy as well as scanned PDF electronic file(s) of marked up paper copy.
  - 1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

**PART 3 EXECUTION**

**3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

**End of Section 01 78 39**

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 79 00 Demonstration and Training

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**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Demonstration and training video recordings.
  - 4. O&M Manuals should be uploaded into Owner's designated software (Kahua)
- B. Related Sections:
  - 1. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules utilizing manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies with closeout documentation per section 01 77 00 closeouts.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date of video recording.
  - 2. At completion of training, submit complete training manual(s) for Owner's use.

1.5 QUALITY ASSURANCE

- A. Instructor Qualifications: A qualified representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 79 00 Demonstration and Training

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1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations. Provide a minimum (14) day advanced notice.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

**PART 2** PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. For each module, include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  - 2. Documentation: Review the following items in detail as applicable:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  - 4. Operations: Include the following, as applicable:

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 79 00 Demonstration and Training

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- a. Startup procedures.
- b. Equipment or system break-in procedures.
- c. Routine and normal operating instructions.
- d. Regulation and control procedures.
- e. Control sequences.
- f. Safety procedures.
- g. Instructions on stopping.
- h. Normal shutdown instructions.
- i. Operating procedures for emergencies.
- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- l. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

**PART 3 EXECUTION**

**3.1 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

DIVISION 1 – GENERAL REQUIREMENTS  
Section 01 79 00 Demonstration and Training

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3.2 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 2. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner's representative with at least 14 days advance notice.
- C. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
- B. Video Recording Format: Provide high-quality color video recordings with menu navigation in format acceptable to Architect and owner's representative.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

**End of Section 01 77 00**

**SECTION 02 41 19**  
**SELECTIVE DEMOLITION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Removal of designated equipment and fixtures.
  - 3. Identification of utilities.
  - 4. Legal offsite disposal of demolition materials.
  - 5. Salvage of existing items to be reused or recycled.

**1.2 DEFINITIONS**

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

**1.3 MATERIALS OWNERSHIP**

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

**1.4 ACTION SUBMITTALS**

- A. Schedule: Submit sequence of demolition operations to Owner for review prior to start of work to prevent interruption of onsite operations.
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

2. Coordinate shutoff, capping, and continuation of utility services as required and interruption of utility services.
  3. Details for dust and noise control protection.
  4. Coordinate with Owner's continuing occupation of portions of existing building.
  5. Use of elevator and stairs.
  6. Location of salvageable items.
  7. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on site operations.
  8. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
  9. Locations of temporary partitions and means of egress.
- B. Shop Drawings: Indicate location and construction of temporary work.
- C. Concrete Cutting: Submit 3 copies of proposed cutting procedures and operations for each type of concrete demolition for review and approval prior to starting the work. Outline types of equipment proposed, protections to be installed, and cutting schedule.
- D. Roof Removal: Submit procedures indicating compliance with manufacturer's warranty (if required) and schedule for roof removal.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Engineering Survey: Submit engineering survey of condition of building.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property from dust control and noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities:
1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on site operations are uninterrupted.
  2. Interruption of utility services. Indicate how long utility services will be interrupted.
  3. Coordination for shutoff, capping, and continuation of utility services.
  4. Dust and noise control protection
  5. Location of salvageable items.
  6. Location of construction for temporary work
  7. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed work.
- D. Permits: Submit permits, notices and certificates authorizing demolition work, necessary for utility work, and for transportation and disposal of debris.



- E. Project Record Documents: Accurately record actual locations of capped utilities, subsurface obstructions, and insert other pertinent items.
- F. Warranties: Documentation indicating that existing warranties remain in effect after completion of selective demolition.
- G. Inventory: Submit a list of items for removal and salvage prior to start of demolition.

#### 1.6 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. Comply with applicable federal, state, and local codes for demolition work, dust and noise control, safety of structure, and debris removal.
  - 2. Obtain required permits from authorities having jurisdiction.
- B. Predemolition Conference: Conduct conference at site.
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.
  - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
  - 5. Review areas where existing construction is to remain and requires protection.

#### 1.7 FIELD CONDITIONS

- A. Occupancy: Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted. Provide minimum of 72 hours' notice to Owner of demolition activities that will affect Owner's operations including but not limited to:
  - 1. Interruption of power.
  - 2. Interruption of utility services.
  - 3. Excessive noise.
- B. Condition of Structure: Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
  - 1. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

- D. Hazardous Materials: It is not anticipated that hazardous materials will be encountered in the work.
  - 1. Hazardous materials will be removed by Owner prior to the commencement of the work.
  - 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract. Work shall continue in other areas of project unaffected by hazardous materials.
- E. Storage or sale of removed items or materials on site is not permitted.
- F. Traffic: Conduct operations and debris removal to ensure minimum interference with roads, streets, drives, fire lanes, walks, accessible paths, and adjacent occupied or used facilities.
  - 1. Do not close, block, or obstruct streets, drives, walks, or occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around obstructed traffic ways.
- G. Flame Cutting: Do not use cutting torches for removal until flammable materials are removed. At concealed spaces, verify conditions prior to flame cutting operations. Maintain portable fire suppression devices during flame cutting operations.
- H. Environmental Controls: Use water sprinkling, temporary enclosures, or other acceptable methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions.
- I. Utility Services: Maintain existing utilities and protect against damage during demolition operations.
  - 1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, acceptable to Owner and governing authorities.
  - 2. Maintain fire protection facilities in service during selective demolition operations.
- J. Protections: Provide temporary barriers to protect Owner's personnel and public from injury from work.
  - 1. Take protective measures to provide free and safe passage to occupied portions of building.
  - 2. Provide protection to ensure safe passage of the Owner's personnel and the public around demolition areas and to and from occupied portions of adjacent areas, buildings, and structures.
  - 3. Provide shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
  - 4. Protect existing work which becomes exposed during demolition operations.
    - a. Protect existing improvements, appurtenances, and conditions to remain.
    - b. Protect adjacent floors with coverings.

- c. Protect walls, openings, roofs, and adjacent exterior construction to remain and exposed to building demolition operations.
- 5. Construct temporary insulated dustproof partitions to separate areas from noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
- 6. Provide temporary weather protection when exposing exterior conditions to prevent water leakage or damage to structure or interior areas of existing building.
- K. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
- L. Firearms and Explosives: Firearms and explosives are not permitted at the site.

## 1.8 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.
- B. Coordinate selective demolition work with cutting and patching requirements.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Demolition Standards: Comply with ASSE A10.6 and NFPA 241.

### 2.2 MATERIALS

- A. Repair Materials: Use repair materials identical to existing materials.
  - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials visually matching existing adjacent surfaces.
  - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify utilities have been disconnected and capped before starting selective demolition operations.

- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
  - 1. Perform surveys as the work progresses to detect hazards resulting from selective demolition activities.
- D. Verify hazardous materials have been remediated before proceeding with building demolition operations.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings or preconstruction photographs and video.
  - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
  - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

### 3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.
- B. Pest Control: Employ certified, licensed exterminator to treat building and to control rodents and vermin before and during selective demolition operations.
- C. Site Access and Temporary Controls: Conduct selective demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities. Comply with requirements for access and protection.

### 3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
  - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
  - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
  - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
  - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

#### 3.4 PROTECTIONS

- A. Temporary Protection: Provide temporary barricades and protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
    - a. Erect temporary pathways and means of egress necessary for ongoing operations compliant with Code and accessibility regulations.
    - b. Provide temporary barricades and protection required to prevent injury and damage to adjacent buildings and facilities to remain.
  2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
    - a. Protect existing work which becomes exposed during demolition operations.
    - b. Protect adjacent entrances from damage due to demolition activities.
    - c. Protect existing improvements, appurtenances, and conditions to remain.
    - d. Protect floors with covering.
    - e. Protect walls, openings, roofs, and adjacent exterior construction to remain and exposed to building demolition operations.
  4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling.
    - a. Construct temporary insulated dustproof partitions to separate areas from noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks.
    - b. Construct dustproof partitions of not less than nominal 4 inch (100mm) studs, 5/8 inch (16mm) gypsum wallboard with joints taped on occupied side, and 1/2 inch (13mm) fire retardant plywood on the demolition side.
    - c. Insulate partition to provide noise protection to occupied areas.
    - d. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
    - e. Protect air handling equipment.
    - f. Weatherstrip openings.
  6. Damage: Promptly repair damages to adjacent components cause by demolition activities.
- B. Temporary Partitions and Enclosures: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
1. Construct dustproof partitions of not less than nominal 4 inch (100mm) studs, 5/8 inch (16mm) gypsum wallboard with joints taped on occupied side, and 1/2 inch (13mm) fire retardant plywood on the demolition side.
  2. Insulate partition to provide noise protection to occupied areas.
  3. Seal joints and perimeter to prevent dust from mitigating to occupied areas. Equip partitions with dustproof doors and security locks.
  4. Protect air handling equipment.
- C. Furnishings and Equipment: Cover and protect furniture, equipment, and fixtures from spoilage or damage as necessary.
- D. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
- E. Remove temporary barricades and protections where hazards no longer exist.
- ### 3.5 SELECTIVE DEMOLITION
- A. Conduct demolition to minimize interference with existing and adjacent building areas and to cause as little inconvenience to Owner and employees of occupied buildings as possible. Do not interfere with use of adjacent public streets.
1. Cease operations immediately if structure appears to be in danger and notify Architect. Do not resume operations until directed.

2. Maintain protected egress and access to work.
  3. Do not burn or bury materials on site. No explosive or blasting will be allowed for demolition.
- B. Demolish and remove existing construction to the extent required by new construction and as indicated. Use methods required to complete the work within limitations of governing regulations and as follows:
1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame cutting operations. Maintain portable fire suppression devices during flame cutting operations.
  5. Maintain fire watch during and for at least 24 hours after flame cutting operations.
  6. Maintain ventilation when using cutting torches.
  7. Remove decayed, vermin infested, and dangerous or unsuitable materials and promptly and legally dispose off site.
  8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  10. Dispose of demolished items and materials promptly.
- C. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- D. Removed and Salvaged Items: Remove items and equipment indicated for salvage. Photograph items with existing damage prior to removal. Submit list of damage items with supporting photographs and videos. Clean and pack or crate items after cleaning. Identify contents of containers. Store items in secure area until delivery to Owner.
1. Transport items to Owner's storage area designated by Owner. Protect items from damage during transport and storage.
- E. Removed and Reinstalled Items: Clean and repair items to functional condition adequate for intended reuse.
1. Pack or crate items after cleaning and repairing. Identify contents of containers.
  2. Protect items from damage during transport and storage.

3. Store items in secure storage, off ground, and covered. Protect until items are reinstalled.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in original locations after selective demolition operations are complete.
- G. Patching and Repair: Repair damage to adjacent construction caused by selective demolition operations promptly.

### 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs on Grade: Saw cut perimeter of area to be demolished, and then break up and remove.
- E. Interior Slab on Grade: Use best practice removal methods to prevent cracking or structurally disturbing adjacent slabs or partitions. Use power saw where possible.
- F. Below Grade Voids: Completely fill below grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 inches (150 mm) in diameter, roots, or organic matter.
- G. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI Recommended Work Practices for the Removal of Resilient Floor Coverings.
- H. Partitions: Completely remove indicated interior partitions and interior finishes indicated. Leave adjacent work scheduled to remain sound and ready for patching or for new finishes.
- I. Doors and Frames: Remove doors, frames, and hardware where indicated. Remove anchors, shims, trim, and attachments. Leave opening ready to receive new work. Remove from site.



- J. Cut existing masonry walls for new openings where indicated. Leave openings ready to receive new work or patching.
- K. Windows: Remove existing windows where indicated. Remove associated anchors, shims, blocking, operating devices, sealant, and trim. Cut back interior finishes required for plumb surface for patching. Leave openings ready for installation of new materials and finishes or to be infilled.
- L. Mechanical, Electrical, and Structural Elements: If unanticipated mechanical, electrical, or structural elements conflicting with intended function or design are encountered, investigate and measure both nature and extent of the conflict.
  - 1. Submit written report to Architect in accurate detail. Pending receipt of directive, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.
  - 2. HVAC Equipment: Remove air conditioning equipment without releasing refrigerants.

### 3.7 REMOVAL OF STRUCTURAL ELEMENTS

- A. Foundation: Demolish foundation walls to a minimum depth of 12 inches (300mm) below existing ground surface. Demolish and remove below grade wood or metal construction. Break up below grade concrete slabs.
  - 1. Interior Slabs on Grade: Employ removal methods to prevent cracking or structurally disturbing adjacent slabs or partitions. Use power saw where possible.
  - 2. Completely fill below grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 (150mm) inches in diameter, roots, or other organic matter.
- B. Pneumatic Operated Hammers: When possible, reduce use of pneumatic operated hammers. When necessary to use pneumatic tools, locate compressors as remote from occupied areas as possible.
  - 1. To break large pieces of concrete, isolate concrete from floor slabs and building structure to prevent structure borne vibration.
- C. Saw Cutting: Locate compressors as remote as possible from occupied areas of facility.
  - 1. Use diamond tipped saw blades and related equipment.
  - 2. Saw cut portions of walls and slabs. Angle saw blade at floors and corners to cut as closely as possible to desired location.
  - 3. Control runoff water used with saw to prevent damage to existing materials.

### 3.8 ROOF REMOVAL

- A. Roof Assembly: Remove existing roofing to the extent that can be covered in one day by new roofing. Maintain building interior in watertight and weathertight condition.
  - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
  - 2. Remove existing roofing system down to substrate.

- B. At new column extensions, cut through roofing as required for welding of new extension. Provide temporary watertight enclosure over stubs and temporarily flash to existing roof to make completely watertight.
- C. At existing parapets, remove portions of roofing, flashing, stone, and masonry necessary to weld new steel and set form work. Provide temporary watertight enclosures over areas of open roof and temporarily flash to make watertight.
- D. As column forms are placed, temporarily flash columns to existing roofing and cover with watertight tarpaulins before and after pouring. After column forms have been removed, temporarily flash new concrete structure into existing roofing immediately to maintain watertight roof.
- E. When removing roofing to place supports for shoring of form work to transfer loads to existing columns or approved structure or to support scaffolding, work platforms, or similar loads, temporarily flash supports to make roof watertight.
- F. Remove excess residue. Thoroughly clean and remove asphalt, dust, loose materials and leave ready for new work.

### 3.9 PATCHING AND REPAIRS

- A. Promptly repair damage to adjacent construction caused by selective demolition operations. Refinish construction or item to a condition comparable or better than before selective demolition operations or replace with new.
- B. Patching: Comply with Section 01 73 29 "Cutting and Patching."
- C. Repairs: When necessary to repair to existing surfaces, patch to produce surfaces suitable for new materials.
  - 1. Fill holes and depressions in existing masonry walls to remain with masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- E. Floors and Partitions: Where walls or partitions are demolished, extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - 1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - 2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.

3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

### 3.10 DISPOSAL OF DEMOLISHED MATERIALS

A. Legally remove demolition waste materials from site and recycle or dispose of them according to Section 01 74 19 "Construction Waste Management and Disposal."

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

### 3.11 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

B. Remove partitions and temporary work. Restore surfaces to match adjacent surfaces.

**END OF SECTION**

SECTION 03 39 00  
CONCRETE SEALING

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes: Application of curing and sealing compounds to concrete flooring.

1.2 REFERENCES

- A. American Society for Testing and Materials:
1. ASTM C 42 - Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
  2. ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete.
  3. ASTM C 1315 - Liquid Membrane - Forming Compound Having Special Properties For Curing And Sealing Concrete.
  4. ASTM C 672 - Test Method for Critical Dilation of Concrete Specimens Subjected to Freezing.
  5. ASTM C 805 - Rebound Number of Hardened Concrete.
  6. ASTM D 3359 - Measuring Adhesion by Tape Test.

1.3 ACTION SUBMITTALS

- A. Product Data: Submit technical information and installation instructions.

1. SUSTAINABLE DESIGN SUBMITTALS

- a. Sustainable Design Submittals: Submit the following supporting documentation separately from Action Submittals. Include with the completed LEED v4 worksheet. See Section 01 33 29 "Sustainable Design Reporting" for more information.
- 1) Product Data, Recycled Content: For products with recycled content, indicate percentage of postconsumer and preconsumer recycled content and relative dollar value per unit of product.
    - I) Indicate percentage of postconsumer and preconsumer recycled content and relative dollar value per unit of product.
    - II) If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  - 2) Product Data, Regional Materials: When available, submit for materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
  - 3) Environmental Product Declaration: Submit EPD data for each product when available.
  - 4) Health Product Declaration: Submit HPD data for each product when available.

- 5) Sourcing of Raw Materials: Submit corporate sustainability report for each manufacturer.
- 6) Construction Waste Management: Submit tabulating and supporting for salvaged, recycled, and reused building waste materials in accordance with Section 01 74 19.

#### 1.4 QUALITY CONTROL

- A. Applicator Qualifications: Acceptable to manufacturer, with minimum three years documented experience applying specified systems.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unopened packages. Protect from freezing, direct sun exposure and exposure to moisture.

#### 1.6 COORDINATION

- A. Coordinate work with concrete curing specified in Section 03 30 00 "Cast-in-Place Concrete".
  1. Combination curing and sealing" products are to be used only for finished flooring applications.
  2. Do not use combination curing and sealing products for concrete curing.

### PART 2 – PRODUCTS

#### 2.1 MATERIALS

- A. Grout: Non-shrink, non-metallic grout as recommended by sealer manufacturer.
- B. Curing and Sealing Compound:
  1. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
  2. Subject to compliance with requirements, provide one of the following:
    - a. Master Builders Systems; MasterKure CC 250 SB.
    - b. Euclid Chemical Company (The), an RPM company; Super Diamond Clear.
    - c. L&M Construction Chemicals, Inc.; Lumiseal Plus.
    - d. Meadows, W. R., Inc.; CS-309-30.
- C. Cleaners: As recommended by manufacturer.

#### 2.2 SUSTAINABILITY REQUIREMENTS

- A. Product Sustainability: Comply with requirements of Section 018100.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

- C. Regional Materials: Provide materials manufactured within 100 miles (160 km) of Project for each raw material.
- D. Low Emitting Materials: Provide products complying with applicable regulations regarding toxic and hazardous materials that complies with VOC content limits and emissions and chemical component limits.
  - 1. Adhesives and Sealants: Comply with the specified content limits and emissions.
  - 2. Paint and Coatings: Comply with the specified content limits and emissions.
  - 3. Anticorrosive Paint: Comply with the specified content limits and emissions.
  - 4. Interior Adhesives, Sealants, Paints and Coatings: Comply with the testing and product requirements of the California Department of Public Health's Standard Method v1.2 for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
- E. Construction Waste Management: Comply with construction waste management plan for disposal of building materials. Maintain record and receipts indicated in management plans.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Verify concrete floors are clean and have obtained adequate strength.
- B. Verify curing compounds and their residue have been removed before applying sealing compounds, hardeners (densifiers), and other concrete finishing systems.

### 3.2 PREPARATION

- A. Remove grease, dirt, form oil, and curing compound residue.
- B. Patch holes in slabs with grout in accordance with manufacturer's instructions.
- C. Protect adjacent surfaces in accordance with manufacturer's instructions.

### 3.3 APPLICATION

- A. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - 1. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
- B. Sealing Compounds: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Repeat process 24 hours later and apply a second coat.

### 3.4 PROTECTION

- A. Protect floor surfaces from soiling and damage until sealing compound has properly dried and cured.

### 3.5 SCHEDULE

- A. Provide at exposed floor slabs in rooms where no other finished flooring products are scheduled such as storage rooms, MEP closets, etc.

END OF SECTION

## SECTION 03 54 16

### HYDRAULIC CEMENT UNDERLAYMENT

#### PART 1 - GENERAL

##### 1.1 SUMMARY

1. Section includes hydraulic-cement-based, polymer-modified, self-leveling underlayment for application below interior floor coverings.

##### 1.2 REFERENCES

###### A. ASTM International

1. ASTM C 109/C 109M: Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)
2. ASTM C 150/C 150M: Specification for Portland Cement
3. ASTM C 219: Terminology Relating to Hydraulic Cement
4. ASTM E 90: Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
5. ASTM E 119: Test Methods for Fire Tests of Building Construction and Materials
6. ASTM E 413: Classification for Rating Sound Insulation
7. ASTM E 492: Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine
8. ASTM E 989: Standard Classification for Determination of Impact Insulation Class (IIC)
9. ASTM F 1869: Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

###### B. Underwriters Laboratories Inc.

1. Fire Resistance Directory

##### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

##### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: Signed by manufacturers of underlayment and floor-covering systems certifying that products are compatible.
- C. Minutes of preinstallation conference.



## 1.5 SUSTAINABLE DESIGN SUBMITTALS

- A. Sustainable Design Submittals: Submit the following supporting documentation separately from Action Submittals. Include with the completed LEED v4 worksheet. See Section 01 33 29 "Sustainable Design Reporting" for more information.
1. Product Data, Recycled Content: For products with recycled content, indicate percentage of postconsumer and preconsumer recycled content and relative dollar value per unit of product.
    - a. Indicate percentage of postconsumer and preconsumer recycled content and relative dollar value per unit of product.
    - b. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
  2. Product Data, Regional Materials: When available, submit for materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
  3. Environmental Product Declaration: Submit EPD data for each product when available.
  4. Health Product Declaration: Submit HPD data for each product when available.
  5. Sourcing of Raw Materials: Submit corporate sustainability report for each manufacturer.
  6. Construction Waste Management: Submit tabulating and supporting for salvaged, recycled, and reused building waste materials in accordance with Section 01 74 19.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.
- B. Product Compatibility: Manufacturers of underlayment and floor-covering systems certify in writing that products are compatible.
- C. Sound Transmission Characteristics: Where indicated, provide hydraulic-cement underlayment systems identical to those of assemblies tested for STC and IIC ratings per ASTM E 90 and ASTM E 492 by a qualified testing agency.
- D. Preinstallation Conference: Conduct conference at Project site.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

## 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ventilation, ambient temperature and humidity, and other conditions affecting underlayment performance.
1. Place hydraulic-cement-based underlayments only when ambient temperature and temperature of substrates are between **50 and 80 deg F**.

## 1.9 COORDINATION

- A. Coordinate application of underlayment with requirements of floor-covering products and adhesives, to ensure compatibility of products.

## PART 2 - PRODUCTS

### 2.1 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS

- A. Underlayment: Hydraulic-cement-based, polymer-modified, self-leveling product that can be applied in minimum uniform thickness of **1/4 inch** and that can be feathered at edges to match adjacent floor elevations.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Ardex Americas; K-15 Self-Leveling Underlayment Concrete.
    - b. Master Builders Systems; Mastertop 110SL.
    - c. Dayton Superior Corporation; EconoLevel.
    - d. Euclid Chemical Company (The); Level Magic.
    - e. MAPEI Corporation; Ultraplan 1 Plus.
  2. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
  3. Compressive Strength: Not less than **4000 psi** at 28 days when tested according to ASTM C 109/C 109M.
  4. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer, formulated for use with underlayment when applied to substrate and conditions indicated.
- B. Aggregate: Well-graded, washed gravel, **1/8 to 1/4 inch**; or coarse sand as recommended by underlayment manufacturer.
1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.
- C. Water: Potable and at a temperature of not more than **70 deg F**.
- D. Reinforcement: For underlayment applied to wood substrates, provide galvanized metal lath or other corrosion-resistant reinforcement recommended in writing by underlayment manufacturer.
- E. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

1. VOC Content: Provide coating with VOC content of 100 g/L or less.

## 2.2 SUSTAINABILITY REQUIREMENTS

- A. Product Sustainability: Comply with requirements of Section 018100.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Regional Materials: Provide materials manufactured within 100 miles (160 km) of Project for each raw material.
- D. Low Emitting Materials: Provide products complying with applicable regulations regarding toxic and hazardous materials that complies with VOC content limits and emissions and chemical component limits.
  1. Adhesives and Sealants: Comply with the specified content limits and emissions.
  2. Paint and Coatings: Comply with the specified content limits and emissions.
  3. Anticorrosive Paint: Comply with the specified content limits and emissions.
  1. Interior Adhesives, Sealants, Paints and Coatings: Comply with the testing and product requirements of the California Department of Public Health's Standard Method v1.2 for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
- E. Construction Waste Management: Comply with construction waste management plan for disposal of building materials. Maintain record and receipts indicated in management plans.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for conditions affecting performance.
  1. Proceed with application only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Prepare and clean substrate according to manufacturer's written instructions.
  1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
  2. Fill substrate voids to prevent underlayment from leaking.
- B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
  1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft.** in 24 hours.

- C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

### 3.3 APPLICATION

- A. General: Mix and apply underlayment components according to manufacturer's written instructions.
  - 1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
  - 2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
  - 3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply underlayment to produce uniform, level surface.
  - 1. Apply a final layer without aggregate to product surface.
  - 2. Feather edges to match adjacent floor elevations.
- D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.
- F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

### 3.4 PROTECTION

- A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

**END OF SECTION**

**SECTION 05 40 00**  
**COLD-FORMED METAL FRAMING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Exterior non-load bearing wall framing.
2. Interior load bearing wall framing, where indicated on Drawings.

**1.2 REFERENCES**

**A. American Iron and Steel Institute**

1. AISI S100: North American Specification for the Design of Cold-Formed Steel Structural Members
2. AISI S200: North American Standard for Cold-Formed Steel Framing - General Provisions
3. AISI S210: North American Standard for Cold-Formed Steel Framing - Floor and Roof System Design
4. AISI S211: North American Standard for Cold-Formed Steel Framing - Wall Stud Design
5. AISI S212: North American Standard for Cold-Formed Steel Framing - Header Design
6. AISI S213: North American Standard for Cold-Formed Steel Framing - Lateral Design

**B. American Society for Testing and Materials:**

1. ASTM A 36/A 36M: Specification for Carbon Structural Steel
2. ASTM A 123/A123M: Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
3. ASTM A 653/A 653M: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
4. ASTM A 780: Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
5. ASTM A 1003/A 1003M: Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members
6. ASTM C 1513: Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections
7. ASTM E 488: Test Methods for Strength of Anchors in Concrete and Masonry Elements

8. ASTM E 1190: Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members

C. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.3 - Light Steel Welding Code - Sheet Steel.

D. ICC Evaluation Service, Inc.

1. ICC-ES AC70: Fasteners Power-Driven into Concrete, Steel and Masonry Elements
2. ICC-ES AC193: Mechanical Anchors in Concrete Elements

E. SSPC: The Society for Protective Coatings

1. SSPC-Paint 20: Paint Specification No. 20: Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic")

F. Structural Engineering Institute/American Society of Civil Engineers

1. SEI/ASCE 7: Minimum Design Loads for Buildings and Other Structures

### 1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Before starting cold-formed metal framing installation, conduct conference at Project site.

1. Meet with Owner, Architect, testing and inspecting agency representative, cold-formed metal framing Installer, Installer's professional engineer responsible for cold-formed metal framing design, and other installers whose work interfaces with or affects cold-formed metal framing installation. Agenda shall include at a minimum:
  - a. Review methods and procedures related to cold-formed metal framing installation, including attachment to primary structural elements.
  - b. Review accommodations for thermal movement, floor deflection under load, and other special conditions.
  - c. Review sequencing and interfacing with other related trades.
  - d. Review governing regulations and requirements.
  - e. Review inspection and testing procedures during construction and repair procedures in the event they are required.

### 1.4 ACTION SUBMITTALS

A. Product Data: Submit Technical Data to verify the section properties of studs shown on the architectural and structural drawings and instructions for securing studs to tracks and other framing connections.

B. Shop Drawings:

1. Indicate component details including size and gage designations, bracing, splices, bridging, framing openings, bearing, anchorage, loading, temporary

- bracing, welds, type and location of mechanical fasteners and accessories, or items required of other work for complete installation.
- 2. Detail stud layout.

- C. Delegated-Design Submittal: For cold-formed metal framing indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Certificates: Certify that each welder has satisfactory passed AWS qualification test for welding process involved and, if pertinent, has undergone recertification.

#### 1.6 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Professional Engineer: Licensed to practice in state where project is located and is experienced in providing engineering services of the kind indicated.
  - 2. Welders: Qualify welding processes and welding operators in accordance with AWS D1.1 and AWS D1.3.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Protect light gage steel framing members from weather exposure and damage. Deliver to project site in bundles, fully identified with name, type and grade. Store off ground in dry, ventilated space or protect with suitable, venting waterproof coverings.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design cold-formed metal framing.
- B. Design Criteria:
  - 1. Comply with AISI Specification for Design of Cold-Formed Steel Structural Members.
  - 2. Calculate structural properties of framing members in accordance with AWCI, MFMA, or AWS D1.3 requirements.
- C. Structural Loads:
  - 1. Wind Loads: Design and size components of cold-formed metal framing to withstand loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with ASCE/SEI 7 to establish wind pressure based on the criteria identified on Structural Drawings.
  - 2. Other Design Loads: As indicated on Drawings.

- D. Maximum Allowable Deflection:
  - 1. For stud behind Stone veneer:  $L/720$  for stud assembly.
  - 2. For stud behind brick/masonry veneer:  $L/600$  for stud by itself and  $L/660$  for the complete wall system.
  - 3. For stud behind metal panel and for typical conditions:  $L/240$  for stud by itself.
- E. Design system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
- F. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- G. Cold-Formed Steel Framing Design Standards:
  - 1. Floor and Roof Systems: AISI S210.
  - 2. Wall Studs: AISI S211.
  - 3. Headers: AISI S212.
  - 4. Lateral Design: AISI S213.
- H. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.
- I. Stud spacing and depth shall be as indicated on drawings.

## 2.2 MATERIALS

- A. Studs, Track, Bracing, Furring and Bridging:
  - 1. Exterior Framing: Formed galvanized sheet steel G-90 complying with ASTM A 653, Grade A, ASTM A 1003.
  - 2. Interior Framing: Formed galvanized sheet steel G-40 or equivalent complying with ASTM A 653, Grade A, ASTM A 1003.
  - 3. Studs: Studs lighter than 43 mils (nominal 18 gage) shall not be used.
    - a. For 43 mils units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi; ASTM A 1003 unless delegated design requires higher yield point steel.
    - b. For 54 mil (nominal 16 gage) and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 50,000 psi; ASTM A 1003.
  - 4. Open box shaped sections, punched web for studs and solid web for track.
  - 5. Structural properties of sections shall be computed in accordance with AISI.
- B. Angles, Plates, Gussets, Clips: Galvanized formed steel, thickness determined for conditions encountered, 20 gage minimum, manufacturer's standard shapes.
- C. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
  - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.



- D. Anchorage Devices: Power driven or powder actuated fasteners, drilled expansion bolts or screws with sleeves.
- E. Welding: In conformance with AWS D1.1 and AWS D1.3.
- F. Repair Material for Galvanized Surfaces: ASTM A780/A780M.

## 2.3 FABRICATION

- A. Galvanize, touch-up and prime metal materials used on exterior wall framing.
- B. Fabricate assemblies and framed sections of sizes and profiles required with joints fitted, secured, reinforced and braced to suit design requirements.
- C. Attach similar components by welding. Attach dissimilar components by welding, bolting or screw fasteners in accordance with manufacturer's recommendations. Do not wire tie framing components.

## PART 3 - EXECUTION

### 3.1 ERECTION

- A. Install metal framing system in accordance with manufacturer's recommendations.
- B. Joining of members shall be made with self-drilling screws or welding. Wire tying of framing members shall not be permitted.
- C. Metal framing may be attached with sheet metal screws at joints according to manufacturer's recommendations except where noted to be welded on details.
- D. Attachments made with screws shall be self-drilling screws or hardened screw-shank nails at maximum fastener spacing as specified by applicable governing codes.
- E. Connections to concrete shall be made with self-tapping screws specially designed for that purpose.
- F. Align floor and ceiling tracks, locating to wall or partition layout. Secure in place with screws or welding at maximum 24" on center. Provide fasteners at corners and ends of track.
- G. Place studs plumb at 16" on center maximum not more than 2" from abutting walls and at each side of openings. Connect studs to tracks using screws or welding in accordance with manufacturer's recommendations. Where stud system abuts column or wall, including masonry, anchor ends of stiffeners to supporting structure.

- H. Construct corners with minimum three studs. Double stud at door, windows, and sidelight jambs. Install intermediate studs above and below openings to match wall stud spacing.
- I. Provide deflection allowance of  $L/360$  below supported horizontal building framing in ceiling or head track for nonload-bearing framing
- J. Install framing between studs for attachment of electrical boxes and other mechanical and electrical items.
- K. Erect load-bearing studs one piece full length where possible. Non welded splicing and wire tying of components is not permitted. Join members forming trusses by welding.
- L. Erect load-bearing studs, brace and reinforce to develop full strength to meet design requirements.
- M. Make provision for erection stresses. Provide temporary alignment and bracing.
- N. Provide bridging at  $1/3$  points, or as recommended by manufacturer for loading conditions, whichever is more stringent.
- O. Frame both sides of expansion and control joints with separate studs. Do not bridge joint with any component of wall system, including tracks.
- P. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- Q. Ensure framing provides true and flat surfaces.

### 3.2 WELDING

- A. Where welding is required, use special low amperage welding equipment and small diameter rods to prevent blow holes in material.
- B. Welds shall be  $1/8$ " fillet continuous across contact joint.
- C. Puddle welds shall be  $3/4$ " diameter full fusion. Weld washers shall be used where welds are made to material  $3/16$ " or more in thickness.
  - 1. Use splices or butt welds at all butt joints in runner track. No splices shall be permitted in track over lintels, diaphragm sheathing, or diagonal bracing.

### 3.3 FIELD QUALITY CONTROL

- A. Testing and Inspection:

1. Engage same qualified professional engineer responsible for design of cold-formed steel framing to perform inspections of cold-formed metal framing installation during construction, at 30, 60, and 90 percent completion, for compliance with approved Shop Drawings.
  2. Owner will engage a qualified independent testing and inspecting agency to perform at least one field inspection and prepare reports.
- B. In addition to inspections for compliance with approved Shop Drawings, field and shop welds will also be subject to testing and inspection.
- C. Contractor's engineer and independent testing and inspection agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.3 ADJUSTING
- A. Touch-up field welds and scratched or damaged galvanizing.

END OF SECTION

**SECTION 05 50 00**  
**METAL FABRICATIONS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Miscellaneous steel framing and supports.
2. Steel tube reinforcement for low partitions.
3. Steel framing and supports for mechanical and electrical equipment, where loads exceed the capacity of slotted channel framing.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
5. Engineered aluminum framing and supports for countertops and vanities.
6. Steel framing and supports for countertops and vanities.
7. Lintels and shelf angles
8. Loose bearing and leveling plates for applications where they are not specified in other Sections.

**B. Products furnished, but not installed, under this Section include the following:**

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

**C. Related Requirements:**

1. Section 04 20 00 " Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
2. Section 05 12 00 "Structural Steel Framing" for steel framing, supports, elevator machine beams, hoist beams, divider beams, door frames, and other steel items attached to the structural-steel framing.
3. Section 05 43 00 "Slotted Channel Framing".

**1.2 ACTION SUBMITTALS**

**A. Product Data: For the following:**

1. Fasteners.

2. Shop primers.
  3. Shrinkage-resisting grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
1. Steel framing and supports for equipment.
  2. Steel tube reinforcement for low partitions.
  3. Steel framing and supports for mechanical and electrical equipment.
  4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
  5. Engineered aluminum framing and supports for countertops and vanities.
  6. Steel framing and supports for countertops and vanities.
7. Loose bearing and leveling plates not specified in other Sections.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Delegated-Design Submittals:
1. For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation, licensed in the state where the Project is located.
  2. For structural performance of gate frameworks, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- B. Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
- C. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.
- D. Welding certificates.
- E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- F. Research Reports: For post-installed anchors.

### 1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

## 1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," using performance requirements and design criteria indicated.
  1. Design Calculations: Submit design calculations for the following:
    - a. Partial height partitions.
- B. Support for Partial Height Partitions:
  1. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
  2. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
  3. Uniform and concentrated loads need not be assumed to act concurrently.
  4. Maximum deflection of L/240.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

### 2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

## 2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
  - 1. Provide stainless steel fasteners for fastening aluminum or stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A307, Grade A (ASTM F568M, Property Class 4.6)**; with hex nuts, **ASTM A563 (ASTM A563M)**; and, where indicated, flat washers.
- C. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, **Grade A325 (Grade A325M)**, Type 3, heavy-hex steel structural bolts; **ASTM A563, Grade DH3, (ASTM A563M, Class 10S3)** heavy-hex carbon-steel nuts; and where indicated, flat washers.
- D. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, **ASTM F593 (ASTM F738M)**; with hex nuts, **ASTM F594 (ASTM F836M)**; and, where indicated, flat washers; Alloy Group **1 (A1)**.
- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, **ASTM A563 (ASTM A563M)**; and, where indicated, flat washers.
  - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group **1 (A1)** stainless steel bolts, **ASTM F593 (ASTM F738M)**, and nuts, **ASTM F594 (ASTM F836M)**.

## 2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: As specified in Section 09 96 59 "High-Performance Coatings," compatible with finish paint systems indicated.

- B. Galvanizing Repair Paint: ASTM A780/A780M and compatible with

## 2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch (1 mm)** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, **1/8 by 1-1/2 inches (3.2 by 38 mm)**, with a minimum **6-inch (150-mm)** embedment and **2-inch (50-mm)** hook, not less than **8 inches (200 mm)** from ends and corners of units and **24 inches (600 mm)** on center unless otherwise indicated.



## 2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts for units installed after concrete is placed.
- C. Partial-Height Partition Supports: At Contractor's option provide one of the following:
  - 1. Fabricate supports for partial height partition supports from steel shapes of size required to limit the specified deflection with attached bearing plates, anchors, and braces.
  - 2. Manufactured minimum 14 gage steel tube and 3/8-inch thick steel base plate assembly, of height required to brace less than full-height, free-standing gypsum board partitions, with pre-punched holes for attachment or anchorage to concrete subfloor substrate.
    - a. Acceptable Products:
      - 1) NoFlex Corporation, Huntington Beach, CA.
      - 2) "R-15" bank rail support post as manufactured by RACO.
- D. Prime miscellaneous framing and supports with zinc-rich primer, galvanize exterior components or where indicated on Drawings.

## 2.7 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.
  - 1. Provide mitered and welded units at corners.
  - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls or where otherwise indicated.
- D. Prime shelf angles located in interior walls with zinc-rich primer. Prepare to receive high-performance coatings specified in Section 09 96 59.
- E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

## 2.8 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
  - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize and shop prime exterior miscellaneous steel trim. Prepare to receive high-performance coatings specified in Section 09 96 59.

## 2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize bearing and leveling plates.

## 2.10 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

## 2.11 ENGINEERED ALUMINUM FRAMING AND SUPPORTS FOR VANITIES AND COUNTERTOPS

- A. ADA- compliant, fully welded extruded aluminum bracket system, engineered for vanities and countertops shown.
- B. Basis of Design: Rakks ADA Compliant Vanity Support Brackets, EH-Series, by Rangine Corporation. Sizes and models to suit conditions shown.
  - 1. Load Capacity: 450 pounds per bracket. Locate end brackets within 12 inches of edge of vanities and countertops and space at not greater than 32 inches on center, centered at studs. Ensure that cold-formed metal framing specified in Section 05 40 00 supports walls to receive vanities and countertops.
  - 2. Finish: Mill finish aluminum

## 2.12 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly.

- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

## 2.13 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
  - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
  - 2. Preparation for Shop Priming Galvanized Items: Comply with Section 09 96 59.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
  - 1. Shop prime with universal shop primer unless zinc-rich primer is indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
  - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 3. Items Indicated to Receive Primers Specified in Section 09 96 59 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 4. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
  - 5. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

## PART 3 - EXECUTION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- B. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- C. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
  - 1. Cast Aluminum: Heavy coat of bituminous paint.

2. Extruded Aluminum: Two coats of clear lacquer.

### 3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions and overhead doors securely to, and rigidly brace from, building structure.
- C. Anchor shelf angles securely to existing construction with through-bolts.

### 3.3 INSTALLATION OF BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with shrinkage-resistant grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### 3.4 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that cane bolts and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

### 3.5 REPAIRS

- A. Touchup Painting:
  1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
    - a. Apply by brush or spray to provide a minimum **2.0-mil (0.05-mm)** dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

**END OF SECTION**

## SECTION 06 10 53 MISCELLANEOUS ROUGH CARPENTRY

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Light framing.
  - 2. Wood blocking.
  - 3. Rough hardware.
  - 4. Rated plywood at electrical closets.
  - 5. Fire-retardant and preservative treated wood.

#### 1.2 REFERENCES

- A. APA - Plywood Construction Guide
- B. American Society for Testing and Materials: ASTM E 84 - Surface Burning Characteristics of Building Materials.
- C. American Wood Preservers Association:
  - 1. AWPA C20 - Structural Lumber, Fire-Retardant Treatment by Pressure Processes.
  - 2. AWPA C27 - Plywood, Fire-Retardant Treatment by Pressure Processes.
  - 3. AWPA U1 - Use Category System: User Specification for Treated Wood.
- D. U.S. Product Standards:
  - 1. PS 1 - Construction and Industrial Plywood.
  - 2. PS 20 - American Softwood Lumber Standard.
- E. NFPA - National Design Specification for Stress Grade Lumber and its Fastening.

#### 1.3 SYSTEM DESCRIPTION

- A. Structural Requirements:
  - 1. Identify lumber and plywood by official grade mark.
  - 2. Preservative treated lumber and plywood shall comply with American Wood Preservers Bureau, Quality Mark.
  - 3. Comply with Underwriters Laboratories for treated lumber and plywood, and ASTM E 84, maximum flame spread of 25.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Preservative Treated Certification:
  - 1. Certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and compliance with applicable standards.
  - 2. For water-borne treated products include statement that moisture content of treated materials was reduced to 25 percent maximum prior to shipment to Project site.

- B. Fire-Retardant Treated-Certification: Certification by treating plant stating that treated materials comply with specified standard, governing ordinances and that treatment will not bleed through finish paint coats.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Immediately upon delivery to job site, place materials in area protected from weather.
- B. Do not store seasoned materials in wet or damp portions of building.
- C. Protect fire-retardant materials against high humidity and moisture during storage and erection.
- D. Stack lumber and plywood, and provide air circulation within stacks.
- E. Protect installed carpentry work from damage by work of other trades until acceptance of work.

#### 1.6 SEQUENCING

- A. Time delivery and installation of work to avoid delaying other trades whose work is dependent on or affected by work of this section, and to comply with protection and storage requirements.
- B. Correlate locations of furring, nailers, blocking and similar supports so that attached work will comply with design requirements.
- C. Coordinate location of required blocking for base and wall cabinets with approved millwork shop drawings.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Lumber:
  - 1. Grading Rules: PS 20.
  - 2. Dimensions: Lumber dimensions are nominal; actual dimensions conform to industry standards established by American Lumber Standards Committee and rules writing agencies.
  - 3. Moisture Content: 19 percent maximum moisture content at time of dressing; kiln dry to 15 percent moisture content after wood treatment except wood in contact with ground.
  - 4. Surfacing: Surface four sides (S4S).
  - 5. Species: No. 2 grade Southern Yellow Pine or equivalent West Coast Douglas Fir.
- B. Plywood: Comply with PS-1 "US Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS-1 provisions, with APA PRP-108.

1. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade designation, APA C-D Plugged, Exposure 1, in thickness indicated but not less than 15/32 inch.
- C. Fire Retardant Treatment:
1. Lumber: AWPA C20.
  2. Plywood: AWPA C27.
  3. Provide appropriate treatment for intended use that will not corrode metal fasteners or steel studs.
  4. If used in contact with roof, provide treatment that will not deteriorate when exposed to temperatures of 160 degrees or higher.
- D. Preservative Treated Wood: AWPA U1 treatment process; Use Categories (UCs) as follows.
1. Above Ground:
    - A. Interior: AWPA UC2.
    - B. Exterior: UC3b.
  2. Ground Contact: AWPA UC4a.
  3. Use treatment which is noncorrosive to metal.
    - A. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
  4. Use only stainless steel fasteners for connecting or attaching preservative treated wood.
- E. Fasteners:
1. Bolts: FS FF-B-575 or FF-B-584.
  2. Nuts: FS FF-N-836.
  3. Expansion Shields, Lag Screws and Bolts: FS FF-B-561C.
  4. Toggle Bolts: FS FF-B-588.
  5. Wood Screws: FS FF-S-111.
  6. Nails and Staples: FS FF-N-105.
  7. Metal Nailing Discs: Flat caps, minimum 1" diameter; 30 gage minimum sheet metal; formed to prevent dishing; bell or cup shapes not acceptable.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Climatize materials according to material manufacturer's recommendations.

### 3.2 INSTALLATION

- A. Discard units of material with defects which might impair quality of work and units which are too small to fabricate work with minimum joints or optimum joint arrangement.
- B. Set carpentry work accurately to required levels and lines, with members plumb and true, and accurately cut and fitted. Construct members of continuous pieces of longest possible lengths.
- C. Securely attach carpentry work to substrate by anchoring and fastening as required by recognized standards. Select fasteners of size that will not penetrate members where

opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood. Pre-drill as necessary. Comply with APA E30a requirements for plywood. Install fasteners at spacings recommended by NFPA National Design Specifications for Stress Grade Lumber and Its Fastening, for lumber and APA Form E30a.

D. Wood Grounds, Nailers, and Blocking:

1. Provide where required for screeding or attachment of other work.
2. Form to shapes cut as necessary for true line and level of work to be attached.
3. Coordinate location with other work involved.
4. Attach to substrate to support applied loading.
5. Countersink bolts and nuts flush with surfaces and built into masonry work.
6. Where possible, anchor to formwork before concrete placement.
7. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of material involved.
8. Remove temporary grounds when no longer required.

E. Apply two coats of same preservative used in original treatment to cut surfaces of treated wood.

3.3 CLEANUP

- A. Remove stain and soil that would show through finish or interfere with painting. Repair or replace work damaged after installation.

3.4 SCHEDULE

A. Wood Blocking:

1. In cavities of framed walls for support of washroom accessories, handrails, millwork, countertops, cabinets, shelves and miscellaneous wall mounted fixtures.
  - A. All upper cabinet and millwork units to receive a minimum of 2 rows of 2x6 blocking.
2. Miscellaneous blocking as indicated on Drawings.

B. Plywood: Use exterior grade plywood where edge of surface is permanently exposed to weather, in contact with roofing, and where indicated.

C. Fire-Retardant Treated Wood:

1. All interior rough carpentry items including blocking in walls, at and around door frames and jambs.

D. Preservative Treated Wood: Provide pressure-treated wood for framing, blocking, furring, or nailing strips built into or in contact with exterior masonry walls or concrete.

E. Rough Hardware: Bolts, nuts, washers, nails, screws, anchors, powder actuated anchorage devices, toggle type fasteners, and expansion anchorage devices.

END OF SECTION



**SECTION 06 20 23**  
**INTERIOR FINISH CARPENTRY**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Wood bench tops; WD-2
  - 2. Miscellaneous trim.
- B. Related Requirements:
  - 1. Section 06 10 53 "Miscellaneous Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view and for stage flooring system.
  - 2. Section 06 41 16 "Plastic-Laminate-Clad Architectural Cabinets."

**1.2 DEFINITIONS**

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
  - 1. Include data for finishing system, hanger system, and treatments.
  - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.
- B. Shop Drawings: Show panel locations, seam locations, pattern orientation, installation method, corner conditions, and installation details of panel products.
- C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.
- D. Samples for Verification:
  - 1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished; **50 sq. in.** for lumber and **8 by 10 inches** for panels.

#### 1.4 QUALITY ASSURANCE

- A. Fire performance characteristics: Provide wall panels fabricated from fire rated materials tested in accordance with ASTM-E84 for Class 1 characteristics listed below:
  - 1. Flame spread 25 or less
  - 2. Smoke developed: 150 or less
- B. Fabricator Qualifications: Shop having minimum 5 years documented experience that employs skilled workers who custom fabricate products similar to those required.
  - 1. Shop Certification: AWI Quality Certification Program accredited participant.
- C. Installer Qualifications: Fabricator of products.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
  - 1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
  - 2. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
  - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of plastic laminate faced wood paneling (decorative laminate surfacing) indicated for construction, finishes, installation, and other requirements.
  - 1. Provide inspections including installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.
  - 2. The Contract Documents contain requirements that are more stringent than the referenced woodwork quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Grade: Custom.

### 2.2 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
- B. Softwood Plywood: DOC PS 1.
- C. Hardboard: ANSI A135.4.
  - 1. Provide Class 1 Tempered Hardboard at Cafeteria stage floor, noted as MS-1 "Masonite" on Finish Schedule and Drawings.
  - 2. Field paint: Section 09 91 23 "Interior Painting".
- D. MDF: ANSI A208.2, Grade 130.
- E. Particleboard: ANSI A208.1, Grade M-2.

### 2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

- C. Paneling Adhesive: Comply with paneling manufacturer's written instructions for adhesives.
- D. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

## 2.4 FABRICATION

- A. Comply with ANSI/AWI 0620, Custom Grade.
- B. Refer to Finish Schedule on Drawings for species and finish of exposed wood millwork items.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

### 3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
  - 1. Use concealed shims where necessary for alignment.
  - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
  - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

4. Install to tolerance of **1/8 inch in 96 inches** for level and plumb. Install adjoining interior finish carpentry with **1/32-inch** maximum offset for flush installation and **1/16-inch** maximum offset for reveal installation.
5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

#### 3.4 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements.
  1. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

#### 3.5 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.
- B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

#### 3.6 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
  1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION**

## SECTION 06 41 16

### PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

#### PART 1 GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Shop or mill fabricated plastic laminate faced wood cabinets, countertops and niches.
2. Hardware and attachment accessories.

##### 1.2 REFERENCES

###### A. American National Standards Institute

1. ANSI A208.1: Particleboard
2. ANSI A208.2: Medium Density Fiberboard (MDF) for Interior Applications

###### B. Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada/Woodwork Institute

1. Architectural Woodwork Standards (AWS).

###### C. Builders Hardware Manufacturers Association

1. BHMA A156.9: Cabinet Hardware
2. BHMA A156.11: Cabinet Locks
3. BHMA A156.16: Auxiliary Hardware
4. BHMA A156.18: Materials and Finishes

###### D. California Department of Health Services

1. Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.

###### E. Code of Federal Regulations

1. 40 CFR 59, Subpart D-2005: National Volatile Organic Compound Emission Standards for Architectural Coatings

###### F. Hardwood Plywood & Veneer Association

1. HPVA HP-1: American National Standard for Hardwood and Decorative Plywood

###### G. National Electrical Manufacturers Association

2. NEMA LD 3: High Pressure Decorative Laminates

###### H. U.S. Department of Commerce, National Institute of Standards and Technology

1. DOC PS 1: U.S. Product Standard for Structural Plywood

##### 1.3 DEFINITIONS

###### A. Exposed Surfaces:

1. Surfaces visible when doors and drawers are closed.

2. Bottoms of cases more than 4'-0" above finish floor.
3. Back and edges of hinged doors exposed when opened.

B. Semi-Exposed Surfaces:

1. Surfaces that becomes visible when drawers and doors are open.
2. Tops of cases 6'-0" or more above finish floor.

C. Concealed Surfaces: Surfaces not visible after installation.

#### 1.4 SYSTEM DESCRIPTION

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" (AWS) for grades of architectural wood cabinets indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents may contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

B. Design Requirements:

1. Design requirements shown by the drawings are intended to show design intent, establish basic dimensions of units, profiles, and sight lines of members.
2. Within these limitations this Contractor is responsible for the design of the entire cabinet system, including its attachment to the structure and shall make whatever modifications and additions to the details as may be required to fulfill the performance requirements.

C. Performance Requirements: Provide millwork in accordance with Architectural Woodwork Standards (AWS), Custom Grade.

1. Casework: AWS Section 10.
2. Countertops: AWS Section 11.
3. Miscellaneous Work: AWS Section 6.

#### 1.5 ACTION SUBMITTALS

B. Shop Drawings:

1. Draw profiles, sections, and views of items specifically manufactured for this work, at scale large enough to permit checking for design conformity.
2. Show sizes, quantities, markings, materials, wood species, finishes and accessories.
3. Include assembly and installation drawings to show methods of fastening, bracing, jointing and connecting to work of other trades.
4. Include size and location of all wood blocking required for anchoring base and wall cabinets.

C. Samples:

1. Shop prepare one typical cabinet front required for job, complete with hardware and applied finishes.
2. Sample units will be examined to ascertain degree of quality and conformity to AWS standards specified in this Section.
3. Samples may be used as part of work when conforming to requirements indicated and with permission of Architect.

4. Solid sample finished on one side and one edge.
5. 12" x 12" plastic laminate of each type specified.

#### 1.6 QUALITY ASSURANCE

- A. AWS Catalog: Catalog numbers indicated on the drawings and in the specifications are for the convenience of identifying specific cabinet types. Unless modified by notation on the drawings or otherwise specified, current description for indicated number, together with indicated or specified options or accessories, constitutes requirements for each cabinet.
  1. Catalog numbers and specific requirements indicated on the drawings and in the specification are given for the purpose of establishing standard design and quality of materials, construction, and workmanship.
  2. Catalog numbers noted on the drawings are based upon AWS, Appendix A.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver millwork items until wet trades, including concrete plaster, tile and painting are completed in same area.
- B. If cabinets must be stored in other than installation areas, store only in areas which meet the specified environmental conditions.
- C. Protect cabinets during delivery, storage and handling to prevent damage, soilage, and deterioration.

#### 1.8 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install cabinets until HVAC system has been balanced to anticipated temperature and humidity expected in the finished areas where these materials will be finally located. HVAC system shall remain in continuous operation until final acceptance by Owner.
- B. Field Measurements:
  1. Verify dimensions with accurate field measurement before fabrications wherever work adjoins other work that precede it in construction.
  2. Allow for trimming and fitting of cabinet work and trim as may be required.
  3. Do not erect or install cabinet work in areas which still require work by other trades which might cause damage or disfigure work.

#### 1.9 COORDINATION

- A. Coordinate work with other trades affected by installation.

#### 1.10 WARRANTY

- A. Furnish warranty with provisions for making good or replacing, at no cost to Owner, cabinetwork and other millwork items which exhibit defects in material and workmanship within a period of two years.



## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Plastic Laminate Manufacturers:
  - 1. Abet Laminati, Inc.
  - 2. ArpaUSA
  - 3. Formica Corporation.
  - 4. Lamin-Art, Inc.
  - 5. Panolam Industries International, Inc.
  - 6. Wilsonart International; Div. of Premark International, Inc.
  
- B. Substitutions: Comply with Section 01 25 00.

### 2.2 MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
  - 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches (75 mm) wide.
  - 2. Wood Moisture Content: 5 to 10 percent.
  
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
  - 1. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
  - 2. Particleboard: ANSI A208.1, Grade M-2.
  - 3. Softwood Plywood: DOC PS 1.
  - 4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
  - 5. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
  
- C. Softwood Lumber: PS 20 of any sound species.
  
- D. High Pressure Decorative Laminate – PL- - PL-6:
  - 1. NEMA LD 3, HPDL; Grades as Scheduled at the end of this Section.
  - 2. Color and Patterns: Refer to Finish Schedule.
  - 3. Acceptable Products: Refer to Finish Schedule.
  
- F. Plastic Laminate Backing: High pressure paper base laminate without decorative finish, minimum 0.028" thick.
  
- G. Upholstery – F-1 – F-5:
  - 1. Type: Vinyl/Faux Leather
  - 2. Finish: Antimicrobial, Knit Backed

3. Abrasion Test 1: Wyzenbeek Wire Mesh – 200,000 Double Rubs
4. Pattern: Solid, Texture.
5. Composition: Silicone – 100%
6. Colors: Refer to Finish Schedule.
7. Acceptable Manufacturer: Refer to Finish Schedule.

## 2.3 HARDWARE

A. General: BHMA A156.9 and as follows.

B. Standards and Brackets:

1. Cabinet – Mortise-Mount.
  - a. Pilaster Standards: #255.
  - b. Shelf Supports: #256.
  - c. Finish: White.
  - d. Capacity: 500 lbs. per shelf.
  - e. Manufacturer: Knape & Vogt.
2. Wall – Regular Duty:
  - a. Standards: #80.
  - b. Brackets: #180-12.
  - c. Finish: Satin Chrome.
  - d. Capacity: 320 lbs. per pair.
  - e. Manufacturer: Knape & Vogt.

C. Work Surface Support Bracket:

1. Stamped metal.
2. 24-1/4" x 18-1/4"; 400 lb. capacity per pair; maximum depth 26"
3. Finish: Crinkle Powder Coat; color as selected by Architect.
4. Acceptable Product: SWS4 by Mockett.com

D. Cabinet Hinges:

1. Fully concealed adjustable overlay cabinet hinges; self-latching, 120 degree opening, with mounting plates and accessories as required.
2. Acceptable Products:
  - a. Wide Angle – Salice by Hafele.
  - b. 71T5580 Blum

F. Cabinet Hinges:

1. Fully concealed adjustable overlay cabinet hinges; self-latching, 90 degree opening for cabinet door adjacent to walls or limited 90 degree opening space.
2. Acceptable Products:
  - a. 200 Series – Salice by Hafele.
  - b. No. 3606 by Grass America Inc.

H. Drawer and Cabinet Pulls:

1. 3-1/2" aluminum pull.
2. Acceptable Product: No. 4483-1/2 by Stanley Security Solutions, Inc.

I. Drawer Slide:

1. Full extension slides, 75 lb. capacity.
2. Acceptable Product: KV8400 by Knape & Vogt.

- J. Drawer Slide:
  - 1. Full extension slides for box, card file and utility drawers.
  - 2. Acceptable Product: No. 7434 by Accuride.
- K. Drawer Slide:
  - 1. Full extension slides for file drawers.
  - 2. Acceptable Product: No. C4034 by Accuride.
- L. Door Catch: MSUPEC12 Duo/Magna Latch by Selby.
- M. Touch Latch:
  - 1. Magnetic pressure catch.
  - 2. Acceptable Product: No. 245.61.322 by Hafele.
- Q. Drawer and Door Lock: No. 986 by Knape and Vogt.
  - 1. Provide locks at every drawer and cabinet in clinic, at teachers' wardrobes, and at locations shown on Drawings.
- R. Bar Grille:
  - 1. 8" wide by 3'- 10" long extruded solid bronze bar grille.
  - 2. Acceptable Product: EP111-3/4 SE10 Flange by Register & Grille Manufacturing Company, Inc.
- S. Hanging Rods:
  - 1. Closet Shelf and Rod Supports:
    - a. Aluminum; painted white
    - b. 11"L x 10" H;
    - c. 1195 by Knape & Vogt
  - 2. Center Support:
    - a. 24" Length; 1-1/16" od tubing; anochrome finish
    - b. 760 by Knape and Vogt
  - 3. Tubing: Stainless Steel; 1-1/16" diameter; 660 by Knape & Vogt
  - 4. Tubing Flange: 1/16" o.d. mounted with two 5mm pins.
  - 5. End Cap: 730 by Knape and Vogt.
- T. Coat Hooks:
  - 1. Finish: Burnish cast aluminum double hook.
  - 2. Acceptable Product: No. 580 by Ives (if double hook).

## 2.4 FABRICATION

- A. Fabricate cabinetwork to comply with AWS Custom Grade standards.
- B. Moisture Content: Kiln-dry interior millwork to average not more than 7 to 10 percent.
- C. Before proceeding with millwork required to be fitted to other construction, obtain measurements and verify dimensions of shop drawing details for accurate fit.
- D. Machine and sand millwork to comply with requirements of AWS for specified grade.

- E. Assemble in mill in as large units as practicable to minimize field cutting and fitting.
- F. Shop assemble cabinetwork items for delivery to site in sizes easily handled to ensure passage through building opening.
- G. Mill apply face edge and backing laminates with heat activated using presses. Contact adhesive shall not be permitted.
- H. When necessary to cut and fit on site, make material with ample allowance for cutting. Provide trim for scribing and site cutting.
- I. Apply plastic laminate in full uninterrupted sheets consistent with manufactured sizes. Face laminates to overlap edge laminates, edge laminates to overlap backing sheets.
- J. Form corners and joints hairline tight. Slightly bevel arises. Cap exposed edges with plastic laminate.
- K. Use exposed fastening devices or nails only when unavoidable; arrange neatly.
- L. Mechanically fasten splash backs and aprons to counter tops with concealed steel brackets at 16" on center maximum.
- M. Provide cutouts for inserts, appliances, outlet boxes and other fixtures and fittings. Verify locations of cutouts from on-site dimensions.
- N. Provide 1/2" minimum thick drawer bottom sheet for drawers.
- O. Apply upholstery per detail on construction drawings. Use upholster in roll in pattern sequence.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Installer: Verify and approve size and location of required wood blocking prior to finished wall surface being installed.

### 3.2 INSTALLATION

- A. Install work in accordance with AWS Custom Grade standards.
- B. Set and secure cabinetwork items in place rigid, plumb and square. Shim as required with concealed shims.
- C. Use fixture attachments designed for wall mounted components.
- D. Anchor cabinet and counter bases to floor using angles and anchorages.
- E. Counter-sink semi-concealed anchorage devices used to wall mount components and conceal with solid plugs of species to match surrounding finish.

- F. Place flush with surrounding surfaces.
- G. Carefully scribe cabinetwork which is against other building materials leaving gaps of 1/32" maximum. Do not use additional overlay trim for this purpose.
- H. Install cabinet hardware.

### 3.3 ADJUSTING

- A. Adjust moving and operating parts to function smoothly and correctly.

### 3.4 SCHEDULE

- A. Exposed Surfaces:
  - 1. Edge-banding: Grade HGS.
  - 2. Horizontal Surfaces: Grade HGS.
  - 3. Vertical Surfaces: Grade VGS.
- B. Semi-Exposed Surfaces:
  - 1. Edge-banding: Grade VGS.
  - 2. Horizontal Surfaces: Grade HGS.
  - 3. Vertical Surface: Thermoset Decorative Panels.
- C. Concealed Surfaces: Grade BKL.

### 3.5 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

**SECTION 06 64 00**  
**PLASTIC PANELING (“FRP”)**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes plastic sheet paneling (“FRP”).

**1.2 REFERENCES**

- A. ASTM International
  1. ASTM D 5319: Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels
  2. ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling and trim accessories.

**1.4 QUALITY ASSURANCE**

- A. Testing Agency: Acceptable to authorities having jurisdiction.

**PART 2 - PRODUCTS**

**2.1 PLASTIC SHEET PANELING**

- A. Glass-Fiber-Reinforced Plastic Paneling – FRP- & FRP-2:
  1. Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319 and USDA requirements.
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Composites, Inc.
    - b. Glasteel.
    - c. Marlite.
    - d. Nudo Products, Inc.
  3. Acceptable Products:

- a. Fire-X Glasbord Plus by Crane Composites.
  - b. Standard FRP by Marlite.
  - c. Fiber-Lite by Nudo.
  - d. Glasliner by Graham/Stabilit/Glasteel
4. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.
    - a. Flame-Spread Index: 25 or less.
    - b. Smoke-Developed Index: 450 or less.
  5. Nominal Thickness: Not less than 0.09 inch.
  6. Surface Finish and Color: As indicated on Finish Schedule.

## 2.2 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
  1. Color: Match panels.
- B. Adhesive: As recommended by plastic paneling manufacturer and with a VOC content of 50 g/L or less.
- C. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 92 00 "Joint Sealants."

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

### 3.2 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.

- C. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

**END OF SECTION**



**SECTION 07 21 00**  
**THERMAL INSULATION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Glass-fiber blanket insulation.
2. Glass-fiber board insulation.
3. Low-rise detailing foam insulation.

**B. Related Requirements:**

1. Section 04 20 00 "Unit Masonry" for masonry.
2. Section 09 21 16 "Gypsum Board Assemblies" for sound attenuation blanket insulation.

**1.2 ACTION SUBMITTALS**

**A. Product Data:** For the following:

1. Glass-fiber blanket insulation.
2. Glass-fiber board insulation.
3. Low-rise detailing foam insulation.

**1.3 INFORMATIONAL SUBMITTALS**

**A. Installer's Certification:** Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

1. For blown-in loose-fill insulation, indicate initial installed thickness, settled thickness, settled R-value, installed density, coverage area, and number of bags installed.
2. Sign, date, and post the certification in a conspicuous location on Project site.

**B. Product Test Reports:** For each product, for tests performed by a qualified testing agency.

**C. Research Reports:** For foam-plastic insulation, from ICC-ES.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam plastic board insulation:
  - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver foam plastic board materials to Project site until just before installation time.
  - 3. Quickly complete installation and concealment of foam plastic board insulation in each area of construction.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of building insulation from single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of Work.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire Performance Characteristics: Identify products with appropriate markings of applicable testing and inspecting organization.
  - 1. Surface Burning Characteristic: ASTM E 84.
    - a. Flame Spread Index: Maximum 25.
    - b. Smoke Developed Index: Maximum 450.
  - 2. Fire Resistance Ratings: ASTM E 119.
  - 3. Combustion Characteristics: ASTM E 136.
- B. National Fire Prevention Association (NFPA) 255 Test of Surface Burning Characteristics of Building Materials.
- C. Underwriter's Laboratories (UL) 723 Tests for Surface Burning Characteristics of Building Materials.

#### 2.3 GLASS FIBER BLANKET

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CertainTeed Corporation.
  - 2. Johns Manville.

3. Owens Corning.
- B. Glass Fiber Blanket, Unfaced: ASTM C 665, Type I; passing ASTM E 136 for combustion characteristics.
1. General Applications: Batt insulation in stud cavities between metal-studs in framed backup exterior walls, and elsewhere as indicated on Drawings.
  2. Acceptable Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corporation; CertaPro CB 150.
    - b. Johns Manville; a Berkshire Hathaway Company; Insul-Shield 100 or 150.
    - c. Owens Corning; 701 or 711.
  3. Flame Spread Index: Not more than 25 when tested in accordance with ASTM E84.
  4. Smoke Developed Index: Not more than 50 when tested in accordance with ASTM E84.
  5. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches (305 mm) and wider in width.

## 2.4 INSULATION FASTENERS

- A. Adhesively Attached, Spindle Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
1. Plate: Perforated, galvanized carbon steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
  2. Spindle: Copper coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
1. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
  2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation.
- C. Insulation Retaining Washers: Self-locking washers formed from 0.016 inch (0.41 mm) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
    - a. Crawl spaces.
    - b. Ceiling plenums.
    - c. Attic spaces.

- D. Insulation Standoff: Spacer fabricated from galvanized mild steel sheet for fitting over spindle of insulation anchor to maintain air space of 2 inches (50 mm) between face of insulation and substrate to which anchor is attached.
- E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

## 2.5 ACCESSORIES

- A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
- B. Low-Expansion Detailing Foam Insulation: Two-component urethane foam with low-expansion pressure, 10 percent flexibility, and 1.75 to 2.0 lb/cu. ft. density, suitable for filling enclosed structural members where indicated, and gaps and voids adjacent to doors, fenestration, and louvers. Provide product complying with the following:
  - 1. ASTM C 1029, Type II, closed cell.
  - 2. ASTM E 84: Maximum flame spread and smoke developed indexes of 75 and 450, respectively.
  - 3. AAMA 812.
  - 4. Basis of Design Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Chemical; Froth Pak.
    - b. Zerodraft Products, Inc.; Zero Draft Foam Sealant.
- C. Insulation for Filling Miscellaneous Voids:
  - 1. Glass Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame spread and smoke developed indexes of 5, per ASTM E 84.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

### 3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

### 3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch (76 mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. For metal framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- B. Low-Expansion Detailing Foam Insulation: Fill gaps and voids between heads, jambs, and sills and their rough openings, at the following openings in exterior walls:
  - 1. Doors.
  - 2. Windows.
  - 3. Entrances and storefront.
  - 4. Louvers.
  - 5. Through-wall penetrations.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Glass Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

### 3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION**

## SECTION 07 84 13

### PENETRATION FIRESTOPPING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

###### B. Related Requirements:

1. Section 07 84 13 "Penetration Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.

##### 1.2 ALLOWANCES

- ###### A. Penetration firestopping Work is part of an allowance.

##### 1.3 UNIT PRICES

- ###### A. Work of this Section is affected by unit prices.

##### 1.4 PREINSTALLATION MEETINGS

- ###### A. Preinstallation Conference: Conduct conference at Project Site.

##### 1.5 ACTION SUBMITTALS

- ###### A. Product Data: For each type of product.

- ###### B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.

1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly developed in

accordance with current International Firestop Council (IFC) guidelines. Obtain approval of authorities having jurisdiction prior to submittal.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Listed System Designs: For each penetration firestopping system, for tests performed by a qualified testing agency.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

#### 1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

#### 1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

#### 1.10 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.



## PART 2 - PRODUCTS

### 2.1 SOURCE LIMITATIONS

- A. Obtain joint firestop systems for each type of joint opening indicated from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:

1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
  - a. Penetration firestop systems installed with products bearing the classification marking of a qualified product certification agency in accordance with listed system designs published by a qualified testing agency.
    - 1) UL in its online directory "Product iQ."
    - 2) Intertek Group in its "Directory of Building Products."
    - 3) FM Approvals in its "Approval Guide."

### 2.3 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems are to be compatible with one another, with the substrates forming openings, and with penetrating items if any.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479.
  1. F-Rating: Not less than the fire-resistance rating of the wall penetrated.
  2. Membrane Penetrations: Install recessed fixtures such that the required fire resistance will not be reduced.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479.
  1. F-Rating: At least one hour, but not less than the fire-resistance rating of the floor penetrated.
  2. T-Rating: At least one hour, but not less than the fire-resistance rating of the floor. The following floor penetrations do not require a T-rating:
    - a. Those within the cavity of a wall.

- b. Floor, tub, or shower drains within a concealed space.
  - c. 4-inch (200-mm) or smaller metal conduit penetrating directly into metal-enclosed electrical switchgear.
3. W-Rating: Provide penetration firestopping systems with a Class 1 W-rating in accordance with UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479.
1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
1. Permanent forming/damming/backing materials.
  2. Substrate primers.
  3. Collars.
  4. Steel sleeves.

## 2.4 FILL MATERIALS

- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric strips for use around combustible penetrants.

- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Compressible, removable, and reusable intumescent pillows encased in fire-retardant polyester or glass-fiber cloth. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.
- K. Fire-Rated Cable Sleeve Kits: Complete kits designed for new or existing cable penetrations through walls to accept standard accessories.
- L. Thermal Wrap: Flexible protective wrap tested and listed for up to 2-hour fire ratings in accordance with ASTM E814/UL 1479 for membrane penetrations or ASTM E1725/UL 1724 for thermal barrier and circuit integrity protection.
- M. Fire-Rated Cable Pathways: Single or gangable device modules composed of a steel raceway with integral intumescent material and requiring no additional action in the form of plugs, twisting closure, putty, pillows, sealant, or otherwise to achieve fire and air-leakage ratings.
- N. Retrofit Device for Cable Bundles: Factory-made, intumescent, collar-like device for firestopping existing over-filled cable sleeves and capable of being installed around projecting sleeves and cable bundles.
- O. Wall-Opening Protective Materials: Intumescent, non-curing putty pads or self-adhesive inserts for protection of electrical switch and receptacle boxes.
- P. Fire-Rated HVAC Retaining Angles: Steel angle system with integral intumescent firestop gasket for use around rectangular steel HVAC ducts without fire dampers.
- Q. Firestop Plugs: Flexible, re-enterable, intumescent, foam-rubber plug for use in blank round openings and cable sleeves.
- R. Fire-Rated Cable Grommet: Molded two-piece grommet made of plenum-grade polymer and foam inner core for sealing small cable penetrations in gypsum walls up to **1/2 inch (13 mm)** diameter.
- S. Closet Flange Gasket: Molded, single-component, flexible, intumescent gasket for use beneath a water closet (toilet) flange in floor applications.
- T. Endothermic Wrap: Flexible, insulating, fire-resistant, endothermic wrap for protecting membrane penetrations of utility boxes, critical electrical circuits, communications lines, and fuel lines.

## 2.5 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION OF PENETRATION FIRESTOPPING SYSTEMS

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
  2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than **3 inches (76 mm)** high and with minimum **0.375-inch (9.5-mm)** strokes.
1. Locate in accessible concealed floor, floor-ceiling, or attic space at **15 feet (4.57 m)** from end of wall and at intervals not exceeding **30 feet (9.14 m)**.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within **6 inches (150 mm)** of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  2. Contractor's name, address, and phone number.
  3. Designation of applicable testing and inspecting agency.
  4. Date of installation.
  5. Manufacturer's name.
  6. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.

- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

**END OF SECTION**

**SECTION 07 84 43**  
**JOINT FIRESTOPPING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Joints in or between fire resistance rated constructions.

**1.2 ACTION SUBMITTALS**

- A. Product Data: Technical data for each joint firestopping system including illustration of firestopping system and design designation.
- B. Product Schedule: Submit schedule for each joint firestopping system including location, illustration of firestopping system, and design designation of qualified testing agency.
  - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire protection engineer as an engineering judgment or equivalent fire resistance rated assembly.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: Submit data for Installer.
- B. Product Test Reports: Submit reports for each joint firestopping system, for tests performed by a qualified testing agency.

**1.4 CLOSEOUT SUBMITTALS**

- A. Installer Certificates: Submit certificates from Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Entity having minimum 5 years documented experience that has been approved by FM Global according to FM Global 4991 Approval of Firestop Contractors or evaluated by UL and found to comply with its Qualified Firestop Contractor Program Requirements and employs applicators with the required experience and training to perform the work.
  - 1. Manufacturer's willingness to sell its fire resistive joint system products to Contractor or to Installer does not confer qualification on buyer.
- B. Preinstallation Conference: Conduct conference at site.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced air circulation.

## 1.7 COORDINATION

- A. Do not cover up joint firestopping system installations that become concealed behind construction until each installation has been examined by Owner's inspecting agency and building inspector when required by authorities having jurisdiction.
  - 1. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.
- B. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- C. Coordinate sizing of joints to accommodate joint firestopping systems.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Test Response Characteristics:
  - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.



2. Test in accordance with testing in referenced standards. Provide rated systems complying with requirements:
  - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
    - 1) UL Fire Resistance Directory.
    - 2) Intertek Group Directory of Listed Building Products.

## 2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire Resistance Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. 3M Fire Protection Products.
    - b. A/D Fire Protection Systems Inc.
    - c. Blazeframe Industries.
    - d. CEMCO.
    - e. Grabber Construction Products.
    - f. Hilti, Inc.
    - g. Nelson Firestop; a brand of Emerson Industrial Automation.
    - h. NUCO Inc.
    - i. Passive Fire Protection Partners.
    - j. RectorSeal.
    - k. ROXUL.
    - l. Specified Technologies, Inc.
    - m. Thermafiber, Inc.; an Owens Corning company.
  2. Fire Resistance Rating: Equal to or exceeding the fire resistance rating of the wall, floor, or roof in or between which it is installed.
  3. Location: Joints include those installed in or between fire resistance rated walls, floor or floor/ceiling assemblies, and roofs or roof/ceiling assemblies.
- C. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.
- D. Accessories: Provide components of fire resistive joint systems, including primers and forming materials, necessary to install elastomeric fill materials and to maintain ratings required. Use components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the work.
- B. Proceed with installation after correcting unsatisfactory conditions.

### 3.2 PREPARATION

- A. Surface Cleaning: Before installing fire resistive joint systems, clean joints immediately to comply with fire resistive joint system manufacturer's written instructions and the following requirements:
  - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire resistive rating.
  - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION

- A. Install fire resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during application and in position needed to produce cross sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire resistive joint system.
- C. Install elastomeric fill materials for fire resistive joint systems by proven techniques to produce the following results:
  - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire resistance ratings indicated.
  - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
  - 3. For elastomeric fill materials that will remain exposed after completing the work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches (76 mm) high and with minimum 0.375 inch (9.5 mm) strokes.
  - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57 m) from end of wall and at intervals not exceeding 30 feet (9.14 m).
  
- B. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
  - 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Designation of applicable testing agency.
  - 4. Date of installation.
  - 5. Manufacturer's name.
  - 6. Manufacturer's product and UL assembly number.
  - 7. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
  
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
  
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
  
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire resistive joint systems immediately and install new materials to produce fire resistive joint systems complying with specified requirements.

### 3.7 FIRE RESISTIVE JOINT SYSTEM SCHEDULE

- A. Where UL classified systems are indicated, they refer to system numbers in UL Fire Resistance Directory under product Category XHBN or Category XHDG.
- B. Floor to Floor, Fire Resistive Joint Systems:
  - 1. UL Classified Systems: FF-S-0000-0999.
- C. Wall to Wall, Fire Resistive Joint Systems:
  - 1. UL Classified Systems: WW-S-0000-0999.
- D. Floor to Wall, Fire Resistive Joint Systems:
  - 1. UL-Classified Systems: FW-S-0000-0999.
- E. Head of Wall, Fire Resistive Joint Systems:
  - 1. UL Classified Systems: HW-S-0000-0999.
- F. Bottom of Wall, Fire Resistive Joint Systems:
  - 1. UL Classified Systems: BW-S-0000-0999.
- G. Perimeter Fire Resistive Joint Systems:
  - 1. UL Classified Perimeter Fire-Containment Systems: CW-S-0000-0999.

**END OF SECTION**

## SECTION 07 92 00

### JOINT SEALANTS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Silyl-terminated polymer joint sealants at joints in sheathing, air barriers, masonry, cladding panels, openings, and at dynamic conditions.
  - 2. Silicone joint sealants at joints in sheathing, air barriers, masonry, cladding panels, openings, and at dynamic conditions.
  - 3. Latex joint sealants at static joints in gypsum board substrates.

##### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

##### 1.3 ACTION SUBMITTALS

- A. Product data.
- B. Samples: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-sealant schedule.

##### 1.4 INFORMATIONAL SUBMITTALS

- A. Preconstruction Laboratory Test Reports: Submit test reports from sealant manufacturer, indicating the following:
  - 1. Materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants.
  - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- B. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- C. Field Quality-Control Submittals:
  - 1. Field-Adhesion-Test Reports: For each sealant application tested.
- D. Sample warranties.

## 1.5 QUALITY ASSURANCE

### A. Qualifications:

1. Installers: Authorized representative who is trained and approved by manufacturer.
2. Testing Agency: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

## 1.6 PRECONSTRUCTION TESTING

### A. Preconstruction Laboratory Testing: Submit to joint sealant manufacturer for testing indicated, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with stone substrates.
4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the work.
6. For materials failing tests, obtain joint sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

### B. Preconstruction Field Adhesion Testing: Before installing sealants, field test adhesion to joint substrates:

1. Locate test joints where indicated or as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
  - a. Test Method: Test joint sealants according to Method A, Field Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
    - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

## 1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 degrees F (5 degrees C).
  2. When joint substrates are wet.
  3. Where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
  4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## 1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified within specified warranty period.
  1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  1. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

## 2.2 POLYMER JOINT SEALANTS

- A. Silyl-terminated Polymer (STPE or STPU), M or S, NS, 50, NT: Single or Multi-component, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use joint sealant; ASTM C920, Type M or S, Grade NS, Class 50, Use NT.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
    - a. Sika; SikaHyflex-150LM
    - b. Tremco; Vulkem 45SSL
    - c. Pecora Corporation; Dynatrol I-XL Hybrid.
  2. Application: Typical exterior and interior non-traffic horizontal and vertical joints not in contact with silicone-based air barriers or sealants.
- B. Self-leveling Sealant: One or two part polyurethane sealant, ASTM C920 Type M or S, Grade P, Class 25, Use T.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
    - a. Sika; Sikaflex-1C SL
    - b. Tremco; Dymonic-FC
    - c. Pecora Corporation; Dynatrol II-SG.
  2. Application: Exterior and interior horizontal, traffic-bearing joints.
- C. Silicone: Single component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic use, neutral curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT; Uses M, G, A, O.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Dow Corning Corporation; 791.
    - b. GE Construction Sealants; SCS 2000 SilPruf.
    - c. Pecora Corporation. PCS.
    - d. Sika Corporation; Sikasil WS 295 and WS 295 FPS.
    - e. Comparable product by Tremco.
  2. Application: For use with silicone-based air barrier system at exterior and interior non-traffic horizontal and vertical joints. Not for contact with STPE-based air barriers or sealants.

## 2.3 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
    - a. Pecora Corporation; AC-20.
    - b. Sherwin-Williams Company (The); 850A Siliconized Acrylic Latex Caulk.
    - c. Tremco Incorporated; Tremflex 834.



## 2.4 MILDEW RESISTANT JOINT SEALANTS

- A. Mildew Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone: Mildew resistant, fungicidal, single component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic use, acid curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT; Use A, G, and O.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Dow Corning Corporation; 786-M White.
    - b. GE Construction Sealants; Sanitary SCS1700.
    - c. May National Associates, Inc.; a subsidiary of Sika Corporation; Bondaflex Sil 100 WF.
    - d. 898 by Pecora.
    - e. Sikasil GP by Sika.
  - 2. Application: Mildew resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
    - a. Joint Locations:
      - 1) Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Hard tile joints, wet locations:
      - 1) Control and expansion joints.
      - 2) At changes in substrates.
      - 3) At inside corners (wall-to-wall and wall-to-floor).
    - c. Other joints as indicated on Drawings.

## 2.5 BUTYL JOINT SEALANTS

- A. Butyl Rubber Based Joint Sealants: ASTM C 1311.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bostik, Inc.; Chem-Calk 300.
    - b. Pecora Corporation; BC-158.
  - 2. Joint Locations:
    - a. Aluminum thresholds.
    - b. Sill plates.
    - c. Other joints as indicated on Drawings.

## 2.6 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
  - a. Construction Foam Products; a division of Nomaco, Inc.
  - b. Master Builders Solutions; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) or Type B (bicellular material with a surface skin) as approved in writing by joint-sealant manufacturer for joint application indicated, and for size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
- D. Sealant Tape: Compressible adhesive cohesive tape of crosslinked butyl polyisobutylene rubber that accommodates variations and movement, sized as necessary to allow for joint movement of plus/minus 25 percent.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. 440 by Tremco.
    - b. Extru-Seal by Pecora.
    - c. PTI-606 by Protective Treatments, Inc., Division of Prosoco.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings

tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
    - d. Exterior insulation and finish systems.
  3. Remove laitance and form-release agents from concrete.
  4. Etch concrete, masonry and plaster joint surfaces to remove excess alkalinity. Etch with 5 percent solution of muriatic acid. Neutralize with dilute ammonia solution. Rinse thoroughly with water and allow to dry.
  5. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Porcelain enamel.
    - d. Glazed surfaces of ceramic tile.
  6. Steel Surfaces: Scrape and wire brush to remove loose mill scale. Remove dirt, oil or grease by solvent cleaning. Wipe surfaces with lintless paper towels.
  7. Aluminum Surfaces: Remove temporary protective coatings.
    - a. When masking tape is used for a protective cover, remove tape prior to applying sealant.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents approved by sealant manufacturer that do not discolor sealants or adjacent surfaces and provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

### 3.3 FIELD QUALITY CONTROL

- A. Field Adhesion Testing: Field test joint sealant adhesion to joint substrates:
  - 1. Extent of Testing: Test completed and cured sealant joints:
    - a. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
    - b. Perform one test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.
  - 2. Test Method: Test joint sealants according to Method A, Field Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
    - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  - 3. Inspect tested joints and report on the following:
    - a. Whether sealants filled joint cavities and are free of voids.
    - b. Whether sealant dimensions and configurations comply with specified requirements.

- c. Whether sealants in joints connected to pulled out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field adhesion hand-pull test criteria.
    4. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
    5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
  - B. Evaluation of Field Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory.
  - C. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.
- 3.4 CLEANING
- A. Clean off excess sealant or sealant smears adjacent to joints as the work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.5 PROTECTION
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

**END OF SECTION**

## INTERIOR EXPANSION JOINT COVER ASSEMBLIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes interior expansion joint cover assemblies.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each expansion joint cover assembly include plans, elevations, sections, details, splices, block-out requirement, attachments to other work, and line diagrams.
- C. Samples: For each expansion joint cover assembly and for each color and texture specified.

### PART 2 - PRODUCTS

#### 2.1 ASSEMBLY DESCRIPTION

- A. Typical Expansion Joint Covers, Wall and Ceiling: Surface mounted aluminum covers including wall-to-wall, ceiling-to-ceiling, and wall-to-ceiling conditions.
- B. Typical Expansion Joint Covers, Floors: Recessed aluminum covers, including at floor-to-floor and floor-to-wall transitions.
- C. Furnish units in longest practicable lengths to minimize field splicing.
- D. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion joint cover assemblies.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Expansion joint cover assemblies to withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Fire-Resistance Ratings: Provide expansion joint cover assemblies with fire barriers identical to those of systems tested for fire resistance according to UL 2079 or ASTM E1966 by a qualified testing agency.
  - 1. Hose Stream Test: Wall-to-wall and wall-to-ceiling assemblies to be subjected to hose stream testing.

## 2.3 FLOOR EXPANSION JOINT COVERS

- A. Metal-to-Metal Recessed Joints: Free-floating seismic aluminum center plate, no-bump design, spans the joint and slides between the fixed aluminum frame assemblies allowing movement.
1. Basis-of-Design, Floor-to-Floor Product: Designed for 50 percent movement; with continuous 45 mil EPDM moisture barrier. Subject to compliance with requirements, provide NBAF-.5-1 by Balco, or comparable product by one of the following:
    - a. Construction Specialties
    - b. MM Systems Corporation.
    - c. Nystrom, Inc.
    - d. Watson Bowman Acme Corp.
  2. Basis-of-Design, Floor-to-Wall Product: Designed for 50 percent movement; with continuous 45 mil EPDM moisture barrier. Subject to compliance with requirements, provide NBAFL-.5-1 by Balco, or comparable product by one of the following:
    - a. Construction Specialties
    - b. MM Systems Corporation.
    - c. Nystrom, Inc.
    - d. Watson Bowman Acme Corp.
  3. Design Criteria:
    - a. Nominal Joint Width, 1 inch.
  4. Aluminum Finish: As selected by Architect.

## 2.4 WALL AND CEILING EXPANSION JOINT COVERS

- A. Metal-to-Metal Surface-Mounted Joints: Free-floating aluminum center plate spans the joint and slides between the fixed, gasketed aluminum frame assemblies allowing movement.
1. Basis-of-Design, Ceiling-to-Ceiling Products: Subject to compliance with requirements, provide Balco 75FCA-1, or comparable product by one of the following:
    - a. Construction Specialties
    - b. MM Systems Corporation.
    - c. Nystrom, Inc.
    - d. Watson Bowman Acme Corp.
  2. Basis of Design, Wall-to-Wall Products: Designed for 50 percent movement; with continuous gray elastomeric seal at face of joint; final color selection by Architect. Subject to compliance with requirements, provide Balco 75FWG-1, or comparable product by one of the following:
    - a. Construction Specialties
    - b. MM Systems Corporation.
    - c. Nystrom, Inc.
    - d. Watson Bowman Acme Corp.

3. Basis-of-Design, Ceiling-to-Wall Product: Designed for 50 percent movement; with continuous gray elastomeric seal at face of joint; final color selection by Architect. Subject to compliance with requirements, provide Balco 75FCAC-1, or comparable product by one of the following:
  - a. Construction Specialties
  - b. MM Systems Corporation.
  - c. Nystrom, Inc.
  - d. Watson Bowman Acme Corp.
4. Design Criteria:
  - a. Nominal Joint Width: 1 inch.
5. Aluminum Finish: As selected by Architect from manufacturer's full range.

## 2.5 MATERIALS

- A. Aluminum: **ASTM B221**, Alloy 6063-T5 for extrusions; **ASTM B209**, Alloy 6061-T6 for sheet and plate.
- B. Elastomeric Seals: Manufacturer's standard preformed elastomeric membranes or extrusions to be installed in metal frames.
- C. Fire Barriers: Any material or material combination, to comply with performance criteria for required fire-resistance rating.
- D. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M.

## 2.6 ALUMINUM FINISHES

- A. Walls and Ceilings: Clear Anodized
- B. Floor: Mill finish.

## 2.7 ACCESSORIES

- A. Manufacturer's standard attachment devices, as indicated or required for complete installations.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Prepare substrates according to expansion joint cover assembly manufacturer's written instructions.
- B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion joint cover assemblies.



- C. Comply with manufacturer's written instructions for storing, handling, and installing expansion joint cover assemblies and materials unless more stringent requirements are indicated.
  - D. Metal Frames: Perform cutting, drilling, and fitting required to install expansion joint cover assemblies.
    - 1. Repair or grout block out as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
    - 2. Install frames in continuous contact with adjacent surfaces.
      - a. Shimming is not permitted.
    - 3. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
    - 4. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation.
    - 5. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
    - 6. Locate anchors at interval recommended by manufacturer, but not less than **3 inches** from each end and not more than **24 inches** o.c.
  - E. Seals: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
    - 1. Provide in continuous lengths for straight sections.
    - 2. Seal transitions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
    - 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
  - F. Install with hairline mitered corners where expansion joint cover assemblies change direction or abut other materials.
  - G. Terminate exposed ends of expansion joint cover assemblies with field- or factory-fabricated termination devices.
  - H. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion joint cover assembly materials and associated work so complete assemblies comply with performance requirements.
    - 1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
- 3.2 PROTECTION
- A. Do not remove protective covering until finish work in adjacent areas is complete.
  - B. Protect the installation from damage by work of other Sections.

**END OF SECTION**

## SECTION 08 11 13

### HOLLOW METAL DOORS AND FRAMES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
1. Hollow-metal work.

##### 1.2 REFERENCES

- A. American National Standards Institute, Inc.:
1. ANSI A117.1: Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
  2. ANSI/DHI A115 Series (ANSI A115.1-1990 through ANSI A115.18-1994): Specifications for Steel Door and Frame Preparation for Hardware.
  3. ANSI/NAAMM-HMMA 861: Guide Specifications for Commercial Hollow Metal Doors and Frames.
  4. ANSI/SDI A250.4: Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.
  5. ANSI/SDI A250.6: Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
  6. ANSI/SDI A250.8: Recommended Specifications for Standard Steel Doors and Frames.
  7. ANSI/SDI A250.10: Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
  8. ANSI/SDI A250.11: Recommended Erection Instructions for Steel Frames.
- B. American Society of Civil Engineers:
1. SEI/ASCE-7: Minimum Design Loads for Buildings and Other Structures.]]
- C. American Society for Testing and Materials:
1. ASTM A 153/A 153M: Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  2. ASTM A 591/A 591M: Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Weight Mass Application.
  3. ASTM A 653/A 653M: Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  4. ASTM A 1008/A 1008M: Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

5. ASTM A 1011/A 1011M: Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
6. ASTM E 2074: Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.

D. Door Hardware Institute (DHI)

1. The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

E. National Association of Architectural Metal Manufacturers/Hollow Metal Manufacturers Association (NAAMM-HMMA)

1. NAAMM-HMMA 840 – Maintenance of Installed Hollow Metal Products

F. National Fire Prevention Association:

1. NFPA 80: Fire Doors and Fire Windows.
2. NFPA 105: Installation of Smoke-Control Door Assemblies.
3. NFPA 252: Fire Test of Door Assemblies.
4. NFPA 257: Fire Test for Window and Glass Block Assemblies.

G. Steel Door Institute:

1. SDI 111C: Recommended Louver Details for Standard Steel Doors.
2. SDI 117: Manufacturing Tolerances for Standard Steel Doors and Frames.

H. Underwriters Laboratories Inc.

1. UL 9: Fire Tests of Window Assemblies
2. UL 10C: Positive Pressure Fire Tests of Door Assemblies.
3. UL 1784: Air Leakage Tests of Door Assemblies.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.

5. Details of each different wall opening condition.
  6. Details of anchorages, joints, field splices, and connections.
  7. Details of accessories.
  8. Details of moldings, removable stops, and glazing.
  9. Details of conduit and preparations for power, signal, and control systems.
- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.
- D. Samples: For each type or exposed finish submit 3 by 5 inch sample using finish system on substrate to be used on Project for selection and verification.
- E. Door Schedule: Use same reference designations as listed in Contract Documents for openings, doors, frames, hardware, fire-ratings, glazed and louver openings, and other aspects of the Work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.
- B. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

#### 1.5 QUALITY ASSURANCE

- A. Qualifications-Manufacturer: Company specializing in manufacturing products specified in this section with a minimum of five years documented experience.
- B. Regulatory Requirements.
1. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  2. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
  3. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide manufacturer's certification that doors conform to all standard construction requirements of tested and labeled fire-rated door assemblies except for size.
  4. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
  - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

## 1.7 SEQUENCING AND SCHEDULING

- A. Coordination:
  - 1. Coordinate of door opening construction with door hardware installation and anchor placement.
  - 2. Coordinate grout fill of metal frames in masonry construction.
  - 3. Coordinate installation of glass and glazing.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS AND SUPPLIERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Ceco Door Products; an Assa Abloy Group company.
  - 2. Curries Company; an Assa Abloy Group company.
  - 3. Steelcraft; an Allegion company.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

### 2.3 INTERIOR HOLLOW METAL DOORS AND FRAMES

- A. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
  1. Physical Performance: Level A according to SDI A250.4.
  2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.053 inch.
    - d. Edge Construction: Model 1, Seamless.
    - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, or mineral-board at manufacturer's discretion.
    - f. Fire-rated Doors: Listed and labeled by approved testing agency.
  3. Frames, typical:
    - a. Materials: Uncoated, steel sheet, minimum thickness of 0.053 inch.
    - b. Construction: Full profile welded.
    - c. Exposed Finish: Prime.
    - d. Fire-rated Frames: listed and labeled by approved testing agency.
  4. Frames at FRP Doors specified in Section 08 17 34 "FRP Flush Doors":
    - a. Materials: Uncoated, steel sheet, minimum thickness of 0.067 inch.
    - b. Construction: Full profile welded.
    - c. Exposed Finish: Prime.

## 2.4 EXTERIOR HOLLOW METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4.
  - 1. Physical Performance: Level A according to SDI A250.4.
  - 2. Doors:
    - a. Type: As indicated in the Door and Frame Schedule.
    - b. Thickness: 1-3/4 inches.
    - c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 (ZF120) coating.
    - d. Edge Construction: Model 1, Seamless.
    - e. Core: Manufacturer's standard polyurethane or polyisocyanurate at manufacturer's discretion.
  - 3. Frames:
    - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 (ZF120) coating.
    - b. Construction: Full profile welded.
    - c. Exposed Finish: Prime.
    - d. At exterior fire-rated insulated windows, provide the following:
      - 1) Fire-rated, fully welded, Mercury Series Thermally Broken Frames by CECO Door, an AssaAbloy Company.

## 2.5 HOLLOW-METAL PANELS

- A. Provide hollow-metal panels of same materials, construction, and finish as adjacent door assemblies.

## 2.6 FRAME ANCHORS

- A. Jamb Anchors:
  - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
  - 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
  - 3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
  - 4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
  - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  - 2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

## 2.7 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
  - 1. Fire Door Cores: As required to provide fire-protection ratings indicated.
  - 2. Vertical Edges for Single-Acting Doors: Provide beveled or square edges at manufacturer's discretion.
  - 3. Top Edge Closures: Close top edges of doors with inverted closures, except provide flush closures at exterior doors of same material as face sheets.
  - 4. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
  - 5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
  - 6. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
  - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted at CMU openings. Do not grout openings in gypsum board partitions.
  - 4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.



5. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
      - 1) Two anchors per jamb up to 60 inches high.
      - 2) Three anchors per jamb from 60 to 90 inches high.
      - 3) Four anchors per jamb from 90 to 120 inches high.
      - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - c. Compression Type: Not less than two anchors in each frame.
    - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
  6. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
  7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
  1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
  2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

## 2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-rated openings, install frames according to NFPA 80.
    - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    - c. Install frames with removable stops located on secure side of opening.
    - d. Install door silencers in frames before grouting.
    - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - g. Field apply corrosion-resistant coating to backs of frames that will be in contact with grout or plaster containing anti-freezing agents.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
  4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
  6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
  7. In-Place Metal Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
    - c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
    - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
  3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

- D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.
  - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

#### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

**END OF SECTION**

## SECTION 08 14 25

### PLASTIC-LAMINATE-FACED WOOD DOORS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Solid core doors with plastic laminate faces.
2. Factory fitting flush wood doors to frames and factory machining for hardware.
3. Integration of electrified hardware, access control systems, and security systems into flush wood doors.

###### B. Related Requirements:

1. Section 08 80 00 "Glazing" for glass view panels in wood doors.

##### 1.2 ACTION SUBMITTALS

###### A. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door louvers.
5. Door trim for openings.
6. Factory-machining criteria.

###### B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
4. Dimensions and locations of blocking for hardware attachment.
5. Dimensions and locations of mortises and holes for hardware.
6. Clearances and undercuts.

###### C. Samples for Initial Selection: Manufacturer's full line of colors for factory-finished metal louvers, metal lite frames, and metal astragals.

D. Samples for Verification:

1. Plastic laminate, 6 inches (150 mm) square, for each color, texture, and pattern selected.
2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
  - a. Include color, texture, and pattern of plastic laminate required.
3. Louver blade and frame sections, 6 inches (150 mm) long, for each material and finish specified.
4. Frames for light openings, 6 inches (150 mm) long, for each material, type, and finish required.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
  1. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.
- B. Test Reports: For results of hinge loading, cycle/slam, stile edge screw withdrawals, and stile edge split resistance for fire rated doors.
- C. Field Quality-Control Reports: Provide copies of Certificate of Compliance for fire rated door and egress door assemblies.
- D. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Special warranties.
- B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
  1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.
- B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
  1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in heavy duty cardboard cartons prior to shipment from factory. Mark each door on top and bottom rail with opening number used on Shop Drawings using temporary, removable, or concealed markings.
  - 1. Protect wood doors during transit, storage, and handling to prevent damage, soiling, and deterioration.
  - 2. Store wood doors on a flat level surface in a dry, well ventilated, place.
  - 3. Keep wood doors a minimum of 3-1/2 inches off floor surface and protected by a protective covering under the bottom door and over the top door.
  - 4. Cover to protect wood doors from dirt, water and abuse but allow for air circulation under and around the stack.
  - 5. Do not store wood doors in direct sunlight.
- C. Handle wood doors with clean gloves. Lift and carry wood doors when moving around the site; do not drag wood doors across one another.
- D. Mark each door on top and bottom rail with opening number used on Shop Drawings.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, wet work is complete, and HVAC system is operating and maintaining temperature between 60 degrees F and 90 degrees F (16 degrees C and 32 degrees C) and relative humidity between 25 and 55 percent during remainder of construction period.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4- inch (6.4 mm) in a 42 inch by 84 inch (1067 mm by 2134 mm) section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3 inch (0.25 mm in a 76.2 mm) span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid Core Interior Doors: Life of installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Marshfield Doors, Division of Masonite.
  - 2. Oshkosh Architectural Door Company
  - 3. VT Industries Inc.
- B. Acceptable Suppliers: Subject to compliance with requirements, available suppliers and vendors offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Door Pro Systems
  - 2. Pearland Industries
- C. Source Limitations: Obtain flush wood doors from single manufacturer.

### 2.2 PERFORMANCE REQUIREMENTS

- A. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
- B. Smoke and Draft Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784 and installed in compliance with NFPA 105.

### 2.3 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.
  - 1. The Contract Documents may contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

### 2.4 FLUSH WOOD DOORS WITH PLASTIC-LAMINATE FACES

- A. Interior Solid Core Doors:
  - 1. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
  - 2. ANSI/WDMA I.S. 1A Grade: Premium.
  - 3. Plastic Laminate Faces: High pressure decorative laminates complying with NEMA LD 3, Grade HGS.
  - 4. Colors, Patterns, and Finishes: As selected by Architect.



5. Exposed Vertical and Top Edges:
  - a. For Doors with Woodgrain Laminates: Hardwood edges for staining to match faces.
  - b. For Doors with Solid Color Laminates: Hardwood edges for painting to match faces.
  - c. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
  - d. Fire-Rated Pairs of Doors: Provide formed-steel edges and astragals with intumescent seals.
    - 1) Finish steel edges and astragals with baked enamel, in color as selected by Architect from manufacturer's full range.
  - e. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
    - 1) Screw Holding Capability: 550 lbf (2440 N) per WDMA T.M. 10.
- B. Core for Non-Fire-Rated Doors:
  1. ANSI A208.1, Grade LD-2 particleboard.
    - a. Blocking: Provide wood blocking in particleboard core doors as follows:
      - 1) Doors Indicated to Have Surface Closers: 5 inch (125 mm) top rail blocking.
      - 2) Doors Indicated to Have Concealed Closers: Not less than 6 inch (152 mm) top rail blocking.
    - b. Provide doors with structural composite lumber cores instead of particleboard cores for doors indicated to receive exit devices.
  2. WDMA I.S. 10 structural composite lumber:
    - a. Screw Withdrawal, Door Face: 550 lbf (2440 N).
    - b. Screw Withdrawal, Vertical Edge: 550 lbf (2440 N).
- C. Core for Fire-Rated Doors: Noncombustible mineral product as required to achieve fire-protection rating indicated on Drawings, and complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
  1. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw holding capability approved for use in doors of fire protection ratings indicated:
    - a. Top Rail Blocking:
      - 1) Doors Indicated to Have Surface Closers: 5 inch (125 mm) top rail blocking.
      - 2) Doors Indicated to Have Concealed Closers: Not less than 6 inch (152 mm) top rail blocking.
    - b. 5 inch (125 mm) bottom rail blocking, in doors indicated to have protection plates.
    - c. 5 inch (125 mm) midrail blocking, in doors indicated to have armor plates.
    - d. 5 inch (125 mm) midrail blocking, in doors indicated to have exit devices.

2. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before faces and crossbands are applied. Faces are bonded to core using a hot press.

## 2.5 LIGHT FRAMES AND LOUVERS

- A. Metal Frames for Light Openings in Fire Rated and Non-Rated Doors: Frame formed of 0.048 inch (1.2 mm) thick, cold rolled steel sheet; with baked enamel or powder coated finish.
  1. Color: As selected by Architect from manufacturer's full range.
  2. Frames for integration into fire-rated doors shall be approved for use in doors of fire protection rating indicated.
- B. Metal Louvers:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Activar Construction Products Group, Inc.
    - b. Advantage Lites and Louvers, an Allegion Company.
    - c. Anemostat Products; a Mestek company.
    - d. Pemko, an ASSA ABLOY Group Company.
    - e. L & L Louvers, Inc.
  2. Blade Type: Vision proof, inverted V.
  3. Metal and Finish: Hot dip galvanized steel, 0.040 inch (1.0 mm) (formerly "18 gage") thick, with baked enamel or powder coated finish.
    - a. Color: As selected by Architect from manufacturer's full range.
- C. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Activar Construction Products Group, Inc.
    - b. Advantage Lites and Louvers, an Allegion Company.
    - c. Anemostat Products; a Mestek company.
    - d. Pemko, an ASSA ABLOY Group Company.
    - e. L & L Louvers, Inc.
  2. Metal and Finish: Hot dip galvanized steel, 0.040 inch (1.0 mm) (formerly "18 gage") thick, with baked enamel or powder coated finish.
    - a. Color: As selected by Architect from manufacturer's full range.

## 2.6 FABRICATION

- A. Factory fit doors to suit frame opening sizes indicated.
  1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

2. Comply with NFPA 80 requirements for fire rated doors.
- B. Factory machine doors for hardware that is not surface applied.
1. Locate hardware to comply with DHI-WDHS-3.
  2. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
  3. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
  5. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.
- C. Openings: Factory cut and trim openings through doors.
1. Light Openings: Trim openings with moldings of material and profile indicated.
  2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."
  3. Louvers: Factory install louvers in prepared openings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Hardware: Refer to Section 08 71 00 "Door Hardware" for installation.
- B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
1. Install fire rated doors according to NFPA 80.
  2. Install smoke and draft control doors according to NFPA 105.
- C. Job Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated.
  2. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.
  3. Comply with NFPA 80 for fire rated doors.
  4. Bevel nonfire rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
  5. Bevel fire rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory Fitted Doors: Align in frames for uniform clearance at each edge.

### 3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
  2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
- E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80.

### 3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

**END OF SECTION**



## SECTION 08 31 13

### ACCESS DOORS

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Access doors and frames for walls and ceilings at plumbing chases or other concealed work that will require maintenance by Owner.
  - 2. Floor access doors; water-tight.

##### 1.2 ACTION SUBMITTALS

- A. Product Data: Submit specifications, details and installation instructions, including methods of anchoring.
- B. Shop Drawings: If modifications from manufacturer's details is required, submit drawings indicating modifications, opening size, attachment details, and hardware.
  - 1. Size Verification: Obtain location and sizes for access doors from trades requiring access to concealed equipment and indicate on submittal schedule.

##### 1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Provide access door assembly with panel door, frame, hinge and latch from manufacturer listed in Underwriters Laboratories, Inc. Classified Building Materials Index for ratings indicated.

##### 1.4 SEQUENCING AND SCHEDULING

- A. Furnish inserts and anchoring devices which must be built into other work for installation of access doors.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with specified requirements manufacturers that may be incorporated into the Work include, but are not limited to, the following.
  - 1. Acudor Products, Inc.
  - 2. Bilco
  - 3. J.L. Industries, Inc.
  - 4. Nystrom, Inc.

##### 2.2 NON-FIRE-RATED - WALLS AND CEILINGS

- A. Frame: 16 gage steel.
- B. Door Panel: 14 gage steel.
- C. Hinges: Continuous type, 175 degree swing, steel with stainless steel pin.
- D. Locking Device:
  - 1. SFIC.
  - 2. Number as recommended by manufacturer for size of door.
- E. Acceptable Products - Concealed Flange:
  - 1. Model WB by J.L. Industries, Inc.
  - 2. NW Series by Nystrom, Inc.
- F. Acceptable Products – Concealed Flange, Recessed Door to receive Gypsum Board:
  - 1. Model CTWB by J.L. Industries, Inc.
  - 2. R Series by Nystrom, Inc.

### 2.3 FIRE-RATED WALLS

- A. Frame: 16 gage steel, with perimeter casing bead for flush appearance.
- B. Door Panel:
  - 1. 20 gage sheet steel.
  - 2. Two-inch thick insulated sandwich panel assembly.
  - 3. Automatic closer and latch.
  - 4. Interior latch release device.
  - 5. UL 1-1/2 hour "B" Label.
- C. Hinges: Concealed, pin type.
- D. Locking Device:
  - 1. SFIC.
  - 2. Number as recommended by manufacturer for size of door.
- E. Acceptable Products – Exposed Flanges:
  - 1. Model FD by J.L. Industries, Inc.
  - 2. IT-WP Series by Nystrom, Inc.

### 2.4 FIRE-RATED – GYPSUM BOARD CEILINGS

- A. Frame: 16 gage steel.
- B. Door Panel: 18 gage sheet steel.
- C. Hinges: Continuous.
- D. Locking Device:
  - 1. SFIC.
  - 2. Number as recommended by manufacturer for size of door.

- E. Acceptable Products – Recessed Door to Receive Gypsum Board:
  - 1. Model FRC J.L. Industries, Inc.
  - 2. IP Series Nystrom, Inc.

## 2.5 FLOOR DOORS

- A. Water-tight Aluminum Floor Access Door: Single-leaf.
- B. Materials:
  - 1. Frame: Formed Steel Plate frame with integral, drainable gutter; 3/16-inch thick, carbon steel with gray primer finish.
    - a. Provide with 1-inch anchor flange, EPDM gasket, and 1-1/2 inch drain coupling.
  - 2. Door Leaf: Formed steel diamond tread plate, 3/16-inch thick, carbon steel with gray primer finish.
- C. Hardware: Stainless steel
  - 1. Spring: Enclosed coil, Type 17-7 stainless steel
  - 2. Hinges: Heavy-duty, Type 316 stainless steel.
  - 3. Hold-Open Arm: Type 316 stainless steel; holds and locks cover in open position.
  - 4. Latch: Slam latch, Type 316 stainless steel, with lever handles, and removable threaded plug.
  - 5. Top Handle: Recessed, fold-down T-handle
  - 6. Lock and Cylinder: SFIC
- D. Load Capacity: 300 PSF live load
- E. Size: 36 inch square plus frame
- F. Basis of Design: Model FDDP-P-36x36-S-WL by Nystrom.

## 2.6 FABRICATION

- A. Fabricate from cold-rolled steel, welded components, exposed welds dressed smooth and flush with adjacent surfaces.
- B. Form doors with flush panel design.
- C. Furnish accessories with adjustable metal anchors for securing to substrate.
- D. Furnish each access door assembly manufactured as a complete unit with parts ready for installation.
- E. Provide plastic grommets at cylinder core through sandwich panels.

## 2.7 LOCKING MECHANISMS

- A. Locks and Cylinders: Provide Small Format Interchangeable Core (SFIC) at access doors and panels typically unless otherwise shown or specified.
  - 1. See Section 08 71 00 "Door Hardware" for basis of design product requirements.



## 2.8 FINISH

- A. Manufacturer's standard baked enamel prime coated.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify size and dimension requirements at site.
- B. Verify that openings are correctly dimensioned to receive doors.

### 3.2 INSTALLATION

- A. Comply with manufacturer's instructions for secure attachment, proper relation to adjacent finished surfaces and proper operation.
- B. Set assemblies plumb and level, properly anchored in place.

### 3.3 ADJUST AND CLEAN

- A. Adjust hardware and panels after installation for proper operation. Adjust latching and locking mechanism to operate smoothly.

END OF SECTION

## SECTION 08 71 00

### DOOR HARDWARE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
1. Hardware for swing doors.
  2. Hardware for sliding doors.
  3. Hardware for folding doors.
  4. Cylinders.

##### 1.2 ACTION SUBMITTALS

- A. Door Hardware Schedule: Submit schedule prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
  2. Format: Use same scheduling sequence, format, and door numbers indicated in door hardware schedule on the Drawings.
  3. Content: Include the following information:
    - a. Identification number, location, hand, fire rating, size, and material of each door and frame.
    - b. Locations of each door hardware set cross referenced to Drawings on floor plans and to door and frame schedule.
    - c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    - d. Description of electrified door hardware sequences of operation and interfaces with other building control systems.
    - e. Fastenings and other installation information.
    - f. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
    - g. Mounting locations for door hardware.
    - h. List of related door devices specified in other Sections for each door and frame.
  4. Upon acceptance of schedule, submit one hardcopy and the electronic files for file and distribution purposes.

5. Do not order hardware until Hardware Schedule has been approved.
- B. Product Data: Technical data including material descriptions and compliance with cited standards, and finishes.
1. Include manufacturer's data sheets for each hardware item indicated options and features of each item.
  2. Include details for type strike plates, length of spindle, hand, backset and bevel of locks, hand and degree of opening for closers and other functions of mechanisms.
  3. Installation instructions and maintenance information.
  4. Copies of final hardware schedule reflecting changes made during construction.
- C. Shop Drawings:
1. Submit details for attachment
    - a. Push Plate: Indicate concealed fastening and graphics.
    - b. Thresholds: Indicate thickness of materials, method of anchoring and details of construction.
  2. Submitted with proposed Hardware Schedule.
- D. Samples: Upon request by Architect, submit full size sample of each type of exposed hardware item and finish.
1. Architect will retain samples until completion of Project.
  2. Upon completion of Project, samples will be turned over to Owner.
  3. Tag Samples with full product description to coordinate Samples with door hardware schedule.
- E. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Templates: Furnish templates and accepted finish hardware schedule to door and frame manufacturers for use in fabrication.
- B. Product Certificates: Submit certificate for:
1. Each type of electrified door hardware certifying that door hardware for use on each type and size of labeled fire rated doors complies with listed fire rated door assemblies.
  2. That each type of hardware complies with requirements of ANSI and are the specified grades.
- C. Product Test Reports: Submit reports for compliance with accessibility requirements, for tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- D. Field quality control reports.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: At completion of the project, provide current copy of the Hardware Schedule, complete with catalog cuts and keying schedule. Provide manufacturer's parts list and maintenance instructions for each type of hardware supplied and necessary wrenches and tools required for proper maintenance of hardware.
  - 1. Maintenance Tools: Deliver hardware adjustment tools for each item of finish hardware.
- B. Schedules: Final door hardware and keying schedule.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products having minimum 5 years documented experience and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant available during the course of the work to consult with Contractor, Architect, and Owner about door hardware and keying.
  - 1. Warehousing Facilities: In Project's vicinity.
  - 2. Scheduling Responsibility: Preparation of door hardware and keying schedule.
  - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of standard units in assemblies similar to those indicated for this Project.
  - 4. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC).
- B. Source Limitations: Obtain each type of door hardware from single manufacturer.
  - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- C. Preinstallation Conference: Conduct conference at site.
- D. Post Installation Inspection for Hardware: Upon completion of installation hardware, prior to Owner acceptance of the project, conduct a post installation inspection of mechanical and electrical door hardware.
  - 1. Inspection shall include the Contractor, Architect, Architect's hardware consultant, hardware supplier, hardware manufacturer's representatives, and installation contractor. Repair or replace each product improperly installed or functioning incorrectly.
  - 2. Additional costs related to repair or replacement is the responsibility of the Contractor.
- E. Keying Conference: Conduct conference at site.

1. Conference participants shall include Installer's Architectural Hardware Consultant.
2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system including, but not limited to, the following:
  - a. Flow of traffic and degree of security required.
  - b. Preliminary key system schematic diagram.
  - c. Requirements for key control system.
  - d. Requirements for access control.
  - e. Address for delivery of keys.

#### 1.6 COORDINATION

- A. Floor Recessed Door Hardware: Coordinate layout and installation with floor construction.
  1. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified for factory preparation. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware with Hardware Supplier on receipt and provide secure lock up for door hardware upon delivery to site.
- B. Tag each item and package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Clearly label packages to identify contents and finish location in building.
- C. Control handling and installation of hardware items that are not immediately replaceable to avoid delaying the work by hardware losses both before and after installation.
  1. Provide dry, secure lock up for hardware delivered. Provide space for unpacking, sorting, checking, and storage of finish hardware.
- D. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- E. Delivery of keys and permanent cores shall be coordinated with the Owner prior to ordering.

## 1.8 WARRANTY

- A. Written warranty signed by Manufacturer in which Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of doors and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated:
    - a. Cylindrical Locks: Ten years from date of Substantial Completion.
    - b. Door Closers: Ten years from date of Substantial Completion.
    - c. Exit Devices: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Rated Door Assemblies: Where fire rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency for fire protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
- B. Smoke and Draft Control Door Assemblies: Where smoke and draft control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- C. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with applicable requirements.
1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
  2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.
  3. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
  4. Comply with the following maximum opening-force requirements:
    - a. Interior, Nonfire Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
    - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.

- c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
- 5. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
- 6. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
- 7. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

## 2.2 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements and door hardware schedule.

## 2.3 HINGES

- A. Hinges, Full Mortise: BHMA A156.1, Grade 1, five knuckle, with nonrising pins, antifriction bearings on each hinge, heavy weight construction.
  - 1. Provide template produced hinges for hinges installed on hollow metal doors and hollow metal frames.
  - 2. Base and Pin Metal:
    - a. Exterior Hinges: Stainless steel with stainless steel pin or Brass with stainless steel pin body and brass protruding heads.
    - b. Interior Hinges: Brass with stainless steel pin body and brass protruding heads or Steel with steel pin or Stainless steel with stainless steel pin.
    - c. Hinges for Fire Rated Assemblies: Steel with steel pin or Stainless steel with stainless steel pin.
- B. Nonremovable Pins: Provide butts with set screw in barrel making hinge non-removable when door is in closed position for exterior and interior doors with locks, and doors with security controls (credential reader and electromechanical/electromagnetic hardware items).
- C. Tips: Flat button, unless otherwise noted.
- D. Corners: Square.
- E. Reverse Spring Hinges: Full mortise, where noted in schedule.

### F. Applications:

Type	McKinney	Hager	Stanley	Ives
Type 2	TA2714	BB1279	FBB179	5BB1
Type 4	T4A3786	BB1168	FBB168	5BB1HW

- 1. Interior doors with closers: Type 2 or 4.
  - a. Provide Type 4 hinges for all hollow metal doors in all cases.
- 2. Interior doors over 36 inches wide: Type 4.

3. Interior doors 36 inches or less without closer: Type 2.
4. Provide NRP (nonremovable pins) at outswinging lockable doors.

G. Size: For 1-3/4 inch Doors:

1. 4 inch by 4 inch (100 mm by 100 mm).
2. 4 inch by 4-1/2 inch (100 mm by 113 mm)
3. 4-1/2 inch by 4-1/2 inch (113 mm by 113 mm).

H. Quantities:

1. Two hinges per leaf for openings through 60 inches (1525 mm) high.
2. One additional hinge per leaf for each additional 30 inches (760 mm) in height or fraction thereof.
3. Drill 5/32 inch (3.75 mm) hole and use No. 12, 1-1/4 inch (31 mm) steel threaded to the head wood screws for hinges on wood doors.

I. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

1. IVES Hardware.
2. McKinney Products Company.
3. Hager Companies.
4. Stanley Commercial Hardware.

## 2.4 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; Grade 1; minimum 0.120 inch (3.0 mm) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

1. Provide aluminum hinges at storefront doors and electrified openings; stainless steel at other locations indicated.

B. Continuous, Gear Type Hinges: Extruded aluminum, pinless, geared hinge leaves joined by a continuous extruded aluminum channel cap; with concealed, self lubricating thrust bearings.

C. Applications:

McKinney	Pemko	Roton	Stanley	Ives
MCK-12HD	FM83SLFHD	780-112HD	661HD	112XY
MCK-FM300	-	790-900	651	700

1. Electrified Hinges: Provide necessary concealed wires to accommodate electric function of specified hardware, supply as three piece hinge (removable electronic wire section in middle leaf).
2. Provide heavy duty hinges at exterior doors and doors with exit devices.



- D. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
1. IVES Hardware.
  2. McKinney Products Company.
  3. Pemko Manufacturing Co.
  4. Roton, Hager Companies
  5. Stanley Commercial Hardware.

## 2.5 MECHANICAL LOCKSETS AND LATCH SETS

- A. Mortise Locks and Latch Sets: Lock functions indicated in Hardware Schedule.
1. Construction: Heavy duty construction with wrought cases, minimum case thickness of 0.093 inch (2.36 mm), BHMA certified ANSI A156.13; Operational Grade 1.
  2. Fronts: 8 inches by 1-1/4 inches (200 mm by 31 mm), adjustable to 1/8 inch in 2 inches (3 mm in 50 mm) with 2-3/4 inches (79 mm) backset.
  3. Minimum Projection of Latch Bolt: 3/4 inch (19 mm).
  4. Minimum Throw of Dead Bolt: 1 inch (25 mm).
  5. Beveled, rounded or rabbeted faces where required.
  6. Electronic functions supplied with factory installed request to exit monitor switch, security monitor switch, latch bolt monitor switch, and electrified trim components, as scheduled.
  7. Provide electrified functions with factory installed common plug in connectors.
- B. Lever Handles and Escutcheons:
1. Cast of forged brass or bronze material, levers supported by internal spring.
  2. On doors into hazardous areas that are accessible to physically handicapped persons, provide knurled lever contact surfaces. Abrasive coating is not permitted
- C. Strikes: Provide strike for each lock bolt or latchbolt to comply with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch
1. Furnish locks and latches with wrought box strikes.
  2. On single swing doors, provide latch strike plates with minimum lip projection necessary to project from trim.
  3. On pair of doors with or without astragal, lip projection of latch strike plates shall not extend beyond face of lock style of inactive leaf.
  4. Where lock stiles are too narrow for backsets of locks specified, furnish special backsets.
  5. Size: 4-7/8 inch by 1-1/4 inch by 3/32 inch (122 mm by 31 mm by 1.5 mm).
- D. Dummy Trim: Match to lock specified on pair of doors; provide complete set both sides of doors.

- E. Manufacturer: Subject to compliance with requirements, provide one of the following:
  - 1. Best Lock Corporation; 45H Series x 15S lever/escutcheon trim (NO SUB).

## 2.6 CYLINDRICAL LOCKS

- A. Cylindrical Locks and Latch Sets: Lock Functions Indicated in Schedule
  - 1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
  - 2. Cylinders: Refer to "KEYING" article, herein.
  - 3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
  - 4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
  - 5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
  - 6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
  - 7. Lever trim: Solid cast levers without plastic inserts and wrought roses on both sides.
- B. Manufacturer: Subject to compliance with requirements, provide one of the following:
  - 1. Best Lock Corporation; 9K Series x 15D lever/escutcheon trim (NO SUB)

## 2.7 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
- B. Factory construction masterkeyed locksets based on small format interchangeable cores.
- C. Owner will establish keying based on existing system. Provide following number of keys:
  - 1. GMK: Six each.
  - 2. MK: Six each.
  - 3. Change keys: Three for each lock.
  - 4. Construction keys: 12 master keys.
- D. Construction Keying: Provide keyed construction cores for locks during construction.
- E. Index, tag and deliver permanent keys in sealed container to Owner.
- F. Contractor to provide keyed permanent cores for installation by Owner.

## 2.8 SURFACE MOUNTED DOOR CLOSERS

- A. Surface Closers: BHMA certified ANSI A156.4, universal regular or parallel arm, nonhanded, nonsized.
1. Cast iron body, rack and pinion construction with compression spring, fully hydraulic.
  2. Closing speed, latching speed and backcheck controlled by independently operated concealed key valves.
  3. Intensity of backcheck feature to be adjustable.
  4. Equipped with spring adjustment allowing adjustment of spring power to suit individual door conditions.
  5. Suitable for mounting on 1-3/4 inch (44 mm) minimum top rail of door.
  6. Size as recommended by manufacturer for door size and weight.
  7. Provide mounting plates, sex nuts and bolts.
  8. No graphics allowed on cover.
  9. Provide parallel arms for exterior doors, hall doors, and outswinging interior doors.
  10. Provide stop arms for exterior door closers with parallel arms.
  11. For doors in areas accessible to physically handicapped persons, provide doors with adjustable opening force and delayed closing actions.
  12. Mount closers to doors with thru-bolts.
  13. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
- B. Arm Finish: Painted, aluminum enamel.
- C. Closer Cover Finish: Sprayed enamel, color selected by Architect.
- D. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
1. LCN Closers; 4040XP Series (NO SUB).

## 2.9 MECHANICAL STOPS AND HOLDERS

- A. Wall and Floor Mounted Stops: BHMA A156.16
1. Wall Stops: Convex gray rubber bumper and brass, bronze or steel with concealed fasteners.
  2. Floor Stops: Dome type with plated brass, bronze or steel stop.
  3. Floor Stop and Holder: Two piece floor mounted stop with door holder.
  4. Preferred method of stopping the door:
    - a. Where door can swing to a wall: wall stop.
    - b. Where door cannot swing to a wall: overhead stop or integrated stop arm (outswing doors).

- c. Where door cannot swing to a wall and overhead stop or integrated stop arm not preferred provide floor stop (ensure no tripping hazard created).
  - B. Overhead Stops and Holders: BHMA A156.8:
    - 1. Provide where scheduled, and for doors that open against equipment, casework, sidelights, other objects that would make wall stops inappropriate
  - C. Furnish door stop for each door leaf.
  - D. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
    - 1. IVES Hardware.
    - 2. Glynn-Johnson.
    - 3. Rixson; (for overhead stops; surface applied and concealed application).
    - 4. Rockwood Manufacturing Company.
    - 5. Trimco.
- 2.10 FLUSH BOLTS AND STRIKES
- A. Flush Bolts: BHMA A156.16; minimum 3/4-inch throw, designed for mortising into door edge. Furnish flush bolts with dustproof strikes.
  - B. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
    - 1. IVES Hardware.
    - 2. Rockwood Manufacturing Company.
    - 3. Trimco.
- 2.11 SILENCERS
- A. Silencers: Preformed neoprene or rubber, gray.
  - B. Provide on interior metal door frames, except for frames for weatherstripped or smoke-sealed doors. Provide three silencers minimum for single doors and two for pairs of doors.
  - C. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
    - 1. IVES Hardware.
    - 2. Rockwood Manufacturing Company.
    - 3. Trimco.

## 2.12 SMOKE SEALS

- A. Smoke Seals: Where smoke and draft control door assemblies are required, provide seals that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
  - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- B. Type: Extruded silicone bulb type with self adhesive backing.
- C. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
  - 1. National Guard Products.
  - 2. Pemko Manufacturing Co.
  - 3. Zero International.

## 2.13 WEATHERSTRIPPING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
- B. Type: Silicone head and jamb pressure sensitive gasket.
- C. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
  - 1. National Guard Products.
  - 2. Pemko Manufacturing Co.
  - 3. Zero International.

## 2.14 THRESHOLD

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
  - 1. Type: Two-piece grooved aluminum treads, for handicap access clear anodized finish, fabricated with mitered corners and returns.
- B. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
  - 1. National Guard Products.
  - 2. Pemko Manufacturing Co.
  - 3. Zero International.

## 2.15 DOOR BOTTOM SEAL

- A. Door Shoes: Neoprene gasket material held in place by aluminum housing; mounted to bottom edge of door with screws.

1. Mounting: Surface mounted on bottom edge of door.

B. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

1. National Guard Products.
2. Pemko Manufacturing Co.
3. Zero International.

#### 2.16 PUSH AND PULLS

A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.

B. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

1. IVES Hardware; An Allegion plc Company.
2. Rockwood Manufacturing Company.
3. Trimco.

#### 2.17 KICK PLATES

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

B. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

1. IVES Hardware.
2. Rockwood Manufacturing Company.
3. Trimco.

#### 2.18 KEY CABINET

A. Surface mounted unit manufactured from patent level cold-rolled furniture steel, electro-welded construction; no sag continuous piano type pin hinge; pin tumbler locking device.

B. Index system including dual tag system, visible key receipt system, three-way visible index and key gathering envelopes.

C. Sized to contain and index keys for project plus 100 percent expansion.

D. Manufacturer:

1. Lund.
2. Key Control.
3. Telkee.

## 2.19 FABRICATION

- A. Form surfaces true, smooth, and free from burrs; of uniform color, reasonably free from imperfections affecting appearance and serviceability. Dress portions of lock mechanism which come in contact or bear upon other parts to true, smooth surface.
- B. Drawings show swing or hand of each door. Finish each item of hardware for proper installation and operation of door swing.
- C. Manufacture hardware to conform to published templates, ANSI A156.7, and prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws except as specifically indicated.
- D. Furnish screws for installation with each hardware item. Provide Phillips flathead screws except as otherwise noted. Finish exposed screws to match hardware finish.
- E. Provide concealed fasteners for hardware units that are not exposed when door is closed, except to extent no standard manufacturer units of type specified are available with concealed fasteners.
- F. Provide appropriate nuts and through bolts with closers.
- G. Provide fasteners compatible with bolt unit fastened and substrate, and which will not cause corrosion or deterioration of hardware, base material, or fastener.

## 2.20 HARDWARE FINISHES

- A. Match finish of each hardware unit at each door or opening. Reduce differences in color and textures as much as possible where base metal or metal forming process is different for individual units of hardware exposed at same door or opening.
- B. Architect will determine of acceptability of match with samples and other hardware at each door. Units will be judged when held 2'-0" apart at 3'-0" distance.
- C. Finish designations used in schedules and elsewhere are those listed in Materials and Finished Standard 1301 by BHMA.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Hardware schedule should include thickness of door, hand and backset of hardware items, method of fastening and other detail requirements.
- B. Check Drawings and door schedule and provide required hardware for openings. Provide required hardware for labeled opening to conform with NFPA 80 and applicable building codes.
- C. Coordinate with door and frame manufacturers.

- D. Trim undesignated openings with hardware of equal quality and design to that specified for similar opening.

### 3.2 INSTALLATION

- A. Install finish hardware plumb, level and true to line in accordance with manufacturer's printed instructions and job conditions.
- B. Locate hardware to comply with NBHA standards.
- C. Install finish hardware to template.
- D. Cut and fit to substrate avoiding damage or weakening. Reinforce attachment substrates as necessary for installation and operation.
- E. Completely cover cutouts with hardware item.
- F. Mortise work to correct location and size without gouging, splintering or causing irregularities in exposed finish work.
- G. Surfaces for paint or other finish:
  - 1. Where cutting and fitting is required on substrates to be painted or similarly finished, install, fit and adjust hardware prior to finishing.
  - 2. Remove hardware and place in original packaging.
  - 3. Reinstall hardware after finishing operation is complete.
- H. Install hardware items affixed to concrete with machine screws and threaded expansion shields.

### 3.3 ADJUSTING AND CLEANING

- A. Check and adjust each operating hardware item to ensure proper operating or function of unit.
- B. Lubricate moving parts as recommended by hardware manufacturer. Use graphite type lubrication if none other is recommended.
- C. Repair or replace defective materials or units that cannot be adjusted and lubricated to operate freely and smoothly. Reinstall items found improperly installed.
- D. Prior to Final Acceptance date, readjust and relubricate as necessary.

### 3.4 FIELD QUALITY CONTROL

- A. Instruct Owner's designated personnel in proper adjustment and maintenance of hardware and finishes at time of final hardware adjustment.



3.5 MAINTENANCE

- A. Continued Maintenance Service: Approximately six months after acceptance of hardware in each area:
1. Re-adjust every item of hardware to restore proper function of doors and hardware.
  2. Consult with and instruct Owner's personnel in recommended additions to maintenance procedures.
  3. Clean and lubricate operational items wherever installed.
  4. Replace hardware items that have deteriorated or failed due to faulty design, materials or installation of hardware units.

**Hardware Group No. 203**

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCKSET	9K-3-7-D-15-D-STK-626	626	BES
1	EA	SFIC Core	BEST SFIC CORE		BES
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S PSA H & J (USE SILENCERS @ NON-RATED DOORS)	BK	ZER

**Hardware Group No. 801L**

<u>QTY</u>		<u>DESCRIPTION</u>	<u>CATALOG NUMBER</u>	<u>FINISH</u>	<u>MFR</u>
1	EA	CONT. HINGE	112XY HEIGHT AS REQ	628	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16" F	630	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA TBWMS X MTG BRKT, SPCR & PLATE AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

END OF SECTION

## GLAZING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Insulated and monolithic glass for windows, doors, borrowed lites.
2. Laminated/Security glass.
3. Glazing sealants and accessories.

#### 1.2 REFERENCES

A. American Architectural Manufacturers Association

1. AAMA 800: Voluntary Specifications and Test Methods for Sealants

B. American National Standard Institute:

1. ANSI Z97.1 - Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test.

C. ASTM International

1. ASTM C 509 - Specification for Elastomeric Cellular Preformed Gasket and Sealing Material
2. ASTM C 920 - Specification for Elastomeric Joint Sealants
3. ASTM C 1036 - Flat Glass.
4. ASTM C 1048 - Heat Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
5. ASTM C 1087 - Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
6. ASTM C 1115 - Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
7. ASTM C 1281 - Specification for Preformed Tape Sealants for Glazing Applications
8. ASTM C 1376 - Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.
9. ASTM E 1300 - Practice for Determining the Minimum Thickness of Annealed Glass Required to Resist a Specified Load.
10. ASTM E 1996 - Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.
11. ASTM E 2188 - Standard Test Method for Insulating Glass Unit Performance.
12. ASTM E 2189 - Standard Test Method for Testing Resistance to Fogging in Insulating in Insulating Glass Units.

13. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
  - D. Code of Federal Regulations
    1. 16 CFR 1201: Safety Standard for Architectural Glazing Materials
    2. 40 CFR 59, Subpart D-2006: National Volatile Organic Compound Emission Standards for Architectural Coatings.
  - E. Glass Association of North America:
    1. Engineering Standards Manual.
    2. Glazing Manual.
  - F. Texas Department of Insurance Evaluation Report: For exterior fenestrations.
  - G. Insulating Glass Manufacturers Alliance
    1. IGMA TB-3001: Guidelines for Sloped Glazing.
    2. SIGMA TM-3000: North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use
  - H. Sealed Insulated Glass Manufacturers Association:
    1. SIGMA TM-3000 - Vertical Glazing Guidelines.
  - I. Structural Engineering Institute/American Society of Civil Engineers:
    1. SEI/ASCE 7 - Minimum Design Loads for Buildings and Other Structures
  - J. Underwriters Laboratories:
    1. UL 972 – Burglary-Resisting Glazing Material.
- 1.3 ACTION SUBMITTALS
- A. Product Data:
    1. Glass: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
    2. Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements.
    3. Identify available colors; indicate special precautions required.
  - B. Shop Drawings:
    1. Sections and details of glass installation at framing members including head, mullions, transoms, jambs and sills.
    2. Submit engineered shop drawings for back-painted glass and mounting systems showing fabrication and installation requirements to ensure installation and removal of individual glass units without requiring removal of adjacent units.
      - a. Show transitions

- C. Samples: Submit 12" x 12" samples of each type and thickness of tint, patterned, coated, and back-painted glass.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Certificates: Submit glass and glazing manufacturer's certifications that materials meet Specification requirements and are compatible with each other.

#### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Regulatory Requirements: Comply with ANSI Z97.1 and CPSC 16 CFR Part 1201 break safe characteristics.
- D. Heat-Strengthened and Fully-Tempered Glass:
  - 1. Fabrication Process: By horizontal (roller-hearth) process.
  - 2. For uncoated glass, comply with requirements for Condition A.
  - 3. For coated vision glass, comply with requirements for Condition C (other coated glass).
  - 4. Orientation: Orient roller-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
    - a. If width of any glass units indicated on Drawings exceeds fabrication limits, roller-wave distortion shall be oriented in a consistent direction for the entire project.
- E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- F. Mock-Ups:
  - 1. Erect mock-ups to demonstrate aesthetic effects and quality of materials and execution using materials indicated for final unit of work.
  - 2. Accepted mock-ups in undisturbed condition at time of Substantial Completion may become part of completed Work.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver glass to job in original containers bearing manufacturer's label indicating quality of contents of each package.
- B. Store glass under cover at site and protect from edge and surface damage.
- C. Do not remove labels until glass has been installed. Keep glass free from contamination by materials capable of staining glass. Do not apply marking materials to either side of glass.

## 1.7 PROJECT CONDITIONS

- A. Environmental Requirements:
  - 1. Do not install glazing materials when ambient temperature is less than 50 degrees F. unless recommended by glazing material manufacturer.
  - 2. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
  - 3. Do not install glazing materials when glazing channel substrates are wet from rain, frost, condensation, or other causes.

## 1.8 SEQUENCING AND SCHEDULING

- A. Coordinate Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.

## 1.9 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers/Fabricators, Glass Products: Subject to compliance with requirements, provide basis of design products or equivalent products by one of the following:
  - 1. Guardian Industries Corp.
  - 2. Oldcastle Building Envelope.
  - 3. Pilkington North America.
  - 4. Viracon, Inc.
  
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
  - 1. Obtain tinted glass from single source from single manufacturer.
  - 2. Obtain coated glass from single source from single manufacturer.
  
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
  
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 " Quality Requirements," to design glazing including impact-resistant glazing at alternates complying with Texas Department of Insurance requirements..
  
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
  - 1. Wind Loads: Design and size components of glazing systems to withstand loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with SEI/ASCE 7 to establish wind pressure based on the criteria listed on Structural Drawings.
  - 2. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
  - 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
  - 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
  
- D. Safety Glazing: Where safety glazing is required, provide glazing that complies with 16 CFR 1201, Category II.

- E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
  3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
  4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  5. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

### 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA: "GANA Glazing Manual."
  3. IGMA TM-3000: "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
  4. IGMA TM-3100: "Voluntary Guidelines for the Identification of Visual Obstructions in the Air Space of Insulating Glass Units."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
1. Minimum Glass Thickness for Exterior Lites: 6 mm.
- E. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- F. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS - FLOAT GLASS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality-Q3 (glazing select), Class 1 (clear) or Class 2 (tinted, heat-absorbing and light-reducing).
- B. Glass Types:
  - 1. Type 0A - Clear.

## 2.5 GLASS - HEAT-STRENGTHENED GLASS

- A. Heat-Strengthened Glass: ASTM C 1048, Type I (transparent glass, flat), Quality-Q3 (glazing select), Class 1 (clear) or Class 2 (tinted, heat-absorbing and light-reducing), Kind HS (heat-strengthened), Condition A (uncoated).
- B. Glass Types:
  - 1. Type 1A - Clear. Provide where shown and in lieu of 0A when required by performance requirements.

## 2.6 GLASS - FULLY TEMPERED

- A. Fully Tempered Glass: ASTM C 1048, Type I (transparent glass, flat), Quality-Q3 (glazing select), Class 1 (clear) or Class 2 (tinted, heat-absorbing and light-reducing), Kind FT (fully tempered), Condition A (uncoated).
- B. Glass Types:
  - 1. Type 2A - Clear.

## 2.7 COATED GLASS - HEAT-STRENGTHENED GLASS

- A. Coated Heat-Strengthened Glass: ASTM C 1376 and ASTM C 1048, Type I (transparent glass, flat), Quality-Q3 (glazing select), Class 1 (clear) or Class 2 (tinted, heat-absorbing and light-reducing), Kind HS (heat-strengthened), Condition C (other coated glass).
- B. Basis-of-Design Product, Typical Exterior Vision Lite: Subject to compliance with requirements, provide Solarban R100 coating on the #2 (inner) surface of a clear glass outer-lite, that, when paired with a clear inner-lite in an insulated unit configuration, results in comparable appearance and performance characteristics as follows:
  - 1. Performance Requirements:
    - a. Visible Light Transmittance: 42 percent minimum.
    - b. Winter Nighttime U-Factor: 0.29 (Btu/hr\* $ft^2$ \*°F) maximum.
    - c. Solar Heat Gain Coefficient: 0.23 maximum.
    - d. Outdoor Visible Light Reflectance: 32 percent maximum.
- C. Glass Types:
  - 1. Type 3A – Clear, Low-E



## 2.8 COATED GLASS - FULLY TEMPERED

- A. Fully Tempered Glass: ASTM C 1376 and ASTM C 1048, Type I (transparent glass, flat), Quality-Q3 (glazing select), Class 1 (clear) or Class 2 (tinted, heat-absorbing and light-reducing), Kind FT (fully tempered), Condition C (other coated glass).
- B. Basis-of-Design Product, Typical Exterior Vision Lite: Subject to compliance with requirements, provide Solarban R100 coating on the #2 (inner) surface of a clear glass outer-lite, that, when paired with a clear inner-lite in an insulated unit configuration, results in comparable appearance and performance characteristics as follows:
  - 1. Performance Requirements:
    - a. Visible Light Transmittance: 42 percent minimum.
    - b. Winter Nighttime U-Factor: 0.29 (Btu/hr\* $ft^2$ \*°F) maximum.
    - c. Solar Heat Gain Coefficient: 0.23 maximum.
    - d. Outdoor Visible Light Reflectance: 32 percent maximum.
- C. Glass Types:
  - 1. Type 4A – Clear, Low-E

## 2.9 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
  - 1. Construction: Laminate glass with polyvinyl butyral interlayer or ionoplast interlayer to comply with interlayer manufacturer's written instructions.
  - 2. For use at security windows specified in Section 08 56 53 and sound-rated windows.
  - 3. Interlayer Thickness: Provide thickness not less than 0.090 or greater when needed to comply with requirements.
  - 4. Interlayer Color: Clear unless otherwise indicated.
  - 5. Type 2A with Hatch Pattern, Base Bid: Laminated Security Glass; Thickness: Nominal 9/16 inch as specified in Section 08 56 53 "Fixed Security Windows"
    - a. Type 2A with Hatch Pattern, Alternate: ASTM F3561 Forced Entry and Ballistic Resistance Rated, Level 4, Basis of Design: Tested assembly of two lites of 1/8-inch (3 mm) clear tempered glass with 0.090 inch thick clear PVB interlayer.
      - 1) Interlayer Basis of Design: Trosifol PVB by Kuraray.
  - 6. Type 8-2A: Laminated Insulated Security Glass Spandrel
    - a. Basis of Design: As specified in Section 08 56 53 "Fixed Security Windows"
      - 1) Outboard lite: Type 4A
      - 2) 1/2 inch air space
      - 3) Inboard lite: Glass Type 7-2 Laminated Security Glass; Nominal 9/16 inch as specified in Section 08 56 53 "Fixed Security Windows" or nominal 1/2-inch thick Alternate 7-2 laminated glass.

## 2.10 INSULATED GLASS

- A. Insulated Glass: Sealed units of glass lites separated by dehydrated air spaces complying with ASTM E 2188, ASTM E 2189, and ASTM E 2190, with the following indicated requirements:
1. For types, classes, kinds, and conditions of each glass lite refer to specified glass types.
  2. Sealing System: Dual seal, primary and secondary using manufacturer's standard sealants.
  3. Spacer: Manufacturer's standard metal.
  4. Air Space Width: Nominal 1/2 inch measured perpendicularly from surfaces of glass lites at unit edge.
- B. Glass Types:
1. Type 8-1: Heat-strengthened or Annealed coated insulated glass units
    - a. Outer Lite: Type 3A
    - b. Air Space: 1/2 inch air
    - c. Inner Lite: Type 0A or 1A where required for fire-department access or by Code.
  2. Type 8-2: Tempered insulated coated glass units
    - a. Outer Lite: Type 4A
    - b. Air Space: 1/2 inch air
    - c. Inner Lite: Type 2A.
  3. Type 8-2A: Laminated Insulated Security Glass Spandrel
    - a. Basis of Design: As specified in Section 08 56 53 "Fixed Security Windows"
      - 1) Outboard lite: Type 4A
      - 2) 1/2 inch air space
      - 3) Inboard lite: Glass Type 7-2 Laminated Security Glass; Nominal 9/16 inch as specified in Section 08 56 53 "Fixed Security Windows" or nominal 1/2-inch thick Alternate 7-2 laminated glass as specified in Section 08 80 00.
  4. Type 8-7: Fire-Rated Insulated Glass Units:
    - a. Two layers of Glass Type 7 fire-rated glass with 1/2 inch air space mounted in Fire-Rated hollow metal frame specified in Section 08 11 13 "Hollow Metal Doors and Frames."
      - 1) Basis of Design, Insulated Fire-Rated Glass: Firelite IGU by Technical Glass Products/TGP or equivalent product as approved by Architect.

## 2.11 FIRE-RATED GLASS

- A. Filmed Monolithic Ceramic Glass – Glass Type 7: Wire-free safety glazing material for use in accidental human impact safety rated locations such as doors, transoms and borrowed lites with fire rating requirement of 45-minutes, with hose stream test compliance, at interior locations.

B. Properties:

1. Thickness: 3/16"
2. Fire Rating: 45 minutes.
3. Impact Safety Rating: ANSI Z97.1 & CPSC 16CFR1201 (CAT I & II)
4. Maximum width by height of door lite: 36 by 89 inches
5. Maximum area of door lite: 3,204 square inches
6. Maximum width by height of non-door lite: 95 by 95 inches
7. Maximum area of non-door lite: 3,325 square inches.
8. Labeling: Each lite shall be labeled with a permanent logo including the name of the product, manufacturer, approved testing laboratory, fire rating period, and safety glazing standard.
9. Fire rating: Fire rating listed and tested for fire rating scheduled in accordance with ASTM E-163.

C. Acceptable Products:

1. FireLite NT by Technical Glass Products.
2. SuperClear 45-HS by SaftiFirst.

## 2.12 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Dow Corning Corporation; Dow Corning® 790 Silicone Building Sealant.
  - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
  - c. Pecora Corporation; 890NST.
  - d. Tremco Incorporated; Spectrem 1.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Dow Corning Corporation; Dow Corning® 795 Silicone Building Sealant.
- b. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf SCS200.
- c. Pecora Corporation; 895NST.
- d. Tremco Incorporated; Spectrem 2.

## 2.13 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.14 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
  1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surface.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

### 3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- L. Tempered Safety Glazing:
  - 1. Do not cut, seam, nip or abrade tempered safety glass.
  - 2. Set tempered safety glass with tong marks completely concealed or in as inconspicuous a location as possible.
  - 3. Install tempered safety glass in hazardous locations:
    - a. Ingress and egress doors.
    - b. Operable or inoperable panels adjacent to a door in building and within same wall plane as door whose nearest vertical edge is within 24" of door in closed position and whose bottom edge is less than 60" above floor or walking surface.
    - c. Fixed panels which have glazed area in excess of 9 sq. ft. and lowest edge is less than 18" above finished floor level or walking surface within 36" of such glazing where panels are not protected with horizontal member not less than 1-1/2" in width located between 24" and 36" above walking surface.
    - d. Other locations required by building code.

### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.

- F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

### 3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

**END OF SECTION**



**SECTION 09 21 16**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

**A. Section Includes:**

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.
4. Interior gypsum board.
5. Tile backing panels.
6. Acoustical accessories at interior partitions.
7. Trim accessories.
8. Joint treatments.

**1.2 ACTION SUBMITTALS**

**A. Product Data: For the following:**

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.
4. Gypsum board products.
5. Acoustical accessories.
6. Trim accessories.
7. Joint treatment materials.

**B. Shop Drawings:**

1. Include layout, spacings, sizes, thicknesses, and types of gypsum board assemblies; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, supplemental framing, seismic restraints, shear diaphragms, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
3. Indicate locations, fabrication, and installation of control and expansion joints.

**C. Samples: For the following products:**

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For embossed, high-strength steel studs and firestop tracks from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

### 1.4 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.
- B. Mockups: Build mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
  - 1. Build mockups for the following:
    - a. Each level of gypsum board finish indicated for use in exposed locations.
    - b. Each texture finish indicated.
  - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
  - 3. Simulate finished lighting conditions for review of mockups.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
  - 1. Do not install interior gypsum panels and products until installation areas are enclosed and conditioned.
- B. Room Temperatures: Maintain minimum 40 degrees F (4 degrees C). For adhesive attachment and finishing of gypsum board, maintain minimum 50 degrees F (10 degrees C) for 48 hours before application and continuously after until dry. Do not exceed 95 degrees F (35 degrees C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

- D. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- E. Do not install panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials identical to those tested in UL design assemblies indicated on Drawings according to ASTM E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

### 2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
  - 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C645. Use either conventional steel studs and tracks or embossed, high-strength steel studs and tracks.
  - 1. Steel Studs and Tracks:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      - 1) CEMCO; California Expanded Metal Products Co.
      - 2) ClarkDietrich.
      - 3) Custom Stud.
      - 4) MarinoWARE.
      - 5) MBA Building Supplies.
      - 6) Phillips Manufacturing Co.
      - 7) SCAFCO Steel Stud Company.
      - 8) Steel Construction Systems.
      - 9) Telling Industries.
      - 10) The Steel Network, Inc.

- b. Minimum Base-Steel Thickness: As indicated on Drawings, in correlation with vertical unbraced span and horizontal deflection performance requirements.
  - c. Depth: As indicated on Drawings
  - d. Spacing: As indicated on Drawings.
- C. Slip-Type Head Joints: Provide one or more of the following as required to accommodate anticipated floor or roof structure deflection:
- 1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 4 inches (102 mm) minimum vertical movement.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) CEMCO; California Expanded Metal Products Co.; Deflex Clips.
      - 2) ClarkDietrich; Fast Top Clip.
      - 3) Fire Trak Corp; PosiKlip.
      - 4) The Steel Network, Inc.; VertiClip SLD Series.
  - 2. Single Long-Leg Track System: ASTM C645 top track with 4 inches (102 mm) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
  - 3. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above and allowing 1-1/2 inches (38 mm) minimum vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) CEMCO; California Expanded Metal Products Co.; CST Slotted Deflection Track.
      - 2) ClarkDietrich; MaxTrak Slotted Deflection Track.
      - 3) MarinoWARE; Slotted Track.
      - 4) Perfect Wall, Inc.; The System Slotted Deflection Track.
      - 5) SCAFCO Steel Stud Company; SDLT-Slotted Leg Track System.
      - 6) Steel Construction Systems; SDLT-Slotted Leg Track System.
      - 7) Telling Industries; Interior Slotted Track.
- D. Firestop Tracks: Provide one or more of the following as required to accommodate anticipated floor or roof structure deflection:
- 1. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 2 inches (51 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) CEMCO; California Expanded Metal Products Co.; FAS Track.

- 2) Fire Trak Corp; Fire Trak System attached to studs with Fire Trak RediKlip.
  - 3) MarinoWARE; FAS Track 1000.
  - 4) Perfect Wall, Inc.; The System Slotted Deflection Track.
  - 5) SCAFCO Steel Stud Company; SCAFCO Slotted Leg Track System.
  - 6) Steel Construction Systems; Steel-Con Slotted Leg Track System.
2. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 4 inches (102 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) ClarkDietrich; BlazeFrame RipTRAK.
    - 2) Fire Trak Corp; Fire Trak System attached to studs with Fire Trak PosiKlip.
3. Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated and allowing up to 6 inches (153 mm) vertical movement; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- a. Product: Subject to compliance with requirements, provide one of the following:
    - 1) Fire Trak Corp; Fire Trak Shadowline attached to studs with Fire Trak PosiKlip.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Steel Thickness: 0.0359 inch (0.912 mm).
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 1-1/2 inches (38 mm).
  2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C645.
1. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).
  2. Depth: 7/8 inch (22.2 mm).
- H. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
    - a. ClarkDietrich; RC Deluxe.
    - b. SCAFCO Steel Stud Company; Kwik RC.

- c. Steel Construction Systems; RC 1/Serenity.
- 2. Configuration: Asymmetrical.
- I. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Depth: 3/4 inch (19 mm).
  - 2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch (0.8 mm).
  - 3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-steel thickness of 0.0179 inch (0.455 mm), and depth required to fit insulation thickness indicated.

## 2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
  - 1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 AC193 AC58 or AC308 as appropriate for the substrate.
    - a. Material: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
  - 2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length indicated.
- E. Angle-Type Hangers: Angles with legs not less than 7/8-inch (22-mm) wide with a base steel thickness of 0.0538 inch (1.367 mm) and minimum 5/16-inch- (8-mm-) diameter bolted connections.
- F. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Depth: 2 inches (51 mm).
- G. Furring Channels (Furring Members):
  - 1. Cold-Rolled Channels: 0.0538-inch (1.367-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
  - 2. Steel Studs and Tracks: ASTM C645.

- a. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).
  - b. Depth: As indicated on Drawings.
  3. Embossed, High-Strength Steel Studs and Tracks: ASTM C645.
    - a. Minimum Base-Steel Thickness: 0.0190 inch (0.483 mm).
    - b. Depth: As indicated on Drawings.
  4. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 inch (22 mm) deep.
    - a. Minimum Base-Steel Thickness: 0.0296 inch (0.752 mm).
  5. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.
    - a. Configuration: Asymmetrical.
- H. Grid Suspension System for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong Ceiling & Wall Solutions; Drywall Grid Systems.
    - b. Rockfon (Rockwool International); 640/660 Drywall Ceiling Suspension.
    - c. USG Corporation; Drywall Suspension System.

## 2.4 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

## 2.5 INTERIOR GYPSUM BOARD

- A. Gypsum Board: ASTM C1396/C1396M.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Gypsum.
    - b. CertainTeed Gypsum.
    - c. Georgia-Pacific Gypsum LLC.
    - d. National Gypsum Company.
    - e. PABCO Gypsum.
    - f. USG Corporation.
  2. Core: 5/8 inch (15.9 mm), Type X.
  3. Long Edges: Tapered.
- B. Flexible Gypsum Board: ASTM C1396/C1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Gypsum.
    - b. Georgia-Pacific Gypsum LLC.
    - c. National Gypsum Company.

- d. PABCO Gypsum.
  - e. USG Corporation.
  2. Thickness: 1/4 inch (6.4 mm).
  3. Long Edges: Tapered.
- C. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces. Use at ceilings at toilet rooms, locker rooms, kitchens, and other wet and high humidity areas.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. American Gypsum; M-Bloc® Type X with Mold & Moisture Resistance.
    - b. CertainTeed Gypsum; CertainTeed M2Tech Mold and Moisture Resistant Type X Gypsum Board.
    - c. National Gypsum Company; Gold Bond® XP® Fire-Shield® Gypsum Board.
    - d. PABCO Gypsum; MOLD CURB® Plus.
    - e. USG Corporation; USG Sheetrock® Brand Mold Tough® Firecode® X Panels.
  2. Core: 5/8 inch (15.9 mm), Type X.
  3. Long Edges: Tapered.
  4. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- D. Acoustically Enhanced Gypsum Board: ASTM C1396/C1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core. Use where required to achieve STC levels shown on Drawings.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Gypsum; CertainTeed SilentFX QuickCut Type X Acoustical Gypsum Board.
    - b. National Gypsum Company; Gold Bond® SoundBreak XP™ Retrofit™ Board.
    - c. PABCO Gypsum; QuietRock® ES.
  2. Core: 5/8 inch (15.9 mm), Type X .
  3. Long Edges: Tapered.
- E. Abuse-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. American Gypsum; 5/8" M-Bloc® AR Type X with Mold & Moisture Resistance.
    - b. CertainTeed Gypsum; CertainTeed Extreme Abuse Resistant Type X Gypsum Board with M2Tech Mold and Moisture Technology.
    - c. National Gypsum Company; Gold Bond® Hi-Abuse® XP® Gypsum Board.
    - d. PABCO Gypsum; PABCO ABUSE CURB®.
    - e. USG Corporation; USG Sheetrock® Brand Mold Tough® Abuse-Resistant Firecode®.
  2. Core: 5/8 inch (15.9 mm), Type X.



3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
  4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
  5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
  6. Long Edges: Tapered.
  7. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.
- F. Impact-Resistant Gypsum Board: ASTM C1396/C1396M gypsum board, tested according to ASTM C1629/C1629M.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. American Gypsum; 5/8" M-Bloc® IR Type X with Mold & Moisture Resistance. 3233
    - b. CertainTeed Gypsum; CertainTeed Extreme Impact Resistant Type X Gypsum Board with M2Tech Mold and Moisture Technology. 3133
    - c. National Gypsum Company; Gold Bond® Hi-Impact® XP® Gypsum Board. 3133
    - d. PABCO Gypsum; PABCO® Impact Resistant. 2133
    - e. USG Corporation; USG Sheetrock® Brand Mold Tough® VHI (Very High Impact) Firecode® Core. 2233
  2. Core: 5/8 inch (15.9 mm), Type X.
  3. Surface Abrasion: ASTM C1629/C1629M, meets or exceeds Level 2 requirements.
  4. Indentation: ASTM C1629/C1629M, meets or exceeds Level 1 requirements.
  5. Soft-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 3 requirements.
  6. Hard-Body Impact: ASTM C1629/C1629M, meets or exceeds Level 3 requirements according to test in Annex A1.
  7. Long Edges: Tapered.
  8. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

## 2.6 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. National Gypsum Company; Gold Bond, eXP.
    - b. USG Corporation; Securock.
  2. Core: 5/8 inch (15.9 mm), Type X.
  3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

- B. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges. For use at wet and dry walls.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. National Gypsum Company; PermaBase® Cement Board.
    - b. USG Corporation; DUROCK Cement Board.
  - 2. Thickness: 5/8 inch (15.9 mm).
  - 3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

## 2.7 ACOUSTICAL ACCESSORIES

- A. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corporation; NoiseReducer™.
    - b. Johns Manville; a Berkshire Hathaway company; Formaldehyde-free™ Unfaced thermal and acoustical batts.
    - c. Knauf Insulation; EcoBatt® Insulation.
    - d. Owens Corning; EcoTouch® Insulation.
  - 2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
  - 3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
- B. Electrical J-Box Putty Pads: Preformed, moldable putty pads formulated to maintain the performance of acoustically rated wall assemblies by sealing penetrations including common electrical outlets boxes, phone outlet boxes, electrical switches, HVAC ducts, and plumbing connections.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ATS Acoustics; ATS Acoustics Putty Pads.
    - b. The Soundproofing Company Inc.; Acoustical Putty Pads.
    - c. QuietRock; QuietPutty.
- C. Sound Isolation Clips: Decouples gypsum board from structure.
  - 1. Products: Subject to compliance with requirements, provide Model RSIC-1 as manufactured by PAC International.
- D. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. GE Construction Sealants; Momentive Performance Materials Inc.; RCS20 Acoustical.
    - b. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant.
    - c. QuietRock; QuietSeal Pro.

- d. Specified Technologies, Inc.; SpecSeal Smoke 'N' Sound Sealant.
  - e. Tremco Incorporated; Tremco Acoustical Sealant.
  - f. USG Corporation; SHEETROCK Acoustical Sealant.
2. Colors of Exposed Acoustical Joint Sealants: White.

## 2.8 TRIM ACCESSORIES

- A. Interior Trim: ASTM C1047, galvanized or aluminum-coated steel sheet, rolled zinc, or paper-faced galvanized-steel sheet.
  1. Edge Shapes:
    - a. Cornerbead.
    - b. Bullnose bead.
    - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - d. L-Bead: L-shaped; exposed long flange receives joint compound.
    - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    - f. Curved-Edge Cornerbead: With notched or flexible flanges.
  2. Expansion (Control) Joints:
    - a. Products: Subject to compliance with requirements, provide the following:
      - 1) ClarkDietrich; #93 Zinc Control Joint (ZNCJ).
  3. Fire-Rated Expansion (Control) Joints: Composite control joint with intumescent tape factory applied to back of control joint on one side.
    - a. Products: Subject to compliance with requirements, provide the following:
      - 1) ClarkDietrich; FAS-093X Fire Rated Control Joint.
- B. Base-of-Wall PVC Moisture Barrier Trim: Extruded PVC, 1/2 inch (12.7 mm) high.
  1. Products: Subject to compliance with requirements, provide the following:
    - a. Waterguard; Waterguard.
- C. Extruded Aluminum Trim Accessories: Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221 (ASTM B221M), Alloy 6063-T5, of profiles and dimensions indicated.
  1. Reveal Molding, 5/8 inch (15.9 mm) deep by 1/2 inch (12.7 mm) wide:
    - a. Products: Subject to compliance with requirements, provide the following:
      - 1) Fry Reglet; DRM-625-50
    - b. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.
- D. Fire-Rated Reveal Backer: 0.0359 inch (0.912 mm) thick, ASTM A653/A653M, hot-dip galvanized, ASTM C645 flat steel strap backer plate with an affixed cured intumescent strip to maintain fire ratings behind architectural reveal moldings in fire-rated partitions.
  1. Products: Subject to compliance with requirements, provide the following:
    - a. ClarkDietrich; BlazeFrame® "FSB" (Flat Strap Backer).

## 2.9 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Floor Track Seal: Provide the following where indicated:
  - 1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.
- C. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- D. Steel Drill Screws For Gypsum Board: ASTM C1002 unless otherwise indicated.
  - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
  - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

## 2.10 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C475/C475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
  - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
      - 1) National Gypsum Company; Proform Quick Set 90 Setting Compound.
      - 2) USG Corporation; Sheetrock Durabond 90 Setting-Type Joint Compound.
  - 2. Fill Coat: For second coat, use setting-type, sandable topping compound.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
      - 1) National Gypsum Company; Proform Quick Set 90 Setting Compound.
      - 2) USG Corporation; Sheetrock Durabond 90 Setting-Type Joint Compound.

3. Finish Coat: For third coat, use drying-type, all-purpose compound.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
      - 1) National Gypsum Company; Proform All Purpose Joint Compound, Ready-Mixed.
      - 2) USG Corporation; Sheetrock Brand All Purpose Joint Compound, Ready-Mixed.
  4. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
      - 1) National Gypsum Company; Proform Lite Joint Compound, Ready-Mixed.
      - 2) USG Corporation; Sheetrock Brand Lightweight Joint Compound, Ready-Mixed.
- D. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
  2. Cementitious Backer Units: As recommended by backer unit manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and support framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.
- B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches (610 mm) o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754, except comply with framing sizes and spacing indicated.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

### 3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around and above ducts that penetrate partitions above ceiling.
  1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.
    - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.

- c. Extend both jamb studs through suspended ceilings and attach to underside of overhead structure.
  3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
  4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
  5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
  6. Curved Partitions:
    - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.
- E. Direct Furring:
  1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Shaped Furring Members:
  1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches (610 mm) o.c.
  2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
  3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

### 3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  1. Hangers: 48 inches (1219 mm) o.c.
  2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
  3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.

- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by ASTM C 754.
  - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  - 5. Do not attach hangers to steel roof deck.
  - 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
  - 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
  - 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances:
  - 1. Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
  - 2. Where sprinkler heads, diffusers, and speakers are arranged in alignment, variation from exact alignment shall not vary more than 1/2-inch (13-mm) either side of centerline through various element openings.



### 3.6 INSTALLATION OF ACOUSTICAL ACCESSORIES

- A. Place acoustical insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- B. Install electrical J-box putty pads at partitions with high STC ratings in accordance with manufacturer's instructions.
- C. Install acoustical sealant at non-fire-rated partitions in accordance with manufacturer's instructions.

### 3.7 INSTALLATION AND FINISHING OF PANELS, GENERAL

- A. Comply with ASTM C840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies:
  - 1. Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations.
  - 2. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.8 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Type X: Typical.
  - 2. Mold-Resistant Type: At framed surfaces where construction will not be fully protected from potential weather exposure at time of installation.
  - 3. Flexible Type: Apply in double layer at curved assemblies.
  - 4. Acoustically Enhanced Type: As indicated on Drawings.
  - 5. High Performance, Acoustically Enhanced Type: As indicated on Drawings.
- B. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    - a. Stagger abutting end joints not less than 24 inches (600 mm) in alternate courses of panels.
    - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
  - 3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
  - 4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:
  - 1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
  3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
  4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- E. Curved Surfaces:
1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
  2. For double-layer construction, fasten base layer to studs with screws 16 inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches (300 mm) o.c.

### 3.9 INSTALLATION OF TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at dry and wet locations indicated to receive tile including locations scheduled to receive tile greater than 1.4 sq. ft. (0.13 sq. m) in area or 5 lb./sq. ft. (24.4 kg/sq. m) in weight and locations indicated to receive adhered masonry or stone.
- B. Where tile backing panels abut other types of panels in same plane, shim framed surfaces to produce a uniform plane across panel surfaces.

### 3.10 INSTALLATION OF TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Maintain fire ratings of assemblies at control joints. Install control joints according to ASTM C840 and as follows:
1. Partitions: Install control joints:
    - a. no greater than 30 feet (9 m) on center where a partition runs in an uninterrupted straight plane;

- b. at both corners of openings in wall planes, above and below opening, where width of opening is 6 feet (1.8 m) or greater, or where ratio of width to height of wall area above or below opening exceeds 4:1;
    - c. at all spliced joints of vertical studs;
    - d. at other locations indicated on Drawings.
  2. Ceilings: Install control joints:
    - a. no greater than 30 feet (9 m) on center and with total area not to exceed 900 sq. ft. (81 sq. m);
    - b. where sections of "A", "L", "O", "U", "T" and "X" shaped ceiling areas or furr-down areas intersect;
    - c. at other locations indicated on Drawings.
- C. Interior Trim: Install in the following locations:
  1. Cornerbead: Use at outside corners unless otherwise indicated.
  2. Bullnose Bead: Use where indicated on Drawings.
  3. LC-Bead: Use at exposed panel edges.
  4. L-Bead: Use where edge trim can only be installed after gypsum board is installed.
  5. U-Bead: Use at exposed panel edges not intended to receive joint compound.
  6. Curved-Edge Cornerbead: Use at curved openings.
- D. Aluminum Trim: Maintain fire ratings of assemblies at aluminum trim. Install in locations indicated on Drawings.

### 3.11 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels:
  1. Level 0: No taping, finishing, or accessories required.
  2. Level 1:
    - a. Joints: Tape set in joint compound.
    - b. Interior Angles: Tape set in joint compound.
    - c. Surface: Tool marks and ridges acceptable. Surface free of excess joint compound.
  3. Level 2: Also known as "Fire Taping"
    - a. Joints: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.

- b. Interior Angles: Tape embedded in joint compound and wiped with a joint knife, leaving a thin coat of compound over tape.
  - c. Accessories: Shall be covered to one separate coat of joint compound.
  - d. Fasteners: Shall be covered by one separate coat of joint compound.
  - e. Surface: Surface shall be free of excess joint compound. Tool marks and ridges acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
4. Level 3:
- a. Joints: Taped as in Level 2, then covered with one separate coat of joint compound.
  - b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
  - c. Accessories: Shall be covered by two separate coats of joint compound.
  - d. Fasteners: Shall be covered by two separate coats of joint compound.
  - e. Surface: Joint compound shall be smooth and free of tool marks and ridges.
5. Level 4:
- a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.
  - b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
  - c. Accessories: Shall be covered by three separate coats of joint compound.
  - d. Fasteners: Shall be covered by three separate coats of joint compound.
  - e. Surface: Joint compound shall be smooth and free of tool marks and ridges.
6. Level 5:
- a. Joints: Taped as in Level 2, then covered with two separate coats of joint compound.
  - b. Interior Angles: Taped as in Level 2, then covered with one separate coat of joint compound.
  - c. Accessories: Shall be covered by three separate coats of joint compound.
  - d. Fasteners: Shall be covered by three separate coats of joint compound.
  - e. Surface: A thin skin coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.
- E. Gypsum Board Finish Level Schedule: Finish panels to levels indicated below and according to ASTM C840:
- 1. Level 0: Temporary construction or where final finishes have not yet been determined. Do not use in areas where fire ratings or smoke control are required.
  - 2. Level 1: Non-fire-rated ceiling plenum areas, concealed areas, service corridors and other areas not normally exposed to view.
  - 3. Level 2: Provide at non-exposed locations in fire-rated walls and ceilings (fire taping, and at panels that are substrates for tile.

4. Level 3: Areas which are to receive heavy or medium, spray or troweled, texture finishes before final painting and areas where heavy grade wall coverings are to be applied as the final finish.
  5. Level 4: Typical panel surfaces that will be exposed to view unless otherwise indicated.
    - a. a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
  6. Level 5: At panel surfaces identified on Drawings and locations flooded with natural or artificial light and scheduled to receive semi-gloss or gloss paint finish.
    - a. a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."
- F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.12 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION**

## SECTION 09 21 19

### GYPSUM BOARD SHAFT WALL ASSEMBLIES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

###### A. Section Includes:

1. Gypsum board shaft wall assemblies.
  - a. Stairwell enclosures.
  - b. Service shaft enclosures for piping, ductwork, air plenums, electrical and similar services.
  - c. Structural column enclosures.
  - d. Chute enclosures for linen, trash, and similar uses.
  - e. Area separation walls.
2. Metal framing and accessories.
3. Gypsum board wall products and accessories.

##### 1.2 DEFINITION

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined.

##### 1.3 ACTION SUBMITTALS

- A. Product Data: Technical data for each component of gypsum board shaft wall assembly.
- B. Shop Drawings: Submit full scale drawings indicating special or unusual conditions relating to the shaft wall system specified not addressed in manufacturer's product data.
- C. Calculations: Submit calculations verifying steel partition stud minimum base metal thickness and depth compliance with Code and ASTM C645 for height, load, and deflection.

##### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: Certification signed by manufacturers of gypsum board and framing assembly components to certify products comply with specified requirements.
- B. Product Test Reports: Submitted from independent testing indicating and interpreting test results relative to compliance of shaft wall systems with acoustical, fire resistance and structural performance requirements.

- C. Research/Evaluation Reports: For firestop tracks, post installed anchors, and power actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Stack panels flat and support on risers on a flat platform to prevent sagging.
- C. Handle panels to prevent damage to edges, ends and surfaces. Do not bend or damage metal corner beads, trim, track, and studs.

#### 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with gypsum shaftliner board manufacturer's written instructions.
- B. Do not install finish panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, or mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire Resistance Ratings: Fire resistive rated assemblies identical to those indicated by reference in GA 600 or to UL design designations, including those incorporating elevator door others framing, whose fire resistance has been determined by ASTM E 119 by an independent testing agency.
- B. Structural Performance Characteristics: Engineer shaft wall systems to withstand lateral design loadings, positive and negative air pressure, of 5.0 psf. for maximum heights of partitions required with deflection not to exceed L/240 of wall height.

##### Air Pressure

Elevator Velocity - Ft./Min.	1 or 2 Elevators Per Shaft	3 or More Elevators Per Shaft
0 to 180	5.0 psf	5.0 psf
180 to 1,000	7.5 psf	5.0 psf



1,000 to 1,800	10.0 psf	7.5 psf
1,800 to 3,000	15.0 psf	7.5 psf

- C. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency and to achieve a minimum STC Rating specified or noted on Drawings.

## 2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

- A. Fire Resistance Rating: Indicated on Drawings.
- B. STC Rating: Indicated on Drawings typically except at shafts containing drain piping provide STC 51, minimum.
- C. Shaft Wall Systems: Assembly consisting of gypsum shaft wall boards inserted between U- or J-shaped metal floor and ceiling tracks; with specially shaped studs engaged in tracks and fitted between shaftliner boards; and gypsum boards on finished side or sides applied to studs in number of layers, thickness, and arrangement indicated.
1. Studs: I, CH, double-E, or CT profile for repetitive members, corner and end members, and fire resistance rated assembly indicated.
    - a. Depth: As indicated, 2-1/2 inches minimum.
    - b. Minimum Base Metal Thickness: As required to meet performance requirements, 0.018 inch, minimum.
  2. Firestop Tracks: Provide firestop track at head of shaft wall on each floor level.
  3. Room Side Finish: One or two layer(s) of 5/8 inch thick gypsum board as indicated on room side.
  4. Shaft Side Finish: One layer of 5/8 inch of gypsum where finish is indicated on shaft side.
  5. Cavity Insulation: Sound attenuation blankets in thickness required to meet indicated STC ratings.
- D. Gypsum Shaftliner Board:
1. Type X: ASTM C 1396/C 1396M; fire resistive liner panels with paper faces, 1 inch (25.4 mm) thick, with double beveled long edges.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) American Gypsum; Shaft Liner Gypsum Wallboard.
      - 2) CertainTeed Corp.; ProRoc Shaftliner.
      - 3) Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; ToughRock Fireguard Shaftliner.
      - 4) National Gypsum Company; Gold Bond Brand Fire-Shield Shaftliner.
      - 5) USG Corporation; Sheetrock Brand Gypsum Liner Panel.
    - b. Thickness: 1 inch (25 mm).
    - c. Long Edges: Double bevel.

2. Moisture and Mold Resistant Type X: ASTM C 1396/C 1396M; fire resistive liner panels with ASTM D 3273 mold resistance score of 10 as rated according to ASTM D 3274, 1 inch (25.4 mm) thick, and with double beveled long edges.
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) American Gypsum Company; M-Glass Shaft Liner with mold and Moisture Resistance.
    - 2) CertainTeed Corp.; GlasRoc Shaft Liner Type X.
    - 3) Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; Dens-Glass Ultra Shaftliner.
    - 4) National Gypsum Company; Gold Bond Brand EXP Extended Exposure Shaftliner.
    - 5) USG Corporation; Sheetrock Glass-Mat Liner Panels.
  - b. Thickness: 1 inch (25 mm).
  - c. Long Edges: Double bevel.
  - d. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
  - e. Provide at locations installed prior to those areas being fully enclosed and protected from exposure to outside air or other elements, moisture, or humidity.
- E. Nonload Bearing Steel Framing: Complying with ASTM C 645 requirements for metal unless otherwise indicated and complying with requirements for fire resistance rated assembly indicated.
  1. Protective Coating: ASTM A 653/A 653M, G60 (Z180), hot dip galvanized unless otherwise indicated.
- F. Studs: Standard profile for repetitive, corner, and end members:
  1. Depth: Indicated on Drawings.
  2. Minimum Base Metal Thickness: As indicated Provide 0.033 inch (0.84 mm) where not otherwise shown.
- G. Runner Tracks: J profile track with long edge length, but at least 2 inches (51 mm) long and matching studs in depth.
  1. Minimum Base Metal Thickness: As indicated.
- H. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire resistance rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Fire Trak Corp.; Fire Trak System.
    - b. Grace Construction Products; FlameSafe FlowTrak System.
    - c. Metal-Lite, Inc.; The System.
    - d. Steel Network Inc. (The); VertiClip SLD Series.

- I. Finish Panels: As indicated. Provide Gypsum board where not otherwise shown; refer to Section 09 21 16.
- J. Auxiliary Materials: Provide auxiliary materials that comply with shaft wall manufacturer's written instructions.
  1. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 09 21 16 that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.
  2. Control Expansion Joint:
    - a. Control Joint Trim: ASTM C1047, provide #93 Zinc Control Joint (ZNCJ) by Clark Dietrich.
    - b. Fire Rated Control Joint Backer: 0.0179 inch minimum thickness, ASTM A 653 hot dipped galvanized, ASTM C 645 flat steel strap backer plates with an affixed cured intumescent strip to maintain fire ratings behind control joints in fire rated partitions.
      - 1) Manufacturer: Subject to compliance with requirements, provide one of the following:
        - a) BlazeFrame CJB series (Control Joint Backer) by Clark Dietrich for horizontal and vertical control joints.
        - b) Fire Rated Control Joint for Horizontal and Vertical Joints: FAS-093X by Cemco.
    - c. Fire Stop Fire Rated Backer: 0.0296 inch minimum thickness, ASTM A 653 hot dipped galvanized, ASTM C 645 flat steel strap backer plate with an affixed cured intumescent strip to maintain fire ratings behind architectural reveal moldings in fire rated partitions.
      - 1) Manufacturer: Subject to compliance with requirements, provide the following:
        - a) Horizontal and Vertical Joint behind Reveals: BlazeFrame FSB series (Flat Strap Backer) by Clark Dietrich.
  3. Reveal Molding: Vertical or horizontal recessed reveal fabricated from extruded aluminum.
    - a. Dimension: 1/2 inch wide x 5/8 inch deep (13 mm by 16 mm).
    - b. Basis of Design: Subject to compliance with requirements, provide DRM-625-50 by Fry Reglet.
  4. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
  5. Track Fasteners: Power driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
    - a. Expansion Anchors: Fabricated from corrosion resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488/E 488M conducted by a qualified testing agency.
    - b. Power Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to

the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

6. Reinforcing: Galvanized steel reinforcing strips with 0.033 inch (0.84 mm) minimum thickness of base metal (uncoated).
7. Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, gunnable synthetic rubber sealant complying with requirements specified in Section 07 92 00.
8. Sound Attenuation Blankets: Unfaced glass or slag mineral fiber blanket complying with ASTM C 665 for Type I, produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
9. Gypsum Board Cants:
  - a. Gypsum Board Panels: Refer to Section 09 21 16, Type X, 1/2 inch or 5/8 inch (13 mm or 16 mm) panels.
  - b. Adhesive: Laminating adhesive; refer to Section 09 21 16.
  - c. Nonload Bearing Steel Framing: Refer to Section 09 21 16.
  - d. Steel Reinforcing Strip: Refer to Section 05 50 00.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the work. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- B. Proceed with installation after correcting unsatisfactory conditions.

#### 3.2 PREPARATION

- A. Sprayed Fire Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of work remain complete and undamaged. Patch or replace sprayed fire resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in Section 07 81 16.
- B. After sprayed fire resistive materials are applied, remove to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire resistive material thickness below that which is required to obtain fire resistance rating indicated. Protect remaining fire resistive materials from damage.

#### 3.3 INSTALLATION

- A. Install gypsum board shaft wall assemblies to comply with requirements of fire resistance rated assemblies indicated and manufacturer's written installation instructions.
- B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.

- C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
  - 1. Elevator Hoistway: At elevator hoistway entrance door frames, provide jamb struts on each side of door frame.
  - 2. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.
- D. Integrate stair hanger rods with shaft wall system by locating cavity of system as necessary to enclose rods.
- E. Penetrations: At penetrations in shaft wall, maintain fire resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.
- F. Isolate shaft wall system from transfer of structural loading to system, both horizontally and vertically and to prevent cracking of panels while maintaining continuity of fire rated construction. Provide slip or cushioned type joints to attain lateral support and avoid axial loading. Comply with details shown and with manufacturer's instructions.
- G. Seal gypsum board shaft walls at perimeter which abuts other work and at joints and penetrations. Install acoustical sealant to withstand dislocation by air pressure differential between shaft and external spaces; comply with manufacturer's instructions and ASTM C 919.
- H. Firestop Tracks: Where indicated, install to maintain continuity of fire resistance rated assembly indicated.
- I. Control Joints: Install control joints at locations indicated on Drawings but not fewer than according to ASTM C 840 and in specific locations approved by Architect while maintaining fire resistance rating of gypsum board shaft wall assemblies.
- J. Sound Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.
- K. Gypsum Board Cants: At projections into shaft exceeding 4 inches (102 mm) and where indicated, install gypsum board cants covering tops of projections.
  - 1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches (610 mm) o.c. with screws fastened to shaft wall framing.
  - 2. Where nonload bearing steel framing is required to support gypsum board cants, install framing at 24 inches (610 mm) o.c. and extend studs from the projection to shaft wall framing.

- L. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

#### 3.4 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION**

## SECTION 09 30 13

### CERAMIC TILING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Ceramic mosaic tile.
  - 2. Unglazed porcelain floor or wall tile.
  - 3. Glazed or unglazed wall tile.
  - 4. Waterproof membrane.
  - 5. Crack isolation membrane.
  - 6. Metal transitions.

##### 1.2 DEFINITIONS

- A. High-Performance Tile Grout: A factory-prepared grouting material mixture of cement and other ingredients, including a redispersible latex/polymer powder, to which only water is added at the jobsite, or a liquid latex additive.
- B. Improved Modified Dry-Set Mortar (Thinset): Modified Dry-Set Mortar with a minimum bond strength of 300 psi to impervious ceramic tile.
- C. Large and Heavy Tile (LHT): Any tile material weighing 5 lbs./sq. ft. or greater, or any tile with a least horizontal dimension of 15 inches or more.
- D. Modified Dry-Set Mortar for Large and Heavy Tile (LHT): Formerly "Medium Bed Mortar," is a modified dry-set mortar formulated to have a bond coat thickness between 3/32 and 1/2 inch after tile embedment, and declared as an "LHT" setting material by the manufacturer based on these characteristics.
- E. Modified Dry-Set Mortar (Thinset): A factory-prepared setting material mixture of cement and other ingredients, including a redispersible latex/polymer powder, to which only water is added at the jobsite, or a liquid latex additive.

##### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show installation details for ceramic tiles at shower enclosures.
  - 1. Include plans, elevations, component details, and trim details.
  - 2. Indicate materials and profiles of each item.

3. Show fittings, joinery, penetrations, fasteners, anchorages, plumbing fixtures, and other accessory items.

C. Samples:

1. Each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide samples of each color blend.

#### 1.4 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

#### 2.2 TILE PRODUCTS

A. Factory-Mounted Ceramic Mosaic Tile:

1. Products: Subject to compliance with requirements, provide product indicated on Drawings.
2. Composition: Impervious natural clay or porcelain.
3. Certification: Tile certified by the Porcelain Tile Certification Agency.
4. Module Size: As indicated by product designations on Drawings.
5. Thickness: **1/4 inch**.
6. Face: As indicated by product designations on Drawings.
7. Dynamic Coefficient of Friction: For products on floor surfaces, not less than 0.42.



8. Finish: As indicated by product designations on Drawings.
9. Tile Color and Pattern: As indicated on Drawings.
10. Grout Color: As selected by Architect from manufacturer's full range.

B. Unglazed Porcelain Floor or Wall Tile:

1. Products: Subject to compliance with requirements, provide product indicated on Drawings.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face: As indicated by product designations on Drawings.
4. Face Size Variation: Rectified.
5. Thickness: As indicated by product designations on Drawings, but not less than **3/8 inch**.
6. Face: As indicated by product designations on Drawings.
7. Dynamic Coefficient of Friction: For products on floor surfaces, not less than 0.42.
8. Tile Color and Pattern: As indicated on Drawings.
9. Grout Color: As indicated on Drawings.

C. Glazed or Unglazed Wall Tile:

1. Products: Subject to compliance with requirements, provide product indicated on Drawings.
2. Module Size: As indicated by product designations on Drawings.
3. Face Size Variation: Rectified.
4. Thickness: **5/16 inch**.
5. Face: As indicated by product designations on Drawings.
6. Finish: As indicated by product designations on Drawings.
7. Tile Color and Pattern: As indicated on Drawings.
8. Grout Color: As indicated on Drawings.
  - a. Wainscot Cap: Surface bullnose except provide flush tile for Wainscot Cap for Flush Conditions flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.

## 2.3 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
1. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement. Provide membrane approved by IAPMO for use in showers and shower pans
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Custom Building Products; Redgard

- 2) Laticrete International, Inc; Laticrete Hydroban 9235 Waterproof Membrane.
- 3) MAPEI Corporation; Mapelastic Aqua Defense

## 2.4 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; **0.030-inch** nominal thickness.
  1. Products: Subject to compliance with requirements, provide the following:
    - a. Noble Company (The); Nobleseal CIS.
- C. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; **0.040-inch** nominal thickness.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Custom Building Products; Crack Buster Pro-Crack Prevention Mat Underlayment.
    - b. Laticrete Blue 92
    - c. MAPEI Corporation; Mapeguard 2 or Mapesonic 2.
- D. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
    - b. Laticrete International, Inc; Laticrete Blue 92 Anti-Fracture Membrane.
    - c. MAPEI Corporation; Mapelastic HPG with MAPEI Fiberglass Mesh.

## 2.5 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Thinset): ANSI A118.4. For use with standard tile.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ARDEX Americas.
    - b. Bostik, Inc.
    - c. Custom Building Products.
    - d. Laticrete International, Inc.
    - e. MAPEI Corporation.
    - f. TEC; H.B. Fuller Construction Products Inc.
  2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.

3. For wall applications, provide nonsagging mortar.
- B. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15 for Large and Heavy Tile (LHT): Provide product that is approved by manufacturer for application thickness of **1/2 inch**.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. MegaLite; Custom Building Products.
    - b. 257 Titanium; Laticrete International, Inc.
    - c. UltraLite S2; MAPEI Corporation.
  2. Provide prepackaged, dry-mortar mix to which only water must be added at Project site.
  3. For wall applications, provide nonsagging mortar.

## 2.6 GROUT MATERIALS

- A. High-Performance Tile Grout: ANSI A118.7.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. FL Grout; ARDEX Americas.
    - b. Prism Sure-Color Grout; Custom Building Products.
    - c. PermaColor Select; Laticrete International, Inc.
    - d. Ultracolor Plus FA; MAPEI Corporation.
  2. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients.
  3. Where joints size is 1/8 inch or less, use unsanded grout. Where joints are greater than 1/8 inch, use sanded grout.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. WA Grout; ARDEX Americas.
    - b. CEG Lite; Custom Building Products.
    - c. SpectraLOCK ProPremium; Laticrete International, Inc.
    - d. Kerapoxy; MAPEI Corporation.

## 2.7 THRESHOLDS

- A. Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.

- B. Marble Thresholds: ASTM C 503/C 503M, with a minimum abrasion resistance of 10 according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.
  - 1. Description: Uniform, fine to medium grained white stone with gray veining.

## 2.8 MISCELLANEOUS MATERIALS

- A. Manufactured Shower Pan System: Prefabricated shower pan fabricated for each application with 2 percent slope, ADA-complaint, with factory-applied waterproofing and crack-suppression system specified in this Section.
  - 1. Basis of Design: ShowerSlope as manufactured by Custom Building Products or by KBRS Hard Core with compliant waterproofing system, compatible with materials specified in this Section. Provide with drain shown or as specified in Division 22.
- B. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- C. Metal Isolation Shapes, Edge and Trim Strips: Angle or L-shape, height to match tile and setting-bed thickness, designed specifically for application indicated; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
  - 1. Products: Subject to compliance with requirements, provide products scheduled in Transition Schedule on Drawings and as follows:
    - a. Floor Sealer: Outside corners: Schluter Rondec
    - b. Wainscot cap: Schluter Rondec
    - c. Metal nosing: Schluter Trep-E
    - d. Locations specified in drawings: Schluter Jolly
- D. Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bonsal American, an Oldcastle company.
    - b. Custom Building Products.
    - c. Summitville Tiles, Inc.
    - d. TEC; H.B. Fuller Construction Products Inc.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped **1/4 inch per foot** toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
  1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors in wet areas.
    - b. Tile floors consisting of tiles **8 by 8 inches** or larger.
    - c. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- D. Provide manufacturer's standard trim shapes where necessary or indicated to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
- G. Joint Widths: Install tile with joint widths recommended by the manufacturer for products indicated.
- H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints where indicated but not greater than 30 feet on center
  - 1. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 2. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  - 3. Install control and expansion joints in accordance with TCNA Handbook Method No. EJ171.
- J. Metal Edge Strips: Install at locations indicated. If not indicated, install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.
- K. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as floor has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- L. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.
- M. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- N. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

### 3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

### 3.5 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

### 3.6 THINSET INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Floor Installations, Concrete Subfloor: At large and heavy tile provide minimum ½ inch thick mortar bed.
  - 1. Slabs-On-Grade: Unless otherwise indicated, TCNA F113; thinset mortar.
    - a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications and for large and heavy tile.
    - b. Grout: High-performance grout.
  - 2. Restroom Slabs-On-Grade: TCNA F113; thinset mortar.
    - a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    - b. Grout: Water-cleanable epoxy grout.
  - 3. Elevated Slabs: Unless otherwise indicated, TCNA F125-Full; thinset mortar on crack isolation or waterproofing membrane.
    - a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    - b. Grout: High-performance grout.
  - 4. Restroom on Elevated Slabs: TCNA F125-Full; thinset mortar on crack isolation membrane.
    - a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    - b. Grout: Water-cleanable epoxy grout.
- B. Wall Installations:
  - 1. Dry Locations: Unless otherwise indicated, TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.
    - a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
    - b. Grout: High-performance grout.

C. Shower Wall Installations:

1. Wet Locations: TCNA B415; thinset mortar on waterproof membrane over cementitious backer units or fiber-cement backer board.
  - a. Thinset Mortar: Modified dry-set mortar typically. Use improved modified dry-set mortar approved for LHT applications for large and heavy tile.
  - b. Grout: High-performance or epoxy grout.

**END OF SECTION**



**SECTION 09 51 13**  
**ACOUSTICAL PANEL CEILINGS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes acoustical panels and exposed suspension systems for ceilings.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Submit grid layout and related dimensioning, splicing, junctions with adjacent work or ceiling finishes, interrelation of mechanical and electrical items related to system.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: Set of **6-inch**-square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of **6-inch**-long Samples of each type, finish, and color.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Ceiling suspension system members.
  - 2. Structural members to which suspension systems will be attached.
  - 3. Method of attaching hangers to building structure.
    - a. Furnish layouts for cast in place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
  - 4. Carrying channels or other supplemental support for hanger wire attachment where conditions do not permit installation of hanger wires at required spacing.
  - 5. Size and location of initial access modules for acoustical panels.
  - 6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    - a. Lighting fixtures.
    - b. Diffusers.
    - c. Grilles.
    - d. Speakers.

- e. Sprinklers.
      - f. Access panels.
      - g. Perimeter moldings.
    - 7. Show operation of hinged and sliding components covered by or adjacent to
  - B. Product Test Reports: Submit for each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency.
  - C. Evaluation Reports: Submit ICC-ES report for each acoustical panel ceiling suspension system and anchor and fastener type.
  - D. Field quality control reports.
- 1.4 CLOSEOUT SUBMITTALS
- A. Maintenance Data: For finishes to include in maintenance manuals.
- 1.5 QUALITY ASSURANCE
- A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
    - 1. Build mockup of typical ceiling area as shown on Drawings.
    - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
  - B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
  - C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.
- 1.7 FIELD CONDITIONS
- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
    - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
  - 2. Smoke-Developed Index: 50 or less.

### 2.2 ACOUSTICAL PANELS, GENERAL

- A. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectance unless otherwise indicated.

### 2.3 ACOUSTICAL PANELS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products equivalent to those scheduled in Finish Schedule on Drawings.
- B. Other Acceptable Manufacturers: Acceptable manufacturers include but are not limited to the following:
  - 1. CertainTeed
  - 2. Rockfon
  - 3. US Gypsum Company
  - 4. Armstrong World Industries

### 2.4 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
  - 1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
  - 1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain,

without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

- a. Type: Postinstalled expansion or bonded anchors.
  - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  2. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
  3. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.
- D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
- F. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.
- H. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in place.

## 2.5 METAL SUSPENSION SYSTEM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings.
- B. Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished flanges.
  1. Structural Classification: Intermediate-duty system.
  2. End Condition of Cross Runners: Override (stepped) or butt-edge type.

## 2.6 METAL EDGE MOLDINGS AND TRIM

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings.
- B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
  - 1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with **ASTM B 221** for Alloy and Temper 6063-T5.
  - 2. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
  - 3. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of **1.5 mils**. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

## 2.7 ACOUSTICAL SEALANT

- A. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
  - 2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
  - 3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
  - 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
  - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
  - 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  - 8. Do not attach hangers to steel deck tabs.
  - 9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
  - 10. Space hangers not more than **48 inches** o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than **8 inches** from ends of each member.
  - 11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

- C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  - 2. Screw attach moldings to substrate at intervals not more than **16 inches** o.c. and not more than **3 inches** from ends, leveling with ceiling suspension system to a tolerance of **1/8 inch in 12 feet**. Miter corners accurately and connect securely.
  - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
  - 1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
  - 2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  - 3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
  - 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
  - 5. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**END OF SECTION**

**SECTION 09 65 13.13**  
**RUBBER BASE AND ACCESSORIES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Rubber base.
  - 2. Rubber molding accessories.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, not less than **12 inches** long.

**PART 2 - PRODUCTS**

**2.1 RUBBER BASE**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Armstrong World Industries, Inc.
  - 2. Burke Mercer Flooring Products, Division of Burke Industries Inc.
  - 3. Flexco.
  - 4. Johnsonite; A Tarkett Company.
  - 5. Mondo Rubber International, Inc.
  - 6. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
  - 1. Group: I (solid, homogeneous).
  - 2. Style and Location:
    - a. Style B, Cove: Provide in areas indicated.
- C. Thickness: **0.125 inch**.
- D. Height: 4 inches..
- E. Lengths: Coils in manufacturer's standard length.



- F. Outside Corners: Preformed.
- G. Inside Corners: Job formed.
- H. Colors: As indicated on Drawings.

## 2.2 RUBBER MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Roppe Corporation, USA.
  - 2. VPI, LLC, Floor Products Division.
- B. Profile and Dimensions: As indicated on Drawings.
- C. Locations: Provide rubber molding accessories in areas indicated.
- D. Colors and Patterns: As indicated on Drawings.

## 2.3 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
  - 1. Adhesives shall have a VOC content of 50 g/L or less.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

### 3.2 RUBBER BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
  - 1. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than **4 inches** in length.
    - a. Miter or cope corners to minimize open joints.

### 3.3 RUBBER ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
  - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
  - 2. Tightly adhere to substrates throughout length of each piece.
  - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

**END OF SECTION**

**SECTION 09 91 23**  
**INTERIOR PAINTING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Surface preparation and application of interior paint coating systems on interior substrates.
1. Concrete.
  2. Concrete masonry units (CMUs).
  3. Steel and iron not otherwise schedule to receive high-performance coating.
  4. Galvanized metal.
  5. Aluminum (not anodized or otherwise coated).
  6. Gypsum board.
  7. Cotton or canvas insulation covering.
  8. ASJ insulation covering.
  9. Other exposed surfaces not scheduled to receive factory finish.
- B. Specialty Paints:
1. Provide whiteboard/dry erase paint at SPT-2.
  2. Provide "green screen" paint at SPT-3.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
1. Prefinished items include the following shop- and factory-finished components:
    - a. Architectural woodwork and casework.
    - b. Metal lockers.
    - c. Prefinished elevator entrance doors and frames.
    - d. Elevator equipment.
    - e. Finished mechanical and electrical equipment.
    - f. Light fixtures.
    - g. Distribution cabinets.
  2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
    - a. Furred areas.
    - b. Ceiling plenums.
    - c. Pipe spaces.
    - d. Duct shafts.
    - e. Elevator shafts.

3. Finished metal surfaces include the following:
  - a. Door hardware.
  - b. Aluminum.
  - c. Brass.
  - d. Bronze.
  - e. Chromium plate.
  - f. Copper.
  - g. Nickel.
  - h. Stainless steel.
4. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
5. Operating parts including moving parts of operating equipment and the following:
  - a. Valve and damper operators.
  - b. Linkages.
  - c. Sensing devices.
  - d. Motor and fan shafts.

## 1.2 DEFINITIONS

- A. Gloss Factors: Values of various degrees of luster when tested in accordance with ASTM D 523 shall comply with following:
  1. Gloss Level 1 – Flat: Not more than five units at 60 degrees and 10 units at 85 degrees.
  2. Gloss Level 2 – Low Sheen: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
  3. Gloss Level 3 – Eggshell: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
  4. Gloss Level 4 – Satin: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
  5. Gloss Level 5 – Semigloss: 35 to 70 units at 60 degrees.
  6. Gloss Level 6 – Gloss: 70 to 85 units at 60 degrees.
  7. Gloss Level 7 – High Gloss: More than 85 units at 60 degrees.

## 1.3 COORDINATION

- A. Coordination of Work: Coordinate field finishing of shop primed metals are provided to ensure compatibility of total systems for various substrates.

## 1.4 ACTION SUBMITTALS

- A. Product Data: Technical data and product information for block fillers, primers, paints, and coatings, including label analysis and instructions for handling, storing, surface preparation, and application for each paint and coating system.

1. For field painting of factory primed metal products and fabrications, submit technical data for each type of paint product, surface preparation requirements, and application instructions.
  2. Indicate manufacturer's instructions for special surface preparation procedures and substrate conditions requiring special attention.
  3. Product List: Provide inclusive list of required coating materials. Indicate each material and cross reference specific coatings, finish system, and application. Identify each material by manufacturer's catalog number, series, and general classification. Use same designations indicated in Finish Schedules.
- B. Samples: Submit aged (minimum seven day old) paint samples for each type of paint system and each color and gloss of topcoat.
1. Provide stepped draw-down samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
    - a. Label draw-down samples with the following:
      - 1) Paint manufacturer.
      - 2) Manufacturer's color name, number, and sheen.
      - 3) Paint formula employed to produce designated color and sheen.
      - 4) Date paint was mixed.
  2. Provide list of material and application for each coat of each sample. Label each sample as to location and application.
  3. Submit samples on substrates for review of color and texture:
    - a. Concrete: Two 4 inch (50 mm) square samples for each color and finish.
    - b. Concrete Masonry: Two 4 by 8 inch (100 by 200 mm) samples of masonry, with mortar joint in the center, for each finish and color.
    - c. Painted Wood: Two 12 inch (305 mm) square samples of each color and material on hardboard.
    - d. Ferrous and Nonferrous Metals: Two 4 inch (100 mm) square samples of flat metal and two 8 inch (200 mm) long samples of solid metal for each color and finish.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For applicator.
- B. Quality Control Submittals: Furnish certificates from manufacturer that products supplied comply with VOC content limits and emission in accordance with local, state, and federal regulations and sustainability limit requirements.

## 1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with Federal and local toxicity and air quality regulations and with Federal requirements on content of for heavy metals including but not limited to lead and mercury. Do not use solvents in paint products that contribute to air pollution.

- B. Applicator Qualifications: Entity having minimum 5 years documented experience in applying paints and coatings similar in material, design, and extent to those indicated.
- C. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
  - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Container Labels: Include manufacturer's name, type of paint, brand name, lot number and date of manufacturer, brand code, coverage rate, surface preparation, instructions for mixing and reducing drying time, cleanup requirements, color designation, and application instructions.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F (7 degrees C).
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Remove rags and waste from storage areas daily.

#### 1.8 FIELD CONDITIONS

- A. Do not thin or add water to waterbased paints, including waterbased alkyds.
- B. Weather Conditions:
  - 1. Apply paints when temperature of surfaces to be painted and ambient air temperatures are between 50 degrees F and 95 degrees F (10 degrees C and 35 degrees C).
  - 2. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

3. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (35 degrees C) for exterior, unless otherwise indicated by manufacturer's Product Data Sheet.
- C. Apply solvent thinned paints when temperatures of surfaces to receive paint and surrounding air are between 45 degrees F. and 95 degrees F (7 degrees F and 35 degrees C).
  1. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.
- D. Painting may continue during inclement weather if surfaces and areas to receive paint and coatings are enclosed and heated within temperature limits specified by the manufacturer during application and drying periods.
- E. Provide lighting level of 80 foot-candles (860 lx) measured mid-height at substrate surface.

#### 1.9 SURPLUS MATERIALS

- A. Inquire and coordinate with Owner regarding disposition of excess and leftover paint materials. If Owner wishes to retain excess materials for maintenance and touch-up purposes, deliver excess materials to designated storage area as directed by Owner.
  1. Any materials not retained by Owner shall become the property of the Contractor and shall be removed from the site.

#### PART 2 - PRODUCTS

- A. Source Limitations: Obtain block fillers, primers, and undercoats for each coating system from the same manufacturer as the finish coats.
- B. Acceptable Manufacturers: Provide first quality, 100% acrylic, commercial or industrial products of one of the specified manufacturers. Residential-grade products are not permitted.
  1. Benjamin Moore & Co. (Moore).
  2. PPG/Glidden Professional Paints (PPG).
  3. PPG Industries, Pittsburgh Paints (PPG).
  4. The Sherwin-Williams Company (S-W).
- C. Specialty Paints:
  1. Whiteboard/Dry Erase Paint for Use at SPT-2: As scheduled on Drawings, with magnetic primer, or equivalent products by other acceptable manufacturers.
  2. "Green Screen" Paint for Use at SPT-3: As scheduled on Drawings.
    - a. No substitutions.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Performance and Durability: Refer to the following as applicable to products and surfaces specified.
  - 1. ASTM D 16 Standard Test Method for Load Testing Refractory Shapes at High Temperatures.
  - 2. ASTM D 2486 Standard Test Method for Scrub Resistance of Interior Wall Paint.
  - 3. ASTM D 2805 Standard Test Method for Hiding Power of Paints by Reflectometry.
  - 4. ASTM D 4828 Standard Test Method for Practical Washability of Organic Coatings.
  
- B. Chemical Components of Field Applied Interior Paints and Coatings: Provide topcoat paints and anticorrosive and antirust paints applied to ferrous metals that comply with chemical restrictions; these requirements do not apply to paints and coatings applied in a fabrication or finishing shop:
  - 1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  - 2. Restricted Components: Paints and coatings shall not contain components restricted by the EPA.

## 2.3 MATERIALS

- A. Material Compatibility:
  - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
  
- B. Accessories: Linseed oil, shellac, turpentine, paint thinners, and similar materials not specifically indicated but necessary to achieve the finishes specified for commercial quality.
  
- C. Patching Materials: Latex filler compatible with paint systems.
  
- D. Fastener Head Cover Materials: Latex filler.
  
- E. Colors: As indicated in Finish Schedule on Drawings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.



- B. Test substrates after repairing and cleaning substrates but prior to application of paint and coatings.
  - 1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
    - a. Concrete: 12 percent.
    - b. Masonry (Clay and CMUs): 12 percent.
    - c. Portland Cement Plaster: 12 percent.
    - d. Gypsum Board: 12 percent.
  - 2. Test cementitious substrates and plaster cement/stucco for alkalinity (pH).
- C. Gypsum Board Substrates: Verify joints are properly taped and finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
  - 1. Verify previously painted surfaces can be stripped to bare substrate, repaired if necessary, and prepared to receive new paint or coating system consisting of primer and two top coats at a minimum.
    - a. When previously painted surfaces have failed to accept new paint systems, determine cause of failure and take corrective measures to ensure each surface accepts new paint or coating system. Failure of new paint system is not permitted.
  - 2. Shop Primed Metals: Inspect shop primed metals to determine if primer is in condition to receive and is compatible with topcoats.
- E. Commence paint and coating application after correcting unsatisfactory conditions and surfaces are dry. Application of coating indicates applicator's acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Coordination of Work:
  - 1. Preprimed Substrates: Inspect existing conditions in which primers are factory applied to ensure compatibility of the total system for each substrate. Notify Architect of anticipated problems when using the materials specified over factory primed or preprimed substrates.
  - 2. Existing Painted Surfaces: Inspect previously painted surfaces to ensure compatibility of the existing paints with new paint system for each substrate. Notify Architect of anticipated problems.
  - 3. Repair defects and clean surfaces affecting bond with paint system. Remove existing paints exhibiting loose surface defects showing signs of rust, scale, or delamination.
  - 4. Seal marks which may bleed through surface finishes.

5. Touch up shop primer or previously painted surfaces prior to application of topcoats.
- C. Surface Cleaning and Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each substrate condition.
- D. Provide barrier coats over incompatible primers or remove and reprime. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting
1. Before applying paint or surface treatments, clean substrates of substances that impair bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and contaminants from the cleaning process will not fall on wet, newly painted surfaces.
  2. Remove hardware, covers, plates, and similar items in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting.
    - a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface applied protection.
  3. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
  4. Seal marks which may bleed through surface finishes with shellac.
  5. Provide barrier coats over incompatible primers or remove and reprime.
  6. Correct defects and clean surfaces which affect the Work.
  7. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- E. Cementitious Substrates: Remove release agents, curing compounds, efflorescence, chalk, dust, dirt, grease, oils, release agents, mold, mildew, and existing paint. Roughen as necessary to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
1. Use abrasive blast cleaning methods if recommended by paint manufacturer.
  2. Do not paint surfaces if moisture content or alkalinity of surfaces exceeds that permitted in manufacturer's written instructions.
    - a. Determine alkalinity and moisture content of surfaces by performing appropriate pH testing. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct condition prior to application of paint.
    - b. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m).
    - c. Relative Humidity Test: Using in situ probes, ASTM F 2170. Proceed with installation after substrates have obtained percent relative humidity level recommended by paint manufacturer.

- d. Perform additional moisture tests when recommended by manufacturer. Proceed with installation when moisture content complies with that permitted in manufacturer's written instructions.
    - e. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to thoroughly dry.
  3. Clean concrete floors to receive paint or coating with a 5 percent solution of muriatic acid or etching cleaner. Flush floors with clean water to remove acid; neutralize with ammonia, rinse, allow to dry; vacuum before painting.
- F. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- G. Ferrous Metals: Remove rust, loose mill scale, and shop primer. Clean ungalvanized ferrous metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.
  1. SSPC-SP 11.
- H. Shop Primed Ferrous Metal Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop primed surfaces.
  1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
  2. Touch up bare areas and damaged shop applied prime coats. Wire brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- I. Galvanized Ferrous Metal Substrates: Clean galvanized surfaces with nonpetroleum based solvents leaving surface free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- J. Aluminum Substrates: Remove surface oxidation with acid etch and solvent washing. Remove oil, grease, surface oxidation, and contaminants in accordance with SSPC SP-1 Solvent Cleaning. Apply etching primer immediately following cleaning.
- K. Wood Substrates:
  1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
  2. Sand surfaces that will be exposed to view, and dust off.
  3. Prime, stain, or seal wood to be painted. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.

4. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
  5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- L. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- M. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- N. Mildew and Mold Removal: Remove mildew and mold by high power washing (pressure range of 1500 to 4000 psi) with solution of trisodium phosphate and bleach. If substrate is too soft for high power washing, scrub substrate with solution. Rinse with clean water and allow surface to dry.
- O. Protective Coverings: Provide protections for duration of the Work, including covering furnishings and decorative items. Protect and mask adjacent finishes and components against damage, marking, overpainting, and injury. Clean and repair or replace damage caused by painting.
- P. Renovated Surfaces: Clean surface free of loose dirt and dust. Except at gypsum board surfaces, remove existing paint and coatings to bare substrate and prepare substrates to receive new paint system. Test substrate to verify it will bond with primer and receive new paint system without failure. If test fails, clean surface to base substrate and apply barrier coat. Retest to verify surface will accept new paint system.
1. Remove surface film preventing proper adhesion and bond.
  2. Wash glossy paint with a solution of sal soda and rinse thoroughly.
  3. Remove loose, blistered, and defective paint and varnish; smooth edges with sandpaper.
  4. Clean corroded iron and steel surfaces.
  5. Repair and blend into portland cement plaster.
  6. Prime bare surfaces.
  7. Tone varnished surfaces with stain bringing to uniform color.
  8. If existing surfaces cannot be put in acceptable condition for finishing by customary cleaning, sanding, and puttying operations, notify Owner and do not proceed until correcting unsatisfactory conditions.
- Q. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- R. Pipe Covering and Insulation: Remove loose, foreign, and objectionable material before applying sealing coat.
- S. Preparation of Substrates for Wallcovering: Prime and seal substrate with release coat in accordance with wallcovering manufacturer's recommendations for substrate.
1. Assure compatibility with product of wall covering manufacturer.

2. Fill indentations in substrate and prime with opaque white primer before applying release coat.
  3. Apply release coat in accordance with manufacturer's recommendations.
- T. Barrier Coat: Provide barrier coats over incompatible primers or remove and reprime. Notify Owner in writing of anticipated problems using specified finish coat material over previously coated substrates.
- U. Paint and Coating Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  3. Do not use thinners for water based paints.
  4. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat. Provide sufficient differences in shade of undercoats to distinguish each separate coat.
- V. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- W. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- X. Wood and Metal Doors: Seal top and bottom edges with primer.

### 3.3 APPLICATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
1. The term exposed surfaces includes areas visible when permanent or built in fixtures, grilles, convector covers, covers for finned tube radiation, and similar components are in place. Extend coatings in these areas to maintain system integrity and provide desired protection.
  2. Provide finish coats compatible with primers.
  3. Use applicators and techniques suited for paint and substrate indicated.
  4. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  5. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces.
    - a. Field painting of exposed surfaces include bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and

- surfaces of mechanical and electrical equipment that do not have a factory applied final finish.
- b. Areas visible when permanent or built in fixtures, grilles, convector covers, covers for finned tube radiation, and similar components are in place.
  - c. Extend coatings in areas, as required, to maintain system integrity and provide desired protection.
  - d. Finish doors on tops, bottoms, and side edges the same as exterior faces.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
  7. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  8. rating, or nomenclature plates.
  9. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or surface imperfections. Cut in sharp lines and color breaks.
  10. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  11. Paint entire exposed surface of window frames and sashes.
  12. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  13. Sand lightly between each succeeding enamel or varnish coat.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Minimum Coating Thickness: Apply paint materials to dry film thickness indicated in pain schedule but no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
1. Measure film thickness on magnetic surfaces by use of Elcometer thickness gauge and on nonmagnetic surfaces by pit gauge or Tooke Gauge.
- F. Application: Apply first coat to surfaces that have been cleaned, pretreated, or prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.

2. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished after removing rust and scale and priming or touching up surface sand if acceptable to topcoat manufacturers.
  3. If undercoats, stains, or conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
  4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried and cured to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- G. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
1. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
  2. Prime and paint uninsulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, heat exchangers, tanks, ductwork, conduit, switchgear, and paintable insulation except where items are prefinished.
  3. Paint interior surfaces of air ducts, and convector and baseboard heating cabinets visible through grilles and louvers with one coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
  4. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
  5. Color code equipment, piping, conduit, and exposed ductwork in accordance with requirements indicated. Color band and identify with flow arrows, names, and numbering.
  6. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
  7. Concealed Members: Wherever steel and metal parts to receive paint are built into and concealed by construction, paint as specified for exposed parts so finish painting is complete before members are concealed.
  8. Paint the following work where exposed to view:
    - a. Equipment, including panelboards and switch gear.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Tanks that do not have factory applied final finishes.
    - h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or paintable jacket material.

9. Paint the following work where exposed in occupied spaces:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.
    - e. Metal conduit.
    - f. Plastic conduit.
    - g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
    - h. Other items as directed by Architect.
  10. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.
- H. Items not to Receive Paint: Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
- I. Electrostatic Spray Painting: Apply coating electrostatically to finished surfaces, free from runs, sags, visible overlaps, holidays, craters, pinholes and other defects detrimental to protective and decorative qualities of coating.
1. Thickness of Coatings: 1.5 to 2.0 mils dry film thickness. Measure dry film thickness with magnetic gauge.
  2. Use application techniques, equipment, materials, and preparation procedures recommended by manufacturer.
- J. Block Fillers: Apply block fillers to concrete masonry block at rate to ensure complete coverage with pores filled.
- K. Prime Coats: Before applying finish coats, apply prime coat, recommended by manufacturer, to material required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or defects due to insufficient sealing.
- L. Finish Coats: Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance without bleed through.
1. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or surface imperfections is not acceptable.
  2. Transparent (Clear) Finishes: Use multiple coats to produce glass smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats.



- M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- N. Touch Up: Touch up marred, scraped, and blemished areas of surfaces which were factory primed or previously coated.
  - 1. Prepare and touch up scratches, abrasions, and blemishes and remove foreign matter before proceeding with succeeding coats.
  - 2. Touch up marred, scraped, and blemished areas of factory primed or previously coated surfaces.
  - 3. Feather touch up coating overlapping minimum 2 inches onto adjacent unblemished areas producing smooth, uniform surface.
  - 4. As soon after erection and installation as possible, touch up fasteners, welded surfaces and surroundings, field connections, and areas on which shop coat has been abraded or damaged with specified primer before corrosion and other damage occurs from exposure.

### 3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
  - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
  - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

### 3.5 WASTE MANAGEMENT

- A. Paint products are considered hazardous materials. Do not empty or allow excess paint to enter storm drainage systems. Comply with manufacturer's written instructions for disposal of leftover paint and paint buckets.
- B. Waste Disposal: Legally dispose of metal, plastic, and product waste, including accessories and used items, by recycling or reusing waste materials.
- C. Clean and recycle plastic paint containers. Do not dispose of paint containers in landfills.
- D. Do not dispose of unused paints, stains, and coatings by pouring into storm drainage or sewer systems.
- E. Do not allow run off water resulting from washing paint containers and applicators to seep into the ground or run into the storm drainage or sewer systems.
  - 1. Prior to disposing, allow unused paint to dry in can before legally disposing.
- F. Legally dispose of unused paint, stain, and coatings and the containers in accordance with manufacturer's recommendations and environmental regulations.

### 3.6 CLEANING AND PROTECTION

- A. Clean Up: At end of each day, remove rubbish, empty cans, rags, and other discarded materials from site. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protections: Protect Work of other trades against damage from paint application. Correct damage to Work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
- D. At completion of painting activities, touch up and restore damaged or defaced painted surfaces.
- E. Provide *Wet Paint* signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work. After related Work is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

### 3.7 INTERIOR PAINT AND COATING SCHEDULE

- A. Cotton or Canvas Covering over Insulation:
  - 1. Finish: Interior, flat, latex-based paint.
    - a. PPGG: Glidden Ultra-Hide No VOC Interior Flat Paint 1209 (0 g/L VOC), 1.3 - 1.5 mils dft/coat.
    - b. Moore: 219 Eco Spec Interior Latex Flat 9) g/L VOC), 1.2 mils dft/coat minimum.
    - c. PPG: 9100 Series Pure Performance Interior flat Latex (0 g/L VOC), 1.8 mils dft/coat minimum.
    - d. S-W: ProMar 200 Zero VOC Interior Flat Paint B30-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.
- B. Gypsum Board:
  - 1. Finish: Lusterless (flat) latex; primer and two finish coats.
  - 2. Primer: No Substitutions.
    - a. PPGG: Glidden Lifemaster No VOC Interior Primer Sealer 9116-1200, (0 g/L VOC), 1.4 mils dft minimum.
    - b. Moore: Ultra Spec 500 Waterborne Interior Primer Sealer N534, (0 g/L VOC), 1.8 mils dft minimum.
    - c. PPG: Speedhide Interior Latex Primer Sealer 6-2, (<50 g/L VOC), 1.0 mils dft minimum.
    - d. S-W: ProMar 200 Zero VOC Interior Latex Primer B28W2600 (0 G/L VOC), 1.5 mils dft minimum.
  - 3. Finish Coats:

- a. PPG: Glidden Lifemaster No VOC Interior Flat Paint 9100 (0 g/L VOC), 1.3 - 1.5 mils dft/coat.
  - b. Moore: Waterborne Ceiling Paint, Flat, 0 VOC, 508, 1.4 mils dft/coat
  - c. PPG: 6-4110XI Speedhide zero Interior Flat Latex (0 g/L VOC), 1.8 mils dft/coat minimum.
  - d. S-W: ProMar 200 Zero VOC Interior Flat Paint B30-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.
4. Location: Ceilings Only.
- C. Gypsum Board:
1. Finish: Satin latex enamel; primer and two finish coats.
  2. Primer: No Substitutions.
    - a. BM: Eco Spec WB Interior Latex Primer N372/F372 (<51 g/L VOC)
    - b. PPG: Speedhide Interior Latex Primer Sealer 6-2, (<50 g/L VOC), 1.0 mils dft minimum.
    - c. S-W: ProMar 200 Zero VOC Interior Latex Primer B28W2600 (0 G/L VOC), 1.5 mils dft minimum.
  3. Finish Coats:
    - a. BM: Premium Interior Latex Eggshell W626/K626 (<51 g/L VOC)
    - b. PPG: 6-411 Series Speedhide Interior Enamel Eggshell Latex (73 g/L VOC), 1.5 – 1.7 mils dft/coat.
- D. Ferrous Metal:
1. Finish: Semi-Gloss latex enamel; primer and two finish coats.
  2. Primer:
    - a. PPGG: Devoe Coatings Devflex 4020PF DTM Primer & Finish (75 g/L VOC), 2.2 – 3.5 mils dft.
    - b. Moore: 363 IronClad Latex Low Lustre Metal & Wood Enamel (<150 g/L VOC), 1.6 mils dft minimum.
    - c. PPG: 90-712 Series Pitt-Tech Interior/Exterior Primer/Finish DTM Industrial Enamel (123 g/L VOC), 2.0 – 3.0 mils dft.
    - d. S-W: Pro Industrial Pro-Cryl Univeral Acrylic Primer B66-310 (<100 g/L VOC), 2.0 – 4.0 mils dft.
  3. Finish Coats:
    - a. PPGG: Glidden Ultra-Hide No VOC Interior Semi-Gloss Paint 1415 (0 g/L VOC), 1.3 dft/coat minimum.
    - b. Moore: 276 Moorcraft Super Spec Latex Semi-Gloss Enamel (< 150 g/L), 1.2 mils dft/coat minimum.
    - c. PPG: 6-500 Series Speedhide Interior Semi-Gloss Acrylic Latex (90 g/L VOC), 1.5 – 1.7 mild dft/coat.
    - d. S-W: S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel B31-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.
- E. Ferrous Metal – Guardrails and Handrails: Refer to Section 09 96 59 “High-Performance Coatings.”

F. Ferrous Metal – Doors, Frames:

1. Finish: Semi-gloss, waterborne light industrial coating; primer and two finish coats.
2. Primer:
  - a. PPGG: Devoe, Devflex 4020 Direct to Metal Primer & Flat Finish (91 g/L VOC) 2.2 – 3.5 mils dft.
  - b. PPG: Pitt-Tech Plus, Int/Ext DTM Industrial Primer 90-912 (<90 g/L VOC) 2.0 – 4.0 mils dft.
  - c. S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 (<100 g/L VOC) 2.0 – 4.0 mils dft.
3. Finish Coats:
  - a. PPGG: Devoe High Performance Devflex 4216 High Performance WB Acrylic Semi-Gloss Enamel 4216L (<150 g/L VOC) 2.0 – 4.0 mils dft/coat.
  - b. PPG: Pitt-Glaze WB1, Pitt-Glaze WBI Int. Semi-Gloss Acrylic Epoxy 16-510 (<100 g/L VOC) 1.5 mils dft/coat minimum.
  - c. S-W: Pro Industrial, Pre-Catalyzed Waterbased Epoxy Semi-Gloss (<143 g/L VOC) 1.5 mils dft/coat minimum.

G. Ferrous Metal – Galvanized:

1. Finish: Semi-Gloss latex enamel; primer and two finish coats.
2. Primer:
  - a. PPGG: Devoe Coatings Devflex 4020 DTM Primer & Finish (75 g/L VOC), 2.2 – 3.5 mils dft.
  - b. Moore: 363 IronClad Latex Low Lustre Metal & Wood Enamel (<150 g/L VOC), 1.6 mils dft minimum.
  - c. PPG: 90-712 Series Pitt-Tech Interior/Exterior Primer/Finish DTM Industrial Enamel (123 g/L VOC), 2.0 – 3.0 mils dft.
  - d. S-W: Pro Industrial Pro-Cryl Universal Acrylic Primer B66-310 (<100 g/L VOC), 2.0 – 4.0 mils dft.
3. Finish Coats:
  - a. PPGG: Glidden Ultra-Hide No VOC Interior Semi-Gloss Paint 1415 (0 g/L VOC), 1.3 dft/coat minimum.
  - b. Moore: 276 Moorcraft Super Spec Latex Semi-Gloss Enamel (<150 g/L VOC), 1.2 mils dft/coat minimum.
  - c. PPG: 6-500 Series Speedhide Interior Semi-Gloss Acrylic Latex (90 g/L VOC), 1.5 – 1.7 mild dft/coat.
  - d. S-W: S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel B31-2600 (0 G/L VOC), 1.7 mils dft/coat minimum.

H. Woodwork:

1. Finish: Semi-gloss waterborne acrylic enamel; primer and two finish coats.
2. Primer:
  - a. PPGG: Glidden Gripper Interior/Exterior Primer Sealer 3210-1200, (<100 g/L VOC), 1.7 mils dft minimum.
  - b. Moore: 216 Regal First Coat Interior Latex Primer & Underbody (<100 g/L VOC), 1.0 mils dft minimum.

- c. PPG: 17-921 Series Seal Grip Interior/Exterior 100% Acrylic Universal Primer/Sealer (89 g/L VOC), 1.2 – 1.5 mils dft.
  - d. S-W: Premium Wall & Wood Interior Latex Primer B28W8111 (41 g/L VOC), 1.8 mils dft minimum.
3. Finish Coats:
- a. PPGG: Glidden Ultra-Hide 250 Interior Semi-Gloss Paint 1406N (<50 g/L VOC), 1.4 mils dft/coat minimum.
  - b. Moore: 314 Low Lustre Waterborne Satin Impervo (<150 g/L VOC), 1.4 mils dft/coat minimum.
  - c. PPG: 87-6 Series Manor Hall Interior Semi-Gloss Acrylic Latex (140 g/L VOC), 1.3 – 1.4 mils dft/coat.
  - d. S-W: ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel B31-2600 (0 G/L VOC), 1.6 mils dft/coat minimum.

**END OF SECTION**

SECTION 09 96 53  
ELASTOMERIC COATINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes elastomeric coatings at CMU and concrete:
1. Surface preparation, including crack repair.
  2. Application of block filler, primer if required, and elastomeric finish coat.

1.2 REFERENCES

- A. ASTM International:
1. ASTM D 412: Rubber Properties in Tension.
  2. ASTM D 552: Test for Cellular Rubber Products.
  3. ASTM D 1653: Test Methods for Water Vapor Transmission of Organic Coating Films.
  4. ASTM D 2370: Test Method for Tensile Properties of Organic Coatings
  5. ASTM D 6904: Standard Practice for Resistance to Wind Driven Rain for Exterior Coatings Applied on Masonry.
  6. ASTM E 96: Water Vapor Transmission of Materials.

1.3 SUBMITTALS

- A. Product Data: For each primer, block filler, and finish coat specified submit basic material and instructions for handling, storage and application.
- B. Samples:
1. Provide stepped samples, defining block filler, primer and finish coats.
  2. Substrate: Two 8 inch square samples of concrete masonry, with mortar joint in center, for each color and texture required.
- C. Quality Control Submittals:
1. Certification by paint coating manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds.
  2. Product test reports from a qualified independent testing agency evidencing compliance of elastomeric coatings with requirements indicated based on comprehensive testing within last two years of current product formulations.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed coating system applications similar in material and extent to those indicated for Project that have resulted in construction with a record of successful in-service performance for at least 5 years.

- B. Single-Source Responsibility: Provide primers and other undercoat material produced by same manufacturer as finish coats.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver elastomeric coating materials to job site in manufacturer's original, new, unopened packages and containers bearing manufacturer's name and label and following information:
  1. Name or title of material.
  2. Manufacturer's name, stock number, and date of manufacture.
  3. Contents by volume.
  4. Thinning instructions (if permitted).
  5. Application instructions.
  6. Color name and number.
  7. Handling instructions and precautions.
- B. Store materials not in actual use in tightly covered containers at a minimum ambient temperature of 45 deg F (7 deg C) in a well-ventilated area. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.
  1. Protect elastomeric coating materials from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workmen and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

#### 1.6 PROJECT CONDITIONS

- A. Temperature Conditions: Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are above 50 deg F (10 deg C), unless otherwise permitted by manufacturer's printed instructions.
- B. Weather Conditions: Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above dew point; or to damp or wet surfaces. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
  1. Glidden Professional Paints (GP)
  2. BASF Building Systems
  3. Kelly-Moore
  4. Sherwin Williams
  5. Sto
  6. PPG Industries, Pittsburgh Paints. (PPG)
- B. Substitutions: Comply with Section 01 25 00.

## 2.2 MATERIALS

### A. General:

1. Material Compatibility: Provide crack fillers, block fillers, primers, elastomeric finish coat materials, and related materials that are compatible with one another and substrates under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
2. Colors: Provide custom colors to match Architects sample.

### B. Elastomeric Paint Coating: Factory-formulated, 100 percent acrylic or silicone-emulsion finish coating materials, compatible with substrate, filler, and primer required.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. GP: 2260 Decra-Flex Exterior Elastomeric Coating
  - b. Master Builders: MasterProtect EL 750.
  - c. Kelly-Moore: Kelly-Moore Premium; Kel-Seal Urethane Modified Acrylic Elastomeric Coating DU0080920.
  - d. Sherwin Williams: ConFlex XL; High Build Coating A05W00451.
  - e. Sto: StoSilco Lastic; StoSilco Lastic 80222.
  - f. PPG: Perma-Crete Pitt-Flex Elastomeric Coating 4-110
2. Texture: Smooth.
3. Physical Properties:
  - a. Elongation at Break: Not less than 240 percent when tested according to ASTM D 412 or ASTM D 2370.
  - b. Low-Temperature Flexibility: Passes a 1/8-inch, 180-degree mandrel bend at minus 10 deg F at 20-mil dry film thickness when tested according to ASTM D 552.
  - c. Tensile Strength: Not less than 220 psi when tested according to ASTM D 412 or ASTM D 2370.
  - d. Water Vapor Permeability: Not less than 10 perms when tested according to ASTM D 1653 or ASTM E 96.
  - e. Wind-Driven Rain Test: No water penetration when tested according to ASTM D 6904.
  - f. Minimum Dry Film Thickness per Coat: Not less than 10 mils.
  - g. Minimum Solids Content by Volume: Not less than 45 percent.

### C. Crack Fillers: Provide manufacturer's standard factory-formulated acrylic emulsion crack fillers that are compatible with substrate and finish coat materials indicated.

### D. Block Fillers: As recommended by coating manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

#### A. Examine substrates and conditions under which elastomeric coating systems will be applied for compliance with requirements for application. Surfaces to receive elastomeric coatings must be thoroughly dry before coatings are applied.

1. Do not proceed with application until unsatisfactory conditions have been corrected.
2. Start of coating within a particular area will be construed as Applicator's acceptance of surface conditions.



### 3.2 PREPARATION

- A. General: Remove items that are not to be coated, or provide surface-applied protection prior to surface preparation and coating. Remove these items, if necessary, to completely coat substrates and adjacent surfaces. Following completion of coating operations in each area, reinstall items removed, using workers skilled in trades involved.
- B. Cleaning: Before applying coatings or other surface treatments, clean substrates of substances that could impair bond of coating systems. Schedule cleaning and coating application so dust and other contaminants will not fall on wet, newly coated surfaces.
- C. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's instructions for particular substrate conditions, and as specified.
  - 1. Cementitious Surfaces: Prepare surfaces of concrete, concrete masonry, stucco, and similar surfaces to receive elastomeric coatings by removing efflorescence, chalk, dust, dirt, release agents, grease, oils, and similar conditions by water blasting followed by a clear water rinse.
  - 2. Remove mildew and neutralize surfaces according to manufacturer's recommendations before materials are applied.
  - 3. Determine alkalinity and moisture content of surfaces to be coated by performing appropriate tests. Do not apply coatings over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

### 3.3 APPLICATION

- A. Application Procedures: By brush or roller according to manufacturer's written instructions.

### 3.4 FIELD QUALITY CONTROL

- A. Owner reserves right to invoke the following test procedure at any time and as often as Owner deems necessary during period when coating operations are being conducted.
  - 1. Owner will engage services of an independent testing agency to sample coating being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
  - 2. Testing agency will perform appropriate tests for the following characteristics as required by Owner:
    - a. Quantitative materials analysis.
    - b. Elongation at break.
    - c. Tensile strength.
    - d. Percent of recovery.
    - e. Resistance to wind-driven rain.
    - f. Water vapor transmission.
  - 3. If results show materials do not comply with requirements, the Contractor may be directed to stop work, remove noncomplying materials, pay for testing, recoat surfaces coated with rejected materials, or remove rejected materials from previously coated surfaces if, upon recoating with specified materials, the two coatings are not compatible.

### 3.5 CLEANING

- A. Cleanup: At the end of each work day, remove rubbish, empty cans, rags, and other discarded materials from the site.
  - 1. After completing work, clean glass and spattered surfaces. Remove spattered coatings by washing, scraping or other methods, being careful not to scratch or damage adjacent finished surfaces.

### 3.6 PROTECTION

- A. Protect work of other trades from damage whether being coated or not. Correct damage by cleaning, repairing, replacing, and recoating as acceptable to the Architect. Leave in an undamaged condition.
- B. Provide "Wet Paint" signs to protect newly coated finishes. Remove temporary protective wrappings provided by others to protect their work after completing coating operations.
  - 1. After construction activities of other trades are complete, touch up and restore damaged or defaced coated surfaces.

### 3.7 COATING SCHEDULE

- A. Provide the following coating systems for substrates indicated.
  - 1. Apply additional coats, if undercoats or other conditions show through the final coat, until the cured film is of uniform coating finish, color, and appearance.
- B. Concrete and Masonry: Two finish coats over block filler with a total dry film thickness not less than 20 mils, excluding block filler.
  - 1. Block Filler: Manufacturer's recommended masonry block filler.
  - 2. First Coat: Elastomeric coating.
  - 3. Second Coat: Elastomeric coating.

END OF SECTION

## SECTION 10 14 16

### PLAQUES

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Metal plaques.

##### 1.2 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

##### 1.3 ACTION SUBMITTALS

- A. Product Data: Technical data for each type of product including installation methods.
- B. Shop Drawings: Submit fabrication and installation details and attachments to other work.
  - 1. Show plaque mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
  - 2. Show message list, tpestyles, graphic elements, and layout for each plaque at least half size.
- C. Samples: Submit samples for each type of plaque showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
  - 1. Plaques: Full size Sample.
  - 2. Exposed Accessories: Full size Sample of each accessory type.
- D. Product Schedule: Submit schedule using same designations indicated on Drawings or specified.

##### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Submit data for Installer and manufacturer.

##### 1.5 SUSTAINABLE DESIGN SUBMITTALS

- A. Sustainable Design Submittals: Submit the following supporting documentation separately from Action Submittals. Include with the completed LEED v4 worksheet. See Section 01 33 29 "Sustainable Design Reporting" for more information.

1. Product Data, Recycled Content: For products with recycled content, indicate percentage of postconsumer and preconsumer recycled content and relative dollar value per unit of product.
  - a. Indicate percentage of postconsumer and preconsumer recycled content and relative dollar value per unit of product.
  - b. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
2. Product Data, Regional Materials: When available, submit for materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
3. Environmental Product Declaration: Submit EPD data for each product when available.
4. Health Product Declaration: Submit HPD data for each product when available.
5. Sourcing of Raw Materials: Submit corporate sustainability report for each manufacturer.
6. Construction Waste Management: Submit tabulating and supporting for salvaged, recycled, and reused building waste materials in accordance with Section 01 74 19.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit data for plaques to include in maintenance manuals.

#### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Entity having minimum five years documented experience that employs installers and supervisors who are trained and approved by manufacturer.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver signs to site in manufacturer's unopened packaging.
- B. Leave protective covering on sign until completion of installation.

#### 1.9 WARRANTY

- A. Written warranty signed by manufacturer in which manufacturer agrees to repair or replace components of plaques that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Deterioration of finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image.
  2. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Requirements: Comply with applicable requirements.
  - 1. U.S. Architectural and Transportation Barriers Compliance Board Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) 2010.
  - 2. ICC/ANSI A117.1 Accessible and Useable Building and Facilities.
  - 3. Texas Accessibility Standards (TAS) 2012.

### 2.2 SUSTAINABILITY REQUIREMENTS

- A. Product Sustainability: Comply with requirements of Section 018100.
- B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Regional Materials: Provide materials manufactured within 100 miles (160 km) of Project for each raw material.
- D. Low Emitting Materials: Provide products complying with applicable regulations regarding toxic and hazardous materials that complies with VOC content limits and emissions and chemical component limits.
  - 1. Adhesives and Sealants: Comply with the specified content limits and emissions.
  - 2. Paint and Coatings: Comply with the specified content limits and emissions.
  - 3. Anticorrosive Paint: Comply with the specified content limits and emissions.
  - 1. Interior Adhesives, Sealants, Paints and Coatings: Comply with the testing and product requirements of the California Department of Public Health's Standard Method v1.2 for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
- E. Construction Waste Management: Comply with construction waste management plan for disposal of building materials. Maintain record and receipts indicated in management plans.

### 2.3 PLAQUES

- A. Cast Plaque: Cast metal plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. A.R.K. Ramos.
    - b. ACE Sign Systems, Inc.
    - c. Erie Landmark Company; a division of Paul W. Zimmerman Foundries.
    - d. Gemini Incorporated.
    - e. Matthews International Corporation; Bronze Division.
    - f. Metal Arts.

- g. Metallic Arts.
    - h. Signs & Decal Corp.
    - i. Southwell Company (The).
  2. Plaque Material: Cast bronze.
- B. Construction: Bronze cast plaque 36 inches wide by 24 inches long with raised and recessed copy, polished face, raised braille copy, inset with leatherette background, and with dark oxidized finish.
  1. Letter style: Optima and Lydian.
  2. Mounting method: Standard type "A" with concealed stainless steel studs included at top and bottom of plaque.
  3. Submit proposed full size layout for approval prior to casting the plaque.
- C. Composition: Include the following:
  1. The name of facility
  2. The year facility construction completed
  3. The names of the Board members at the time the contract for the facility was awarded, and at the time of dedication of the facility.
  4. The name of the Superintendent at the time the contract for the facility was awarded, and at the time of dedication of the facility.
  5. The name of the Architect of Record.
  6. The name of the Contractor.
  7. Finish raised characters to contrast with background color, and finish Braille to match background color.
  8. The plaque may include information regarding the city and state.
  9. No other information may be included in dedication plaques without Board approval.

## 2.4 MATERIALS

- A. Bronze Casting: ASTM B 584, alloy UNS No. C83600 (No. 1 manganese bronze), (85-5-5-5 Standard U. S. bronze alloy). Casting shall be free of pits and gas holes and all letters shall be sharp and hand tooled.
- B. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher leveled standard of flatness.

## 2.5 ACCESSORIES

- A. Fasteners and Anchors: Necessary for secure anchorage of plaques, noncorrosive and compatible with each material joined, and complying with the following:
  1. Use concealed fasteners and anchors unless indicated to be exposed.
  2. Furnish bronze or stainless steel devices unless otherwise indicated.
  3. Exposed Metal Fastener Components:

- a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
  - b. Fastener Heads: For nonstructural connections, use flathead screws and bolts with tamper resistant spanner head or one way head slots unless otherwise indicated.
4. Plaque Mounting Fasteners:
- a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of plaque, screwed into back of plaque, or screwed into tapped lugs cast integrally into back of plaque unless otherwise indicated.
- B. Adhesive: Recommended by plaque manufacturer.

## 2.6 FABRICATION

- A. Provide plaques according to requirements indicated.
1. Preassemble plaques in the shop to greatest extent possible. Disassemble plaques only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
  3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
  4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
  5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match plaque finish.
  6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and casting marks before finishing.
- B. Surface-Engraved Graphics: Machine-engrave characters and other graphic devices into indicated plaque surface to produce precisely formed copy, incised to uniform depth.
1. Engraved Metal: Fill engraved graphics with manufacturer's standard baked enamel.

## 2.7 FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.8 COPPER ALLOY FINISHES

- A. Cast-Bronze Character Finishes: Manufacturer's standard satin finish with exposed surfaces free from porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
- B. Cast-Bronze Plaque Finishes: Exposed surfaces free of porosity, burrs, and rough spots; with returns finished with fine-grain air blast.
  - 1. Raised Areas: Hand-tool and buff borders and raised copy to produce manufacturer's standard polished finish.
  - 2. Background Finish: Dark oxidized.

## 2.9 LACQUER COATING FOR COPPER-ALLOY FINISHES

- A. Lacquer Coating: Clear, organic, waterborne, air-drying, acrylic lacquer called "Incralac"; specially developed for coating copper-alloy products; consisting of a solution of acrylic resin, methyl methacrylate copolymer, leveling agent, and corrosion inhibitor benzotriazole.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Location and Wording to be verified by Architect and FBISD Design Manager.
- B. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- C. Verify that plaque support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of plaques and support surfaces unless otherwise indicated.
- D. Proceed with installation after correcting unsatisfactory conditions.

### 3.2 INSTALLATION

- A. Install plaques using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.
  - 2. Install plaques so they do not protrude or obstruct according to the accessibility standard.



3. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of plaque. Remove loose debris from hole and substrate surface.
  - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place plaque in position and push until flush to surface, embedding studs in holes. Temporarily support plaque in position until adhesive fully sets.
  - b. Thin or Hollow Surfaces: Place plaque in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.
  - c. Gypsum Board Partitions: Mount with wood or sheet metal screws into solid wood blocking, or with toggle bolts through heavy duty sheet metal strap backing plates behind gypsum board, secured to studs.
2. Shim Plate Mounting: Provide 1/8 inch (3 mm) thick, concealed aluminum shim plates with predrilled and countersunk holes, at locations indicated, and where other direct mounting methods are impractical. Attach plate with fasteners and anchors suitable for secure attachment to substrate. Attach plaques to plate using specified method.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed plaques and plaques that do not comply with specified requirements. Replace plaques with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as plaques are installed.
- C. On completion of installation, clean exposed surfaces of plaques according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain plaques in a clean condition during construction and protect from damage until acceptance by Owner.

**END OF SECTION**

## SECTION 10 14 23

### PANEL SIGNAGE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Interior room identification signs.
- B. Related Requirements:
  - 1. Division 01 Section "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.
  - 2. Division 22 Section "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.
  - 3. Division 23 Section "Identification for HVAC Piping and Equipment" for labels, tags, and nameplates for HVAC systems and equipment.
  - 4. Division 26 Sections for electrical service and connections for illuminated signs.
  - 5. Division 26 Section "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.
  - 6. Division 26 Section "Interior Lighting" for illuminated Exit signs.

##### 1.2 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: TAS and U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

##### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For panel signs.
  - 1. Include fabrication and installation details and attachments to other work.
  - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
  - 3. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
- C. Samples for Initial Selection: For each type of sign assembly and exposed finish.
  - 1. Include representative Samples of available typestyles and graphic symbols.

- D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
  - 1. Room-Identification Signs: Full-size Sample.
  - 2. Full-size Samples, if approved, will be returned to Contractor for use in Project.
- E. Product Schedule: For panel signs. Use same designations indicated on Drawings or specified.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Sample Warranty: For special warranty.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

#### 1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of metal and polymer finishes beyond normal weathering.
    - b. Deterioration of embedded graphic image colors and sign lamination.
    - c. Separation or delamination of sheet materials and components.
  - 2. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Subject to compliance with requirements acceptable manufacturers include the following:
  - 1. Architectural Graphic Products
  - 2. South Texas Graphics

- B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design," ICC A117.1, and Texas Accessibility Standards (TAS).

## 2.3 PANEL SIGNS

- A. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles.
  - 1. All signs shall be ADA compliant.
- B. Room-Identification Sign: Signs with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
  - 1. Material: 1/8-inch thick polymer with raised copy and Grade II Braille.
  - 2. Finish: Surface and edge painted.
  - 3. Font: Helvetica Medium, all caps, or as indicated on Drawings.
- C. Room Identification Signs with Insert Window:
  - 1. Material: 1/4-inch thick assembled acrylic / polymer with raised copy and Grade II Braille, with 1/8-inch thick acrylic backer, 1/16-inch acrylic spacers, and .020-inch thick polymer face.
  - 2. Window: Sliding 1/16-inch thick non-glare clear acrylic lens, capable of accepting paper or acetate inserts to allow changing and updating as required.
  - 3. Finish: Surface and edge painted.
  - 4. Font: Helvetica Medium, all caps, or as indicated on Drawings.
- D. Signs which require tactile copy and Grade II Braille shall be manufactured utilizing a 1/32", raised engraved lettering.
  - 1. Tactile lettering shall be precision machined, raised 1/32-inch.
- E. Sign Types and Configuration: As indicated on Drawings.
- F. Panel Sign Schedule: Refer to Drawings for Schedule.
- G. Mounting: One of the following, as selected by fabricator / installer:
  - 1. Adhesive: As recommended by sign manufacturer.
  - 2. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, **0.045 inch (1.14 mm)** thick, with adhesive on both sides.

## 2.4 FABRICATION

- A. General: Fabrication of signage assemblies shall be in accordance with approved Shop Drawings and manufacturer's recommendations.
- B. Provide manufacturer's standard signs of configurations indicated.
  - 1. Preassemble signs in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
  - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
- C. Copy shall be a true, clean, accurate reproduction of typeface(s) specified. Provide upper and lower case or all caps as indicated on Drawings. Letter spacing to be normal and interline spacing shall be set by manufacturer.
- D. Arrows, Symbols, Graphics, and Logo Art: Provided in style, sizes, colors and spacing as indicated on Drawings.
- E. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
  - 1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use.

## 2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Finishes shall comply with Accessibility Standards.
- D. Provide primer coats or other surface pre-treatment where recommended by signage manufacturer.
- E. Sign colors shall match approved samples and shall be as specified in unit descriptions. Sign colors shall be consistent in chroma and value, shall maintain proper opacity or translucency, and shall be free of all imperfections.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
  - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
  - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
  - 3. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches (75 mm) of sign without encountering protruding objects or standing within swing of door.
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements are indicated.
- C. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the Accessibility Standards.
- D. Mounting Methods:
  - 1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
  - 2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

- E. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

**END OF SECTION**

**SECTION 10 21 13**  
**TOILET COMPARTMENTS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Phenolic-core toilet compartments configured as floor- anchored overhead braced toilet enclosures and urinal screens.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachment details.
- C. Samples for each type of toilet compartment material indicated.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Product certificates.

**1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

**PART 2 - PRODUCTS**

**2.1 PERFORMANCE REQUIREMENTS**

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities, Texas Accessibility Standards of the TDLR, and ICC A117.1 for toilet compartments designated as accessible.



## 2.2 TOILET COMPARTMENTS

- A. Basis of Design, Configuration: Provide Floor- Anchored Overhead-braced Phenolic Toilet Partition System as available from ASI Global Partitions or equivalent products by one of the following:
  - 1. Bobrick Washroom Equipment, Inc.
  - 2. Bradley Corporation.
  - 3. Columbia Partitions/PSISC
- B. Toilet-Enclosure Style: Floor anchored, overhead braced with front panels extending, and anchoring, to floor and ceiling.
- C. Urinal-Screen Style: Floor and wall anchored.
- D. Door, Panel, Screen, and Pilaster Construction: Solid phenolic-core panel material with melamine facing on both sides fused to substrate during panel manufacture (not separately laminated), and with eased and polished edges and no-sightline system. Provide minimum **3/4-inch**-thick doors and pilasters and minimum **1/2-inch**-thick panels.
- E. Pilaster Shoes and Sleeves (Caps): Formed from stainless steel sheet, not less than **0.031-inch** nominal thickness and **3 inches** high, finished to match hardware.
- F. Urinal-Screen Post: Manufacturer's standard post design of monolithic phenolic urinal screen cut out at bottom to form a post; with shoe matching that on the pilaster.
- G. Brackets (Fittings):
  - 1. Stirrup Type: Ear or U-brackets, stainless steel.
- H. Phenolic-Panel Finish:
  - 1. Facing Sheet Finish: One color and pattern in each room.
  - 2. Color and Pattern: As indicated by manufacturer's designations or as selected by Architect from manufacturer's full range.
  - 3. Panel Core/Edge Color: Black.

## 2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's heavy-duty stainless steel operating hardware and accessories.
  - 1. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
  - 2. Hinges: Heavy-duty barrel type.
- B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use

stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

## 2.4 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.
- C. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at bottoms of posts. Provide shoes at posts to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide **24-inch**-wide in-swinging doors for standard toilet compartments and **36-inch**-wide out-swinging doors with a minimum **32-inch**-wide clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:
    - a. Pilasters and Panels: **1/2 inch**.
    - b. Panels and Walls: **1 inch**.
  - 2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.
    - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.

### 3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

**END OF SECTION**

**SECTION 10 28 13**  
**TOILET ACCESSORIES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. Toilet accessories.
- B. Owner-Furnished, Contractor-Installed (OFCI):
  - 1. Toilet tissue dispensers
  - 2. Soap dispensers
  - 3. Paper towel dispensers
  - 4. Feminine Napkin Disposals.

**1.2 COORDINATION**

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify products using designations indicated.

**1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

**1.5 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 15 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 TOILET ACCESSORIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products scheduled based on products listed by:
  - 1. American Specialties, Inc.
  - 2. Bobrick Washroom Equipment, Inc.
  - 3. Bradley Corporation.

### 2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

### 2.3 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of three keys to Owner's representative.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

### 3.2 SCHEDULE

- A. Grab Bars:
  - 1. Material: 1-1/2" diameter stainless steel, 18 gage, Type 304, brushed satin finish with peened gripping surface.
  - 2. Mounting: Concealed plates, without exposed fasteners; concealed anchor kit for type of wall.
  - 3. Acceptable Products:
    - a. 36" Units: Toilet Compartments:
      - 1) B-6806.99 x 36 by Bobrick
      - 2) ASI 3801-36P
      - 3) Bradley 812-2-001-36 (Safety-Grip Finish)
    - b. 42" Units: Toilet Compartments:
      - 1) B-6806.99 x 42 by Bobrick
      - 2) ASI 3801-42P
      - 3) Bradley 812-2-001-42 (Safety-Grip Finish)
    - c. Showers:
      - 1) B-68616 by Bobrick
      - 2) ASI 3850
- B. Pediatric Changing Table:
  - 1. Fabricated from stainless steel Type 304, 16 gage, with seamless welds; rated to support static load of 400 pounds.
  - 2. ADA Compliant
  - 3. Acceptable Products:
    - a. Model 100SSE-SM Horizontal Surface Mounted Special Needs Diaper Changing Station.
- C. Baby Changing Table:
  - 1. Product: Wall mounted, fold-down, HDPE changing table

2. Acceptable Products:
  - a. Changing Station Model WB641430 by Global Industries
  
- D. Toilet Tissue Dispenser – A2
  1. Owner Furnished, Contractor Installed.
  2. Wausau Paper: Dblserv – Opti-core
  3. Model # BW80200EACH, Black
  4. Dimensions: 11 1/16 x 8 13/16 x 7 3/16
  5. Weight: 2.2 lbs.
  
- E. Toilet Tissue Dispenser – R1
  1. Owner Furnished, Contractor Installed.
  2. Tork: Three Roll Capacity
  3. Model # 565828, Black
  4. Dimensions: 14.56 x 14.12 x 6.31
  5. Weight: 4.3 lbs.
  
- F. Sanitary Napkin Disposal
  1. Owner Furnished, Contractor Installed
  2. Bobrick, Contura Series, Surface mounted
  3. Model: B-270
  4. Type 304, 22 guage Stainless Steel.
  
- G. Soap Dispensers
  1. Owner Furnished, Contractor Installed.
  2. Elevate Soap Dispensers – Touch-Free
  
- H. Paper Towel Dispensers
  1. Owner Furnished, Contractor Installed
  2. Optiserv – Model #86860 Roll Towel Dispenser, White Translucent.
  3. Size: 12.125 x 16.8125 x 9.8125
  4. Dispenser Capacity: One Roll.
  5. Weight: 7.95 lbs.
  
- I. Framed Mirrors, partial height and full-height.

1. Material: One piece, roll-formed stainless steel angle frame, 1/2" x 1/2" x 1/2", Type 430, Lock tab, bright polish finish.
  2. Mirror: 1/4" thick float glass mirror electrolytically copper plated; 15-year guarantee.
  3. Mounting: Theft resistant, concealed wall hangers.
  4. Size per Construction Documents.
  5. Acceptable Products:
    - a. B-165, 1836 (18W by 36 H) and 2460 (24 W by 60 H) Series by Bobrick
    - b. ASI 0620, 1836 (18W by 36 H) and 2460 (24 W by 60 H)
    - c. Bradley 781, 1836 (18W by 36 H) and 2460 (24 W by 60 H).
- J. Mop and Broom Holders:
1. Material: 18 gage stainless steel, Satin finish.
  2. Construction: 8" deep with four mop holders, three rag hooks, wet rag rod, and shelf above.
  3. Mounting: Surface.
  4. Acceptable Products:
    - a. B-224 x 36" by Bobrick
    - b. ASI 1315-4
    - c. Bradley 9984.
- K. Shower Curtain & Curtain Rod
1. Shower Curtain
    - a. Material: Opaque matte white vinyl 0.008 thick; nickel plated grommets.
    - b. Size: 42" wide x 72" long.
    - c. Acceptable Products:
      - 1) Bobrick 204-2
      - 2) 1200-v42
      - 3) Bradley 9533-48 (48")
  2. Curtain Rod
    - a. Material: Type 304, 20 gage, 1" diameter stainless steel tubing.
    - b. Acceptable Products:
      - 1) 207 by Bobrick
      - 2) ASI 1224
      - 3) Bradley 9538.
- L. Towel Pin
1. Material: 2" x 2" flange, projects 3-3/8" from wall, brushed satin stainless steel.
  2. Acceptable Products:
    - a. Bobrick B-6777
    - b. ASI 7301-S
    - c. Bradley 9314.
- M. Soap Dish:
1. Material: Vandal Resistant; extra heavy duty, chrome-plated cast bronze, bright finish.
  2. Size: 5"w x 1-3/8" h x 3" d.
  3. Acceptable Product: B-973 by Bobrick.

N. Shower Seat

1. Seat: One-piece, ½" thick, solid phenolic with matte-finish, melamine surfaces and phenolic-resin core. Integral slots for water drainage. Secured to frame with stainless steel carriage bolts and acorn nuts. Reversible for left- or right-hand installation.
2. Frame: Type 304 stainless steel, satin finish, 16 gage, 1-1/4" square tubing and 18 gauge, 1" diameter seamless round tubing.
3. Products: Subject to compliance with requirements, provide one of the following:
  - a. B-5181 by Bobrick
  - b. ASI 8206L/R
  - c. Bradley 9565-L/9566-R

**END OF SECTION**



**SECTION 12 36 61.16**  
**SOLID SURFACING COUNTERTOPS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section includes solid surface material countertops.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples: For each type of material exposed to view.

**PART 2 - PRODUCTS**

**2.1 SOLID SURFACE COUNTERTOP MATERIALS**

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
  - 1. Products: Subject to compliance with requirements, provide products indicated on Drawings.
    - a. Type: Provide Standard type or Veneer type made from material complying with requirements for Standard type, as indicated unless Special Purpose type is indicated.
    - b. Colors and Patterns: As indicated on Drawings.
  - 2. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
  - 3. Medium-Density Fiberboard: ANSI A208.2, Grade 130.

**2.2 COUNTERTOP FABRICATION**

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
  - 1. Grade: Custom.
- B. Configuration:
  - 1. Front Edge: As indicated on Drawings.
  - 2. Backsplash: Straight, slightly eased at corner.

3. End Splash: Matching backsplash.
- C. Countertops: One of the following:
1. **1/2-inch**-thick, solid surface material with front edge built up with same material to profile indicated.
  2. **1/4-inch**-thick, solid surface material laminated to **3/4-inch**-thick MDF with front edge built up to profile indicated.
- D. Backsplashes: **3/4-inch**-thick, solid surface material.
- E. Joints: Fabricate countertops without joints wherever possible. Fabricate oversized countertops in sections for joining in field, with joints at locations indicated on approved Shop Drawings.
- F. Cutouts and Holes:
1. Undercounter Plumbing Fixtures: Make cutouts for fixtures using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
- 2.3 INSTALLATION MATERIALS
- A. Adhesive: Product recommended by solid surface material manufacturer.
1. Adhesives shall have a VOC content of 70 g/L or less.
- B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- B. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.
- C. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
- D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive.
- E. Install aprons to backing and countertops with adhesive.
- F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed,

and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

- G. Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants."

**END OF SECTION**

**DIVISION 20**

**FACILITY SERVICES GENERAL REQUIREMENTS INDEX**

<b>SECTION</b>	<b>DESCRIPTION</b>
20 00 00	FACILITY SERVICES GENERAL REQUIREMENTS INDEX
20 05 00	CODES AND STANDARDS
20 05 01	SCOPE OF WORK
20 05 03	BASIC DIVISION 20-28 REQUIREMENTS
20 05 04	SCHEDULE OF SUBMITTAL DATA
20 05 05	GENERAL DIVISION 20-28 MATERIALS AND METHODS
20 05 06	OWNER AND CONTRACTOR FURNISHED EQUIPMENT
20 05 08	DEMOLITION AND WORK WITHIN EXISTING BUILDINGS
20 05 48	NOISE AND VIBRATION ISOLATION
20 07 00	THERMAL INSULATION
20 08 00	COMMISSIONING
20 21 16	MISCELLANEOUS PIPING

**END OF INDEX**

**SECTION 20 05 00**  
**CODES AND STANDARDS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.

**1.2 CODES: DIVISIONS 20 - 28**

- A. Code Design Basis: The following codes and ordinances were used in the design of the project and shall be complied with during construction of the project.
  - 1. Refer to each discipline's cover sheet per school for codes and ordinances followed.

**1.3 STANDARDS**

- A. Refer to Division 1 for general administrative/procedural requirements related to compliance with applicable standards. This Work and all materials shall meet the standards set forth in the applicable portions of the following recognized standards:
  - 1. ADC..... Air Diffusion Council
  - 2. AEIC ..... Association of Edison Illuminating Companies
  - 3. AGA..... American Gas Association
  - 4. AHRI ..... Air Conditioning, Heating, and Refrigeration Institute
  - 5. AMCA ..... American Movement and Control Association
  - 6. ANSI ..... American National Standards Institute
  - 7. ASHRAE .. American Society of Heating, Refrigerating, and Air Conditioning Engineers
  - 8. ASME ..... American Society of Mechanical Engineers
  - 9. ASPE..... American Society of Plumbing Engineers
  - 10. ASSE ..... American Society of Sanitary Engineering
  - 11. ASTM..... American Society for Testing and Materials
  - 12. AWS ..... American Welding Society
  - 13. AWWA..... American Water Works Association
  - 14. CBM..... Certified Ballast Manufacturers
  - 15. CDA..... Copper Development Association
  - 16. CE ..... Corps of Engineers (U.S. Department of the Army)
  - 17. CISPI ..... Cast Iron Soil Pipe Institute
  - 18. EIA..... Electronic Industry Association
  - 19. EPA ..... Environmental Protection Agency
  - 20. ETL..... Electrical Testing Laboratory
  - 21. FAA..... Federal Aviation Administration (U.S. Department of Transportation)

- 22. FCC ..... Federal Communications Commission
- 23. FM ..... Factory Mutual Engineering Corporation
- 24. FS ..... Federal Specification (General Services Administration)
- 25. ICEA ..... Insulated Cable Engineering Association
- 26. IEEE ..... Institute of Electrical and Electronics Engineers
- 27. IES ..... Illuminating Engineering Society of North America
- 28. IRI ..... Industrial Risk Insurers
- 29. LPI ..... Lightning Protection Institute
- 30. MCAA ..... Mechanical Contractors Association of America
- 31. MIL ..... Military Standardization Documents (U.S. Department of Defense)
- 32. MSS ..... Manufacturers Standardization Society of the Valve and Fittings Industry
- 33. NAIMA ..... North American Insulation Manufacturers Association
- 34. NEC ..... National Electrical Code (by NFPA)
- 35. NECA ..... National Electrical Contractor Association
- 36. NEMA ..... National Electrical Manufacturers Association
- 37. NFPA ..... National Fire Protection Association
- 38. OSHA ..... Occupational Safety Health Administration (U.S. Department of Labor)
- 39. PDI ..... Plumbing and Drainage Institute
- 40. SMACNA . Sheet Metal and Air Conditioning Contractor's National Association
- 41. UL ..... Underwriters' Laboratories, Inc.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

**END OF SECTION**

## SECTION 20 05 01

### SCOPE OF WORK

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, and Drawings apply to all Work herein.
- B. Refer to Specification Section 20 05 00 for related required Codes and Standards.
- C. Refer to Specification Section 20 05 04 for related required Schedule of Submittal Data.
- D. Requirements of Division 20 apply to all Work of Divisions 20-28.

##### 1.2 SCOPE

- A. General: Provide all labor, materials, tools, machinery, equipment, supplies, transportation, storage, utilities, appliances, drayage, hauling, hoisting, excavation, backfill, supervision, and services necessary to complete the Fire Suppression, Plumbing, Heating, Ventilating, and Air Conditioning, Automation, Electrical, Communications, and Electronic Safety Work under this Contract. Pay all fees, tap charges, meter charges, permits, licenses, inspections, and special fees assessed by the local utilities and local authorities having jurisdiction. Coordinate Work with the Work of the other trades so as to resolve conflicts without impeding job progress.
- B. Examine the Architectural, Structural, Mechanical, Plumbing, and Electrical Drawings and other Divisions, and Sections of the Specifications in order to determine the extent of Work required to be completed. Failure to examine all the Contract Documents for this Project will not relieve the Contractors of the responsibility to perform all the Work required for a complete, fully operational and satisfactory installation.
- C. Project Location: The Work to be performed under this Contract is all in connection with the construction and erection of a new building or renovations in an existing building located in Fort Bend County, Texas.
- D. Work Included: The Work includes but is not limited to the following systems, equipment, and services:
  - 1. Tagging and identification of equipment, valves, piping, and conduit, etc.
  - 2. Radiation protection for ductwork, piping, and conduit penetration of walls surrounding various radiotherapy department rooms.
  - 3. Connection of all equipment furnished under other Divisions and/or by the Owner.
  - 4. All water services for the building, including all required fees.

5. All electric services for the building, including all required fees.
6. Furnishing of Shop Drawings, Product Data and Samples.
7. Furnishing of Record Drawings.
8. Start-up, testing, balancing, and adjusting of systems as specified in Divisions 20-28.
9. Furnishing of operating and maintenance books.
10. Miscellaneous items as required for complete and functioning systems as specified, as indicated on the Drawings, and as required.
11. All systems, equipment, and services specified shall be furnished and installed complete and ready to use.
12. Performance and acceptance testing of equipment and systems as specified and as required by Authorities Having Jurisdiction. Refer to Sections in Divisions 20-28 titled "Start-up, Testing, Balancing, and Adjusting" for additional requirements. Participate in and provide labor as required for "off-hour" testing of equipment and systems if required by job conditions or by the Authorities Having Jurisdiction and as required to obtain the "Certificate of Occupancy (CO)".

### 1.3 WORK OF OTHER DIVISIONS

A. The following is a partial list of work not included in Divisions 20-28:

1. Factory finish painting is included in the work of these Divisions. Prime, protective, and field finish painting is included in the work of Division 9, except as otherwise specified herein. The Work of these Divisions includes coordinating the painting of Division 20-28 systems with the Division 9 contractor.
2. Motors and motor controllers that are an integral part of the equipment are furnished under the Division with the driven equipment. All other motor controllers, electrical wiring and connections are included in the work of Division 26.
3. Concrete housekeeping pads, equipment pads, fill for equipment inertia bases, and water curbs are specified under Division 3. Dimensions and locations of pads, inertia bases, and curbs for equipment furnished under Divisions 21-28 are included in the Work of the respective Division.
4. Installing access doors. Provision of access doors are included in the Work of Divisions 21-28.
5. Owner and General Contractor furnished equipment. Fire Suppression, Plumbing, Heating, Ventilating, and Air Conditioning, Automation, Electrical, Communications, and Electronic Safety provisions, including rough-in and final connections, are included in the Work of the respective Division.
6. Metal louvers.
7. Cooling tower supporting structure to be provided by the contractor.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

**END OF SECTION**



## SECTION 20 05 03

### BASIC DIVISION 20-28 REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.

##### 1.2 COMPLETE PERFORMANCE

- A. The Contractor shall furnish and install all items specified herein and as indicated on the Drawings. The Contractor shall also furnish and install all items necessary to make the systems function which may be reasonably implied as essential, whether mentioned in the Contract Documents or not.
- B. Each Contractor for Divisions 20-28 shall provide competent, experienced full time superintendents who are authorized to make decisions on behalf of the Contractor.
- C. Work shall be executed in strict accordance with the best practice of the trades in a thorough, substantial and workmanlike manner by competent workmen.

##### 1.3 SITE FAMILIARIZATION

- A. General: Become familiar with the Drawings and Specifications, examine the premises, and understand the conditions under which the Contract shall be performed, prior to submitting a bid.
- B. Site: Be informed of the site conditions, verify locations of new and existing equipment, and determine exact requirements for connections.
- C. Coordination: Tender of a proposal for this project infers that the Contractor has visited the site and has become familiar with the Drawings, Specifications, and site conditions and has included in his proposal, all work necessary to properly install complete and functioning systems on the project. Failure to comply with this requirement shall not be considered justification for the omission or faulty installation of any Work covered by the Contract Documents.

##### 1.4 CODES AND STANDARDS

- A. General: All Work shall comply with the most recently revised versions of all applicable laws, rules, regulations and ordinances of all Federal, State and Local Authorities and applicable Utilities. None of the terms or provisions of this Specification shall be construed as waiving any part of the laws, rules, regulations or requirements of these Authorities.

- B. Asbestos: Be aware of and comply with Asbestos NESHAP (National Emission Standard for Hazardous Air Pollutants) regulations, as well as all other applicable codes, laws, and regulations.
- C. Conflict: In the event of conflict between the Contract Documents and the local enforcing authority, the latter shall rule. Any modifications resulting therefrom shall be made without any additional cost to the Owner or Architect/Engineer. This Contractor shall report any such modifications to the Architect/Engineer and secure his approval prior to proceeding with the work.
- D. Precedence: Where Contract Document requirements exceed the requirements of the Codes and Standards, the Contract Documents shall take precedence provided they are not in conflict with those Codes and Standards.
- E. Approval Labels: All items of equipment and all materials for which approved standards have been established by Underwriters' Laboratories, Inc. (UL), Factory Mutual (FM), Certified Ballast Manufacturer (CBM), Electrical Testing Laboratory (ETL), National Manufacturers Association (NEMA), American Standard Codes, ASME, AGA, AMCA, ASA, ANSI, ASHRAE, and ARI shall be so approved and shall bear approval labels attesting to same.

#### 1.5 DRAWINGS AND SPECIFICATIONS

- A. Drawings: The Drawings are schematic in nature and indicate approximate locations of the heating, ventilating, and air conditioning systems, fire protection systems, plumbing equipment, fixtures and piping systems, and electrical items, except where specific locations are noted and dimensioned on the Drawings. All items are shown approximately to scale. The intent is to show how these items shall be integrated into the construction. Locate all items by on the job measurements and in accordance with the Contract Documents. Coordinate with other trades.
- B. Location: Prior to locating diffusers, grilles, plumbing fixtures, fire hose cabinets, plumbing items, outlets, switches, fixtures, fire alarm devices, sprinkler heads, and other exposed devices, obtain the Architect's approval as to exact location. Locations shall not be determined by scaling Drawings. Mount plumbing fixtures, fire hose racks, cabinets, outlets, switches, and other wall-mounted devices at heights as directed by the Architect. Contractor shall be responsible for costs of redoing work of trades necessitated by failure to comply with this requirement.
- C. Specifications: The specifications are intended to supplement the Drawings and it is not in the scope of the Specifications to mention any part of the work that the Drawings are competent to fully explain. Conversely, any part of the work that the specifications are competent to fully explain may not be mentioned on the Drawings. Drawings and Specifications are complimentary/supplementary documents to each other.
- D. Disagreement: Disagreement between the Drawings and Specifications or within the Drawings or Specifications shall be estimated and/or bid using the better quality or greater quantity of material or installation, and a clarification request for information shall be made to the Architect/Engineer in a timely manner after the Project is under contract.

## 1.6 DISCREPANCIES

- A. Clarification: Clarification of significant cost matters shall be obtained before submitting a proposal for the Work under Divisions 20-28 as to discrepancies or omissions from the Contract Documents or questions as to the intent thereof.
- B. Detailed Instructions: Should it appear that the work hereby intended to be done or any of the materials relative thereto is not sufficiently detailed or explained in the Drawings or Specifications, then the Contractor shall apply in a timely manner to the Engineer for clarification or explanations as may be necessary, allowing a reasonable time for the Engineer to respond. The Contractor shall conform to this additional information as a part of the Contract without additional cost to the Owner or Engineer.
- C. Interpretations: Should any doubt or question arise respecting the true meaning of Drawings or Specifications, reference shall be made to the Engineer, whose written decision shall be final and conclusive. No alleged statement by the Engineer will be accepted as an excuse for non-compliance or inferior work.
- D. Contractor Agreement: Consideration will not be granted for misunderstanding of the amount of work to be performed. Tender of a proposal conveys full Contractor agreement of the items and conditions specified, shown, scheduled, or required by the nature of the project, and all costs are included in the proposal.

## 1.7 REQUESTS FOR INFORMATION (RFI)

- A. General: Submit all Contractor Requests for Information (RFI) in writing to the Architect/Engineer for response. Submit RFI on a standard form that has a space for the requested information and the Architect/Engineer's response. Electronic submissions shall be sent to RFI@wylieeng.com.
- B. Solution Proposal: In general, the Contractor shall propose solutions to identified problems for review and approval of the Architect/Engineer. The RFI shall include hand sketches, marked drawing prints, equipment cutsheets, drawing and specification references, and any other back-up information, etc., as required to sufficiently explain the problem and proposed solution.

## 1.8 QUALITY ASSURANCE

- A. General: Materials and equipment shall be new, of best grade and quality, and standard products of reputable manufacturers regularly engaged in the production of such materials and equipment.
- B. Workmanship: Work shall be executed, and materials installed in accordance with the best practice of the trades in a thorough, substantial, workmanlike manner by competent workmen, presenting a neat appearance when completed.
- C. Judgment: In all cases, the Engineer shall be the sole judge of the quality and equivalence of manufacturers, products, materials, and methods.

- D. Manufacturers/Products/Materials/Methods: Manufacturers, products, materials, and methods described in the various sections of the Specifications and indicated on the Drawings are intended to establish a standard of quality only. It is not the intention of the Engineer to discriminate against any manufacturer, product, material, or method that is equal to the standards as indicated and/or specified, nor is it intended to preclude open, competitive bidding. The fact that a specific manufacturer is listed as an acceptable manufacturer shall not be interpreted to mean that the manufacturer's standard product will meet the requirements of the project design, Specifications, and space constraints.
1. Wherever a definite manufacturer, product, material, or method is specified and there is not a statement that another manufacturer, product, material, or method will be acceptable, it is the intention of the Engineer that the specified manufacturer, product, material, or method is the only one that shall be used without Prior Approval.
  2. Wherever a definite manufacturer, product, material, or method is specified as "NO SUBSTITUTE", it is the intention of the Engineer that the listed item is the only one acceptable.
- E. Alternate Manufacturers/Products/Materials/Methods: Products by Alternate reliable manufacturers, products, materials, or methods may be accepted provided they have equal capacity, construction, and performance.
1. Wherever a definite material or manufacturer's product is specified and the Specification states that products of listed manufacturers may be provided, it is the intention of the Engineer that Alternate products of manufacturers that are specified (i.e., listed) are the only products that will be acceptable and that products of non-listed manufacturers will not be considered for Substitution without Prior Approval.
- F. Substitute Manufacturers/Products/Materials/Methods: Products by Substitute reliable manufacturers, products, materials, or methods may be accepted provided they have equal capacity, construction, and performance.
1. Wherever the expression "Or Approved Equal" is used in the Contract Documents, it is the intention of the Engineer that Substitute manufacturers, products, materials, and methods may be used only with Prior Approval. Under no circumstances shall any Substitution of manufacturers, products, materials, or methods be made without the prior written approval of the Engineer.
- G. Coordination: Where Alternate or Substituted equipment is used on the project, it shall be the responsibility of the Contractor or Subcontractor involved to verify that the equipment will fit in the space available, including all required Code and maintenance clearances, and to coordinate all equipment requirements and provisions with the System Design, all affected Divisions, and all other Contractors. Where the use of Alternate or Substitute materials affects the cost of provisions made by other Contractors, the Contractor providing the Alternate or Substitute shall be responsible for the other Contractor's cost adjustment. There shall be no additional cost to the Owner or Architect/Engineer due to the use or acceptance of any Alternate or Substitute manufacturer, product, material, or method.

## 1.9 PRIOR APPROVAL

- A. General: Contractors wishing to Substitute manufacturers, products, materials, or methods from those indicated, or specified, shall submit such requests to the Architect in writing ten (10) calendar days prior to the General Contractor's bid. Requests for Prior Approval sent directly to the Engineer will not be considered. Requests for permission to make Substitutions after that time will not be considered. An approved Substitution will receive a written approval only in the form of an issued Specification change.
- B. Submittal: Requests shall consist of two (2) sets of descriptive literature and performance data covering each item of equipment or material. The submittal shall include the following:
1. Name of the Architect, Engineer, Project, Sub-Contractor, and General Contractor.
  2. Reference to Specification Section and Page Number.
  3. A list of all variations from the Contract Document requirements.
  4. Dimensional drawings.
  5. Sufficient information on the specified product for which approval is sought. All technical performance data and construction materials shall be clearly noted.
- C. Samples: Provide, upon request of the Architect/Engineer, samples of materials and equipment for review.
- D. Conditions: The Contractor's Substitution request will be received and considered by the Architect/Engineer when the following conditions are satisfied:
1. Extensive revisions to Contract Documents are not required.
  2. Proposed changes are in keeping with the general intent of Contract Documents.
  3. The request is timely, fully documented, and properly submitted.
  4. The request is directly related to an "or equal" clause or similar language in the Contract Documents or as permitted in the section QUALITY ASSURANCE.
  5. One or more of the following conditions:
    - a. The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
    - b. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
    - c. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation, or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect/Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.

- d. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
  - e. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
- E. Shop Drawings, Product Data, and Samples: The Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data, or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for Substitution, nor does it constitute approval.
- F. Division 1: The requirements for Prior Approval listed herein supersede the requirements for Substitutions listed in Division 1 of the Specifications.
- 1.10 CONFERENCE PRIOR TO START OF WORK
- A. Immediately upon the award of this Contract, but prior to commencing any Work, the Contractor, together with designated major subcontractors, shall confer with the Architect and Engineer concerning the Work under this Contract.
  - B. The conference will be at a mutually agreed place and acceptable time.
- 1.11 UTILITIES
- A. General: Location, inverts and sizes of water lines, gas lines, fire hydrants, sewer lines, manholes, capacity and voltage of electric lines, and location of telephone lines, etc., are shown if available. This data is accurate to the best knowledge of the Engineer.
  - B. Coordination: The Contractor shall be responsible for field verification of the actual location of site utilities and shall make modifications necessary for connection to or construction around those utilities at no additional cost to the Owner or Engineer.
  - C. Temporary Power Services:
    - 1. Temporary electrical power for construction operations shall be derived from a new temporary service from the Power Company. The Electrical Contractor shall provide the necessary conductors, connections, service switches, poles, protective devices, lighting fixtures, lamps, outlet devices, disconnect switches, etc., required for temporary lighting and single and three phase power of voltage levels required by the construction of the project.
    - 2. All such temporary equipment shall remain the property of the Contractor and shall be removed when permanent connections have been completed.
    - 3. Temporary connections shall be safe and in accordance with applicable codes. The Contractor shall be responsible for any damage or injury to equipment, materials, or personnel caused by improperly protected temporary installations.
    - 4. All costs for materials and installation for distribution of temporary electrical facilities shall be at the expense of the Electrical Contractor.

5. No conductors, bus, nor any other electrical equipment which is part of the permanent electrical system may be used for temporary electrical service for construction operations, unless approved by the Architect/Engineer.
6. Power Company costs for temporary and permanent power usage (during construction) until date of occupancy will be born by the General Contractor.
7. In addition, it is the responsibility of the Electrical Contractor to coordinate with the local power company the installation and activation of permanent power to the building, in a timely manner to avoid construction delays.

#### 1.12 CHANGE ORDERS

- A. Refer to Division 1 for requirements concerning Change Orders.

#### 1.13 ALTERNATES

- A. General: Refer to Division 1 for information concerning Alternates.

#### 1.14 UNIT PRICES

- A. General: Refer to Bid Form for information on required Unit Prices.

#### 1.15 SPACE LIMITATIONS

- A. General: Determine in advance of purchase that the equipment and materials proposed for installation will fit into the confines indicated, leaving adequate clearances for adjustments, repair, or replacement. Allow adequate space for clearance in accordance with requirements of the Code, local inspection department, and equipment manufacturer.
- B. Scheduled Equipment: The design shown on the Drawings is based on the equipment scheduled. Equipment has been chosen which will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc.
- C. Responsibility: Since space requirements and equipment arrangement vary according to each Manufacturer, the responsibility for initial access and proper fit rests with the Contractor.
- D. Review: Final arrangements of equipment to be installed shall be subject to Architect/Engineer review.

#### 1.16 COORDINATION

- A. Each Contractor shall be responsible for the coordination of all items that will affect the installation of the Work of his Division. The coordination shall include, but not be limited to, voltage, ampacity, capacity, electrical/piping connections, structural supports, space requirements, locating devices in Architectural finish elements, staging the construction and building requirements, and special conditions.

- B. By submitting shop drawings on the project, this Contractor is indicating that all necessary coordination has been completed and that the systems, products and equipment submitted can be installed in the building and will operate as specified and intended, in full coordination with all other disciplines.
- C. Holes or other openings required in surfaces with special Architectural finishes (stone, cloth, finished wood, etc.) shall be reviewed and approved by the Owner or Architect prior to any cutting or drilling.

#### 1.17 SHOP DRAWINGS AND SUBMITTALS

- A. General: After the Contract is awarded but prior to proceeding with the Work requiring Shop Drawing review, the Contractor shall obtain complete shop drawings and product data from the manufacturers, suppliers, vendors, and Sub-Contractors for all materials and equipment specified herein and make formal submission to the Architect. A minimum period of two (2) weeks should be allowed in the Construction Schedule for the Engineers review.
- B. Certification: Each Contractor responsible for the Work shall review and certify the shop drawing, submittal and/or product data to be in full compliance with the requirements of the Contract Documents.
- C. The Engineer's review of shop drawings and submittal data shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from any requirements of the Contract Documents. It shall be clearly understood that the Engineers noting some errors but overlooking some others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the shop drawing or product data, the Contract Documents shall govern the Work and are neither waived nor superseded in any way by the review of shop drawings, product data and samples.
- D. A SUBMITTAL SHALL NOT CONTAIN INFORMATION FROM MORE THAN ONE SPECIFICATION SECTION. A specification section can be subdivided into separate submittals for items that are listed in the section.
- E. Electronic Submittal: Each submittal shall contain the following items in a suitable electronic document or file:
  - 1. Electronic Submittals shall be sent to the Architect for distribution to the proper Design Team recipients.
  - 2. The Architect shall provide Electronic Submittals to Engineer at [Submittals@wylieeng.com](mailto:Submittals@wylieeng.com). Submittals sent to individual Wylie Engineers only will not be accepted.
  - 3. Electronic submittals shall be sent via email in searchable PDF form with electronic marks. At no point shall a submittal be printed and scanned prior to emailing. Submittals required to be printed for review are to be provided via hard copy. Submittals scanned from hard copies with handwritten marks are not acceptable.
  - 4. Any electronic submittals deemed not readable will be automatically rejected.



F. Each submittal shall contain the following items:

1. A cover sheet with the names and addresses of the Project, Architect, MEP Engineer, General Contractor and the Subcontractor making the submittal.
2. The Specification Section Number or Drawing Reference Number covering the items being submitted and the product name or description.
3. An index page listing all data within the submittal including the product name and description.
4. A specification compliance review. This shall consist of a reproduction of the applicable specification section(s) from the contract documents. Each line in the specification shall be marked either "Comply", "Deviate", or "N/A", as appropriate. An explanation shall be provided for Deviate and N/A items.
5. Dimensional data and actual sketches as applicable to show that the submitted equipment will fit into the space available with all required Code and maintenance clearances.
6. Identification of each item of material or equipment matching that indicated on the Drawings.
7. Sufficient performance data, capacity, sound data where applicable, diagrammatic data and descriptive information to show its compliance with the requirements of the Contract Documents. Any options or special requirements shall be clearly highlighted. All applicable information shall be clearly highlighted. All non-applicable data shall be crossed out.

G. Submittals will be marked with one of the following levels of status:

1. NO EXCEPTIONS
2. FURNISH AS NOTED
3. REVISE AND RESUBMIT
4. REJECTED AS NOTED
5. NO ACTION

H. NO EXCEPTIONS: The submittal was reviewed and general compliance with the design concept and general requirements of the Contract Documents was noted.

I. FURNISH AS NOTED: The submittal was reviewed and found to have minor deviations from the requirements of the Contract Documents or missing information. The contractor shall correct deviations or missing information when ordering materials or equipment and shall provide a corrected submittal in the O&M Manual.

J. REVISE AND RESUBMIT: The submittal was reviewed and major deviations from the requirements of the Contract Documents were noted. The shop drawing or product data shall be revised to eliminate the deviations. A complete resubmittal is required with a written response to each review comment.

K. REJECTED AS NOTED: The submittal was found to be in direct conflict with the requirements of the Contract Documents and was not reviewed further. A complete submittal on the product specified is mandatory.

- L. NO ACTION: This status is assigned to O & M Manuals, Record Drawings, and non-applicable submittals made to the Engineer. Should there be comments with this status, the contractor shall address and satisfy them all via written correspondence.
- M. Materials and equipment which are purchased or installed without a "NO EXCEPTIONS" shop drawing review shall be at the risk of the Contractor and the cost for removal and replacement of such materials and equipment and related work which is judged unsatisfactory by the Architect/Engineer for any reason shall be at the expense of the Contractor.
- N. Shop Drawings shall be complete and certified by the Contractor prior to submission to the Engineer for review. Where more than two reviews are required for a given submittal to obtain a status of "NO EXCEPTIONS", the owner shall be reimbursed by the Contractor for any expense in connection with more than the two submittals set forth herein.

#### 1.18 CERTIFICATIONS AND TEST REPORTS

- A. Submit a detailed schedule for completion and testing of each system indicating scheduled dates for completion of system installation and outlining tests to be performed and schedule date for each test. This detailed completion and test schedule shall be submitted at least thirty (30) days before the projected project completion date.
- B. Test result reporting forms shall be submitted for review prior to submittal of the completion and test schedule.
- C. Submit an electronic copy of all certifications and test results to the Architect/Engineer for review in sufficient advance of the completion schedule to allow for any remedial work required to correct any deficiencies discovered in equipment and systems.
- D. Certifications and completed test reports to be submitted electronically, and shall include, but not be limited to those items outlined in Sections titled "Startup, Testing, Adjusting and Balancing", and "Testing".

#### 1.19 OPERATING AND MAINTENANCE MANUALS

- A. Bind together electronically or in 3-ring binders, four (4) sets (if hard copy is selected) of all approved shop drawings, submittals, bulletins, wiring diagrams, and operating and maintenance instructions on every piece of equipment furnished under this Division. All Sections shall be organized into Sections, typed, labeled and indexed for ease of reference. All pertinent information required for proper operation and maintenance of equipment supplied by the respective Division shall be clearly and legibly written and shall be bound with the O & M's.
- B. The following information shall be provided for all equipment:
  - 1. Identifying name, name tag designation and location of all equipment.
  - 2. Valve tag lists with valve number, type, location, service and color-coding.
  - 3. Fuse and motor heater size information.

4. Equipment and motor nameplate data.
5. Manuals shall only contain submittals with a status of "No Exceptions Taken" or have written responses.
6. Fabrication drawings.
7. Equipment and device bulletins and catalog cut sheets clearly highlighted to show pertinent information about the product installed in the Project. Include also all performance curves and capacity data.
8. Maintenance instructions clearly highlighted to show all required periodic maintenance and lubrication.
9. Wiring diagrams.
10. Operating instructions clearly highlighted.
11. Exploded parts views and parts lists for all equipment and devices.
12. Location and listing of all spare parts and special keys and tools furnished to the Owner.
13. Vendor source name, address, and phone number for replacement parts.
14. Copies of all certified test results and other required certifications.
15. Color-coding charts for all painted equipment and conduit.
16. Operating and Maintenance Manuals shall be delivered to the Architect/Engineer at least fourteen (14) days prior to the beginning of the operator's training period.

#### 1.20 RECORD DRAWINGS

- A. The Contractor shall maintain, on a daily basis, a complete set of black line record prints clearly stamped "Record Drawings" on the job site on which he shall note all details and alterations required to be made to meet actual site conditions and Changes made by Change Order notices. All deviations from the Contract Documents shall be noted on the Record Drawings. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or Work without definite instructions from the Architect. These drawings shall be kept available for inspection by the Architect/Engineer at all times. Refer to Division 1 for additional requirements concerning Record Drawings.
- B. The Record Drawings shall indicate accurate dimensions in two directions from a column for all buried or concealed Work and for recording any deviations from the Work indicated on the Contract Documents as a result of coordination.
- C. Within thirty (30) days of completion of the Work, the Contractor shall transfer all marks from the Record Drawings to a set of Record CAD or BIM files and shall submit the Record CAD or BIM files and three (3) sets of black line prints to the Architect/Engineer for review.
- D. The reproducible Record CAD or BIM files shall have the Engineer's name and seal completely removed. Each Drawing shall be marked with an impression identical to the example below and signed on each sheet as follows:

CERTIFIED RECORD DRAWINGS	
DATE:	_____
	(NAME OF GENERAL CONTRACTOR)
BY:	_____
	(NAME OF SUBCONTRACTOR)
BY:	_____

### 1.21 EXECUTION AND COORDINATION OF WORK

- A. The Drawings attempt to show reasonable indications of the locations of ductwork, piping, conduit, and equipment without always indicating elevations and dimensions. The Contractor shall perform field measurements of actual structural conditions prior to fabricating ductwork, piping, and conduit. All piping systems that require grading shall be coordinated with all trades. Exact locations of equipment and connections thereto shall be coordinated with "No Exceptions Taken" shop drawings, equipment drawings, rough-in drawings, building conditions and all other trades. Any reasonable changes in the locations indicated on the Contract Documents, up to a distance of three (3) feet, shall be made by the Contractor without any additional cost to the Owner.
- B. All ducts, pipes, and conduit, except those in the various equipment rooms, in unfinished spaces or where specifically designated herein or on the Drawings shall be run concealed in furrings, plenums and chases.
- C. Interferences with other trades shall be resolved by giving precedence to systems required to be sloped for drainage or proper operation. Where space requirements conflict, the following order of precedence shall be observed:
  - 1. Building lines.
  - 2. Structural members.
  - 3. Soil and drain piping.
  - 4. Steam and condensate piping.
  - 5. Sprinkler piping.
  - 6. Vent piping.
  - 7. Supply ductwork.
  - 8. Exhaust ductwork.
  - 9. HVAC water piping.
  - 10. Domestic water piping.
  - 11. Electrical conduit.
- D. Manufacturer's Recommendations: With exceptions as specified and/or indicated on the Drawings or in the Specifications, apply, install, erect, use, clean, and condition, manufactured articles, materials, and equipment per Manufacturer's current printed recommendations. Keep copies of such printed recommendations at job site and make them available as required.

E. Architectural Approval: Devices exposed to occupant view or mounted on walls, ceilings, floors, etc. in finished spaces shall:

1. Be located in exact locations shown on the Architectural Drawings or locations approved by the Architect.
2. Have appearances acceptable to the Architect.

1.22 CONTRACTOR'S COORDINATION DRAWINGS/BUILDING INFORMATION MODEL (BIM)

- A. The Contractor shall coordinate efforts of all trades and shall furnish (in writing, with copies to the Architect and Owner) any information necessary to permit the Work of all trades to be installed satisfactorily and with the least possible interference or delay.
- B. The Contractor and all Subcontractors shall prepare a complete set of construction coordination drawings ("Coordination Drawings") indicating all of the equipment actually purchased and the exact routing and elevations for all lines such as piping, busway, conduit, ductwork, etc., including conduit embedded in concrete and openings, sleeves, etc., required in the structure, walls, partitions, etc. The Coordination Drawings shall be submitted complete for review to the Architect, Engineer and Owner in accordance with the specifications. The Coordination Drawing preparation and completion shall comply with the requirements of the Schedule. Prior to commencing the Work, the Subcontractor shall obtain from the Architect or Engineer the Building Information Model (BIM) file in Revit® and/or a set of AutoCAD compatible format Architectural and Engineering Drawings, to be used to produce the Coordination Drawings. The Subcontractor shall give to the Architect and Engineer a written release acceptable to the Architect and Engineer signed by a corporate officer of the Subcontractor, prior to receipt of the compact disks. The sheet metal Drawings, prepared on electronic media using BIM software at a scale not less than 1/4" = 1'-0", shall serve as the base Drawings to which all other Subcontractors will overlay and add their Work. The Mechanical Subcontractor shall be designated as the lead contractor in the development of the composite modeling process and shall be responsible for electronically incorporating the various trade models into the final composite Building Model. Each trade shall draw their Work on separate layers represented by individual colors. Each Coordination Drawing shall be completed and signed off by the other Subcontractors and the Contractor prior to the installation of the Work in the area covered by the specific Coordination Drawing. The Subcontractors Work shall be installed in accordance with the Shop Drawings and the Coordination Drawings and shall include the required maintenance access space and the code clearance space. If the Contractor allows one trade to install their Work before coordinating with the Work of other trades, the Contractor shall make necessary changes to correct the condition without extra cost to the Owner. The Coordination Drawings indicating piping, conduit, busway and equipment support points, and loads exceeding 1,000 lb. imposed on the building structure shall be submitted to the Architect for review and approval. The elevation, location, support points, static, dynamic and expansion forces and loads imposed on the structure at support and anchor points and the size of all lines shall be indicated. All beam penetrations, slab penetrations, and sleeves shall be indicated, sized and coordinated with all other Work. All required code clearance space and required maintenance access space shall be indicated and coordinated with all other work. All Work routed underground or embedded in concrete shall be indicated by dimension to

column and building lines and shall be coordinated. This requirement for Coordination Drawings shall not be construed as authorization for the Contractor or Subcontractor to make any unauthorized changes to the Drawings. All space allocations shown on the Drawings shall be maintained, such as ceiling height, seven (7) inch high zone directly above the ceiling reserved for tenant build out and flexibility, chase walls, equipment room size, etc., unless prior written authorization is received from the Architect to change them. Prior to final acceptance of the Work, the Contractor shall give the BIM in Revit® or AutoCAD 3D 2018 or later compatible format on electronic media storage, containing the Contractor's coordination documentation, to the Owner.

### 1.23 SUPERVISION

- A. A competent Superintendent approved by the Architect/Engineer, shall be kept by the Contractor at the building to receive instructions and to act for the Contractor. Once the Superintendent has been approved, no change shall be made without approval of Architect/Engineer. Representatives of the Owner, Architect/Engineer shall have the right to observe the work at any time. The Contractor shall have a representative available when his work is being observed and he shall give assistance as may be required to the Architect/Engineer's representative.
- B. The project shall be constructed by employees of the Contractor or by workers under his supervision. Any subcontractors employed by the Contractor shall be approved by the Owner's Representative. The Contractor shall be responsible for all equipment, material and work performed by any subcontractor.

### 1.24 SAFETY REGULATIONS

- A. All Work shall be performed in compliance with all applicable and governing safety regulations. All safety lights, guards and signs required for the performance of the Work shall be provided and operated by the respective Contractor.

### 1.25 STORAGE AND PROTECTION OF MATERIALS

- A. The Contractor shall properly store all material and equipment at the jobsite and protect it from the elements and from damage. Any equipment damaged due to improper protection shall be replaced by the Contractor at his expense.
- B. It shall be the responsibility of the Contractor to provide a watertight installation throughout the construction process.
- C. All large pieces of equipment which are to be installed in the building and which are too large to permit access through doorways, stairways or shafts shall be brought to the job by the Contractor and shall be placed in the spaces before enclosing structure is completed. All apparatus shall be cribbed up from the floor.
- D. The Contractor shall protect the work, equipment, and material of all other trades from damage by his work or other workmen and shall make good all damage thus caused.
- E. The Contractor shall be responsible for all work, materials, and equipment until finally inspected, tested, and accepted; protect work against theft, injury or damage; and

carefully store material and equipment received on site which are not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing material. The Contractor shall cover and protect in an acceptable manner to the Owner, all his equipment and materials from damage due to water, spray-on fireproofing, construction debris, etc.

- F. If any item of equipment is received prior to the time it is required, the Contractor shall be responsible for its proper storage and protection until such time as it may be required. The Contractor shall pay for all costs of demurrage or storage.

#### 1.26 SCAFFOLDING

- A. The Contractor shall provide his own scaffolding and ladders to facilitate the necessary adjustment and balancing of the system.

#### 1.27 DRAYAGE AND HAULING

- A. The Contractor shall keep the jobsite free from the accumulation of trash and construction debris, regardless of which subcontractor may be responsible.

#### 1.28 EXCAVATION AND BACKFILL

- A. The Contractor shall make all necessary excavations, cutting of paving, concrete, etc., and do all backfilling and temporary patch type paving repairs necessary for the proper execution of the Work. Remove all dirt and debris out and away from the building as directed.
- B. Backfill shall be compacted and repairs to paving or concrete shall be accomplished to the satisfaction of the Architect and the Local Authorities having jurisdiction.

#### 1.29 SLEEVES, CUTTING, PATCHING AND FIRESAFING

- A. Where it becomes necessary to cut through any wall, floor or ceiling to permit the installation of any Work, or to repair any defects that may appear, the cutting shall be performed under the supervision of the General Contractor. Inform the Owner's representative before any work commences. No structural member shall be altered without the written permission of the Structural Engineer.
- B. The Contractor shall be responsible for the timely placing of sleeves for all piping passing through walls, partitions, beams, floors, and roofs while the same are under construction.
- C. Seal all material and system support penetrations of fire rated construction with factory-built devices or with manufactured fill, void or cavity materials "Classified" by Underwriter's Laboratories, Inc. for use as a Through-Penetration Firestop.
- D. If holes and/or sleeves are not properly installed and cutting and patching becomes necessary, it shall be done at no additional expense to the Owner.

- E. Unused sleeves shall be sealed with fire-stop devices and systems to maintain the fire rating of the construction penetrated.
- F. This Contractor shall be responsible for patching fire proofing on steel and concrete structural members where it has been removed or disturbed for the installation of his hangers, braces or brackets.

### 1.30 LUBRICATION

- A. All equipment shall be properly filled with lubricating oil prior to initial startup.
- B. All parts of equipment requiring the regular preventive maintenance of lubrication shall be equipped with an appropriate Zerk fitting and/or extension tube to an accessible location.

### 1.31 EQUIPMENT NOISE AND VIBRATION

- A. It is the intent to specify and for the Contractor to install systems that are quiet and free of vibration. Equipment shall be balanced, and vibration isolated to meet the requirements specified herein for both the equipment itself and conditions within occupied spaces. Each Contractor is responsible for obtaining and installing equipment that is quiet in operation as compared to other available equipment of its size, capacity, and type.
- B. Equipment not meeting these requirements shall be corrected by the Contractor to an acceptable level but within the requirements of the Specifications at no cost to the Owner, Architect or Engineer.
- C. Air distribution equipment shall be sound tested at the design operating conditions and shall not exceed an NC of 35 at rated CFM.
- D. Noise Level: Unless noted otherwise herein or on the Drawings, the noise level in all occupied spaces shall not exceed the "lowest value in the range" of the noise criteria curves published in the current Fundamentals edition of the ASHRAE Guide and Data Book. The noise criteria curves shall be based on ANSI Standard S1.6-1967 octave bands and a sound pressure level in decibels referenced to 0.002 microbars. Sound levels in occupied spaces must meet the design criteria with all construction in place.
- E. Verification: Should a question arise regarding the acceptable level of noise or vibration in a particular space or piece of equipment, the Contractor shall be responsible for providing the services of an approved acoustical consultant to determine actual noise/vibration conditions.

### 1.32 START-UP

- A. The Contractor shall furnish the services of factory-trained specialists to supervise the installation and start-up of all major systems and equipment.



### 1.33 FINAL COMPLETION AND TESTING

- A. Near the completion of the Work, all equipment and systems specified herein to receive individual testing shall be demonstrated by the Contractor to the Engineer to operate in accordance with the requirements of the Contract Documents. Should any piece of equipment fail to meet those requirements, it shall be either repaired in a timely manner or replaced.
- B. The date for the final acceptance test shall be sufficiently in advance of the Contract completion date to permit the execution of the test and make any remedial repairs prior to the expiration of the Contract. Any adjustments and/or alterations that the final acceptance tests indicate as necessary for the proper functioning of all equipment shall be completed prior to the expiration of the Contract. Retests shall not relieve the Contractor of completion data responsibility. See individual Sections and Sections titled "Startup, Testing, Adjusting and Balancing", and "Testing", for extent of testing required.
- C. The Contractor shall provide a detailed schedule of completion indicating when each system is to be completed and outlining when tests will be performed. Completion schedule shall be submitted for review at least thirty (30) days prior to the anticipated project completion date.
- D. Replace all air filters immediately prior to final acceptance by the Owner.
- E. Equipment and material shall satisfactorily serve continuous loads.
- F. Clean all new lighting fixtures and diffusers immediately prior to final acceptance.
- G. Touch up and/or refinish all scratched equipment and devices immediately prior to final acceptance by the Owner.

### 1.34 OPERATOR INSTRUCTIONS

- A. The Contractor shall provide the services of factory trained specialists to supervise the installation, start-up, testing, and operation of major equipment and systems as specified herein and in other individual specification Sections and to instruct the Owner's operators for a five-day operating instruction period. The operating instruction period shall be defined as straight time working hours and shall not include nights, weekends, or travel time to and/or from the Project. See individual Specification Sections for additional instructions by Manufacturer's trained specialists.
- B. The Owner shall be notified in writing at least five (5) days before each operating instruction period begins. The Contractor shall commence no instruction period until the Owner has issued his written acceptance of the starting time.

### 1.35 FINAL REVIEW

- A. At a time, designated, the entire system shall be reviewed for compliance with the Contract Drawings and Specifications. The Contractor shall be present at this review.

- B. The entire system shall be operating properly with all systems balanced and all controls adjusted.
- C. Certificates and Documents required herein shall be in order and presented to the Architect at least two (2) weeks prior to the review.
- D. After the review, any changes or corrections noted as necessary for the Work to comply with these Specifications and the Drawings shall be accomplished without delay in order to secure final acceptance of the Work.

#### 1.36 WARRANTIES AND GUARANTEES

- A. General: Contractor shall guarantee all material and equipment installed by him against defects in workmanship and material for a period of twelve (12) months after final acceptance of the Work by the Owner, and he shall repair or replace any materials or equipment developing such defects within that time, promptly on due notice given him by the Owner and at Contractor's sole cost and expense.
- B. Equipment: All equipment bearing a manufacturer's guarantee shall be construed to have an extended guarantee to the Owner by the manufacturer. Any such equipment that proves defective in materials or workmanship within the guarantee period is to be replaced by the Contractor in accordance with the manufacturer's guarantee.

#### PART 2 - PRODUCTS (NOT APPLICABLE)

#### PART 3 - EXECUTION

##### 3.1 SUBMITTALS

- A. Submittals shall include, but not be limited to the following:
  - 1. List of proposed manufacturers and subcontractors for major equipment and systems.
  - 2. Test Result Reporting Forms.
  - 3. Detailed completion and test schedule.
  - 4. Operating and maintenance manuals.
  - 5. Record drawings.
  - 6. Operator instruction schedule.

**END OF SECTION**

## SECTION 20 05 04

### SCHEDULE OF SUBMITTAL DATA

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05

##### 1.2 SCOPE

- A. Furnish submittals consisting of shop drawings, product data, brochures, samples, etc., as indicated on the Drawings, as specified herein, and as required by other sections of these specifications.

##### 1.3 SUBMITTALS REQUIRED

- A. The submittals to be furnished for this Project shall comply with the Specifications herein. The referenced Sections scheduled here are for general information purposes only and shall not be construed to be limiting to the submittal data scheduled and/or required within the individual Sections of these Specifications.
- B. Division 20 Submittals are required for, but not limited to, the following items:
  - 1. 20 05 05.....GENERAL DIVISION 20-28 MATERIALS AND METHODS
  - 2. 20 05 06.....OWNER AND CONTRACTOR FURNISHED EQUIPMENT
  - 3. 20 05 07.....ALTERNATES
  - 4. 20 05 08.....DEMOLITION AND WORK WITHIN EXISTING BUILDINGS
  - 5. 20 05 13.....MOTORS AND CONTROLLERS
  - 6. 20 05 14.....ELECTRONIC VARIABLE SPEED DRIVES
  - 7. 20 05 33.....PIPE HEAT TRACING
  - 8. 20 05 48.....NOISE AND VIBRATION ISOLATION
  - 9. 20 07 00.....THERMAL INSULATION
  - 10. 20 08 00.....COMMISSIONING
  - 11. 20 21 16.....MISCELLANEOUS PIPING
  - 12. 20 24 10.....DIESEL ENGINE PROVISIONS
  - 13. 20 24 10.....NATURAL GAS ENGINE PROVISIONS
  - 14. 20 38 00.....KITCHEN EQUIPMENT PROVISIONS
  - 15. 20 63 19.....BULK LIQUID OXYGEN PROVISIONS

C. Division 23 Submittals are required for, but not limited to, the following items:

1. 23 05 10.....HVAC WATER PIPING ACCESSORIES
2. 23 05 25.....MISCELLANEOUS EQUIPMENT
3. 23 05 93.....STARTUP, TESTING, ADJUSTING AND BALANCING
4. 23 05 93.13....SUPPLEMENTAL BALANCING AND ADJUSTMENTS
5. 23 09 16.....BUILDING CONTROL AND AUTOMATION SYSTEM (BCAS)
6. 23 21 13.....HVAC WATER PIPING
7. 23 21 23.....HVAC PUMPS
8. 23 23 00.....REFRIGERANT PIPING
9. 23 31 13.....DUCTWORK AND SHEET METAL
10. 23 33 10.....AIR DISTRIBUTION DEVICES AND DAMPERS
11. 23 34 10.....FANS
12. 23 36 00.....AIR TERMINAL UNITS
13. 23 41 10.....AIR FILTERING
14. 23 43 19.....KITCHEN HOOD MAKEUP EXHAUST AIR CLEANING UNITS
15. 23 52 33.15....BOILERS AND ACCESSORIES - FLEXIBLE WATER TUBE
16. 23 52 39.13....BOILERS AND ACCESSORIES - FIRETUBE [SCOTCH MARINE]
17. 23 62 13.....AIR COOLED CONDENSING UNITS
18. 23 64 16.....WATER CHILLING UNITS - CENTRIFUGAL
19. 23 64 33.....WATER CHILLING UNITS - AIR COOLED
20. 23 65 19.....COOLING TOWERS - STEEL
21. 23 73 00.....AIR HANDLING UNITS
22. 23 75 13.....CUSTOM AIR HANDLING UNITS
23. 23 81 13.....ROOF MOUNTED AIR CONDITIONING UNITS
24. 23 81 23.....COMPUTER ROOM AIR CONDITIONING UNITS – WATER COOLED
25. 23 81 23.01....COMPUTER ROOM AIR CONDITIONING UNITS
26. 23 81 26.....AIR COOLED SPLIT SYSTEM AIR CONDITIONING UNITS
27. 23 81 27.....AIR SOURCE SPLIT SYSTEM HEAT PUMP UNITS
28. 23 82 16.....DUCT MOUNTED COILS

D. Division 25 Submittals are required for, but not limited to, the following items:

1. 25 06 01.....STRUCTURED CABLING INFRASTRUCTURE
2. 25 07 01.....NETWORK AND CENTRAL HARDWARE
3. 25 09 01.....INSTALLATION, TESTING, AND TRAINING
4. 25 09 02.....PANELS AND CONTROLLERS
5. 25 09 03.....DAMPERS, VALVES AND ELECTRONIC CONTROL AND AUTOMATION HARDWARE
6. 25 09 16.....BUILDING CONTROL AND AUTOMATION SYSTEM (BCAS) SOFTWARE
7. 25 09 33.....INPUT/OUTPUT POINT SCHEDULE
8. 25 09 93.....SEQUENCE OF OPERATION
9. 25 10 00.....UTILITY METERING SYSTEM
10. 25 11 00.....LIGHTING CONTROL SYSTEM SOFTWARE AND PROGRAMMING - Long
11. 25 11 00.....LIGHTING CONTROL SYSTEM SOFTWARE AND PROGRAMMING - Short
12. 25 12 00.....SECURITY SYSTEM INTEGRATION

E. Division 26 Submittals are required for, but not limited to, the following items:

1. 26 00 05.....LISTED SUBCONTRACTORS
2. 26 05 07..... TESTING
3. 26 05 19..... CONDUCTORS
4. 26 05 23.....MOTOR AND CONTROL WIRING
5. 26 05 26..... GROUNDING
6. 26 05 33..... CONDUIT
7. 26 05 34.....OUTLET BOXES
8. 26 05 44.....SERVICE PROVISIONS
9. 26 22 13.....DRY TYPE TRANSFORMERS
10. 26 24 16.....CIRCUIT BREAKER DISTRIBUTION PANELS
11. 26 24 17.....CIRCUIT BREAKER LIGHTING AND POWER PANELBOARDS
12. 26 27 26..... WIRING DEVICES
13. 26 28 13..... FUSES
14. 26 28 16.16.... SAFETY AND DISCONNECT SWITCHES

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

**END OF SECTION**

## SECTION 20 05 05

### GENERAL DIVISION 20 MATERIALS AND METHODS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. Demolition and Work Within Existing Buildings - Section 20 05 08
- C. Requirements of Division 20 apply to all Work of Divisions 20-28.

##### 1.2 SCOPE

- A. Provide and install general Division 20-28 materials and methods as shown, scheduled, specified, and required.

#### PART 2 - PRODUCTS

##### 2.1 PIPING SYSTEM MATERIALS

- A. Refer to other Division 21-28 Sections.

##### 2.2 PIPE HANGERS AND SUPPORTS

- A. Refer to Section 20 05 05, Part 3, Execution.

##### 2.3 CABINETS AND PULL BOXES

- A. Refer to Section 20 05 05, Part 3, Execution.

##### 2.4 PIPE CLEANING AND STERILIZATION CHEMICALS

- A. Refer to Section 20 05 05, Part 3, Execution.

##### 2.5 SLEEVES

- A. Refer to Section 20 05 05, Part 3, Execution.

## 2.6 FIRESTOP DEVICES, SYSTEMS, AND MATERIALS

- A. Refer to Section 20 05 05, Part 3, Execution.

## 2.7 EQUIPMENT PADS

- A. Refer to Section 20 05 05, Part 3, Execution.

## 2.8 ACCESS DOORS

- A. Refer to Section 20 05 05, Part 3, Execution.

## 2.9 CURBS AND SUPPORTS

- A. Refer to Section 20 05 05, Part 3, Execution.

## PART 3 - EXECUTION

### 3.1 PIPING INSTALLATION

- A. Erection: Piping shall be properly supported, and adequate provisions shall be made for expansion, contraction, slope and anchorage. Piping measurements are the responsibility of the Piping Contractor. Piping shall be worked into place without springing or forcing. All pipes shall have burr and cutting slag removed by reaming or other approved cleaning methods. All changes in direction shall be made with fittings.
- B. Concealed and Exposed Piping: All piping in finished areas shall be concealed, unless otherwise noted. Piping exposed in mechanical rooms and other locations as noted shall be installed in an orderly manner and parallel with or perpendicular to building lines. Exposed piping in occupied areas shall be routed tight to the structure or as high as is possible.
- C. Electrical Equipment and Electrical Room Precautions: In general, Contractor shall not install piping for heating, refrigeration, plumbing, fire protection, process piping, or any piping systems not included as part of the electrical work, in any switchgear, transformer, elevator equipment, telephone, or electrical equipment room. No piping shall be installed above switchboards, panelboards, control panels, motor control centers, individual motor controllers, etc.
- D. Grading: All piping shall be carefully installed so as to eliminate traps and pockets in pressurized lines and to maintain flow in gravity flow lines. Where air pockets and traps cannot be avoided, provide valved hose connections for water traps and valved automatic air vents for air traps. The Contractor shall consider the pipe grading requirements when coordinating pipe routing for the project. Pipe slope shall be maintained throughout the project. Waste and vent piping shall be sloped in accordance with applicable codes. Pressurized plumbing piping systems shall be sloped to drain points. HVAC water piping systems shall be graded up 1/16" per 10 lineal foot of horizontal run to air vent locations and down 1/16" per 10 lineal feet of horizontal run to drain locations.

- E. Arrangement: Flanges or unions, shall be provided in the piping at connections to all items of equipment. All valves and specialties shall be placed to permit easy and proper operation and access, and all valves shall be regulated, packed and glands adjusted at the completion of the work before final acceptance. Eccentric reducers shall be used wherever changes in pipe sizes occur in horizontal mains. The use of bull head tees or other high pressure drop configurations will not be permitted. Devices installed in the piping systems such as thermowells, gages, etc., shall be installed in positions such that any condensation will drip away from, not into the insulation.
- F. Welding: All welded joints on piping shall be continuous metallic arc or gas fusion welds connecting pipe ends which are beveled to 37-1/2 degrees before welding. The use of backing rings will not be acceptable. All taps shall be made using proper weld fitting. No "burn-ins" will be allowed. Gas torch cuts shall be true and free from burned metal. Clean pipe surfaces to be welded immediately prior to welding. Welded pipe joints shall be properly aligned with no weld material or bead projection into the pipe. All weld procedures shall be in accordance with requirements of the American Welding Society and shall be performed by certified welders. Documentation of welder certification shall be available if requested. All welding operations shall conform to the latest recommendations of the American Welding Society and to ASME B31.9 Piping Code. All qualifying tests, welding and stress relieving procedures, shall, moreover, be in accord with Standard Qualification for WELDING PROCEDURES, WELDERS AND WELDING OPERATORS, APPENDIX A, SECTION 6 of the Code, current edition. In no cases shall Schedule 40 pipe be welded with less than three passes including one tack, one filler, and one lacer. Schedule 80 pipe shall be welded with not less than four passes including one tack, two fillers and one lacer. Welds lacking penetration shall be removed. Internal and external cracks shall be ground down and removed. Finished welds shall be buffed and spray painted with lacquer.
1. All weld fittings shall be factory made wrought carbon steel butt-welding fittings conforming to ASTM A234 and ASME/ANSI B16.9 latest edition, as made by Anvil, Tube Turn, Hackney, Taylor Forge, or Ladish Company. Long radius fittings shall be provided for all 90 degree and 45-degree elbows. Each fitting shall be stamped as specified by ASME/ANSI B16.9 and, in addition, shall have the laboratory control number metal stenciled on each fitting for ready reference as to physical properties required for any fitting selected at random. Complete test reports may be required for any fittings selected at random. Only one manufacturer of weld fittings will be approved for each project. Fittings that have been machined, remarked, or painted will not be acceptable. Each fitting shall have the manufacturer's trademark permanently identified in accordance with MSS SP-25. Markings shall be placed on the fittings at the farthest point from the edge to be welded to prevent disfiguring from the welding process.
  2. Piping and fittings shall be welded and fabricated in accordance with ASME/ANSI and the latest edition of Standard B31.9 from the Code for Pressure Piping for all systems. Machine beveling in shop is preferred. Field beveling may be done by flame cutting to recognized standards.
  3. Ensure complete penetration of deposited metal with base metal. Contractor shall provide filler metal suitable for use with base metal. Keep inside of fittings free from globules of weld metal.



4. Align piping and equipment so that no part is offset more than 1/16". Set all fittings and joints square and true and preserve alignment during welding operation. Use of alignment rods inside pipe is prohibited.
  5. Do not permit any weld to project within the pipe so as to restrict it. Tack welds, if used, must be of the same material and made by the same procedure as the completed weld, otherwise, remove tack welds during welding operation.
  6. Contractor shall not split, bend, flatten or otherwise damage piping before, during or after installation. Remove dirt, scale, and other foreign matter from inside piping before tying in sections, fittings, valves or equipment.
  7. In no case shall Schedule 40 pipe be welded with less than three passes including one stringer/root, one filler and one lacer. Schedule 80 pipe shall be welded with not less than four passes including one stringer/root, two fillers and one lacer. In all cases, however, the weld must be filled before the cap weld is added.
  8. All welds are subject to visual inspection for compliance with specifications. The Owner will, at the Owners option, provide employees or employ a testing laboratory for the purposes of performing said inspections and/or X-ray testing. Initial visual and X-ray inspections will be provided by the Owner. The Contractor shall be responsible for all labor, material and travel expenses involved in the re-inspection and retesting of any welds found to be unacceptable. In addition, the Contractor shall be responsible for the costs involved in any and all additional testing required or recommended by ASME/ANSI Standards due to the discovery of poor, unacceptable, or rejected welds.
  9. Welds lacking penetration, containing excessive porosity of cracks, or is found to be unacceptable for any reason, must be removed and replaced with an original quality weld as specified herein. All qualifying tests, welding, and stress relieving procedures shall, moreover, be in accord with Standard Qualification for Welding Procedures, Welders and Welding Operators, Appendix A, Section 6 of the Code, current edition.
- G. Screw Pipe Fittings: All screw joints shall be made with taper threads, properly cut. Joints shall be made tight with Teflon applied to the pipe threads only and not to fittings. When threads are cut on pipes, the ends shall be carefully reamed to remove any burrs. Before installing pipe that has been cut and threaded, the lengths of pipe shall be upended and hammered to remove all shavings and foreign material.
- H. Assembling Other Joints: Procedures for assembling joints in cast iron and copper lines have been set forth elsewhere in these Specifications. For any special materials, consult the manufacturers for the recommended procedures in assembling the joints.
- I. Expansion and Contraction: Expansion and contraction of piping shall be provided by expansion loops, bends, or expansion joints, to prevent injury to connections, piping, equipment or the elements of the building. Pipe guides shall be provided and installed on piping as shown on Drawings and as necessary to properly fulfill function of expansion loops.
- J. Anchors: Pipe anchors shall be provided and installed at each end of piping runs which require expansion loops or joints, and where indicated on Drawings. Anchors shall be fabricated of rigid structural steel members firmly secured to the building structure.

- K. Escutcheons: Spring clamp plate escutcheons shall be provided where pipes are exposed in finished locations of the building and run through walls, floors, or ceilings. Plates shall be chrome plated spun brass of plain or approved pattern and shall be set tight on the pipe and to the building surface.
- L. Unions: Shall be installed on all bypasses, ahead of all traps, at all connections to equipment, where shown on the Drawings and where required to facilitate removal of equipment. Unions shall also be provided in welded lines at the connections to items of equipment, where equipment flanges are not provided. Unions in steel lines assembled with screwed fittings shall be malleable iron screwed pattern unions with bronze seats. Unions in copper or brass lines shall be all brass, threaded pattern unions. Where unions are required by the above in steel lines assembled by welding, they shall consist of two mating welding flanges.
- M. Protection: All open ends of pipes and equipment shall be properly capped or plugged during construction to keep dirt and other foreign materials out of the system. Plugs of rags, wool, cotton, waste or similar materials are not acceptable.
- N. Dissimilar Pipe Materials: Connections between copper and steel pipes shall be made with dielectric couplings, flanged dielectric unions, or nylon bushings temperature and pressure rated for the service at the point of installation. Connections between copper and steel pipes shall be located in accessible locations or access shall be provided by the installation of access doors.

### 3.2 HANGERS AND SUPPORTS

- A. General: Provide pipe and conduit hangers and support materials as specified herein. All horizontal and vertical piping shall be thoroughly and substantially supported in accordance with ASME B31.9 Standard Code for Pressure Piping and Manufacturers' Standardization Society MSS SP-69 Pipe Hangers and Supports - Selection and Application. The design, type, spacing and application of all hangers, supports, anchors and guides shall comply with the above standards. Hanger rods shall be galvanized, or cadmium plated. Hanger rod clamps and inserts shall be as recommended by the clamp or insert manufacturer for the intended use and shall be approved in writing by the Structural Engineer. All methods of attachment to the structure and the use of after-set inserts shall be approved in writing by the Structural Engineer. The load and spacing on each hanger and/or insert shall not exceed the safe allowable load for any component of the support system, including the concrete that holds the inserts. Reinforcement at inserts shall be provided as required to develop the strength required. The Contractor shall patch fireproofing on steel and concrete structural members where it has been removed or disturbed for the installation of his hangers, braces, or brackets, etc.
- B. MSS Standard Compliance: Provide pipe hangers and supports of materials, design, and manufacture which comply with ANSI/MSS SP-58, SP-59, SP-69, SP-89, and SP-90.
- C. Acceptable Manufacturers: The model numbers listed in the Specification establish a level of quality and material. The following manufactures are acceptable subject to compliance with the requirements of this Specification:

1. Anvil International
  2. B-Line
  3. Central Iron Manufacturing Company
  4. F & S Manufacturing Company
  5. The Michigan Hanger Company
- D. Inserts: Provide Anvil Fig. 282 or equal inserts for all pipe and equipment suspended from new concrete construction. Where inserts are placed in the bottom faces of concrete joists which are too narrow to provide adequate strength of concrete to hold insert properly or where a larger insert would require displacement of the bottom joist steel, the hanger rod shall be suspended from the center of a horizontal angle iron, channel iron, I-beam, and similar items spanning across two adjacent joists. The horizontal support shall be bolted to nonadjustable concrete inserts of the "spot" type, of physical size small enough to avoid the bottom joist steel.
- E. Fasteners: Fastening of pipes, conduits, and similar items in the building shall be as follows: To wood members - by wood screw; to masonry - by threaded metal expansion screws, or welding (when specifically permitted or directed), or bolts, and to new concrete by suitable insert anchored to reinforcing steel and poured in place unless other means are indicated on the plans. Power-actuated fasteners (shooting) will not be acceptable under any circumstances.
- F. Piping in Multiple Parallel Runs: Provide structural channels or angles with Anvil Fig. 137 or equal U-bolt clamps, supported as trapeze hangers where multiple parallel runs of piping are shown. Select and size members for weights to be carried and span dimensions between supports.
- G. Piping in Single Runs: Provide Anvil Fig. 260 or equal adjustable clevis hangers with a nut above and below the hanger on the hanger rod.
- H. Copper Pipe Hangers: Hangers supporting and contacting brass or copper lines 3" in size and smaller shall be Anvil Fig. CT 99C or equal, adjustable plastic-coated copper-plated tubing rings. Hangers supporting and contacting brass or copper lines 4" and larger shall be Anvil Fig. 260 or equal, adjustable clevis, with a nut above and below the hanger, and approved neoprene isolating material between pipe (or tubing) and hanger on the support rod. For insulated copper or brass domestic water lines, hangers for all sizes of pipe shall be Anvil Fig. 300 or equal, adjustable clevis, with a nut above and below the hanger, and approved neoprene isolating material between pipe (or tubing) and hanger on the support rod. Isolate all copper or brass lines from ferrous metals with electrical tape or other dielectric materials to prevent electrolytic action.
- I. Hanger Rod: Provide cadmium-coated or galvanized hanger rods of required length. All hanger rods shall be trimmed neatly so that no more than one inch (1") of excess hanger rod protrudes beyond the hanger nut. In the event a rod is intentionally but temporarily left excessively long (for slope or insulated lines for example), the Contractor shall take appropriate measures to protect the pipe or other materials from damage. Rod diameters shall be as follows:

PIPE SIZES	ROD DIAMETER
3/4" - 2"	3/8"
2-1/2" - 3"	1/2"
4" - 5"	5/8"
6"	3/4"
8" - 12"	7/8"
14" - 18"	1"

- J. Riser Clamps: Provide Anvil Fig. 261 or equal riser clamps with equal bearing on each end. Riser clamps for copper-plated tube shall be copper-plated.
- K. Pipe Supports in Chases and Partitions: Horizontal and vertical piping in chases and partitions, shall be supported by hangers or other suitable support. Pipes serving plumbing fixtures and equipment shall be securely supported near the point where pipes penetrate the finish wall. Supports shall be steel plate, angles or special channels such as Unistrut mounted in vertical or horizontal position. Pipe clamps such as Unistrut P2426, P2008, P1109 or other approved clamps shall be attached to supports. Supports shall be attached to wall or floor construction with clip angles, brackets, or other approved methods. Supports may be attached to cast iron pipe with pipe clamp or other approved method.
- L. Saddles and Shields:
1. Saddles for Horizontal Insulated Piping Without Vapor Barrier: At each hanger or support on horizontal runs, provide Anvil Fig. 160 or equal saddles, as applicable. Shields as described below may be used instead of the saddles. On heating water systems below 140°F (60°C), hangers may be sized for the pipe size and of material compatible with the pipe. Where dissimilar materials are used, provide dielectric separation. Carry insulation over hanger and seal where hanger is sized for pipe.
  2. Shields for Horizontal Insulated Water Piping with Vapor Barrier: At each hanger or support for water piping, provide a half section of preformed cellular glass or rigid calcium silicate blocking, with jacket of adjacent insulation brought across unbroken, supported on Anvil Fig. 167 or equal semicircular galvanized steel shields. Shields for pipe 4" and smaller shall be 12" long; shields for pipe 5 to 8" shall be 18" long; and shields for larger pipe shall be 24" long.
- M. Roller Supports: Provide Anvil Fig. 177 or equal adjustable pipe roll supports for support of horizontal piping installed in racks, beam supports, and where shown on the Drawings.
- N. Independent Support: Support fire sprinkler and standpipe piping independently of other piping in accordance with NFPA-approved methods and local codes and standards, using UL-listed and labeled support components.

O. Provisions for Movement:

1. Movement: Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends, and similar units.
2. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to any pipe or connected equipment. Pipe supports shall properly transmit the weight of the pipe and its contents to the building structure, or to independent posts, piers, or foundations.
3. Pipe Slopes: Install hangers and supports to provide the indicated pipe slopes so maximum pipe deflections allowed by ANSI B31 are not exceeded.

- P. Spacing: Install hangers and supports in piping systems to remove stress from equipment flanges and rotating equipment. The following table gives maximum hanger spacing for copper and steel lines. Hangers shall be more closely spaced where required by the conditions of the installation in order to prevent sagging, excess load on structure and hangers, undue strain on equipment, noise transmission, etc. A hanger shall be placed within 2' of each elbow or tee with a minimum support of one hanger per joint or fitting and at each rise, drop, and trap. Maximum hanger and support spacing shall be as follows:

METALLIC TRADE PIPE SIZE*	MAXIMUM SPACING
1/2"	5'
3/4"	6'
1" AND 1-1/4"	7'
1-1/2"	9'
2"	10'
2-1/2"	11'
3"	12'
4"	14'
5"	16'
6"	17'
8"	19'
10"	22'
12"	23'
14"	25'
16"	27'
18"	28'

\*Includes all sizes of cast iron and non-metallic piping. Provide rolled sheet metal pipe shields at hangers required to prevent any visible non-metallic pipe sag between hangers.

OR

- Q. Spacing: Install hangers and supports in piping systems to remove stress from equipment flanges and rotating equipment. The following table gives maximum hanger spacing for CPVC lines. Hangers shall be more closely spaced where required by the conditions of the installation in order to prevent sagging, excess load on structure and hangers, undue strain on equipment, noise transmission, etc. A hanger shall be placed within 6' of each elbow or tee with a minimum support of one hanger per joint or fitting and at each rise, drop, and trap. Maximum hanger and support spacing shall be as follows:

METALLIC TRADE PIPE SIZE*	MAXIMUM SPACING
1/2"	4'
3/4"	4'
1" AND 1-1/4"	5'
1-1/2"	5'
2"	6'
2-1/2"	6'
3"	6'
4"	6'

\*Includes all sizes of cast iron and non-metallic piping. Provide rolled sheet metal pipe shields at hangers required to prevent any visible non-metallic pipe sag between hangers.

- R. Guides: Install pipe guides complying with the manufacturers published product literature. Where not otherwise indicated install pipe guides near expansion loops, expansion joints, and ball joints.
- S. Anchors: Install anchors at the proper locations to prevent stresses from exceeding those permitted by ANSI B31 and to prevent the transfer of loading and stresses to connected equipment. Anchors shall include vibration isolation in accordance with the pipe support system specified. Where the piping system is floating, the anchors shall be termed restraints or braces.
1. Where expansion compensators are indicated, install anchors in accordance with the expansion unit manufacturers written instructions, to limit movement of piping and forces to the maximums recommended by the manufacturer of each unit.
  2. Where not otherwise indicated, install anchors at the ends of principal pipe runs and at intermediate points in pipe runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.
- T. Leveling: Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

- U. Hangers: Refer to Section 20 05 48, Noise and Vibration Isolation, for additional information and support requirements. Pipe hangers made of wood, wire, or sheet iron shall not be permitted.
- V. Non-Isolated Riser Supports: Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.
  - 1. Cast iron soil pipe shall be supported at the base and at each story level, but in no case at intervals greater than 10 ft.
  - 2. Steel pipe shall be supported at the base and at not less than every other story level, but in no case at intervals greater than 25 ft., except that grooved-piping system shall be supported at each pipe section.
  - 3. Copper tube shall be supported at each story level, but in no case at intervals greater than 10 ft.
  - 4. CPVC pipe shall be supported at each floor level with mid-level guide.
- W. Miscellaneous Steel: All miscellaneous steel required for pipe and duct supports, anchors, guides, and similar items shall be galvanized for indoor use or hot dipped galvanized for outdoor use and where exposed to ambient conditions and shall be sized and provided by the Mechanical Contractor unless specifically indicated to be provided by others. The support members and their connection to the building structure shall be designed by a registered professional Structural Engineer.
- X. Finish: All steel and iron hangers for piping including clevis hangers, rods, inserts, clamps, stanchions, brackets, etc., shall be hot dip galvanized after fabrication for exterior applications and interior applications that are not in an air-conditioned space or air-conditioned return air plenum. Rods shall be electro-galvanized, or cadmium plated after threading for indoor applications and hot dip galvanized after fabrication for outdoor applications. Universal concrete inserts shall be hot dip galvanized.

### 3.3 PIPE CLEANING AND STERILIZATION

- A. HVAC Piping: All HVAC piping shall be cleaned following pressure testing of pipe. Piping shall be completely drained following pressure testing and then filled with clear water and alkaline pipe cleaning treatment (Garratt-Callahan Company 247-L or approved equal) to the suppliers recommended concentration. Provide copies of chemical treatment MSDS Sheets to the Owner. The system shall then be circulated per the supplier's recommendations. Following cleaning, each system shall be drained, refilled, and then continuously flushed until clean water is obtained. All strainers shall be cleaned prior to the system's final operation. Building pumps shall not be used for system flushing or cleaning. All pumps, piping, valves, fittings, etc. needed for flushing, filling and draining, shall be provided as required. After the system has been pressure tested, treated with pipe cleaning treatment and rinsed with clear water to remove the cleaning treatment, a 5 micron in-line filter may be installed in the system, in lieu of continuous water flushing, to clear the piping of construction debris. Each system being filtered shall be pumped continuously and the filter shall be cleaned once every 24 hours until no visible filtered matter is present in the filter after 24 hours of circulation. After the cleaning process is complete, the filters shall be removed from the system and all strainers shall be cleaned prior to putting the piping system into operation.

- B. Potable Water Piping: All potable water piping system components shall, after pressure testing, be thoroughly flushed with clear water and then sterilized. Sterilization shall be with either liquid chlorine or chlorine gas of adequate volume to give a concentration of 50 ppm based upon the volume of the system being treated. A minimum residual chlorine level of 5 ppm shall remain in each system for a minimum of 24 hours. After sterilization, all piping shall be thoroughly flushed. The above are minimum requirements and all sterilization procedures shall be in strict accordance with all local codes and authorities having jurisdiction.
- C. Fire Suppression Water Piping: All fire suppression water piping system components shall, after pressure testing, be thoroughly flushed with clear water.

### 3.4 SLEEVES

- A. General: This Contractor shall be responsible for the timely placement of sleeves in construction. If sleeves are not placed during construction, this contractor shall secure written permission to perform a core drill or cut and patch installation at no cost to the Owner. No piping shall pass through obstructions without sleeves, unless noted otherwise. Furnish and install sleeves around all piping passing through masonry, CMU and concrete walls and partitions, suspended slabs, plaster or drywall ceilings, structural members, other building features and where shown on the drawings.
- B. Partitions: Sleeves shall be required for piping passing through rated drywall and plaster partitions where required by the U.L. Classification for the Through-Penetration Firestop used. Sleeves shall be installed in accordance with the Firestop U.L. Classification. Sleeves are not required for piping passing through non-rated drywall or plaster partitions. Non-isolated piping shall be mudded in and isolated piping shall have the opening mudded to within 1/2" of the pipe and an elastomeric caulk shall be installed in the opening around the pipe or insulation. Sleeves shall be secured to partitions as required by local Codes.
- C. Storm, Waste, and Vent Piping: Sleeves shall not be required for storm, waste or vent piping through slabs on grade or for piping passing through precast structure. Where piping passes vertically through pre-cast structures without sleeving, adequate provisions shall be made to prevent water leakage through slabs where applicable.
- D. Sizing Sleeves: Sleeves shall be one size larger than the pipe passing through the sleeve, except where larger sizes are required for mechanical seals. Where insulated piping passes through non-fire rated construction, sleeves shall be one size larger than the outside diameter of the insulation. All sleeves in floors shall extend 2 inches above the finished floor. Do not cut fire stop assemblies, such as ProSet or Hilti cast-in devices, off flush at slab level.
- E. Materials:
  - 1. Non-Supporting Vertical Construction: Provide minimum 18-gauge galvanized steel sleeves.
  - 2. Non-Supporting Horizontal Construction: Provide minimum 16-gauge galvanized steel sleeves.



3. Horizontal Construction Supporting Risers 3" and Smaller: Provide Schedule 40 galvanized pipe sleeves.
  4. Horizontal Construction Supporting Risers 4" and Larger: Provide Thunderline "Link-Seal" Model WS galvanized steel wall sleeves or Schedule 40 galvanized pipe sleeve with four, six (6) inch long, 3/8" diameter reinforcing rods welded radially to the sleeve on 90-degree centers, set in concrete.
  5. Exterior Building Construction: For exterior concrete construction above and below grade, and exterior brick or masonry above grade, provide Thunderline "link-seal" Model WS galvanized wall sleeves or Schedule 40 black steel pipe with 1/4" thick steel plate secured to the piping with continuous fillet weld. The plate shall be located in the middle of the wall and shall be four inches wider all around than the sleeve it encircles. The entire assembly shall be hot dipped galvanized after fabrication. Seal off annular opening between piping and sleeve with "Link Seal" Casing Seal: Thunderline Corporation, Livonia, Michigan; "Pipe Linx": Mason-Dallas, Inc.
  6. The piping sleeve shall be sized to accommodate the casing seal. Casing seals shall be Series 300 for piping sizes 3/4" through 4", Series 400 for piping 5" through 24", and Series 500 for piping 30" and larger.
- F. Installation: At no point shall the pipe or its insulation touch the sleeve it passes through. Clearance around piping shall not be less than 1/2" or more than 1". Seal all sleeves that are not in exterior construction below grade or rated construction with an approved non-hardening mastic. Seal sleeves through fire rated construction as specified herein and as detailed on the Drawings. Sleeves below grade shall be sealed with Thunderline "Link-Seal" model LS or Mason-Dallas "Pipe Linx" mechanical seals.
- G. Option: At the contractor's option, waterproof, fire rated Sleeve/Coupling Penetrations: ProSet Systems, Inc., may be used for non-isolated piping systems in lieu of galvanized sleeves specified hereinabove.

### 3.5 CUTTING AND PATCHING

- A. Where it becomes necessary to cut through any wall, floor or ceiling to permit the installation of any Work, or to repair any defects that may appear, the cutting shall be performed under the supervision of the General Contractor. Inform the Owner's representative before any work commences. No structural member shall be altered without the written permission of the Structural Engineer.
- B. Patching of all openings cut by this Contractor or repairing of any damage to the work of other trades occasioned by cutting operations, or occasioned by the failure of any part of work installed under this Contract, shall be performed by the trade whose work is involved, but shall be paid for by this Contractor.
- C. Any openings cut through exterior walls or roofs shall be provided with suitable covers while they are left open to protect the property or materials involved. Any openings cut through walls below grade shall be properly protected to prevent entrance of water or other damaging elements.
- D. Water Stops: Provide water stops at new penetrations of existing floors. Water stops shall be at least 16 gauge and be sized as specified herein for sleeves. Water stops

shall be securely attached to the top of the floor slab with a waterproof mastic applied between the bottom flange of the water stop and the floor slab. The thickness of the firesafing system shall not exceed the existing floor thickness.

### 3.6 FLASHING

- A. Flash around all vent pipes passing through the roof with sheet lead not less than 4 lbs. per square foot, built a minimum of 8" into the roofing in all directions from the outside of the pipe, running up the pipe, and turned over into the pipe cavity.

### 3.7 FIRESTOPPING

- A. Where Division 20-28 materials and system supports pass through fire or smoke rated construction, they shall be fire stopped with a factory-built UL Classified Through-Penetration Firestop Device, or with manufactured Fill, Void, or Cavity Materials Classified by Underwriters Laboratories, Inc. for use in a UL Classified Through-Penetration Firestop System to prevent the spread of smoke, fire, toxic gas, or water.
- B. The Firestop Devices, Materials, and Systems shall meet all the fire test and hose stream test requirements of ASTM E119, "Standard Test Methods for Fire Tests of Building Construction and Materials", or ASTM E814, "Standard Test Method for Fire Tests of Through-Penetration Fire Stops".
- C. "F" ratings of the Firestop used shall be not less than the required fire resistance rating of the wall or floor penetrated. "T" ratings shall be as required by local code for the type of building construction.
- D. Fill, Void, or Cavity Materials shall only be installed in accordance with UL classified system numbers.
- E. All firestop Devices and Systems shall be approved for such use by the authority having jurisdiction.
- F. Excessive shrinkage of the fire stopping materials that would permit the transmission of smoke or water prior to exposure to a fire condition is unacceptable. Where mastic is used to seal the surface of the firestop, the mastic shall be non-hardening. Firestop Systems for isolated piping systems shall be non-hardening except that non-hardening putty will not be acceptable. The Firestop System used shall accommodate expansion and contraction of the floating mechanical piping systems without damaging the firestop or reducing its effectiveness as a barrier to the passage of smoke, fire, toxic gas, or water.
- G. Submittal data for Firestop Materials shall include the U.L. System Numbers listed in the U.L. Fire Resistance Directory under which the material was tested in accordance with ASTM E 814 (UL 1479) or ASTM E119.
- H. If it complies with these Specifications, firestop Devices, Systems, and Materials manufactured by one of the following manufacturers will be acceptable:

1. Tremco Fire-Resistive Joint System using Dymeric sealant and Cerablanket-FS mineral filler
2. 3M Fire Barrier Penetration Sealing Systems (Electro Products Division)
3. GE Pensil 1851 Silicone RTM by General Electric
4. ProSet Systems, Inc.
5. The Rectorseal Corporation
6. STI
7. Hilti

### 3.8 PAINTING

- A. Field painting will be provided under Division 9 utilizing these guidelines.
- B. All machinery and equipment not finished at the factory shall be given a prime coat and then finish painted with two coats of enamel in colors as directed by the Architect/Engineer or Owner's Representative. No nameplates on equipment shall be painted, and suitable protection shall be afforded such plates to prevent their being rendered illegible during the painting operations.
- C. All un-insulated black steel pipe, hangers and supports shall be given two (2) coats of zinc-epoxy primer. Where exposed to outdoor weather or public view, these items shall be primed and finished with two coats of epoxy in colors as indicated in the Piping System Identification Table. Outdoor insulated piping shall be primed prior to application of insulation.
- D. All un-insulated black steel pipe direct buried shall be given two coats of primer and then coated with 3M Scotchwrap Pipe Insulation #50 applied in strict accordance with manufacturer's published recommendations (machine wrapping of pipe is acceptable) prior to burial in the ground.
- E. All insulated piping exposed to view shall have the finished insulation painted with two coats of acrylic in colors as indicated in the Piping System Identification Table. Piping concealed in furrings, chases, or above suspended ceilings, need not be painted.
- F. All grilles and registers will be furnished with a factory-applied finish. Should the plans indicate that certain grilles and registers be furnished with a factory-applied prime coat for field painting, the cores shall be removed for painting under another Division. The frames, after installation, shall be given two coats of enamel. The cores shall be spray painted with two coats of enamel and shall be reinstalled in the frames only after both cores and frames are thoroughly dry. In such cases the color of the enamel finish shall be as directed by the Architect/Engineer.
- G. Before painting, all surfaces to be painted shall be suitably prepared. This shall include removing all oil, rust, scale, dirt, and other foreign material. Surfaces shall be made smooth by grinding, filing, brushing, or other approved method. In the painting operations, the primer for metal surfaces shall be of the zinc dust type, and where finish painting is specified for a finish, it shall be painted as specified in another Division.

H. Except where specific materials and colors are designated above, the various piping systems, hangers, supports, equipment items, machinery and appurtenances shall be painted using materials and colors approved by the Architect/Engineer.

I. PIPING SYSTEM IDENTIFICATION TABLE (Also refer to Section 23 21 13)

PIPE MARKERS CLASSIFICATION LEGEND				
PIPING SYSTEM	COLOR PIPE	COLOR FIELD	COLOR LETTERS	DIRECTIONAL ARROWS
CONDENSER WATER SUPPLY	Light Green	Green	White	Yes
CONDENSER WATER RETURN	Dark Green	Green	White	Yes
CHILLED WATER SUPPLY	Dark Blue	Green	White	Yes
CHILLED WATER RETURN	Light Blue	Green	White	Yes
HOT WATER HEAT SUPPLY	Dark Red	Yellow	Black	Yes
HOT WATER HEAT RETURN	Light Red	Yellow	Black	Yes
DOMESTIC COLD WATER	Brown	Green	White	No
HOT WATER SUPPLY 120°	Tan	Yellow	Black	Yes
HOT WATER RETURN 120°	Tan	Yellow	Black	Yes
250 PSI STEAM SUPPLY	Orange	Yellow	Black	Yes
100 PSI STEAM SUPPLY	Orange	Yellow	Black	Yes
25 PSI STEAM SUPPLY	Orange	Yellow	Black	Yes
PUMPED STEAM CONDENSATE RETURN	Light Orange	Yellow	Black	Yes
GRAVITY STEAM CONDENSATE RETURN	Light Orange	Yellow	Black	Yes
HOT WATER SUPPLY 140°	Tan	Yellow	Black	Yes
HOT WATER RETURN 140°	Tan	Yellow	Black	Yes
WASTE AND VENT	Black	Green	White	Yes
FUEL OIL	Safety Yellow	Yellow	Black	Yes
OXYGEN	Light Green	Green	White	No
NITROGEN	Black	Green	White	No
NITROUS OXIDE	Light Blue	Yellow	Black	No
MEDICAL AIR	Light Yellow	Blue	White	No
VACUUM	Silver	Yellow	Black	Yes
NATURAL GAS	Safety Yellow	Yellow	Black	No
COMPRESSED AIR		Yellow	Black	
FIRE PROTECTION	Red	Red	White	No

3.9 IDENTIFICATION AND LABELING OF ELECTRICAL EQUIPMENT

A. Equipment: All service entrance equipment, distribution equipment, and distribution panelboards, including their associated branch circuit devices, and each new major item of electrical equipment including lighting and power panelboards, motor starters, transfer switches, and disconnect switches, shall be properly identified by the attachment of engraved nameplates constructed from laminated plastic, at least 1/16-inch-thick 3-ply, with black surfaces and white core. Emergency power equipment nameplates shall have red surfaces and white core.

1. Engraving shall be condensed gothic, at least 1/4 inch high. The engraved nameplates shall be securely attached to the device or panelboard using non-corroding screws. The use of adhesive or tape attachment is not acceptable.
  2. Labeling shall include the name of equipment the device feeds, the source panel, the source circuit number, and the voltage. Consult the Mechanical, Electrical and Plumbing drawings for label nomenclature.
  3. Transfer Switches: Transfer switch nameplates shall include the name and circuit number for the normal and emergency power sources to the transfer switch.
  4. Fire Pump: Fire pump controller, transfer switch, emergency power source, and overcurrent protection device shall be labeled as per NFPA-20.
- B. Miscellaneous Switch Plates or Device Plates: Device and switch plates for all 20-amp devices circuited to "emergency" circuits, special purpose outlets, pilot lights, remote operated light switches, devices in critical care areas of healthcare facilities, and all remote-control devices shall be identified by engraving the switch plate or device plate.
1. Nomenclature shall include the panel and circuit of the outlet or switch, or the indication of the pilot, or the area of control, or equipment served. Consult the Architect/Engineer for label nomenclature.
  2. Plates shall be stainless steel or as otherwise specified.
  3. Engraving shall be 3/16-inch condensed gothic and shall be filled with black enamel.
- C. Conduits: All exposed conduits shall have the voltage marked on 50-foot centers, at least one in each room and at all junction boxes and electrical devices. Markers shall be Brady B-500 vinyl cloth with black letters on an orange background or an approved equal. Emergency power conduits shall also be labeled to indicate the type of service. Designations shall be approved by the Architect/Engineer.
- D. Emergency Power Panelboards: Engraved red nameplates for panelboards serving emergency power loads shall indicate the "Branch" of the Essential Electric System served. The nameplate shall also identify the voltage, circuit number, and equipment name from which the incoming feeder circuit was derived.
- 3.10 IDENTIFICATION AND LABELING OF EQUIPMENT, PIPING, VALVES, AND ACCESS DOORS
- A. Equipment: Rooftop equipment, air handling units, pumps, water heaters, supply fans, duct heaters, exhaust fans, water chilling units, boilers, cooling towers, terminal units and any other equipment designated by the Architect/Engineer shall be labeled with permanently attached engraved nameplates constructed from laminated phenolic plastic, at least 1/16-inch-thick, 3-ply, black surfaces and white core. Engraving shall be condensed gothic at least 3/8 inch high. Engraving shall include equipment name and number and electrical panel and circuit that serve the equipment. Consult the Drawings for label nomenclature.
- B. Valves: All valves at major equipment and in all equipment, rooms shall be marked with 1-1/2" diameter aluminum or engraved plastic tags securely attached to valve stems with "S" hooks.

- C. Piping: Piping at major equipment and in all equipment, rooms shall be identified by color-coded markers as to type of use, service and direction of flow as indicated within the Piping System Identification Table. Markers shall be located at each valve, at entries through walls, and on 20 ft. centers on straight runs of pipe. Piping concealed in accessible locations shall be marked on 50-foot centers on straight runs of pipe, at all changes in direction, and at least one location above each room having partitions to structure. Labels shall be as manufactured by Brady, Brimar, Seton, Marking Services, Inc., or Westline.
- D. Access Doors: Access doors provided for access and servicing of fire and smoke dampers shall be labeled as to type of damper (fire, smoke, combination fire and smoke) served.
- E. Equipment nameplates and valve designation data shall be recorded on Record Drawings, and on itemized listing by equipment types and valve number sequence. Itemized listings shall include designation, device description and device location.
- F. PIPING SYSTEM LEGEND LETTER SIZING TABLE

OUTSIDE DIAMETER OF PIPE OR COVERING - INCH	LENGTH OF COLOR FIELD - INCH	SIZE OF LETTER - INCH
3/4 to 1-1/4	8	1/2
1-1/2 to 2	8	3/4
2-1/2 to 6	12	1-1/4
8 to 10	24	2-1/2
OVER 10	32	3-1/2

### 3.11 WARNING SIGNS

- A. Provide warning signs where there is a hazardous exposure associated with access to or operation of mechanical facilities. Provide text of sufficient clarity and lettering of sufficient size to convey adequate information at each location. Mount warning signs permanently in an appropriate and effective location in the space, at equipment, and on piping and ductwork.
- B. Comply with recognized industry standards for color and design.

### 3.12 EXPOSED PIPING

- A. All exposed piping in finished areas shall be polished chrome plated unless noted otherwise on the Drawings. This shall include piping, fittings and valves. Polished chrome plated sleeves may be used over piping provided that the finished installation presents the appearance of a fully chrome plated system.

### 3.13 EQUIPMENT PADS AND ACCESSORIES

- A. Equipment Housekeeping Pads and Anchor Bolts: Concrete pads for equipment will be furnished under another Division. Pads shall be provided in equipment rooms, and in other locations with major equipment installed. Pads shall nominally be 3-1/2" high and shall generally conform to the shape of the piece of equipment it supports with a minimum of 3" margin around the equipment and supports. Height of pads for air handling units shall consider whether the units have internal or external vibration isolation to permit proper installation of the condensate drain p-trap.
- B. Pad Materials: Pads shall be minimum 2500 psi (28 day) concrete reinforced with 6 x 6 #6 welded wire mesh. Tops and sides of pads shall be hard troweled smooth with a 3/4" bullnose on all external corners. Furnish galvanized anchor bolts according to the equipment layout templates for installation in equipment pads. Bolts shall be of the size and quantity recommended by the manufacturer and where vibration isolators are used, they shall be anchor bolted to the equipment pad.
- C. Equipment Guards: Provide easily removable expanded metal guards for all belts, couplings, exposed fan inlets and outlets and other moving parts of machinery. Provide tachometer openings in motor and fan shaft guards at least 2" diameter on all belt drive and variable speed equipment.
- D. Belt Drives: Select belt drives as accurately as possible, based upon the design conditions. Whenever, in the course of balancing a system, it is determined that a drive change is required, the Contractor shall furnish one complete drive change without additional cost to the Owner or Architect/Engineer. Multiple belt drives shall have matched belt sets.
- E. Supports: The Contractor shall support all work and equipment furnished under his Division. The Contractor shall study thoroughly all Architectural, Structural, Mechanical, Plumbing, Fire Suppression, and Electrical drawings, shop drawings and catalog data to determine how equipment is to be supported, mounted or suspended, and shall provide all bolts, inserts, pipe stands, brackets and accessories for proper support.

### 3.14 ACCESS DOORS

- A. Access doors shall be provided by Division 20-28 Contractors for access to valves, balancing dampers, fire dampers, motors, duct cleanouts or any other item which may require servicing or adjusting, and which is concealed behind an inaccessible surface such as spline ceilings and plaster walls or ceilings. Doors shall be factory finished as noted below and turned over to the General Contractor for installation and painting. Doors shall be as manufactured by Inryco/Milcor or an approved equal in the following styles:
  - 1. Drywall construction (vertical partition surface) - Milcor Style DW with gray prime finish.
  - 2. Drywall construction (ceiling horizontal surface) - Milcor Style ATR with door design for drywall insert.
  - 3. Finished acoustical ceiling tile - Milcor Style AT with door design for tile insert.

4. Finished plaster ceiling or walls - Milcor Style AP with door designed for finish plastering.
  5. Masonry or tile walls - Milcor Style M with gray prime finish.
  6. Fire rated walls - Milcor Fire Rated Access Door with gray prime finish.
  7. Fire rated ceiling or ceiling assembly - Milcor Style ATR with door designed for tile insert.
- B. Access doors shall be furnished with a continuous piano hinge with screwdriver operated flush locks and shall be a minimum of 12" x 12". Larger sizes shall be furnished where required for proper access. Access doors shall not be installed until location and style have been approved by the Architect.

### 3.15 TRENCHING AND BACKFILLING

- A. All underground pipes and conduit shall be laid open in trench. All field measurements, layouts, grade establishments, etc., shall be done by Registered Public Surveyor in the employ of the Contractor. The Contractor's Surveyor shall be on-the-job during all underground Work. The Architect will provide a "Bench Mark" reference for use by the Contractor.
- B. Pipes shall be laid and maintained at required lines and grades during the course of the Work. All joints shall be aligned and complete.
- C. The trench shall be excavated to alignment and depth as required. Trench shall be properly braced and dewatered. The trenches shall be kept free of water at all times during installation, testing of pipe and/or conduit, and back filling. The Contractor shall provide proper facilities for discharging water into natural drainage channels. No water shall be discharged onto a street without approval by the Architect.
- D. All exterior underground piping and conduit shall be installed with a minimum of 18" of earth or equivalent cover, except where specifically shown otherwise or required by the Architect/Engineer.
- E. The trench shall be at least 18" wider than the diameter of the largest bell on the pipe duct bank, and conduit. If the pipe has no bells, the trench shall be at least 18" wider than the maximum diameter of the pipe. Pipe or conduit shall be laid in the center of the trench. The trench shall be excavated to a depth sufficient to provide for pipe/conduit cushions as specified herein.
- F. Sheet pile and brace excavations wherever necessary to prevent cave-in. Trench width may be increased as required and piling left in place until sufficient compacted backfill is in place. The Contractor shall properly sheet and brace all open trenches to render them secure and shall remove all such sheeting and bracing before completing the backfill. The quantity of the excavation required to install sheeting and the installation and removal of sheetings and bracings will not be regarded as extra Work and all costs incurred for this excavation and the installation of sheeting shall be included in the Contract price.
- G. Trenching may be done with trench digging machinery unless hand digging is required to avoid damage to existing structures or apparatus both above or below grade.



- H. Pipe Cushion/Select Fill: Upon completion of excavation and prior to the laying of the pipe or conduit, the trench bottom shall be brought up to the required elevation with a pipe cushion, except where the cushion has been eliminated by the Architect. Pipe and conduit cushions shall be selected material deposited in the trench, and shall be compacted, leveled off, and shaped to obtain a smooth compacted bed along the laying length of the pipe. Material for pipe and conduit cushion shall comply with local codes and shall be placed in accordance with the Earthwork section of the specifications. In absence of local code requirements, the cushion shall be select fill with a PI of between 10 and 20. Any select fill used shall pass a one-inch screen.
- I. Pipes and conduit shall not be laid in water or when trench condition is unsuitable.
- J. As sections of pipe and conduit are installed, they shall be temporarily sealed until remaining sections of the piping have been installed to complete the system.
- K. Cast iron pipes subject to potential heads of 15 feet of water or more shall have concrete anchors at each change in direction and/or as directed. Any change in direction exceeding 15 degrees shall be anchored. Concrete anchors shall rest against solid (virgin) ground with the required area of bearing on pipe and ground to provide suitable anchoring.
- L. Trenches shall be backfilled only after piping has been inspected, tested, and approved by the Architect/Engineer. All backfill material shall be placed in the trench either by hand or by approved mechanical methods. The compaction of backfill material shall be accompanied by tamping with hand tools or approved pneumatic tampers, by using vibratory compactors, or by any combination of these. The method of compaction shall be approved, and all compaction shall be done in accordance with requirements of the Earthwork section of the Specifications. Backfill completely around pipe or conduit, including 18" above the pipe or conduit, with select fill, tamped in 8" layers under, around, and over pipe or conduit. The remainder of the backfill for all pipes or conduit shall be select backfill material tamped at intervals of no more than 12" depths, to attain Proctor Compaction Density required. If in the opinion of the Architect or the Geotechnical Consultant, the excavated material does not meet the requirements for select fill, the Contractor shall be required to screen the material prior to its use as select fill material. Material used in the upper portion of the backfill or sub-grade shall not contain stone, rock, or other material larger than six inches in its longest dimension. No wood, vegetable matter, or other material, which in the opinion of the Architect or Geotechnical Consultant, are unsuitable shall be included in the backfill. Backfill shall be brought up to finish grade identified on the Architectural Drawings and include additional backfill required to offset settlement during consolidation.
- M. At building perimeter where pipe or conduit exits the building, mix a granular pellet form of Bentonite with select fill and completely fill trench for 8 feet inside and outside building exterior to create a vertical hydraulic barrier.
- N. When removal of unsuitable excavated material creates a shortage of backfill material, the Contractor shall, at no cost to the Owner, furnish material as specified in this Section in the amount required to complete the backfill.

- O. Existing street, driveways, and sidewalks damaged during the excavation work shall be restored to acceptable condition, subject to approval by the Architect.
- P. Provide all street and sidewalk excavations with approved barricades, warning lights, and cover plates as required by the Authorities Having Jurisdiction.
- Q. Submit complete installation and test procedures of the excavation and backfill work for approval by Architect prior to commencing any work.

### 3.16 CURBS AND SUPPORTS - ROOF MOUNTED EQUIPMENT

- A. Where required, curbs and supports shall be of box section design, heavy gauge galvanized steel or aluminum construction, continuous mitered and welded corner seams, integral base plate, factory installed wood nailer, and shall be insulated with 1-1/2" thick, rigid fiberglass board insulation. Curbs and supports shall be mounted and flashed according to manufacturer's recommendations. Curbs for sloping roof surfaces shall be custom fabricated such that supported equipment is level. Curbs and Support: Pate Company of the style as outlined below or approved equal.
  - 1. Utility Fan Curbs: Shall be style PC-1A, 12" high.
  - 2. Duct Curbs: Where ducts are required to penetrate the roof without passing through an equipment curb, Pate style PC-1A, 12" high curbs shall be used.
  - 3. Piping Curbs: Where piping penetrates the roof without passing through an equipment curb, Pate style PCA-1, 12" high curbs shall be used.
  - 4. Equipment Supports: Roof mounted equipment shall be supported using Pate style ES-1A equipment supports with provisions for securing equipment as required. Equipment curbs shall be at least 12" high. Curbs for sloping roof surfaces shall be custom fabricated such that supported equipment is level.
  - 5. Pipe and Ductwork Supports: Piping and ductwork routed on roofs shall be suspended using support products as manufactured by Portable Pipe Hangers, Inc. of Stafford, Texas. Supports shall consist of reinforced pre-cast concrete bases, tubular steel frame, and hangers as specified in HANGERS AND SUPPORTS. The tubular steel frame and rollers shall be hot dipped galvanized to prevent rust. Threaded rods, nuts, washers, etc., shall be cadmium plated. Pipe hangers shall be adjustable in height to provided appropriate pipe slope where required and equally distribute the piping load. Pipes and ducts shall be suspended a minimum of 18" above the roof surface. The entire support system shall be designed by a factory-authorized engineer and shall consist of standard and custom hanger arrangements as required for proper support. The support system shall accommodate piping expansion/contraction and for pumped water systems shall accommodate system vibrations. See Section 20 05 48, Noise and Vibration Isolation. The design shall be coordinated with the pipe and duct fabrication drawings, building structure, and actual roof construction. Provide protection pads such as Siplast Trafbloc composed of chopped rubber particles and synthetic binders under each pre-cast concrete base. Use polyurethane caulking where the frame fits into the base to prevent water migration into the insert. Install the piping support system in accordance with the manufacturers written installation instructions.

- B. Roof mounted equipment shall be designed and constructed to sustain vertical and horizontal loads due to wind as prescribed by the building code. In the absence of specific building code requirements, the design wind load shall be based on an ultimate wind speed of based on an ultimate design wind speed of 139 mph, roughness Class C, as per IBC Section 1609. Manufacturer shall submit a curb or support design that is sealed by an Engineer licensed in the state where the project is to be located. Documentation shall be provided indicating that the equipment casing and components are designed to sustain the prescribed wind loading.

### 3.17 SUBMITTALS

- A. Submit shop drawing information on the following Basic Materials:
1. Link Seal mechanical seals and sleeves.
  2. Pipe Cleaning and Sterilizing methods and materials.
  3. Pipe Hangers, Supports, Saddles, Insulation Shields and Anchors for attaching hangers and supports to the building structure.
  4. Fire Stop Materials with manufacturers recommended installation details.
  5. Miscellaneous Curbs and Supports.
  6. Equipment (housekeeping) Pad drawings.
  7. Identification, Labeling and Warning Signs.
  8. Access Doors.
  9. Pipe Fabrication Drawings.
  10. Roof Mounted Equipment Curbs and Supports.
  11. Cabinets and Pull Boxes.
  12. Additional requirements as outlined in Section 20 05 03.

**END OF SECTION**

## SECTION 20 05 06

### OWNER AND CONTRACTOR FURNISHED EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Schedule of Submittal Data - Section 20 05 04

##### 1.2 SCOPE

- A. Furnish and install Fire Suppression, Plumbing, Heating, Ventilating and Air Conditioning, and Electrical connections and utility provisions for equipment including, but not limited to Owner and Contractor furnished equipment.
- B. Furnish and install all Fire Suppression, Plumbing, Heating, Ventilating and Air Conditioning, and Electrical services for Owner and Contractor furnished equipment as shown on the Drawings, as actually supplied, and as required to suit the actual equipment furnished.
- C. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Plumbing Piping and Accessories - Section 22 11 16
  - 2. Ductwork and Sheet Metal - Section 23 31 13
  - 3. Conduit - Section 26 05 33
  - 4. Conductors - Section 26 05 19
  - 5. Grounding - Section 26 05 26

#### PART 2 - PRODUCTS

##### 2.1 MATERIALS

- A. Others will set equipment in place, including leveling, fastening, etc., and will furnish to this Contractor, for installation, all trim such as fittings, sink plugs, traps, tailpiece, gas cocks, faucets, etc. This Contractor shall furnish and install all piping, ductwork, conduit, and conductors above floor, between components, furnish and install rough-in and make final connections. All trim will be job site delivered to the Contractor. Trim that is not furnished to the Contractor shall be furnished by the respective Contractor. Equipment will be delivered with all openings and holes drilled in the equipment to accommodate

required fittings. Provide chrome plated brass stop valves on all water connections to equipment.

- B. Where Owner and Contractor furnished equipment consists of multiple components, provide and install all required interconnecting piping, ductwork, conduit, wiring, control wiring, etc.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Rough-in and final connections are the responsibility of the Contractor and he shall closely check service conflicts, access and space constraints. It shall be the responsibility of the Contractor to obtain exact services required for equipment listed. Prior to rough-in installations, the Contractor shall obtain certified rough-in drawings of equipment and coordinate with all trades all connections required for the actual equipment to be installed.
- B. Any changes in location for service rough-ins shall be made at no cost to Owner or Architect/Engineer. Where changes are to be made that are equal to or less than those shown on the plan sheets, then these changes shall be made at no cost as a matter of project coordination. Where these changes exceed service and spatial constraints provided for on the Drawings, notify the Architect/Engineer in writing.
- C. Furnish and install final utility connections to all equipment. Connections shall be coordinated with actual connection sizes and location. All valves, unions, flexible connections, air gaps, traps and other devices required by the plan sheets, equipment shop drawings, cut sheets and equipment manufacturer's written installation drawings, shall be provided and installed.
- D. Utility connections shall be coordinated with equipment so as not to hinder any required service access points and to provide all required service access clearances. Connections shall be concealed to the maximum extent possible and all exposed piping that is not specified to be insulated shall be chrome plated with chrome escutcheons.
- E. It shall be the responsibility of the Divisions 20-28 to coordinate with the Owner, General Contractor and other Divisions to determine which equipment connections and provisions are provided by these Divisions, and which are provided by others and to ensure that provisions are provided in a complete and timely manner.

### 3.2 PIPE HEAT TRACING

- A. Connect pipe heat tracing cable as specified in Divisions 21, 22, and 23.
- B. The heat tracing cable and all required accessories shall be furnished and installed by Divisions 21, 22, and 23, and grounded, connected and tested by Division 26 per the cable manufacturer's written installation instructions.

- C. Provide ground fault interrupting circuit breakers (GFCI) for all heat trace cable branch circuits.

**END OF SECTION**

## SECTION 20 05 08

### DEMOLITION AND WORK WITHIN EXISTING BUILDINGS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05

##### 1.2 SCOPE

- A. Existing buildings and their facilities must remain functional while the Work under this Contract is performed. All system shutdowns and outages must be minimized and coordinated with the Owner.

##### 1.1

##### 1.3 DEMOLITION AND WORK WITHIN EXISTING BUILDINGS

- A. General: During the construction and remodeling, portions of the project shall remain in service. Construction equipment, materials, tools, extension cords, and similar items shall be arranged so as to present minimum hazard or interruption to the occupants of the building. Make every effort to minimize damage to the existing building and the Owner's property. Repair, patch, or replace, as required, any damage that might occur as a result of work at the site. Care shall be taken to minimize interference with the Owner's activities during construction. Cooperate with the Owner and other trades in scheduling and performance of the work.
- B. Loss or Damage: The Contractor shall be responsible for loss or damage to the existing facilities caused by him and his workmen and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection and in-service maintenance of all mechanical services for the new and existing facilities. The Contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of the work.
- C. Operational Continuity: The Contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being accomplished under this project.

- D. Utility Access: Where existing construction is removed to provide working and extension access to existing utilities, Contractor shall remove doors, piping, air conditioning ductwork, conduit, and equipment, and similar items to provide this access and shall reinstall same upon completion of work in the areas affected.
- E. Demolition of Architectural/Structural Elements: Where partitions, walls, floors, or ceiling of existing construction are indicated to be removed and reinstalled, this Contractor shall remove and reinstall, in locations approved by the Architect, all devices required for the operation of the various systems installed in the existing construction.
- F. Scheduled Service Outages: Outages of services as required by the new installation will be permitted but only at a time approved by the Owner. The Contractor shall allow the Owner two (2) weeks in order to schedule required outages. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount.
- G. Pre-Demolition Salvage Survey: The Contractor shall modify, remove, and/or relocate all materials and items so indicated or as required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Survey the project with the Owner's Representative before demolition begins and determine all materials that the Owner specifically chooses to be salvaged. Pre-establish with the Owner locations where salvaged materials are to be stored. Salvage materials shall remain the property of the Owner and shall be delivered to such destination as directed by the Owner. Materials and/or items scheduled for relocation and that are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion and upon the approval of the Owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.
- H. Relocated Equipment: All items that are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean and repair and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.
- I. Damaged Materials/Equipment to be Reused: When items scheduled for relocation are found to be in damaged condition before work has been started on dismantling, the Contractor shall call the attention of the Owner to such items and receive further instructions before removal. Items damaged in repositioning operations are the Contractor's responsibility and shall be repaired or replaced by the Contractor as approved by the Owner, at no additional cost to the Owner.
- J. Termination of Utility Services: Service lines and piping to items to be removed, salvaged, or relocated shall be removed to points indicated on the Drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied-off or disconnected in a safe manner acceptable to the Owner. All disconnections or connections into the existing facilities



shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities that must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner as hereinabove specified.

- K. Nighttime Shifts: Certain work during the demolition and alteration phase of construction may require overtime or nighttime shifts or temporary evacuation of the occupants. Coordinate times with the Owner.
- L. Include in the contract price all rerouting of existing ductwork, piping, air devices, fixtures, and similar items and the reconnecting of existing fixtures and devices as necessitated by field conditions to allow the installation of the new systems regardless of whether or not such rerouting, reconnecting or relocating is shown on the Drawings. Furnish all temporary ductwork and piping, and similar items as required to maintain service for the existing areas with a minimum of interruption.
- M. All existing air devices materials, equipment and appurtenances not included in the remodel or alteration areas are to remain in place and shall remain in service.
- N. All existing electrical devices, materials, equipment and appurtenances not included in the remodel or alteration areas are to remain in place and shall remain in service.
- O. Mechanical equipment and building systems equipment, and similar items that are to remain but are served by piping that is disturbed by the remodeling work, shall be reconnected in such a manner as to leave it in proper operating condition.
- P. Electrical equipment and building systems equipment, and similar items that are to remain but are served by conduit and circuits disturbed by the remodeling work, shall be reconnected in such a manner as to leave it in proper operating condition.
- Q. Existing plumbing fixtures, registers, grilles, and diffusers shown to be removed and indicated to be reused, shall be cleaned, repaired and provided with such new accessories as may be needed for the proper installation in their new locations.
- R. Existing lighting fixtures, outlets, switches, and panelboards shown to be removed and indicated to be reused, shall be cleaned, repaired and provided with such new accessories as may be needed for the proper installation in their new locations.
- S. Within the remodeled or alteration areas where existing ceilings are being removed and new ceilings are installed, all existing air devices, other ceiling mounted devices and their appurtenances shall be removed and reinstalled into the new ceiling, unless otherwise shown or specified.
- T. Within the remodeled or alteration areas where existing ceilings are being removed and new ceilings are installed, all existing light fixtures, fire alarm devices, and other ceiling mounted devices and their appurtenances shall be removed and reinstalled into the new ceiling, unless otherwise shown or specified.
- U. Within the remodeled or alteration areas where existing walls are being removed, all existing fixtures, thermostats, other materials and equipment and their appurtenances

shall be removed and relocated if necessary, where required by the remodel work either shown or specified.

- V. Within the remodeled or alteration areas where existing walls are being removed, all existing outlets, switches, other materials and equipment and their appurtenances shall be removed and relocated if necessary, where required by the remodel work either shown or specified.
- W. Any salvageable equipment as determined by the Owner, shall be delivered to the Owner, and placed in storage at the location of his choice. All other debris shall be removed from the site immediately.
- X. Equipment, materials or other potential hazards to the public and working occupants of the building shall not be left overnight outside of the designated working or construction areas.
- Y. All existing air handling equipment that is shown as being reused shall have coils cleaned and shall be equipped with new filters and belts by this Contractor.
- Z. No portion of the fire protection or alarm systems shall be turned off, modified or changed in any way without the express knowledge and written permission of the Owner's representative.
- AA. Refer to Architectural "Demolition" and "Alteration" plans for actual location of walls, ceiling, and similar items being removed and/or remodeled.
- BB. Drawings do not fully indicate conditions or existing obstructions or utilities. Visit the site and examine work to be removed and become familiar with conditions affecting work.
- CC. Asbestos removal is not part of this Contract.
- DD. Floor Sleeves: Sleeves are not required where new openings are core-drilled into existing construction, unless noted otherwise on the Drawings. Provide water stops at new penetrations of existing floors.
- EE. Wall Sleeves: In the remodel of existing areas, the Contractor shall install new sleeves and seal existing piping penetrations through new walls with materials specified herein.
- FF. Water Stops: Provide water stops at new penetrations of existing floors. Water stops shall be 1-1/2" tall, at least 16 gauge, and be sized as specified in Section 20 05 05 for sleeves. Water stops shall be securely attached to the top of the floor slab with waterproof mastic applied between the bottom flange of the water stop and the floor slab. Pipe supports for riser piping shall be elevated sufficiently on spacers to prevent crushing water stops. The thickness of the firesafing system shall not exceed the existing floor thickness.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

**END OF SECTION**

## SECTION 20 05 48

### NOISE AND VIBRATION ISOLATION

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods Section 20 05 05

##### 1.2 SCOPE

- A. General: Furnish and install vibration isolation supports for all equipment and piping as required to prevent transmission of vibration and noise to the building structure.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. All Pump Equipment and Piping Sections
  - 2. All Air Handling Equipment Sections

##### 1.3 QUALITY ASSURANCE

- A. Expected noise levels in various parts of the building shall conform to noise criteria recommendations as set forth in the ASHRAE 2015 Applications Handbook, **Chapter 47, Table 42**. Refer to ASHRAE 2017 Fundamentals Handbook, **Chapter 7, Figures 7 and 9** for NC and RC curves. The mid-point of the range of NC criteria curves shall apply. It shall be the Contractor's responsibility to select and install vibration isolators that enable the noise criteria standards to be met to the extent that the noise can be controlled by vibration isolators.
- B. All vibration isolation devices, including auxiliary steel bases and pouring forms, shall be designed and furnished by a single manufacturer and supplier.
- C. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. Amber/Booth Company, Inc. (Proco Products)
  - 2. Kinetics Noise Control
  - 3. Mason Industries

4. VMC/Korfund
5. Vibration Eliminator
6. Vibro Acoutics

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Unless otherwise noted, equipment driven by motors 2 HP and smaller shall be isolated by means of elastomeric mounts or hangers properly sized for 1/2" deflection.
- B. Unless otherwise noted, spring type vibration isolators shall be used for all equipment driven by motors of 3 HP and larger. Deflections as tabulated are minimums and it shall be the responsibility of the isolation manufacturer to determine the amount of spring deflection required for each isolator to achieve optimum performance, prevent the transmission of objectionable vibration and meet the noise criteria referenced herein.
- C. All spring isolators shall be completely stable in operation and shall be designed for not less than 50% reserve deflection beyond actual operating conditions. Open spring isolators shall be designed such that the KX/KY ratio shall be 1.0 or greater. Spring shall be welded both to the baseplate and the compression plate.
- D. All elastomeric isolators shall be of neoprene or high-quality synthetic rubber with anti-ozone and anti-oxidant additives.
- E. Steel components shall be cleaned and painted. All nuts, bolts, and washers shall be zinc-electroplated. Structural steel bases shall be thoroughly cleaned of welding slag and primed with zinc-chromate or metal etching primer.
- F. Height saving brackets used with isolators having 2.5" deflection or greater shall be of the pre-compression type to limit exposed bolt length.
- G. All isolators exposed to the weather shall have PVC, cadmium, or neoprene coated springs and hot dipped galvanized steel components. Aluminum components shall be etched and painted. Nuts, bolts and washers may be zinc-electroplated.
- H. Isolators for equipment installed outdoors shall be designed to provide adequate restraint due to normal wind conditions and to withstand wind loads of 30#/sq. ft. applied to any exposed surface of the isolated equipment.
- I. Axial flow fans operating at 2" of static pressure and above shall be furnished with type TRK isolation thrust resisters to limit displacement to 1/4".

### 2.2 EQUIPMENT ISOLATION (TABLE 20 05 48-A)

- A. The following table represents the isolator and base types required for various equipment.

TABLE 20 05 48-A				
EQUIPMENT		ISOLATOR TYPE	MINIMUM DEFLECTION (IN.)	BASE TYPE
AIR HANDLING UNITS (Externally Isolated)				
FLOOR MOUNTED:	UP TO 15 HP	SW	1.0	HKP
	20 HP AND OVER	SW	2.0	HKP
SUSPENDED:	UP TO 15 HP	BSRA	1.5	---
	20 HP AND OVER	BSRA	2.5	----
CURB MOUNTED:		SW	(1.0) (2.0) (3.0)	RTIR
AIR HANDLING UNITS (Internally Isolated)				
FLOOR MOUNTED:	UP TO 15 HP	SP-NRE	0.15	HKP
FAN COIL UNITS				
SUSPENDED:		BSRA	0.50	----
FANS - CENTRIFUGAL				
FLOOR MOUNTED:	UP TO 15 HP	SW	1.5	HKP
	20 HP AND OVER	SW	3.0	CPF/HKP
SUSPENDED:	UP TO 15 HP	BSRA	1.5	---
	20 HP AND OVER	BSRA	2.5	----
FANS - AXIAL				
FLOOR MOUNTED:	UP TO 15 HP	SW	1.5	HKP
	20 HP AND OVER	SW	3.0	CPF/HKP
SUSPENDED:	UP TO 15 HP	BSRA	1.5	---
	20 HP AND OVER	BSRA	2.5	----
FANS - WALL OR CURB MOUNTED	ISOLATORS FURNISHED WITH EQUIPMENT			
IN-LINE PUMPS		NONE	----	----
FLOOR MOUNTED PLUMBING PUMPS		NONE	----	HKP
PACKAGED DOMESTIC WATER PUMPING SYSTEM		SP-NRE	0.15	HKP
FIRE PROTECTION PUMPS		NONE	----	HKP
HVAC PUMPS				
FLOOR MOUNTED:	UP TO 5 HP	RSW	1.0	CPF/HKP
	7-1/2 HP AND OVER	RSW	2.0	CPF/HKP
ROOF MOUNTED:	UP TO 5 HP	SP-NRE	0.15	HKP
	7-1/2 HP AND OVER	SP-NRE	0.15	HKP
AIR COMPRESSORS		SW	2.0	HKP
MEDICAL AIR COMPRESSOR		SP-NRE	0.15	HKP
MEDICAL AIR COMPRESSOR		SW	2.0	CPF/HKP *
MEDICAL VACUUM PUMP		SP-NRE	0.15	HKP
MEDICAL VACUUM PUMP		SW	2.0	CPF/HKP *
WATER CHILLING UNITS		SP-NRE	0.15	HKP
WATER CHILLING UNITS		CT	2.0	HKP *
AIR COOLED CONDENSING UNITS				
ROOF MOUNTED:	UP TO 5 TONS	SP-NRE	0.15	RTIR
	7-1/2 TONS - 20 TONS	CT	1.0	RTIR
	ABOVE 20 TONS	CT	2.0	RTIR

TABLE 20 05 48-A			
EQUIPMENT	ISOLATOR TYPE	MINIMUM DEFLECTION (IN.)	BASE TYPE
WATER HEATERS	----	----	HKP
BOILERS	----	----	HKP
HEAT EXCHANGERS	----	----	HKP
COOLING TOWER			
UP TO 499 TONS	CT	3.0	SEE
500 TO 1,000 TONS	CT	3.5	STRUCTURAL
OVER 1,000 TONS	CT	4.5	DRAWINGS

\* WHERE MOUNTED ON FLOOR SLAB OVER OCCUPIED SPACE.

### 2.3 ISOLATOR TYPES

- A. General: Isolator types shall be one or more of the following. Model numbers of Amber/Booth products are included for identification.
- B. Type SW: An adjustable, freestanding, open-spring mounting with combination leveling and equipment fastening bolt. The spring shall be welded to the spring mounting baseplate and compression plate for stability. The isolator shall be designed for a minimum KX/KY of 1.0. An elastomeric pad having a minimum thickness of 1/4" shall be bonded to the baseplate. Nuts, adjusting bolts and washers shall be zinc-electroplated to prevent corrosion.
- C. Type RSW: An adjustable, freestanding, open-spring for recessed mounting in a Type CPF base. The isolator shall be designed for a minimum KX/KY of 1.0. An elastomeric pad having a minimum thickness of 1/4" shall be bonded to the spring base plate. Nuts, bolts and washers shall be zinc-plated to prevent corrosion.
- D. Type RVD: An elastomeric mounting having a steel baseplate with mounting holes and a threaded insert at the top of the mounting for attaching equipment. All metal parts shall be completely embedded in the elastomeric material. Mounting shall be designed for approximately 1/2" deflection.
- E. Type SP-NRE: A pad type mounting consisting of two layers of 3/8" thick ribbed or waffled elastomeric pads bonded to a 16-gauge galvanized steel separator plate. Pads shall be sized for approximately 20 to 40 psi load and a deflection of 0.12" to 0.16".
- F. Type CT: An adjustable, open-spring isolator having one or more coil springs attached to the top compression plate and a baseplate. An elastomeric pad having a minimum thickness of 1/4" shall be bonded to the baseplate. Nuts, adjusting bolts and washers shall be zinc-electroplated to prevent corrosion. The spring assembly shall be removable and shall fit within welded steel enclosure consisting of a top plate and rigid lower housing, which serves as a blocking device during installation. Isolated restraining bolts which shall not be engaged during normal operation shall connect the top plate and lower housing to prevent the isolated equipment from rising when drained of water.

- G. Type PBSR: A combination spring and elastomeric hanger consisting of a rectangular steel box capable of 200% minimum overload without visible deformation, with the addition of a load transfer plate to hold the equipment or piping at a fixed elevation during installation and to permit transferring the load to the spring after installation, a coil spring, spring retainers and elastomeric element.
- H. Type BSA: A spring hanger consisting of a rectangular steel box capable of 200% minimum overload without visible deformation, coil spring, spring retainers, neoprene impregnated fabric washer, and steel washer. This isolator shall incorporate a 30° angularity feature that will permit up to a 15° misalignment of the hanger rod from the vertical without shorting out to the hanger box.
- I. Type BSRA: A combination spring and elastomeric hanger consisting of a rectangular steel box capable of 200% minimum overload without visible deformation, coil spring, spring retainers, and elastomeric element. This isolator shall incorporate a 30° angularity feature that will permit up to a 15° misalignment of the hanger rod from the vertical without shorting out to the hanger box.
- J. Type PBSA: A spring hanger consisting of a rectangular steel box capable of 200% minimum overload without visible deformation, with the addition of a load transfer plate to hold the equipment or piping at a fixed elevation during installation and to permit transferring the load to the spring after installation, a coil spring, spring retainers, neoprene impregnated fabric washer, and steel washer. This isolator shall incorporate a 30° angularity feature that will permit up to a 15° misalignment of the hanger rod from the vertical without shorting out to the hanger box. Alternately, the hanger shall be of the pre-positioned configuration.
- K. Type PBSRA: A combination spring and elastomeric hanger consisting of a steel box capable of 200% minimum overload without visible deformation, with the addition of a load transfer plate to hold the equipment or piping at a fixed elevation during installation and to permit transferring the load to the spring after installation, a coil spring, spring retainers, and elastomeric element. This isolator shall incorporate a 30° angularity feature that will permit up to a 15° misalignment of the hanger rod from the vertical without shorting out to the hanger box. Alternately, the hanger shall be of the pre-positioned configuration.

## 2.4 BASE TYPES

- A. Type HKP: A concrete equipment housekeeping pad as specified in Section 20 05 05.
- B. Type CPF: A concrete inertia base, consisting of perimeter steel concrete pouring form (CPF), with reinforcing bars and isolators welded in place. The perimeter steel members shall have a minimum depth of 1/12" of the longest span, but not less than 6" deep. The base shall be sized with a minimum overlap of 4" around the base of the equipment and, in the case of belt-driven equipment, 4" beyond the end of the drive shaft. Fan bases are to be supplied with NEMA standard motor slide rails. The bases for pumps shall be sized to support the suction elbow of horizontal split-case pumps. The bases shall be T-shaped where necessary to conserve space. The CPF base shall be installed over a concrete equipment (housekeeping) pad as specified in Section 20 05 05.



- C. Type RTIR: An extended aluminum rail base for rooftop air conditioning units consisting of a pair of weatherproofed aluminum rails for fastening to equipment and to the roof curb incorporating wind restraints and a continuous air and water seal which is protected from accidental puncture and direct sunlight by an aluminum weather shield. Rails shall incorporate non-adjusting Type SW spring isolators properly spaced around the perimeter according to load distribution of the supported equipment.
- D. Type CURB: An equipment roof curb as specified in Section 20 05 05.

## 2.5 PIPING ISOLATION

- A. All piping for the systems listed herein shall be isolated by means of spring type vibration isolation hangers or floor mounts as may be required to create the effect of a completely floating system. It shall be the responsibility of the vibration isolation manufacturer to coordinate the selection of piping supports with equipment supports to provide for a carefully engineered system designed to accommodate expansion and contraction while isolating and supporting the pipe and equipment. Piping for the following systems shall be isolated:
  - 1. All piping four (4) inches in diameter and larger, and all piping two inches in diameter within 100 ft. of the pump for pumped domestic water.
  - 2. All piping two inches in diameter and larger for all other pumped water, air, steam, gas, and engine exhaust systems.
  - 3. Piping shown in tunnels on the Drawings to be installed on rollers does not require vibration isolation.
- B. Riser diagrams shall be prepared by the vibration isolation manufacturer and submitted for approval. These diagrams shall show anticipated vertical expansion and contraction; initial and final loads on the building structure; initial and final deflections at each support point; spring deflection changes; operating temperatures; and temperature changes. Isolators shall be selected for minimum deflections equal to four (4) times the calculated thermal movement at each support point to minimize load shifts on the structure. If flexible connectors or expansion loops to relieve stress are required in the riser system, they shall be furnished whether shown or not at no additional expense to the Owner or Architect/Engineer. Submittal data shall include certification that the piping system (horizontal and vertical) has been examined for excessive stresses and that none will exist in the design proposed when installed in accordance with the submittals and these specifications.
- C. Hangers for horizontal piping shall be installed at regular intervals as specified in Section 20 05 05. Isolated pipe risers up through 8" shall be supported at intervals of every third floor of the building and every second floor for risers 10" and over, and as shown on the riser schematics on the plans.
- D. The first two piping supports away from any given piece of externally isolated equipment to which piping is connected shall be vibration isolators selected for an operating spring deflection equal to that specified for the equipment isolators. This shall apply whether the remainder of the piping system is or is not isolated by means of spring type vibration isolators.

- E. Condenser Water Piping: The first two supports for condenser water connecting to cooling towers shall have isolators of the same type and deflection as those specified for the towers.
- F. The first three horizontal piping supports away from a riser connection shall have deflections selected to adequately accommodate the riser thermal movement.
- G. Provide Type 301 acoustic seals where isolated piping passes through non-fire rated wall, ceiling or floor openings from equipment rooms into adjoining occupied spaces. The acoustic seals shall consist of an S-shaped molded synthetic rubber seal attached with stainless steel clamps to the pipe wall sleeves and to carrier piping.
- H. Domestic water systems shall have flexible connections where shown.

## 2.6 PIPING ISOLATOR TYPES

- A. Type PBSA - for first two hangers in suspended horizontal piping adjacent to isolated equipment and for all hangers on 8" and larger pipe.
- B. Type BSA - for remaining hangers in horizontal piping.
- C. Type SW - for pipe risers. Isolator base plates shall be provided with holes for bolting and isolation grommets.

## 2.7 FLEXIBLE CONNECTORS (NON "FLOATING" SYSTEMS)

- A. Install full line size flexible connectors at the suction and discharge connection of each pump and at other locations as shown on the drawings. All connectors shall be suitable for use at the pressure and temperature encountered at point of operation. End fitting of connectors shall conform to pipe fitting types specified elsewhere and are to be of the following types, as applicable. All flexible connectors shall be Amber/Booth or an approved equal by Mason, Metraflex or Vibration Mountings.
- B. Water Service
  - 1. Flanged (2-1/2" and larger), Type 2800 - A flanged spherical arch rubber expansion joint constructed of molded reinforced neoprene with integral steel floating flanges, suitable for pressure up to 214 psi (working) and 850 psi (burst) and temperatures up to 180°F. Connectors shall have minimum movement capability of 1/2" compression, 1/2" control units shall be furnished for sizes up through 8" to limit thrust elongation to 3/8". For 10" and larger, the control rods shall be fitted with neoprene bushings for isolation.
  - 2. Threaded (2" and smaller), Type SS-PM - A metal hose connector constructed of stainless-steel hose and braid with carbon steel NPT threaded end fittings. Minimum lengths shall conform to the following table:
    - a. 1-1/2" diameter and smaller: 10" long
    - b. 2" diameter and larger: 12" long

### C. Steam and Condensate Service

1. Flanged (2-1/2" and larger), Type SS-FP - A flanged metal hose connector constructed of stainless-steel hose and braid with carbon steel plate flanges. Minimum lengths shall conform to the following table:
  - a. 2-1/2" through 4": 9" long
  - b. 5" and 6" diameter: 11" long
  - c. 8" diameter: 12" long
  - d. 10" diameter: 13" long
2. Threaded (2" and smaller), Type SS-PM - Same as for water service.

### 2.8 DUCTWORK ISOLATION

- A. Ductwork suspended above or below public spaces shall be isolated from the structure by Type BSRA vibration isolators sized for 3/4" deflection. These public spaces, include but are not limited to:
  1. Ballroom
  2. Meeting Rooms
  3. Boardroom
  4. Lobby
  5. Pre-Function Room
  6. Dining Room
- B. Ductwork supported from floors above these areas shall be isolated from structure by Type RSW vibration isolators sized for 3/4" deflection.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Upon startup of internally isolated equipment, shipping restraints shall be released from internal springs to ensure proper function. Verification of operation shall be confirmed by the Vibration Isolation manufacturer, or qualified representative, as described in Paragraph B. below.
- B. Shop drawings submittal data shall include, but not be limited to, the following information:
  1. A complete listing of proposed types of isolators for each specified application, including size and deflection information
  2. Selection calculations for all isolators
  3. Vertical isolation riser diagrams with expansion/contraction calculations
  4. Cut sheets for each isolator type to be utilized on the project
  5. A clearly outlined procedure for installation and adjusting all isolators
  6. Cut sheets on all furnished bases and frames
  7. Cut sheets on all flexible connectors and application data as required

8. Piping drawing submittal shall show all isolator locations and types
9. Additional information as specified in Section 20 05 03
10. Additional information as may be required for proper evaluation of the proposed vibration isolation system

### 3.2 INSTALLATION

- A. The vibration isolation manufacturer, or his qualified representative, shall be responsible for providing such supervision as may be necessary to assure correct installation and adjustment of the isolators and flexible connectors. Upon completion of the installation and after the system is put into operation, the manufacturer or his representative shall make a final inspection and submit his report in writing certifying the correctness of installation and compliance with approved submittal data.

**END OF SECTION**

**SECTION 20 07 00**  
**THERMAL INSULATION**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05

**1.2 SCOPE**

- A. Furnish and install thermal insulation for systems as specified in this Section and as shown on the Drawings.
- B. Insulation Protection: All piping and/or duct insulation subject to damage, exposed to the outdoor elements, and/or within parking garage drive lanes shall be covered with factory applied aluminum laminate or 0.016" thick smooth aluminum jacket utilizing longitudinal "zee" closures. Jacket shall be secured at butt joints with 2" wide aluminum straps containing a permanently plastic sealant. Straps shall be centered over butt joints of jacket. Provide 1/2" wide aluminum bands applied on 12" centers. Install the longitudinal joint facing downward to shed water. Furnish end closure and caps to cover completely all valves, fittings, etc. Aluminum jacket for insulated grooved pipe fittings shall be as manufactured by Pro-Tec-T-Kotes, Inc., or approved equal. At the contractor's option, all ductwork insulation (including elastomeric type) exposed to the outdoor elements and/or within parking garage drive lanes may be covered with VentureClad Plus 1579CW-CE, clear embossed 13-ply laminate as manufactured by Venture Tape Corporation. All rigid insulation in unconditioned, ventilated attics open to the outdoors shall be covered with VentureClad 1579CW-CE, clear embossed 13-ply laminate in accordance with the manufacturer's written installation instructions. Venture Clad is not acceptable for pipe covering.
- C. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Miscellaneous Piping - Section 20 21 16
  - 2. Plumbing Piping and Accessories - Section 22 11 16
  - 3. Plumbing Fixtures and Trim - Section 22 42 10
  - 4. HVAC Water Piping Accessories - Section 23 05 10
  - 5. HVAC Water Piping - Section 23 21 13

6. HVAC Pumps - Section 23 21 23
7. Refrigerant Piping - Section 23 23 00
8. Ductwork and Sheet Metal - Section 23 31 13
9. Air Distribution Devices and Dampers - Section 23 33 10

### 1.3 QUALITY ASSURANCE

- A. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

1. Insulation:

- a. Armacell LLC
- b. CertainTeed Corporation
- c. Knauf Insulation
- d. Johns Manville
- e. Owens/Corning
- f. Thermal Ceramics
- g. Resolco
- h. K-Flex
- i. Polyguard Products, Inc.

2. Adhesives/Sealants:

- a. Childers
- b. Foster
- c. Vimasco
- d. Armacell
- e. K-FLEX

B. Codes and Standards:

1. Fire/Smoke Ratings: Fire and smoke hazard rating as tested by Procedure ASTM E84, NFPA 255, and UL Classified under UL 723 shall not exceed Flame Spread 25, Smoke Developed 50:
2. Specifications:
  - a. Preformed fiberglass - ASTM C547
  - b. Fiberglass Blanket - ASTM C553
  - c. Polyisocyanurate board - ASTM C591
  - d. Expanded closed cell elastomeric - ASTM C534
  - e. Preformed Calcium silicate block - ASTM C533, Type I
  - f. Cellular glass - ASTM C552
  - g. Phenolic foam - ASTM C1126
  - h. Fiberglass internal duct liner - ASTM C1071, Type I or II
  - i. High Temperature Blanket - ASTM E119 & E814
  - j. Aluminum jacket - ASTM B209
  - k. Vapor barrier jacket - ASTM C1136
  - l. Fiberglass insulation adhesive- ASTM C916

- m. Thermal efficiency test method - ASTM C177
- n. Dimensional standard - ASTM C585

## PART 2 - PRODUCTS

### 2.1 PREFORMED FIBERGLASS INSULATION

- A. General: Insulation material shall be Johns Manville Micro-Lok APT, Owens-Corning ASJ/SSL, or Knauf Earthwool 1000 Degree Pipe Insulation preformed glass fiber pipe insulation.
- B. Conductivity: Preformed glass fiber pipe insulation shall have an average thermal conductivity (K factor) not to exceed 0.23 BTU • IN/HR • SF • °F at 75°F mean temperature and a temperature limit of at least 850°F.
- C. Jacket: The insulation shall include an all-service jacket (ASJ) consisting of a high density, white kraft bonded to aluminum foil and reinforced with fiberglass yarn. The jacket shall include a longitudinal lap with a pressure sensitive tape lap sealing system and matching ASJ butt wraps. Jacket shall comply with ASTM C 1136 Type I.

### 2.2 FIBERGLASS BLANKET INSULATION

- A. General: Insulation shall be Johns-Manville Microlite EQ100, Owens-Corning Type SoFTR 100, or CertainTeed Type 100, or Knauf Atmosphere 1 PCF duct wrap 1-pound FSK flexible glass fiber blanket.
- B. Conductivity: Insulation shall have an average thermal conductivity (K-value) of no more than 0.27 BTU • IN/HR • SF • °F at 75°F mean temperature and a 250°F temperature limit.
- C. Jacket: Insulation shall be furnished with a factory applied foil-scrim-kraft facing consisting of 0.35 mil aluminum foil reinforced with glass yarn mesh and laminated to 40 pound chemically treated and fire resistant white kraft paper. Jacket shall comply with ASTM C 1136 Type II.

### 2.3 HIGH TEMPERATURE BLANKET INSULATION

- A. General: Insulation shall be Thermal Ceramics, FireMaster Duct Wrap, FireMaster Duct Wrap+, Unifrax FyreWrap Elite 1.5, or approved equal 2300°F, high temperature, foil encapsulated, blanket insulation, 6-pound density. Core material shall be composed of alumina and silica or biosoluble, low biopersistence, alkaline-earth silicate wool.
- B. Conductivity: Insulation shall have an average thermal resistance (R-value) of 4.5 per inch at 70°F mean temperature.
- C. Fire Protection: Where used for the fire protection of PVC conduit or kitchen hood exhaust ductwork, insulation shall be installed in accordance with the manufacturers written installation instructions to provide 1-hour protection (PVC conduit) or 2-hour protection (hood exhaust duct).

## 2.4 PIPE INSULATION ACCESSORIES

- A. Protection Shields: Provide protection shields at all clevis hangers as specified in Section 20 05 05, Basic Division 20 Materials and Methods.
- B. Protection Shield Inserts: Where protection shields are used, provide an insert between the piping and the shield 2" longer and 2" wider than the shield, having the same thickness and contour as the adjoining insulation. Inserts shall be minimum 8.0-pound density, minimum 100 psi compressive strength.
1. Owens-Corning Foamglas cellular glass
  2. Johns-Manville Thermo-12 Gold calcium silicate
  3. Resolco Insul-phen phenolic foam
  4. Polyguard Products, Inc. Polyphen Phenolic Foam
- C. Banding: Pipe insulation 2" and larger shall be banded with either of the following:
1. A.J. Gerrard & Company "Steel-Binder" 0.02" thick by 1/2" wide aluminum bands or approved equal.
  2. Thomas & Betts "TY-RAP" nylon ties or approved equal.

## 2.5 ADHESIVES/SEALANTS/COATINGS

- A. Elastomeric Adhesives:
1. Armacell 520 or 520 BLV (for low VOC)
  2. K-Flex 720-LVOC
  3. Foster 85-75
  4. Childers CP-82
- B. Fiberglass Insulation Adhesive: Adhesives shall comply with ASTM C916, Standard Specification for Adhesives for Duct Thermal Insulation. Adhesive VOC content shall not exceed limits set forth in LEED IEQc 4.1 and SCAQMD Rule #1168.
1. Foster (H.B. Fuller Co.) 85-60
  2. Childers CP-127
- C. Phenolic/Polyisocyanurate Foam Adhesive:
1. Foster 81-33/81-84
  2. Childers CP-96
- D. Vapor Barrier Coatings: Indoor applications, water-based vapor barrier coating for service -20oF to 180oF, permeance 0.013 perms or less at 43 mils dry thickness per ASTM E 96, Procedure B. Coating VOC content shall not exceed limits set forth in LEED IEQc 4.2 and GS-11. Coating must also meet MIL 19565C, Type II as be listed on Qualified Products Database (QPD).



1. Childers CP-38
2. Foster (H.B. Fuller Co.) 30-80
3. Vimasco 749
4. Armcell WB Finish
5. K-Flex 374

E. Insulation Joint Sealant: Sealant used with phenolic, polyisocyanurate and cellular glass on cold service. Sealant VOC content shall not exceed limits set forth in LEED IEQc 4.1 and SCAQMD Rule #1168 categorized as "other".

1. Foster 95-50
2. Childers CP-76
3. Pittsburgh Corning CW (for cellular glass)

F. Metal Jacketing/Flashing Sealant: Sealant VOC content shall not exceed limits set forth in LEED IEQc 4.1 and SCAQMD Rule #1168 categorized as "other".

1. Foster 95-44
2. Childers CP-76
3. Pittsburgh Corning PC 727

G. Reinforcing Mesh: Mesh used in conjunction with mastics/coating as reinforcement. Fiberglass or synthetic fiber, 10 x 10 or 9 x 8 strands per square inch

1. Foster Mast a Fab
2. Childers Chil Glas #10
3. Pittsburgh Corning PC 79

H. Fungicidal Coating: Water based, fungicidal coating used inside ducts on duct liners.

1. Foster 40-20

## 2.6 LAVATORIES AND SINKS

A. Supply Pipes: The 3/8" supply pipes and risers to lavatory and sink fixtures exposed beneath the counter, lavatory, or sink, shall be insulated with 1/2" thick insulation. Handi-Lav-Guard insulation kits manufactured by Truebro will be an acceptable alternate.

B. Waste Piping: All exposed lavatory and sink waste piping beneath the counter, lavatory, or sink, shall be insulated as required by Federal, State, and Local requirements for handicap lavatories. Insulation shall be provided with fitted cover to give a finished appearance, color by Architect. Handi-Lav-Guard insulation kits manufactured by Truebro will be acceptable. Method of insulation and sample shall be submitted to Architect for approval.

2.7 INSULATION SCHEDULE

A. General: Insulation thickness shall be at least the minimum value scheduled. Thickness shall be increased where required to prevent condensation or to comply with governing energy code requirements.

1. Piping Systems: (2013 ASHRAE 90.1 and 2015 IECC Requirements)

EQUIPMENT/SYSTEM SURFACE	TYPE	THICKNESS
CHILLED WATER INDOORS / OUTDOORS, 1/2" – 1-1/2"	CELLULAR GLASS	1" / 2"
CHILLED WATER 2" AND LARGER INDOORS / OUTDOORS	CELLULAR GLASS	1-1/2" / 2"
HEATING HOT WATER 1-1/4" AND SMALLER (140°F AND BELOW)	PREFORMED FIBERGLASS	1"
HEATING HOT WATER MAINS 1-1/2" AND LARGER (140°F AND BELOW)	PREFORMED FIBERGLASS	1-1/2"
HEATING HOT WATER MAINS 1-1/4" AND SMALLER (141°F AND ABOVE)	PREFORMED FIBERGLASS	1-1/2"
HEATING HOT WATER MAINS 1-1/2" AND LARGER (141°F AND ABOVE)	PREFORMED FIBERGLASS	2"
STEAM 3" AND SMALLER (250°F AND BELOW)	PREFORMED FIBERGLASS	2-1/2"
STEAM 4" AND LARGER (250°F AND BELOW)	PREFORMED FIBERGLASS	3"
STEAM CONDENSATE 1-1/4" AND SMALLER (250°F AND BELOW)	PREFORMED FIBERGLASS	1-1/2"
STEAM CONDENSATE 1-1/2" AND LARGER (250°F AND BELOW)	PREFORMED FIBERGLASS	2"
STEAM CONDENSATE VENT PIPING	PREFORMED FIBERGLASS	1"
REFRIGERANT AND HOT GAS	ELASTOMERIC	1"
CONDENSATE (COOLING COILS)	PREFORMED FIBERGLASS	1/2"
CONDENSATE (ROOFTOP UNITS)	ELASTOMERIC	1"
DOMESTIC HOT WATER 1-1/4" AND SMALLER	PREFORMED FIBERGLASS	1"
DOMESTIC HOT WATER 1 1/2" AND LARGER	PREFORMED FIBERGLASS	1-1/2"
REFRIGERATED DRINKING WATER	PREFORMED FIBERGLASS	1"
HORIZONTAL STORM DRAIN PIPING*	PREFORMED FIBERGLASS	1"
ROOF DRAIN BODY (UNDERSIDE)*	FIBERGLASS BLANKET	2"
OVERFLOW ROOF DRAIN BODY (UNDERSIDE)*	FIBERGLASS BLANKET	2"
HORIZONTAL AREAWAY DRAIN PIPING*	PREFORMED FIBERGLASS	1"
AREAWAY DRAIN BODY (UNDERSIDE)*	FIBERGLASS BLANKET	2"
FLOOR DRAIN/HUB DRAIN PIPING***	PREFORMED FIBERGLASS	1/2"

EQUIPMENT/SYSTEM SURFACE	TYPE	THICKNESS
FLOOR DRAIN/HUB DRAIN TRAPS, BODIES***	FIBERGLASS BLANKET	2"
DRINKING FOUNTAIN DRAIN PIPING (TO JUNCTION WITH MAIN RISER)***	PREFORMED FIBERGLASS	1/2"
EXPOSED LAVATORY/SINK STOPS/RISERS	MOLDED VINYL	3/16"
EXPOSED LAVATORY/SINK TRAP/TAIPIECE	MOLDED VINYL	3/16"
ENGINE EXHAUST AND MUFFLER	PREFORMED CALCIUM SILICATE BLOCK	2 @ 1-1/2"
EXISTING PVC WASTE, VENT, STORM PIPING IN RETURN AIR PLENUMS	HIGH TEMPERATURE BLANKET	1-1/2" (1hr)
UNDERGROUND PIPING	(SEE SECTION 23 21 13)	
ICE MACHINE DRAIN PIPING	PREFORMED FIBERGLASS	2"
CHILLED WATER PIPING – HEAT TRACED OR EXPOSED TO FREEZING TEMPERATURES	CELLULAR GLASS	2"
WATER FILLED PIPING OTHER THAN CHILLED WATER _ HEAT TRACED OR EXPOSED TO FREEZING TEMPERATURE	PREFORMED FIBERGLASS	2"
FIRE SPRINKLER PIPES IN: MECHANICAL ROOMS, IDF, MDF, AND MAIN ELECTRICAL ROOMS; REFER TO PLANS	PREFORMED FIBERGLASS	2"
* Where located in air-conditioned spaces and plenums only. ** Where located in non-air conditioned spaces and plenums only. *** Systems that receive cooling coil condensate, refrigerated drinking water only, or drainage from ice Machines, or other fluids that can cause piping to condensate.		

**PART 3 - EXECUTION**

**3.1 SUBMITTALS**

A. Insulation submittals shall include, but not be limited to, the following:

1. Cut sheets on all insulation products, shield insert blocks, fitting covers, protection jackets, straps, bands, etc., to be used.
2. Cut sheets on all mastic, adhesives, sealants, coatings, anti-microbial agents, etc., and other products to be used with insulation products.
3. Cut sheets on covering and aluminum jacketing materials.
4. Manufacturer's pre-printed installation instructions for all products.

B. LEED Submittals:

1. Product data for Credit IEQ 4.1: For adhesives and sealants and sealant primers used inside the building, include printed statement of VOC content.
2. Product data for Credit IEQ 4.2: For coatings (vapor barrier coatings, lagging adhesive/coatings, etc.) used inside the building, include printed statement of VOC content.

### 3.2 INSTALLATION

#### A. General:

1. Install thermal insulation on clean, dry surfaces after all leakage testing and inspection is completed. Any leaking equipment shall be brought to the attention of the Contractor who shall cause these conditions to be corrected. Thermal insulation installation shall be in strict accordance with these Specifications, the Midwest Insulation Contractors Association (MICA) Commercial and Industrial Insulation Standards, recognized industry practice, and the manufacturer's printed installation instructions.
2. Where there is evidence of vapor stop failure or "wet" insulation after installation, the insulation shall be removed, and the surface shall be cleaned, dried, and properly reinsulated.
3. The insulation shall be handled and applied in a manner that will not adversely affect its structural, insulating, or vapor permeability properties.

#### B. Piping:

##### 1. Condensate Drains:

- a. All drain lines, including but not limited to sanitary or storm, receiving condensate shall be insulated to a point three feet past vertical connection or according to local codes whichever is more stringent.
- b. Equipment drains, receiving condensate from cooling coil, shall be fully insulated.

##### 2. Drain Bodies: The substitution of ductwrap insulation for piping insulation is prohibited except on drain bodies.

##### 3. Miscellaneous Valves and Fittings:

- a. All valve operators, "Pete's Plugs", drain valves, meter and gauge fittings, and other items, which must protrude through the pipe insulation, shall be suitably insulated with removable insulation caps. Bevel and seal insulation and joints at removable caps. Chilled water riser support plates shall be suitably insulated.
- b. Fittings, flanges, strainers, unions, and valves shall be insulated with pre-molded rigid glass fiber or phenolic foam insulation and finished with two brush coats of vapor barrier mastic with reinforced glass fabric tape embedded in between each coat.

##### 4. Protection Shield Inserts: Protection shield insert blocking shall be thoroughly vapor sealed and finished to match pipe insulation.

##### 5. Protective Jacketing: All piping insulation subject to damage, exposed to the outdoor elements, and/or within parking garage drive lanes shall be covered with factory applied aluminum laminate or 0.016" thick smooth aluminum jacket utilizing longitudinal "zee" closures. Jacket shall be secured at butt joints with 2" wide aluminum straps containing a permanently plastic sealant. Straps shall be centered over butt joints of jacket. Provide 1/2" wide aluminum bands applied on

- 12" centers. Install the longitudinal joint facing downward to shed water. Furnish end closure and caps to cover completely all valves, fittings, etc.
6. Banding: Band insulation on 24" centers and install at least two (2) bands per section of insulation.
  7. Installation of Cellular Glass Insulation: Bore coat insulation with Hydrocal B11. For cold service, apply joint sealant and vapor stop using PITTSEAL CW. Secure insulation with 0.5"x0.016" 304 SS bands. Jacket shall be PITTWRAP CF for straight piping. At fittings, valves and other locations, finish insulation with PITTCOAT 404 coating and PC Fabric 79.
  8. Installation of Preformed Fiberglass and Phenolic Foam Insulation: An approved vapor retarder mastic compatible with the insulation shall be applied to all joints and fittings around the edges of the adjoining pipe/fitting insulation overlapping seam. The preformed fitting insulation shall be finished with two brush coats of vapor barrier mastic with reinforced glass fabric tape embedded in between each coat.
    - a. Longitudinal and Butt Joint Vapor Seal: For Cold Service, longitudinal self-sealing laps and butt joint 3" wide self-sealing strips of the insulation jacket shall be further sealed by applying one coat of fire-resistant vapor barrier coating over the entire joint surface. For Hot Service longitudinal joints on insulation systems utilizing factory applied Self Seal or dual factory applied adhesive strips, such as Owens-Corning SSL II, need not be further sealed or banded as required above. For Self-Seal and factory applied adhesive systems, firmly rub all longitudinal and circumferential joints using a squeegee or sealing tool.
    - b. Butt Joint Vapor Stop/Seal: Provide an isolating vapor stop between pipe insulation jacket and the pipe at butt joints of insulation at fittings, flanges, valves, and hangers and at 21-foot intervals on continuous runs using vapor barrier coating. Extend the vapor barrier coating 2" along the insulation jacket, across the face of the insulation, and 4" along the pipe.
  9. Installation of Elastomeric Pipe Insulation: Insulation shall be installed in continuous lengths over piping and glued with adhesive at butt joints. Horizontal suspended piping shall be provided with protection shields at hangers. All elastomeric piping insulation exposed to weather or ultra-violet light shall be protected by aluminum jacket or by a factory applied cladding consisting of a laminate of aluminum and polyester with a white finish. Insulation installed indoors but exposed to view shall be finished with two (2) coats of Elastomeric Coating.
  10. Installation of Phenolic Foam Pipe Insulation: Install insulation in half sections wherever possible. Seal joints with Childers CP-76 or Foster 95-50 Flextra Sealant. Joints shall be butted tightly. Apply 3" wide 2 mil foil tape to all joints and openings. Fittings shall be 2-piece pre-formed phenolic insulation secured with fiber reinforced tape. Finish fittings, valves, etc., with scrim reinforced vapor retarder mastic which overlaps adjacent jacket by 2". Cover edges with butt strips. Preformed fitting insulation covers may be used as specified herein.

11. Installation of Preformed Calcium Silicate Block Insulation:
- a. All protrusions through the insulation shall be wrapped and/or packed with refractory fiber. All joints and cracks over 1/8" wide shall be sealed with Ryder "V" one Coat.
  - b. Insulation shall be held in place with 20-gauge galvanized wire on 9" centers.
  - c. Horizontal hangers shall be installed inside the calcium silicate insulation and shall be insulated with glass fabric and Foster 46-50 or Childers CP-10/11 weather barrier mastic coated calcium silicate and fiberglass where exposed to possible contact.
  - d. Provide expansion joints in the insulation and aluminum jacket where provided, as recommended by the manufacturer to allow for differential expansion between the exhaust pipe, or flue, insulation, and jacket.
  - e. Engine Exhaust Piping: Entire engine exhaust pipe from exhaust manifold expansion connection to outside terminal shall be enclosed in two layers of insulation.
    - 1) Joints for the first and second layers shall be staggered.
    - 2) Apply a third outer layer of 1" thick fiberglass pipe insulation. Finish as required for fiberglass insulation.
    - 3) Insulate exhaust muffler in the same manner as the exhaust piping.
12. Heat Traced Insulated Piping: All chilled water, domestic water, fire protection, make-up water, condensate, and sanitary drain piping exposed to weather and cold outdoor temperatures (i.e., open truck docks, open parking garages, outdoors, etc.) subject to freezing shall be heat traced and insulated.

END OF SECTION

## SECTION 20 08 00

### COMMISSIONING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05

##### 1.2 SCOPE

- A. Furnish and install commissioning work as specified herein and in the Commissioning Agent's Specifications.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. All Division 20-28 Sections
  - 2. Division 1, General Commissioning Requirements (01 91 13)

##### 1.3 COMMISSIONING

- A. A complete checkout and test shall be performed to demonstrate and certify that the HVAC systems (Divisions 20-28) are 100% operational and adjusted upon completion of the installation, and that they comply with all applicable codes and specification requirements. Testing shall be performed in two (2) parts and two-way radios for use by test observers shall be provided. The first part of the test shall be a full test of all system components, function, and alarms. All affected subcontractors shall participate in this test. All tests shall be witnessed and acknowledged by written signature of the General Contractor's supervising representative. The Owner's building engineer may elect to observe this first part testing. The first part test results shall be certified and submitted to the Engineer and Owner's Commissioning Agent. The second part of the test shall be a 100% demonstration of basic system functions and alarms for the Engineer, Owner's Commissioning Agent, and Owner's Representative.
- B. The General Contractor shall coordinate the test schedule with the Owner's Commissioning Agent, BCAS Contractor, Electrical Contractor, Mechanical Contractor, Fire Protection Contractor, Fire Alarm Contractor, and other Contractors required to be present for a complete and functional test.

- C. The system checkout and test shall be a comprehensive 100% inspection and functional test of all equipment and software and shall include, but not be limited to, the following:
1. Testing to verify that all control functions specified in the sequence of operation are provided and fully functional as specified and required.
  2. Verification of manual and program control of all start/stop and alarm points, including status indication and alarms.
  3. Verification of all controlled points including setpoint and actual point readouts, remote setpoint change and point alarm.
  4. Verification that all system annunciation text and messages are correct and appropriate.
  5. Functional test of the normal and emergency power building start-up and shutdown routines.
  6. Testing to verify that all systems on emergency power operate as specified in the sequence of operation.
  7. Testing to verify that all specified software is provided and fully implemented.
  8. Display and demonstrate such data entry template and show site specific customizing capability. Demonstrate parameter changes.
  9. Execute menu tree.
  10. Display graphics, demo update.
  11. Execute digital and analog commands in English and graphic mode.
  12. Demonstrate all specified diagnostics.
  13. Demonstrate DDC loop precision and stability via trend logs of inputs and outputs.
  14. Demonstrate BCAS performance via trend logs and command printouts.
  15. Demonstrate scan, update, and alarm responsiveness.
  16. Other testing required by Section 23 05 93.
  17. Other testing required by the Commissioning Agent's Specifications.
- D. Fire Alarm System Interface Testing: Testing of the BCAS interface with the fire alarm system for smoke management, air handling unit shutdown, fire/smoke damper control, duct smoke detector annunciation and other specified interfaces shall be coordinated with the Division 28 fire alarm testing and certification.
- E. Emergency Power Operation Testing: Testing of BCAS operation under emergency shall be coordinated with the Division 26 Contractor such that the testing is conducted along with the Division 26 emergency power system testing and certification.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

**END OF SECTION**



**SECTION 20 21 16**  
**MISCELLANEOUS PIPING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20 Sections apply to this section:
  - 1. Scope of Work - Section 20 05 01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05

**1.2 SCOPE**

- A. Furnish and install complete miscellaneous piping systems as specified herein and shown on the Drawings.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Noise and Vibration Isolation - Section 20 05 48
  - 2. Thermal Insulation - Section 20 07 00
  - 3. Plumbing Piping and Accessories - Section 22 11 16
  - 4. HVAC Piping - Section 23 21 13

**PART 2 - PRODUCTS**

**2.1 DRAIN PIPING**

- A. General: Drain piping within the building shall be provided from each air handling unit, heat exchanger, pump base drain, vessel overflow, auxiliary drain pan, piping system drain, blowdowns, strainers, and elsewhere where drains are required and shall extend to the nearest floor drain, funnel drain or condensate drainage system. Drains shall be sized as indicated but not less than the equipment drain connection size. Air handling unit drains shall have deep seal traps at each blow-through or draw-through unit to maintain water seal. Provide cleanouts on each change of direction on deep seal traps.

- B. Main Mechanical Rooms: Drains on equipment other than for seals or condensate shall be equipped with full bore ball valves and full size quick disconnect type couplings with caps for drains 1" and larger and hose end adapters for smaller drains.
- C. Materials: The drain piping shall be fabricated of Schedule 40 galvanized steel pipe ASTM A-53 and Class 150, ANSI B16.3 galvanized malleable iron threaded fittings or Type L hard drawn copper tubing and wrought copper solder type fittings and shall be manufactured in the United States of America. The ends of all copper pipe, and the inside of all sweat fittings shall be carefully cleaned before joining with Bridgit solder or Silver Brite 100 using Bridgit burn-resistant soldering flux. No acid shall be used in cleaning or as a flux in soldering joints. Drain piping from rooftop units to roof drains may be Schedule 40 CPVC and painted for UV protection.

### PART 3 - EXECUTION

#### 3.1 SUBMITTAL

- A. Shop drawing submittal shall include, but not limited to, the following:
  - 1. Cut sheets marked to clearly indicate all miscellaneous piping system materials to be used.
  - 2. Piping fabrication drawings indicating plan views and suitable elevations and shall include all accessories and connected equipment.

**END OF SECTION**

**DIVISION 21**

**FIRE SUPPRESSION INDEX**

<b>SECTION</b>	<b>DESCRIPTION</b>
21 00 00	FIRE SUPPRESSION INDEX21 05 01 SCOPE OF WORK
21 05 93	STARTUP, TESTING, ADJUSTING AND BALANCING
21 13 13	WET-PIPE FIRE SPRINKLER SYSTEMS

**END OF INDEX**

## SECTION 21 05 93

### START-UP, TESTING, ADJUSTING AND BALANCING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Design Criteria - Section 20 05 02
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Schedule of Submittal Data - Section 20 05 04
  - 5. Scope of Work - Section 21 05 01

##### 1.2 SCOPE

- A. Hydrostatic pressure testing of all pressure piping systems.
- B. Sound measurement of equipment operating conditions.

##### 1.3 RELATED SECTIONS

- A. All Division 21 Sections.

##### 1.4 QUALITY CONTROL

- A. Testing of equipment requiring starting procedures may be performed by the Fire Suppression Contractor, where manufacturer representatives are not required.

#### PART 2 - PRODUCTS (NOT APPLICABLE)

#### PART 3 - EXECUTION

##### 3.1 EXAMINATION

- A. Before commencing work, verify that systems are complete and operable to the following extent:
  - 1. Equipment is operable and in a safe and normal condition
  - 2. Proper thermal overload protection is in place for electrical equipment
  - 3. Piping systems have been flushed, filled, and vented

4. Correct pump rotation
5. Proper strainer baskets are clean and in place
6. Service and balance valves are open

- B. Report any defects or deficiencies noted during performance of services to Architect/Engineer.
- C. Promptly report abnormal conditions in fire suppression systems.
- D. Beginning of work means acceptance of existing conditions.

### 3.2 PREPARATION

- A. Provide all material, equipment, and personnel, including factory personnel where specified or required, to fully check out and start up all equipment and systems as specified in accordance with manufacturer's requirements.
- B. No water piping systems shall be "pumped" until all piping has been hydrostatically tested, flushed, cleaned and water treated as applicable.
- C. Lubrication and fluid levels shall be checked prior to equipment start-up. Alignment on all motor driven equipment shall be checked and adjusted prior to start-up.

### 3.3 TESTING PROCEDURES

- A. Tests shall be made during the course of construction as specified and as required by the authorities having jurisdiction.
- B. Test submittals shall include a preliminary submittal of all proposed test procedures and recording forms for engineer's review prior to any testing and four (4) copies of all certified test results and completed reporting forms for approval.
- C. Vibration Testing: Where a piece of equipment exhibits, in the Engineers opinion, excessive noise or vibration, the service of a certified acoustic consulting engineer shall be provided to perform noise and vibration testing on the equipment or system involved. The consulting engineer shall provide a written report concerning the noise and vibration of the equipment or system involved and the Contractor involved shall make changes or modifications as recommended by the consulting engineer. The above services and retroactive corrections shall be provided at no cost to the Owner or Architect/Engineer.
- D. Hydrostatic Testing: All pressurized piping (not listed herein) shall be leak tested prior to enclosure or cover-up. Piping shall be leak tested for 24 hours under a hydrostatic pressure of 150% of the system design working pressure. The Engineer shall be notified prior to all hydrostatic tests and may elect to witness any of the tests. Water shall not be drawn off of the piping, and the piping shall not be covered up until it has been observed by the Engineer. Care shall be taken to protect any equipment which may be damaged by hydrostatic testing.

- E. Fire Protection System Testing: All fire protection piping shall be hydrostatically tested as specified herein above and additional tests shall be performed as Specified in Section 21 12 00.
- F. Fire Alarm System Interface: Provide testing, in conjunction with the Fire Alarm System functional testing specified in Section 28 31 00, to verify that all Fire alarm related HVAC control functions and shutdowns operated as specified in Section 28 31 00, Division 28 as shown on the drawings.
- G. Completion Reports: Before the final inspection, but after all testing, balancing, and adjusting, the Contractor shall furnish all labor, materials, and devices necessary to prepare a completion report with the following information.
  - 1. Motor data on all motors installed on the project. Motors shall be listed by the device on which they are installed, and information provided shall include:
    - a. Horsepower
    - b. Speed
    - c. Type
    - d. Location
    - e. Rated full load amperage
    - f. Rated voltage
    - g. Actual measured amperage for each leg
    - h. Actual measured voltage for each leg

**END OF SECTION**

## SECTION 21 13 13

### WET-PIPE FIRE SPRINKLER SYSTEMS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Design Criteria - Section 20 05 02
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05
  - 5. Scope of Work - Section 21 05 01
  - 6. Start-up, Testing, Adjusting, and Balancing -Section 21 05 93
  - 7. Fire Suppression Standpipes - Section 21 12 00

##### 1.2 SCOPE

- A. General: Furnish and install a complete hydraulically calculated, automatic wet-pipe fire sprinkler protection system as shown and specified.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Pipe Heat Tracing - Section 20 05 33
  - 2. Thermal Insulation - Section 20 07 00
  - 3. Electric-Drive Centrifugal Pumps - Section 21 31 13
  - 4. Plumbing Piping and Accessories - Section 22 11 16
  - 5. Tanks and Vessels - Section 21 41 23

##### 1.3 QUALITY ASSURANCE

- A. Contractor: The fire protection system shall be designed and installed by a fire protection contractor who is licensed by the State to perform fire protection work of the type required for this project. The fire protection contractor shall have a minimum of five (5) years of experience in the design and installation of fire protection work of the type specified.
- B. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

1. Sprinkler Heads:
  - a. Reliable
  - b. Viking
  - c. GEM/Grinnell
  - d. Automatic Sprinkler
  - e. Tyco Fire Products
  - f. Approved equal
  
2. Fire Protection Specialties:
  - a. Potter-Roemer
  - b. Elkhart
  - c. Reliable
  - d. Viking
  - e. Notifier
  - f. Approved equal
  
3. Fire Protection Valves:
  - a. Potter-Roemer
  - b. Jenkins
  - c. Stockham
  - d. Crane
  - e. Nibco
  - f. Walworth
  - g. Victaulic
  - h. GEM/Grinnell
  - i. Tyco Fire Products.
  
4. Fire Protection Test/Drain Valves:
  - a. Victaulic.
  
- C. Codes and Standards: The publications listed below form a part of this Specification to the extent referenced.
  1. National Fire Protection Association (NFPA):
    - a. NFPA 13 Standard for the Installation of Sprinkler Systems
    - b. NFPA 70 National Electrical Code
  
  2. Underwriters' Laboratories, Inc. (UL):
    - a. Fire Protection Equipment Directory
  
  3. FM Global (FM):
    - a. Approval Guide



## PART 2 - PRODUCTS

### 2.1 WET-PIPE FIRE SPRINKLER SYSTEM

- A. General: Design and install a complete wet-pipe fire sprinkler system for the entire building except elevator machine rooms. The contractor's design and installation are subject to all governing Codes, rules, regulations, and specification requirements including aesthetic concerns in finished areas.
- B. Materials: Pipe, valves, fittings, and other materials used in the wet-pipe fire sprinkler system shall be as specified in Section 21 12 00 Fire Suppression Standpipes unless otherwise specified in this section.
- C. Water Supply: The city water main and shall serve the wet-pipe sprinkler system.
- D. Zoning: The sprinkler system shall be zoned as indicated on the drawings.
- E. Floor Control Assembly: This contractor shall provide a Floor Control Assembly for required flow tests at each zone test station for sprinklers per NFPA 13. Operable components shall be located no higher than 7'-0" A.F.F. System components for each zone shall include, but not be limited to:
1. Zone control (test/drain) assembly
  2. Drain valve
  3. Waterflow switches
  4. Valve supervisory switches
  5. Piping
  6. Sprinkler heads
- F. Drain Riser: A drain riser shall be provided for each standpipe to which a floor control assembly is connected. Each drain line shall be routed to a suitable drain receptacle.
- G. Hydraulic Calculations: A state licensed individual in the direct employ of the Fire Protection Contractor shall design the sprinkler system using hydraulic calculations, prepare detailed ceiling plans and mechanical and electrical requirements, clearances, and location. Hydraulic calculations for the standpipe and sprinkler systems shall be based upon the water supply shown on the Drawings. Sprinkler piping shall be sized as required by the hydraulic calculations to meet code requirements with the indicated water supply source. Velocities in underground piping shall not exceed 16' per second. Velocities in all other piping shall not exceed 20' per second. Velocities in standpipes must be calculated based on the combined sprinkler flow and hose flow.
- H. Densities: The sprinkler system shall be designed to meet the requirements of NFPA 13.
1. The sprinkler subcontractor shall determine the building area usage type and shall be responsible for providing coverage sufficient to meet all NFPA 13 requirements.

2. Should there be a question regarding occupancy use, the subcontractor shall notify the Architect and obtain direction.
- I. Electrical Equipment: Sprinkler heads in rooms with electrical equipment shall be located as far as code requirements allow from electrical equipment.
- J. Spare Heads: Spare sprinkler heads shall be provided and turned over to the Owner's Representative at the time of substantial completion. Sprinkler head quantities shall be in accordance with NFPA recommendations and shall be furnished with a wall mounted metal storage cabinet with an engraved nameplate and appropriate installation wrenches for each head type furnished. Locate cabinet in the fire command center or where directed by Owner.
- K. Test Valves: Test valves shall be conveniently accessible within 7' of the floor. Provide inspector's test valves for each zone.
- L. Shafts: Where elevator shaft walls are of less than 2-hour fire-rated construction, elevator shafts shall be sprinkled from the top of the shaft with intermediate-temperature heads.

## 2.2 FIRE SPRINKLER SYSTEM SPECIALTIES

- A. Sprinkler Heads:
  1. Public Areas: Sprinkler heads in all public areas (i.e., lobbies, common areas, atria, and corridors having inaccessible ceilings) shall be Reliable Quick Response (or approved equal manufacturer) Model G5-56 "Concealer" (standard coverage only) with flush white coverplate. Sprinkler head shall be U.L. listed and F.M. approved with white plate. Final approval for this sprinkler head shall be by the Architect.
  2. Finished Ceilings: All other areas with finished ceilings and shall have quick response Reliable Model G5-56 "Concealer" (standard coverage only) with flush white cover plate. Final approval of sprinkler head shall be by the Architect.
  3. Sleeping Rooms: Provide listed quick response, semi-recessed chrome-plated heads with white escutcheons throughout smoke compartments containing sleeping rooms.
  4. Areas without Ceilings: All areas without ceilings shall have Reliable Model G, chrome finish, upright or pendant as required.
  5. Elevator Pits: For elevator pits, provide standard Reliable horizontal sidewall type Model G4.
  6. Temperature Ranges: Temperature ranges for all sprinkler heads shall be selected by the Fire Protection Contractor to suit the use and temperature range of the protected space, unless noted otherwise herein.
- B. Alarm Valves: Sprinkler Alarm Valves shall be Reliable Model E 6" with retard, variable pressure with closed retard drain trim, flow switch (electric sprinkler alarm switch), mechanical water bell and drain and all other required trim.
- C. Inspector's Test Valves: Sprinkler Test/Drain Valves shall be Victaulic Style 718, AGF, or Tyco Model F350 threaded connection Test Master Sprinkler test/drain valve

assemblies. Assembly shall provide a means to test the verification and a means to drain the sprinkler system zone. Site glass orifice shall be selected to match the sprinkler heads installed in the zone served. Valves shall be U.L. listed and FM approved for 175 psi working pressures.

- D. Gauges: Furnish and install Potter-Roemer Fig. No. 6240 polished brass case, 1/4" NPT male connection, glass enclosed, 0-300 psi dial pressure gauges with isolation valves, as follows:
1. At the fire service water entry
  2. At the top of each sprinkler riser
  3. Where shown on the Drawings

### 2.3 VALVES FOR SERVICE UP TO 400 PSIG

- A. 2-1/2 Zone Control Valve: For regulating high pressure sprinkler systems shall be Potter-Roemer Fig. No. 4005 Series, cast brass, rising stem with red aluminum hand wheel, female N.P.T. inlet and outlet, with monitor switch adapter.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Shop drawings submittals shall include the following:
1. Cut sheets marked to clearly indicate all fire protection system materials and accessories to be used including, but not limited to, sprinkler heads and test/drain assemblies.
  2. Samples of sprinkler heads to be furnished upon request.
  3. Preliminary submittal drawings showing all proposed sprinkler head locations shall be provided to the Architect/Engineer for review.
  4. Final fire protection system shop drawings drawn at 1/8" or 1/4" = 1'-0" scale showing all piping sizes and elevations, sprinkler head types and hydraulic calculations. Piping shall be sized, and elevation of mains shall be indicated. Final Drawings shall be approved by all Authorities Having Jurisdiction prior to being submitted to the Engineer.
  5. Contractor shall certify his drawings to be coordinated with all other trades.
  6. Additional items as specified in Section 20 05 03 and 21 12 00.

### 3.2 INSTALLATION

- A. During construction, the contractor shall provide fire protection to the building in accordance with Local and NFPA requirements.
- B. All fire protection piping shall be thoroughly flushed out to remove any slag or debris prior to being tested or put into service.
- C. Sprinkler piping shall be pressure tested for 24 hours at pressures in accordance with NFPA 13 and 14. Additional testing shall be provided as required by local authorities.

- D. Note to contractor: The fire suppression system contractor shall avoid running sprinkler lines over MDF/IDF footprints. Only piping for local sprinkler head shall be located in the MDF/IDF but any branch piping serving other locations shall not be installed above any telecommunication room.
- E. Sprinkler Head Locations:
1. All sprinkler heads in general shall be in a straight line, parallel to the lines of the building and shall be located in the approximate center of ceiling tiles.
  2. Sprinkler heads in public high-profile finished areas shall be located exactly (double swing connection if necessary) where shown on the architectural reflected ceiling plans. Where shown, sprinkler head quantities are the minimum that must be provided. If additional heads are required to meet NFPA 13, obtain approval of the additional head layout from the Architect.
  3. The Contractor shall submit Sprinkler Head locations to the Architect and Engineer for location and type approval prior to completing the sprinkler system design, unless otherwise instructed in writing by the Architect.
- F. Finished Areas: Install sprinkler heads in all finished areas with and without ceilings.
- G. Non-Built-out Tenant Areas: Initially, install sprinkler heads in reducing fittings in branch piping.
- H. Tenant Area Build-out: During tenant area build-out, add drop nipples and relocate sprinkler heads to finished ceiling elevation. Add sprinkler heads as required by the tenant partition plans to provide coverage in accordance with density and area requirements.

END OF SECTION

**DIVISION 22**  
**PLUMBING INDEX**

<b>SECTION</b>	<b>DESCRIPTION</b>
22 00 00	PLUMBING INDEX
22 05 01	SCOPE OF WORK
22 05 25	MISCELLANEOUS EQUIPMENT
22 05 93	STARTUP, TESTING, ADJUSTING AND BALANCING
22 11 16	PLUMBING PIPING AND ACCESSORIES
22 42 10	PLUMBING FIXTURES AND TRIM

**END OF INDEX**

## SECTION 22 05 01

### SCOPE OF WORK

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Refer to Specification Section 20 05 00 for related required Codes and Standards.
- C. Refer to Specification Section 20 05 02 for related required Design Criteria.
- D. Refer to Specification Section 20 05 04 for related required Schedule of Submittal Data.
- E. Requirements of Division 20 apply to all Work of Divisions 20-28.

##### 1.2 SCOPE

- A. General: Provide all labor, materials, tools, machinery, equipment, supplies, transportation, storage, utilities, appliances, drayage, hauling, hoisting, excavation, backfill, supervision, and services necessary to complete the Plumbing Work under this Contract. Pay all fees, tap charges, meter charges, permits, licenses, inspections, and special fees assessed by the local utilities and local authorities having jurisdiction. Coordinate Work with the Work of the other trades, so as to resolve conflicts without impeding job progress.
- B. Examine the Architectural, Structural, Fire Suppression, Plumbing, Mechanical and Electrical Drawings and other Divisions, and Sections of the Specifications in order to determine the extent of Work required to be completed under this Division. Failure to examine all the Contract Documents for this Project will not relieve the Contractors of the responsibility to perform all the Work required for a complete, fully operational and satisfactory installation.
- C. Project Location: The Work to be performed under this Contract is all in connection with the construction and erection of [a new building and renovations in an existing building located in Houston, Harris County, Texas.]
- D. Work Included: The Work includes but is not limited to the following systems, equipment, and services:
  - 1. Plumbing system consisting of all items indicated on the Drawings and/or specified herein, such as:
    - a. Plumbing fixtures and trim
    - b. Domestic hot water piping
    - c. Domestic cold-water piping

- d. Electric drinking fountains
- e. Electric water heaters
- f. Packaged gas water heaters
- g. Sanitary waste piping
- h. Storm drain piping
- i. Vent piping
- j. Steam to domestic hot water heat exchangers
- k. Water surge and house tanks
- l. Domestic water pumps and controls
- m. Roof and floor drains
- n. Oil interceptors
- o. Grease interceptors
- p. Sewer and water main extensions to 5'-0" beyond perimeter foundation walls
- q. Insulation, controls, safety devices, vibration isolation, etc.
- r. Natural gas piping
- s. Medical gas systems
- t. Brine storage tanks, pumps, piping, and controls
- u. Water softeners
- v. De-ionized water system
- w. Distilled water system
- x. Acid resistant waste and vent piping
- y. Diesel fuel oil storage tanks, pumps, piping, and controls
- z. Main water meter, vault, and piping extension to the building

### 1.3 WORK OF OTHER DIVISIONS

A. The following is a partial list of work not included in Division 22:

- 1. Electrical connections to motors.
- 2. Engine-driven generator remote fuel storage day tank. Installations of remote fuel storage day tanks are included in the Work of this Division.
- 3. Utility mains and piping 5 feet beyond the foundation walls unless shown otherwise on the Drawings.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

**END OF SECTION**

## SECTION 22 05 25

### MISCELLANEOUS EQUIPMENT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Design Criteria - Section 20 05 02
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05
  - 5. Scope of Work - Section 22 05 01
  - 6. Start-up, Testing, Adjusting, and Balancing - Section 22 05 93

##### 1.2 SCOPE

- A. Furnish and install miscellaneous equipment as shown on the Drawings, scheduled, and specified.

#### PART 2 - PRODUCTS

##### 2.1 DOMESTIC COLD-WATER PRESSURE REDUCING VALVE ASSEMBLIES

- A. Domestic water pressure reducing assemblies shall be provided where indicated on the Drawings. The pressure reducing assemblies shall have the capacities indicated in the schedule on the Drawings and shall maintain a constant downstream pressure with the varying inlet pressure indicated over the minimum to maximum flow range listed in the Schedule. The pressure reducing valves shall be selected to provide stable flow conditions without cavitation or valve chatter over the entire flow range specified. PRV piping, valves, and strainers shall be full size to maximum flow velocity or 10 feet/sec. Valve shall be sized as scheduled or noted on the Drawings.
- B. (OPTION 1) PRV WITH BLOCK VALVE:
  - 1. The high flow pressure reducing valve shall be a hydraulically operated, pilot-controlled diaphragm-type ductile iron (ASTM A-536) globe valve with stainless steel trim and suitable for a working pressure as indicated on the Drawings. The pressure-reducing valve shall have an adjustable outlet pressure range suitable for the scheduled valve outlet pressure. The valve shall be stem center guided or guided at both ends and have a single removable seat and resilient disc. The pilot control shall be 316 Stainless Steel or a bronze ASTM B-61 direct-acting, adjustable, spring-loaded, normally open diaphragm valve designed to permit



flow when controlled pressure is less than the spring setting. The control system shall include a fixed orifice and .. a pilot control system completely factory piped (stainless steel) with shut-off cocks to isolate the pilot system . The pressure-reducing valve shall be Clayton 90G-01AS, Charles M. Bailey Company No. 400, Bermad Model BC-720-P/Victaulic Series 972 or approved equal.

2. The low flow pressure-reducing valve shall be selected to operate at flow rate below the minimum flow rate of the high flow valve and the minimum flow rate indicated in the Schedule on the Drawings. The low flow pressure-reducing valve shall be a pilot operated or spring-loaded direct acting globe valve suitable for a working pressure as indicated on the Drawings. The outlet pressure setting shall be field adjustable. The pressure-reducing valve shall be Watts #223, Bermad BC-720-P/Victaulic Series 972 or approved equal.
3. Furnish and install relief valves suitable for a working pressure where required and as indicated on the Drawings. Relief valve size shall be as required by the applicable code, and as indicated on the Drawings. Domestic cold-water pressure reducing assembly relief valve shall have an adjustable range of 20 to 200 psig and remote indication to the Building Control and Automation System (BCAS) Bermad model BC-73Q-P/ Victaulic 973-Q Section 23 09 16.
4. Provide and install pilot operated shutoff valves with solenoid actuation , as detailed on the Drawings in the inlet to each pressure reducing valve station. This valve shall close upon activation of the pressure relief valve for its zone. Valve shall be Bermad BC-710-P-/Victaulic 971 or Cla-Val Model 131-KX, 120-volt, 60 hertz.
5. Provide additional pressure reducing valve with on off solenoid control on the redundant bypass. Valve shall remain closed during normal operation, and open upon command from the control box by passing PRV station. Pressure reducing valve shall open automatically according to pilot setting. Valve shall be Bermad BC-720-55-P/Victaulic Series 972-55, Cla-Val Model 131-KX, 120-volt, 60 hertz.

C. (OPTION 2) PRV WITH WATCHDOG:

1. Pressure Reducing System with "Watchdog" Hydraulic Backup Valve (Pilot Operated): shall automatically reduce a higher upstream pressure and maintain a constant lower downstream pressure regardless of varying flow rate and/or varying inlet pressure. The system shall also include an integral hydraulic backup that protects the system should the primary pressure reducing valve fail open. When the backup is activated, the valve shall take over pressure control and trigger an alarm. 1½" through 16", factory assembled valve with either Groove x Groove ends (1½"-8"), NPT threaded ends (1½"-3"), and Class 150# and 300# flanged ends (1½"-16") with a maximum pressure rating of 400 psi/2557 kPa (250 psi/ 1723 kPa for ANSI Class 150# flanges), hydraulically operated, diaphragm actuated globe style with double-chambered actuator, full bore "Y" pattern type with a V-port throttling plug and semi-straight (no right angles) flow through the valve. Valve body and cover shall be ductile iron to ASTM A536, electro- statically applied fusion bonded epoxy coating. The interior trim shall be stainless steel, tin bronze bearing, SAE 316 external nuts and bolts, NBR disc

seal, EPDM nylon fabric bonded rubber diaphragm and EPDM O-rings. 316 stainless steel pilot control, accessories, tubing & fittings. The primary valve will operate independent of valve differential pressure, utilizing a 2-way control principle using a spring-loaded pilot valve. The backup valve shall utilize a 3-way control principal with a double chamber actuator to ensure immediate response when activated. A full range of pilot spring settings shall be available in ranges of 3 to 430 psi (21 to 2965 kPa) with a standard range of 15-145 psi (103-1000 kPa). The complete valve shall be certified to NSF/ANSI 61 and 372 for contact with drinking water. All necessary repairs shall be possible without removing the valve from the line, the entire actuator assembly shall be removable from the valve as a single, integral unit. Basis of Design: Bermad Model BC-72S-H-P/Victaulic Series 972S-H.

2. The low flow bypass shall be the same design as the main branch described above. The low flow branch shall be a smaller line size to meet the system demand. Basis of Design: Bermad Model BC-72S-H-P/Victaulic Series 972S-H.
3. Furnish and install relief valves suitable for a working pressure where required and as indicated on the Drawings. Relief valve size shall be as required by the applicable code, and as indicated on the Drawings. Domestic cold-water pressure reducing assembly relief valve shall have an adjustable range of 20 to 200 psig and remote indication to the Building Control and Automation System (BCAS) or Victaulic 973-QS Section 23 09 16.
4. System Basis of Design: Victaulic Series 386C/D.

D. (OPTION 3) SINGLE BRANCH PRV SYSTEMS:

1. Victaulic Series 386A/B-SB Single Branch PRV Station with Integral Low-Flow Bypass: Factory assembled, single branch pressure reducing valve (PRV) Station consisting of a Victaulic Style 972-2B PRV with an integral low-flow bypass with a Victaulic style 935-H DPRV. Assembly shall include required Schedule 10S, type 304L, stainless steel pipe conforming to ASTM A312, with Victaulic stainless steel fittings, (2) Victaulic Series 461 butterfly valves for isolation, a wye pattern strainer style 968-F upstream of the PRV, joined with Victaulic installation-ready rigid couplings, Style 107N. Where the ratio of the inlet to outlet pressure is greater than 3, a 972-PD Proportional PRV shall be added for a double stage reduction. PRV Station shall be UL classified to ANSI / NSF-61 for potable water service and shall be certified to the low lead requirements of NSF-372.
2. Victaulic Series 386C/D-SB Single Stage, Single Branch PRV Station with Integral Low-Flow Bypass & Emergency Downstream Over-Pressure Guard "Watchdog": Factory assembled, single branch pressure reducing valve (PRV) Station consisting of a Victaulic Style 972S-2B-H PRV Watchdog valve combo with a mechanical limit switch for BMS alert on the main branch and with an integral low-flow bypass with a Victaulic style 935-H DPRV. Assembly shall include required Schedule 10S, type 304L, stainless steel pipe conforming to ASTM A312, with Victaulic stainless steel fittings, (2) Victaulic Series 461 butterfly valves for isolation, a wye pattern strainer style 968-F upstream of the PRVs, joined with Victaulic installation-ready rigid couplings, Style 107N. Where the ratio of the inlet to outlet pressure is greater than 3, a 972-PD Proportional PRV shall be added for a double stage reduction. PRV Station shall be UL

classified to ANSI / NSF-61 for potable water service and shall be certified to the low lead requirements of NSF-372.

## 2.2 GAS PRESSURE REGULATORS

- A. Pressure regulating controllers shall be furnished and installed where indicated on the Drawings.
- B. Regulators shall have capacities as scheduled.
- C. Regulators shall be installed and vented in accordance with A.G.A. Bulletin 90.
- D. If it complies with these Specifications, one of the following manufacturers will be acceptable: Rockwell, or Fisher-Governor.

## 2.3 GAS SOLENOID VALVES

- A. Provide and install gas solenoid valves in the gas supply and vent piping to the kitchen.
- B. Gas valve shall have aluminum body with Buna "N" diaphragm, and be UL listed for the application.
- C. Valves shall be as manufactured by ASCO or approved equal.

## 2.4 ACID NEUTRALIZING TANKS

- A. Furnish and install as shown on the Drawings an acid neutralization tank in the laboratory drain piping.
- B. The tank shall be fabricated of black polyethylene with size and capacity as scheduled on the Drawings. Fill with limestone chips as required.
- C. Construction shall be capable of a continuous water flow of 140°F liquid.
- D. Supply cover, gasket, and stainless-steel nuts, bolts, and washers. Inlet and outlet connections shall match the piping shown on the Drawings.
- E. If it complies with these Specifications, one of the following manufacturers will be acceptable: Enfield, Nalgene, MA Knight, or Lab-Line.

## 2.5 STILL

- A. General: Provide a duplex steam powered still to produce and deliver distilled water to outlets where shown on the Drawings. Furnish and install all components as required for a complete and functioning system including evaporator, baffle, condenser, and distillate-collecting chamber contained in a stainless-steel housing, and an external distillate cooler. The system shall produce distilled water at an adjustable pressure of from 2 to 10 psig. The pressure vessel shall comply with ASME requirements for unfired pressure vessels and shall be so certified. Top and bottom covers of the housing shall be removable for easy access to internal components. Components in contact with

the water vapor and distillate shall be passivated stainless steel conforming to ASTM A 240 and A 312. The unit shall consist of two distillate generators feeding a common storage tank with all controls, etc., for a complete and functioning system.

- B. Evaporator: The evaporator shall include steam coil, water reservoir, and automatic float valve, drain valve, baffle or self-cleaning orifice for removal of impurities, pressure gauge, and drain.
- C. Condenser: The condenser shall include a water-cooled heat exchanger suitable for the system design working pressure indicated on the Drawings, and a water powered ejector or vent for removal of non-condensable gases.
- D. Distillate Cooler/Collector: The collector/cooler shall receive the distillate and cool it to below 140°F prior to release from the still. Cooler shall include coil with cooling water.
- E. Storage Tank: Provide vertical storage tank to receive distillate and hold it under controlled conditions of purity and pressure. The tank shall be welded, passivated stainless steel or tin-lined copper complying with Federal Specification QQ S-766. Provide tank with distillate inlet fitting, stainless steel self-closing draw off cock, renewable sight glass with metal protector, overflow, inlet filter, drain valve, and ultraviolet light. Inlet filter shall be certified to remove particles larger than 0.5-micron diameter.
- F. Distillate Purity Monitor: Provide a purity monitor to monitor the resistivity of supply distillate from the still. An automatic diverter shall divert poor quality distillate to drain, and acceptable quality distillate to the storage tank. The unit shall have solid-state circuitry and meter with range selector switch. Three ranges shall include 0-18 megohms, 0-1.8 megohms, and 0-0.18 megohms. The purity reading shall be continuously displayed. Status light shall show if purity is above or below the selected level. Provide interface and strip chart recorder for continuous monitoring of the electrical resistance. Recorder shall be suitable for 12-hour segments and minimum 756 hours per chart. Unit shall be suitable for 120-volt, single-phase operation.
- G. Operation: Automatic controls shall start the unit when water in the vessel fails to a preset level and shut down when a second preset level is attained. Interconnect still controls to storage vessel. Controls shall be mounted on a stainless-steel housing on the side of the unit. Unit shall be arranged to be supplied with water from the building's domestic cold-water system as shown on the Drawings.
- H. Miscellaneous: Include strainer and automatic flow regulator as well as shutoff valves in the steam and water supplies and distillate supply piping. All valves shall be suitable for the use intended. Seal all threaded joints of distillate carrying lines with tetrafluoroethylene tape. Exterior water and waste lines shall be nickel-plated copper tubing or brass pipe.
- I. Booster Pump: Booster pump shall operate on 120-volt, single phase power and shall be suitable for pumping distilled water. Booster pump supply pressure shall be 15 psig. Pump shall be provided with automatic controls to maintain supply pressure.
- J. Water Softener: Provide an integral water softener sized for minimum 10 GPM.

- K. Mounting: Entire unit shall be mounted on a floor stand and located where shown on the Drawings.

L. Capacities and Design Conditions:

STEAM SUPPLY TEMPERATURE- °F	308
STEAM SUPPLY PRESSURE- PSIG	60
DOMESTIC WATER SUPPLY TEMPERATURE- °F	60 - 75
DOMESTIC WATER SUPPLY PRESSURE- PSIG	40 - 80
EVAPORATOR MINIMUM WORKING PRESSURE- PSIG	80
CONDENSER MINIMUM WORKING PRESSURE- PSIG	80
STILL CAPACITY- GPH	2 @ 20
MINIMUM STORAGE CAPACITY- GALLONS	300
DISTILLATE BOOSTER PUMP SUPPLY PRESSURE- PSIG	15

- M. Manufacturers: If it complies with these Specifications, steam powered still systems as manufactured by The Barnstead Company or American Sterilizer will be acceptable.

2.6 DEIONIZER CYLINDERS

- A. Deionizer Cylinder "DI-1": DI cylinders shall be mounted under individual sinks. Cylinder shall have a capacity of 0.8 GPM with a capacity of 292 grams and 4500 grains of CaCO<sub>3</sub>. Cylinders shall be rated for 100 psig and have a capacity of 100 gallons each. Each sink, where indicated on the Drawings, shall be provided with 2 cylinders for continuous service. Cylinders shall be equipped with a light or other indicator for replacement needs. Deionized cylinders by Culligan, Continental Water Systems, or approved equal shall be acceptable.
- B. Deionizer Cylinder "DI-2": DI cylinders shall be mixed-bed exchange service type producing water at less than 0.5 PPM dissolved minerals. System shall have a capacity of 15 GPM, 23,500 grams and 1527 grains of CaCO<sub>3</sub>. DI water shall have a capacity of 400-500 gallons. DI water system shall be provided with a 25 gpm stainless steel, 2 HP (480-volt, 3 phase) circulating pump suitable for use on a DI water system. Pump shall be vertical, multiple stage configuration of 316 stainless steel. Deionized cylinders by U.S. Filter and pump by Grundfos or approved equal shall be acceptable.

2.7 WATER SOFTENING SYSTEM

- A. General: Furnish, install and place into operation a twin automatic water softening system consisting of two (2) 10" diameter x 54" high fiberglass resin tanks, each with 1.5

cubic ft. of ion exchange resin and an 18" diameter x 40" high combination polyethylene brine-making and salt storage tank.

- B. Equipment: The equipment shall be similar to KF Series twin softeners #KFZST010FXZNAX as manufactured by U.S. Filter Corporation or approved equal.
- C. Softening Tanks:
1. Tanks shall be non-corrosive fiberglass with a one-piece thermoplastic inner liner and suitable for 150 psi working pressure at temperatures up to 120°F. The tanks shall be approved by NSF, and UL and shall meet WQA Standard S-100. The tanks shall be fabricated of FDA approved materials.
  2. Tanks shall have female NPT 2-1/2" top opening.
- D. Internal Manifold Tube/distributor:
1. Internal manifold tubes shall be of ABS, FDA Approved plastic.
  2. Distributor attached to the manifold tube shall be of FDA approved polypropylene.
- E. Main Control Valve: The sequence control valve shall be Fleckenstein Series 9000, constructed of high-quality brass, designed to operate a hydraulically balanced piston, which glides effortlessly along non-corrosive spacers and seals to a precise position. This precision motor driven valve performs to regenerate and control flow through both resin tanks.
- F. Controller/Meter: Regeneration shall be controlled by a meter that initiates a regeneration cycle after a pre-set volume of water has been softened or passed through the unit.
- G. Regeneration Controller: Controller shall be Fleckenstein or equal, fully adjustable 5-cycle and operate all steps and regeneration cycles for both vessels. Steps/cycles shall include upflow backwash, downflow brining, slow rinse, rapid rinse, brine refill and downflow service.
- H. Brine Tank: The brine tank shall be a combination brine maker and salt storage vessel, be constructed of tough high-density polyethylene, and include a grid plate for maximum saturation of brine, a polyethylene brine valve well with float and safety valve shut-off to minimize the chance of brine tank overflow. Lid shall be supplied with the tank.
- I. Softening Resin: Softening resin shall be new virgin cation exchange resin, Rohm & Haas IR120 or equal.
- J. Performance: Acceptable performance requires:
1. Under actual operating conditions, the mineral shall not be washed out of the system during the service run or backwashing period.
  2. The turbidity, color, and quality of the effluent, by reason of passing through the filter system, shall not be less than the incoming water.

3. The under-drain system, gravel, and mineral shall not become fouled, either with turbidity or by dirt, while operating as noted in the manufacturer's written instructions.

## 2.8 ACTIVATED CARBON FILTER

- A. General: Furnish, install and place into operation an automatic activated carbon filter consisting of one (1) 12" diameter x 52" high filter tank with 2 cubic feet of granular activated carbon. System shall be rated for 8 gpm at a pressure loss of not more than 3 psi, with peak flow capability at 10 gpm.
- B. Equipment: The equipment shall be similar to KF Series #KFZCS012FXZFAX single or approved equal.
- C. Filter Tank:
  1. Tank shall be of electric welded pressure vessel quality low carbon steel construction rated for 100 psig working pressure and hydrostatically tested at 50% in excess of the working pressure.
  2. Tank shall have threaded NPT connections, pressure gauges, and sampling cocks on the service inlet and outlet.
  3. Tank shall have access hand-hole in the top. Interior shall be sandblasted to white metal with a 1 to 12" mill anchor pattern, then coated with 8-10 mils DFT epoxy polyamid. The exterior surface shall be cleaned and coated with 2 - mils DFT rust resistant primer, and 8-10 mils of finish enamel. Tanks shall have 50% or more freeboard.
- D. Internal Distribution:
  1. Upper distribution system shall be of the baffle type to evenly distribute the water over the entire tank area.
  2. Lower distribution system shall be of a proven design slotted PVC nipple. The distribution system shall be embedded in a single layer subfill of washed 1/8" x 1/16" gravel to support the resin bed.
- E. Main Operating Valve:
  1. The main operating valve shall be an industrial automatic multi-port diaphragm type, slow opening and closing, free of water hammer. The diaphragm assembly shall be fully guided on its perimeter when pressure actuated from one position to another to assure a smooth reliable shut-off without sticking. There shall be no contact of dissimilar metals within the valve and no special tools shall be required to service the valve.
  2. The main operating valve shall be manufactured by the manufacturer of the softening equipment. Single units shall have an internal automatic by-pass of the untreated water during regeneration. Valve shall have a treated water sampling cock.
- F. Pipe and Fittings: Piping shall be Schedule 40 galvanized. Threaded fittings shall be standard Class 150 galvanized malleable.

- G. Flow Control: An automatic flow controller shall be provided to maintain proper backwash and flush rates over wide variations in operating pressures and require no field adjustment.
- H. Controls:
1. A factory-mounted and wired cycle controller shall incorporate an adjustable time switch with multi-ported pilot valve to control all steps of the automatic regeneration. Provision for push-button initiated regeneration shall be included.
  2. The multi-ported pilot control valve shall be factory pre-tubed to automatically pressure activate the main operating control valve through the steps of regeneration and return to service. A pointer on the pilot valve shall indicate the cycle of operation at all times. In the event of power failure, a complete regeneration can be performed by manual operation of the pilot control valve. Electrical lockouts for reverse osmosis system shall be provided to prevent it from operating while the activated carbon filter is in either manual or automatic backwash.
- I. Filter Media: The granular media (Activated Carbon) shall be made from selected grades of bituminous coal combined with suitable binders to give superior hardness and long life. It shall have an iodine number of at least 850 and a minimum abrasion number of 75. The media shall be designed for efficient de-chlorination and removal of dissolved organics including those causing tastes and odors. Particle retention shall be 40 micron and larger.
- J. Performance: Acceptable performance requires:
1. Under actual operating conditions, the mineral shall not be washed out of the system during the service run or backwashing period.
  2. The turbidity, color, and quantity of the effluent, by reason of passing through the filter system, shall not be less than the incoming water.
  3. The under-drain system, gravel, and mineral shall not become fouled, either with turbidity or by dirt, while operating as noted in manufacturer=s written instructions.

## 2.9 PRIMARY REVERSE OSMOSIS SYSTEM

- A. General: Furnish and install a complete Reverse Osmosis (RO) unit designed to remove greater than 99% of all microorganisms, pyrogens, particles, colloids, and organic molecules greater than 200 molecular weight as well as over 97% of all dissolve solids. The system shall use a high-pressure pump to force a portion of the feed water through a semi-permeable membrane. The amount of product water produced varies directly with the feed water pressure and temperature. A portion of the feed water shall be bled off to drain, or reclamation to remove the product water pollutants left on the feed waterside of the membrane that would over time foul or scale the membrane. The amount of reject water required shall vary with the amount and character of the contaminants in the feed stream. Determine through on-site and laboratory water analysis the recovery rate required to produce specified product water quantity.



- B. Mechanical Description: The complete reverse osmosis system shall consist of RO cartridges, pressure vessels, a feed pump with interconnecting piping, instrumentation, and controls. RO cartridges shall be 2.5", 4.0" or 8.0" diameter by 40" long, incorporate Thin Film Composite membranes, and be housed in pressure vessels. Provide standard feed pumps sized for a nominal water temperature of 77°F. Feed pumps and high-pressure piping shall be fabricated from stainless steel. Low-pressure piping shall be Schedule 80 PVC with all RO components pre-assembled and mounted on an epoxy painted carbon steel frame. The major components shall be supported by the epoxy coated frame, designed, and fabricated in such a way to provide easy access for servicing, maintenance, and monitoring system performance.
- C. Electrical Description:
1. Instrumentation shall include pressure gauges, product and reject flow meters, feed and product conductivity, and percent ionic rejection through the integral controller. The RO controller shall be housed in a NEMA 12 enclosure and based on a solid-state controller. Provide indicators on the panel for controller power, pump on, tank full, high feed temperature, low feed pressure, flush, and pretreatment interlock. Unit panel shall be arranged to receive a single 480-volt, 3 phase, 4-wire circuit, contain pump motor controller and 120/208 volt transformer sized to power all integral controls.
  2. Panel mounted manual switches for control power On/Off, alarm acknowledgment, and RO On/Off/Auto. Automatically activated controls interface with a tank level controller, pretreatment interlock, system shutdown on low inlet pressure, and for motor overload protection.
- D. System Capacity: System shall be capable of producing 4,000 gallons per day.
- E. Storage Tank: Provide a 165-gallon flat bottom, FDA approved, high density polyethylene storage tank.
- F. Manufacturers: RO systems shall be similar to U.S. Filter/Continental Model ROSLV1040C or approved equal.

## 2.10 PURITY MONITOR

- A. Provide a purity monitor to monitor the resistivity of supply from the water purification system. An automatic diverter shall divert poor quality product to drain, and acceptable quality product to the storage tank. The unit shall have solid-state circuitry and meter with range selector switch. Three ranges shall include 0-18 megohms, 0-1.8 megohms, and 0-0.18 megohms. The purity reading shall be continuously displayed. Status light shall show if purity is above or below the selected level. Provide interface and strip chart recorder for continuous monitoring of the electrical resistance. Recorder shall be suitable for 12-hour segments and minimum 756 hours per chart. Unit shall be suitable for 120-volt, single-phase operation and shall be Thorton Model ZMET62221, or approved equal, with alarm contacts and remote audio/visual alarm. Location of alarm to be field coordinated with Owner.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Shop drawing submittal shall include, but not be limited to, the following:
  - 1. Cut sheets on all miscellaneous equipment specified herein, clearly marked to show sizes, construction features, connection and installation details, capacities and other pertinent information.
  - 2. Additional information as required in Section 20 05 03.

### 3.2 INSTALLATION

- A. General: Install all materials in accordance with manufacturer's written installation instructions, applicable standards, and recognized industry practices.
- B. The PRV Station manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of the PRV Station and installation. The representative shall periodically visit the jobsite and review contractor is following best recommended practices in PRV Station installation. (A distributor's representative is not considered qualified to conduct the training or jobsite visit(s).)

**END OF SECTION**

## SECTION 22 05 93

### START-UP, TESTING, ADJUSTING AND BALANCING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Design Criteria - Section 20 05 02
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05
  - 5. Scope of Work - Section 22 05 01

##### 1.2 SCOPE

- A. Hydrostatic pressure testing of all pressure piping systems
- B. Pneumatic pressure testing of all-natural gas piping
- C. Leak testing of waste, storm and vent piping
- D. Sound measurement of equipment operating conditions

##### 1.3 RELATED SECTIONS

- A. All Division 22 Sections

##### 1.4 QUALITY CONTROL

- A. Testing of equipment requiring starting procedures may be performed by the Contractor, where manufacturer representatives are not required.

#### PART 2 - PRODUCTS (NOT APPLICABLE)

#### PART 3 - EXECUTION

##### 3.1 EXAMINATION

- A. Before commencing work, verify that systems are complete and operable to the following extent:

1. Equipment is operable and in a safe and normal condition
2. Proper thermal overload protection is in place for electrical equipment
3. Access doors are closed
4. Hydronic systems have been flushed, filled and vented
5. Correct pump rotation
6. Proper strainer baskets are clean and in place
7. Service and balance valves are open

- B. Report any defects or deficiencies noted during performance of services to Engineer.
- C. Promptly report abnormal conditions in mechanical systems or conditions which prevent system balance.
- D. If, for design reasons, system cannot be properly balanced, report as soon as observed.
- E. Beginning of work means acceptance of existing conditions.

### 3.2 PREPARATION

- A. Provide all material, equipment and personnel, including factory personnel where specified or required, to fully check out and start up all equipment and systems as specified in accordance with manufacturer's requirements.
- B. No water piping systems shall be "pumped" until all piping has been hydrostatically tested, flushed, cleaned and water treated as applicable.
- C. Lubrication and fluid levels shall be checked prior to equipment start-up. Alignment on all motor driven equipment shall be checked and adjusted prior to start-up.

### 3.3 TESTING PROCEDURES

- A. Tests shall be made during the course of construction as specified and as required by authorities having jurisdiction.
- B. Test submittals shall include a preliminary submittal of all proposed test procedures and recording forms for engineer's review prior to any testing and four (4) copies of all certified test results and completed reporting forms for approval.
- C. Vibration Testing: Where a piece of equipment exhibits, in the Engineers opinion, excessive noise or vibration, the service of a certified acoustic Consulting Engineer shall be provided to perform noise and vibration testing on the equipment or system involved. The Consulting Engineer shall provide a written report concerning the noise and vibration of the equipment or system involved and the Contractor involved shall make changes or modifications as recommended by the Consulting Engineer. The above services and retroactive corrections shall be provided at no cost to the Owner or Engineer.
- D. Hydrostatic Testing: All pressurized piping (not listed herein) shall be leak tested prior to enclosure or cover-up. Piping shall be leak tested for 48 hours under a hydrostatic pressure of 150% of the system design working pressure. The Engineer shall be notified

prior to all hydrostatic tests and may elect to witness any of the tests. Water shall not be drawn off of the piping, and the piping shall not be covered up until it has been observed by the Engineer. Care shall be taken to protect any equipment which may be damaged by hydrostatic testing.

- E. Natural Gas: Natural gas piping shall be leak tested for 48 hours under a pneumatic pressure of 25 psi or a higher pressure if required by the natural gas utility. The Engineer shall be notified prior to pneumatic tests and may elect to witness any of the tests. Air shall not be drawn off of piping until it has been approved by the Engineer. Care shall be taken to protect any equipment which may be damaged by pneumatic testing.
- F. Leak Testing: All soil, waste, storm and vent piping shall be leak tested by temporarily plugging piping stacks and filling the system to be tested with standing water for 48 hours. Water shall not be drawn off of piping and the piping shall not be covered up until it has been observed by the Engineer. Additional testing shall also be provided as required by the local Plumbing Inspection Department. Submit the proposed test procedure and grouping to the Engineer for review.
- G. Completion Reports: Before the final inspection, but after all testing, balancing and adjusting, the Contractor shall furnish all labor, materials and devices necessary to prepare a completion report with the following information.
  - 1. Motor data on all motors installed on the project. Motors shall be listed by the device on which they are installed, and information provided shall include:
    - a. Horsepower
    - b. Speed
    - c. Type
    - d. Location
    - e. Rated full load amperage
    - f. Rated voltage
    - g. Actual measured amperage for each leg
    - h. Actual measured voltage for each leg
  - 2. Belt and drive data for all belt driven equipment installed on the project. Data shall be listed by the device on which the belts and drive are installed, and information provided shall include: number of belts, size of belts, size and type of drive installed, motor RPM and driven device RPM.
- H. Domestic Hot Water System Balancing and Adjustments: Water flow through the domestic water heaters shall be balanced to provide an equal volume through each water heater. Water heater thermostats shall be adjusted to provide a true 120°F hot water supply in each of the building domestic systems, and 140°F to kitchen and laundry systems. Hot water system balancing valves shall be adjusted to provide indicated flows prior to final acceptance.
- I. Sewer Rodding: All sanitary and storm sewer piping shall be free of obstruction both inside the building and to the points of connection to public utility systems. If blockage develops in any sanitary or storm piping within the warranty period and the blockage is

due to construction related debris or defects, this Contractor shall be responsible for the cost of rodding out the piping to remove the blockage or obstruction. The rodding shall be done at no additional cost to the Owner or Engineer. Notify the Engineer prior to proceeding with rodding of any piping.

**END OF SECTION**

## SECTION 22 11 16

### PLUMBING PIPING AND ACCESSORIES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Design Criteria - Section 20 05 02
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05
  - 5. Scope of Work - Section 22 05 01
  - 6. Start-up, Testing, Adjusting, and Balancing - Section 22 05 93

##### 1.2 SCOPE

- A. The Work of this Section shall include, but not be limited to:
  - 1. Securing and installing plumbing services for the building.
  - 2. A complete domestic hot and cold-water distribution system.
  - 3. A complete sanitary soil waste and vent system.
  - 4. A complete storm water piping system.
  - 5. Miscellaneous plumbing equipment and specialties required for a complete plumbing system as specified.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Owner and Contractor Furnished Equipment - Section 20 05 06
  - 2. Pipe Heat Tracing - Section 20 05 33
  - 3. Noise and Vibration Isolation - Section 20 05 48
  - 4. Thermal Insulation - Section 20 07 00

##### 1.3 QUALITY ASSURANCE

- A. Codes and Standards: All materials, fixtures or devices used or entering into the construction of the plumbing system shall be listed for Uniform Plumbing Code (UPC) or shall conform to Alternate Standards recognized as "equal" by the Authorities Having Jurisdiction.
- B. All grooved components including couplings, fittings, valves, gaskets, and specialties shall be of one manufacturer. All castings shall be dated stamped for quality assurance and traceability.

- C. NSF Compliance: All components used in potable water systems shall be NSF 61 certified and shall be NSF/ANSI 61-G and/or NSF/ANSI 372 certified for lead content. Components for domestic water shall be 3<sup>rd</sup> Party Certified.
- D. All piping shall be manufactured in the United States of America.

#### 1.4 PLUMBING SERVICES

- A. The Plumbing Contractor shall be responsible for securing all plumbing services necessary for the project as shown on the Drawings.
  - 1. Securing water connection permit from the authority having jurisdiction.
  - 2. Tapping, or arranging for tapping of the city main in accordance with the authority having jurisdiction.
  - 3. Extending water service to meter.
  - 4. Installation of water meter and meter box in accordance with authority having jurisdiction.
  - 5. Extending water services from meter box to building entry.
  - 6. Securing sanitary sewer connection permit from the authority having jurisdiction.
  - 7. Connecting, or arranging for the connection of the sanitary lines(s) into the sanitary sewer in accordance with the authority having jurisdiction.
  - 8. Securing storm sewer connection permit from the authority having jurisdiction.
  - 9. Connection of or arranging for the connection of the storm drain(s) into the storm sewer system in accordance with the authority having jurisdiction.
  - 10. Installing all drainage systems with the proper slope as required by code.
  - 11. Boring and jacking existing streets, driveways, sidewalks, etc., in the city right-of-ways as is necessary. (Where this stipulation cannot be met, it shall be the responsibility of the Plumbing Contractor to secure all necessary permits at his cost to do whatever is required to secure the service from the city or local authority and make whatever repairs necessary after the service is secured.)
  - 12. Arranging with the gas company to have the necessary gas service and properly sized gas meter station located where shown on Drawings.
  - 13. Extending gas service from the gas meter station to the building entry.
- B. The Plumbing Contractor shall be responsible for coordinating plumbing services and site utility work as shown on the Plumbing and Civil Utility Drawings with the General Contractor to determine what work is included in the scope of the Plumbing Subcontract.

#### 1.5 PIPING FABRICATION DRAWINGS

- A. Piping fabrication drawings shall be submitted for all piping in the Central Plant, Mechanical Rooms, and Penthouse and for Equipment connections and all other areas requiring coordination with other trades.
- B. Pipe fabrication drawings shall be double line drawings to scale on 1/4" scale building floor plans and shall indicate pipe size, fittings, valves, accessories, connections, system type, insulation, support requirements, isolator locations and types, pipe elevations and other information required for coordinating with other trades and fabrication of piping.



- C. Pipe fabrication drawings shall be coordinated with other trades and building construction prior to submittal for approval.

#### 1.6 EXPOSED PIPING

- A. All exposed piping for supply, waste, and vent connections to plumbing fixtures and connected equipment in finished areas shall be polished chrome plated unless noted otherwise on the drawings. This shall include piping, fittings and valves. Polished chrome plated sleeves may be used over supply, waste and vent piping provided that the finished installation presents the appearance of a fully chrome plated system.

#### 1.7 PIPE HEAT TRACING (FREEZE PROTECTION)

- A. The Plumbing Contractor shall furnish and install heat tracing cable as specified in Section 20 05 33, where shown on the Drawings, and where piping is exposed to freezing conditions. The entire length of the exposed pipe including all valves, fittings and accessories shall be traced and insulated. Refer to Section 20 07 00 for insulation requirements.

#### 1.8 NO LEAD

- A. Lead Free: Refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content  $\leq 0.25\%$  per Safe Drinking Water Act as amended January 4, 2011, Section 1417. All materials and components used in potable water systems shall be lead free.

### PART 2 - PRODUCTS

#### 2.1 DOMESTIC WATER PIPING

- A. General: The domestic water system in the building shall be designed for pressures up to 150 psi for distribution piping and risers.
- B. Water Service Piping: Water service piping shall be ductile iron, mechanical joint water pipe (ANSI C-110) or Tyton joint water pipe (ANSI C-151) and shall be installed in accordance with manufacturer's recommendations. Water service to the building shall be routed and installed as detailed on the Drawings. No main water service piping shall be permitted under the slab. Water service piping shall have a minimum 24" cover from top of pipe in non-paved areas and 30" cover in paved areas.
- C. Underground Protection: Underground metallic water piping shall be coated with 3M Scotchwrap Pipe Wrap Insulation No. 50, or Tapecoat CT, applied in strict accordance with the manufacturer's recommendations. Machine wrapping of piping is acceptable. Concrete thrust blocks shall be poured at all turns and offsets of mechanical joint piping.
- D. Underslab Piping: Piping underground and piping under the building slab for hose bibbs and equipment stubs shall be no larger than 1" and shall be Type "K" soft drawn copper tubing (ASTM Standard B-88). Piping shall be run continuous from slab penetration to

penetration and there shall not be any fittings or connections below the slab. Piping shall have minimum 24" cover in non-paved areas. Underground piping up to 3" inches above slab penetrations shall be protected as described herein above.

- E. Underground Piping: In general, all underground piping shall be buried in a trench with minimum 24" of cover from top of pipe insulation jacket, and at minimum 12" wider than the combined O.D. of all piping systems within the trench. All backfill material shall be cleaned bank sand.
- F. 4" and Smaller Inside Piping: Water piping, 4" and smaller inside the building shall be type "L" hard drawn copper tubing (ASTM B-88) with wrought copper fittings (ASME B16.22, or ASME B16.18), roll-grooved ends with Victaulic copper grooved end couplings, or copper press fittings Viega ProPress or Nibco NibPress System. Clean and de-burr the insides of all fittings and pipe carefully before joining. Solder shall be Bridgit solder or Silver Brite 100 using Bridgit burn resistant soldering flux. No acids sweating joints. Press fittings shall employ an EPDM o-ring seal and shall be pressed using the tool approved by the system manufacturer. The use of drilled-T connections is not permitted. Press fittings manufactured by Viega or Nibco shall be acceptable if they comply with these specifications.
- G. Larger than 4" Inside Piping: Water piping larger than 4" inside the building shall be Class 250, Schedule 40 galvanized steel domestic water pipe conforming to ASTM A-53 and ANSI B125.2. All piping shall be manufactured by one of the manufacturers listed in the latest edition of the American Petroleum Institute (API) approved manufacturer listing.
- H. Grooved CPVC Pipe Option for 2" and Larger Inside Piping: At the contractor's option only with prior approval by the engineer, CPVC pipe meeting the requirements of ASTM F441 and ASTM D1784 - minimum cell classification 23447 may be provided within the limits of Residential Dwelling Units and Residential Main Riser only. Provide schedule 80 CPVC (ASTM D-2241, ASTM D-1785) with Victaulic grooved fittings and coupling connections only. Solvent welded fittings shall not be used. Reduced pressure ratings must be considered for hot water temperature applications. Refer to the manufacturer's requirements prior to installation.
- I. Fittings:
1. Pipe fittings 4" and larger shall be galvanized malleable iron fittings, or galvanized cast iron flanged fittings per ASME B16.1. Fittings shall be Class 150 for pressures up to 150 psi and Class 250 for pressures above 150 psi and up to 250 psi.
  2. Grooved Piping Option:
    - a. For galvanized steel pipe, a grooved piping connection system with "roll grooves or cut-grooves" may be used. All couplings shall be Victaulic Style 807N Installation-Ready Rigid Couplings with angled bolt-pads to achieve rigidity and shall require visual verification only for proper installation without torque requirements. Rigid couplings shall be used at valves and in other areas where piping system rigidity meeting ASME B31 hanging requirements. Victaulic Style 877N Installation-Ready®

Flexible Couplings may be used in approved locations to accommodate vibration, deflection or expansion/contraction as designed within accordance of the manufacturers' recommendations and shall be reviewed by Victaulic Engineering Services. All gaskets shall be grade "P" Fluoroelastomer compound with red and blue color code designed for operating temperatures from 0 deg F to +180 deg F.

3. Taps to mains shall be made using Victaulic Style 72 or Style 920, galvanized mechanical tees. Mechanical tee couplings with U-bolts such as Victaulic style 921 shall not be permitted. Flanged connections shall be made using Victaulic Style 741. Fittings for elbows, tees, reducers, etc. shall be Victaulic galvanized full flow fittings. All grooved piping connection materials shall be utilized with the manufacturer's recommended groove cutting tool. All grooved piping couplings and fittings used in conjunction with companion grooved fittings shall be by the same manufacturer. The use of boltless couplings and reducing couplings is prohibited. All wetted surfaces in the piping system shall be hot dip galvanized and all proposed grooved piping connection materials shall be suitable for domestic water use at the temperatures and pressures at the point of application. Painted couplings may be used where they meet the above requirements.
  - a. Manufacturers: If they comply with these Specifications, all grooved piping products shall be manufactured by Victaulic only. No substitutions will be allowed. Installation: The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools and installation of grooved joint products. The representative shall periodically visit the jobsite and review contractor is following best recommended practices in grooved product installation. (A distributor's representative is not considered qualified to conduct the training or jobsite visit(s)).
- J. Copper Option: Copper pipe type "L" hard drawn in sizes 2-1/2", 3", 4", and 6" for 150 psig systems may be used and assembled with Victaulic style 607N couplings.. All fittings shall be Victaulic style 600 series with =Grade "P" Fluoroelastomer compound with red and blue color code designed for operating temperatures up to +180 deg F full flow with grooved ends manufactured to copper-tube dimensions. (Flaring of tube or fitting ends to accommodate alternate size couplings is not permitted). Piping shall be roll grooved utilizing the grooving system manufacturer's roll-grooving machine. Couplings and fittings shall be of one manufacturer.
- K. Water Hammer Arrestors (Shock Arrestors): The following water hammer arrestors are designed for installation in sealed walls without an access panel. Water hammer arrestors shall be provided on both hot and cold-water lines serving fixtures or equipment using flush valves or quick-closing valves. Water hammer arrestors are to be sized according to the number of fixture units and installed per manufacturer's recommendations. Contractor fabricated pipe type air chambers are not allowed. Check applicable codes which may require access in walls or ceilings. Verify size of unit in conformance to PDI Standards.

1. Precision Plumbing Products, Inc. Model Series SC, PDI WH-201, piston actuated, factory sealed, seamless hard drawn Type "L" copper barrel with threaded ends.
  2. Sioux Chief Manufacturing Company, Inc. Model Series 650, PDI WH-201, piston actuated, factory sealed, seamless hard drawn Type "L" copper barrel with threaded ends.
- L. Minimum Size: The minimum size of water piping on the project shall be 1/2" on fixture drops and 3/4" on risers. Final fixture connection sizes shall be as specified or shown on the drawings.
- M. Isolation Valves: Each fixture, device or connection to equipment shall have a stop valve to isolate that fixture without shutting down any other portion of the system.

## 2.2 VALVES

- A. Furnish and install valves as required, specified and shown on the drawings.
- B. Gate valves or Butterfly valves shall be used for all riser shutoff and zone isolation applications. Gate, Butterfly, or Ball valves shall be used for fixture bank isolation, equipment isolation and other local isolation applications. Globe valves shall be used for throttling and balancing applications unless noted otherwise on the Drawings.
- C. Bronze bodied valves, involving internal components, shall contain no more than 15% zinc. Where a brass valve is specifically called out in the specifications or drawings, the valve body and all internal components shall be resistant to dezincification and stress corrosion cracking as defined in NSF/ANSI Standard 14. Submittals shall include a report indicating the results of testing conducted in accordance with ISO 6509 "Corrosion of metal and alloys - Determination of dezincification resistance of brass".
- D. Acceptable Manufacturers:
1. Globe, Gate, and Check Valves:
    - a. Nibco
    - b. Rigid
    - c. Viega ProPress
    - d. Keystone
  2. Ball Valves, Butterfly Valves:
    - a. Nibco
    - b. Kitz
    - c. Hammond
    - d. Stockham
    - e. Apollo
    - f. Jomar
    - g. Grinnell
    - h. Victaulic
    - i. Milwaukee Valve

3. Balancing Valves:

- a. Armstrong
- b. Victaulic
- c. Taco
- d. Nibco

E. Globe Valves:

- 1. Globe valves 2" and smaller shall be Class 125 bronze globe valves with screw-in bonnet, integral seat and removable disc. Valves shall be rated for 200 psi CWP or 300 WOG and shall conform to MSS SP-80. Valves shall be Milwaukee Valve 1502, or equal by listed manufacturer.
- 2. Globe valves 2-1/2" and larger shall be bronze mounted Class 125 iron body, outside screw and yoke globe valves with bolted bonnets and renewable seat and disc. Valves shall be rated for 200 psi CWP or 200 psi WOG and shall conform to MSS SP-85. Valves shall be Milwaukee F-2981M, or equal by listed manufacturer.

F. Gate Valves:

- 1. Gate Valves 2" and smaller shall be Class 125 bronze gate valves with screw-in bonnet, non-rising stem and solid wedge. ASTM B584 C87850 or C89833 Alloy. Valves shall be rated for 200 psi CWP or 300 psi WOG and shall conform to MSS SP-80. Valves shall be Nibco S/T-113-LF, Milwaukee Valve UP105 or UP115, or equal by listed manufacturer.
- 2. Gate valves 2-1/2" and larger shall be bronze mounted Class 125 iron body, outside screw and yoke gate valves with bolted bonnets and solid wedges. Valves shall be rated for 200 psi CWP or 200 psi WOG and shall conform to MSS SP-70. Valves shall be Nibco F-637-33, Milwaukee F-2885M, or equal by listed manufacturer.

G. Butterfly Valves:

- 1. Butterfly valves 2-1/2" to 6" shall be lever operated and provide bi-directional dead-end service without a downstream flange, and bubble tight shutoff at 200 psi. Valves shall be constructed of ductile iron with an aluminum bronze disc. Valve shall include a molded-in EPDM liner and a stainless-steel stem with copper bushings. Valve shall be rated for 200 psi CWP and designed to meet MSS-SP-67. Valve will carry the NSF/ANSI 372/61 rating for lead-free. Valve shall be NIBCO 2D-2000-3 or equal, by listed manufacturer.
- 2. Butterfly valves 6" and larger shall be gear operated and provide bi-directional dead-end service without a downstream flange, and bubble tight shutoff at 200 psi. Valves shall be constructed of ductile iron with aluminum bronze disc. Valve shall include a molded-in EPDM liner and a stainless-steel stem with copper bushings. Valve shall be rated for 200 psi CWP and designed to meet MSS-SP-

67. Valve will carry the NSF/ANSI 372/61 rating for lead-free. Valve shall be NIBCO 2D-2000-5 or equal, by listed manufacturer.

3. Grooved End Butterfly valves for galvanized, copper, CPVC, or stainless steel grooved piping systems 2-1/2" meeting the specification requirements shall be used. Valves 2 1/2" to 4" shall be lever operated. 6" and larger shall be gear operated. Valve shall be rated for 300 psi maximum pressure rating. Valves shall be Victaulic, selected for the appropriate piping system as specified. Where grooved systems are installed, grooved Victaulic valves shall be installed. The use of flange adapters on lug or wafer style butterfly valves shall not be allowed.
  - a. For Copper Grooved Systems: Valve shall be constructed of cast brass body to UNS C87850. (Alloy code shall be cast or stamped into the valve body.) Aluminum bronze disc to UNS C95500, with pressure responsive Grade "P" fluoroelastomer seat. Stem shall be offset from the disc centerline to provide complete 360-degree circumferential seating. Bubble tight, dead-end or bi-directional service, with memory stop for throttling, metering or balancing service. Valve may be automated with electric, pneumatic, or hydraulic operators. Valve shall be certified to NSF 61 Hot/Cold and NSF 372 Low Lead. Valves shall be Victaulic Series 608N.
  - b. For Stainless Steel, Galvanized Carbon Steel, and CPVC Grooved Systems: Valve construction and performance shall meet or exceed MSS-SP-67 requirements. Valve body and disc shall be constructed of stainless steel to ASTM A351 Grade CF8M, with pressure responsive Grade "P" fluoroelastomer seat. Stem shall be offset from the disc centerline to provide complete 360-degree circumferential seat. Bubble tight, dead-end or bi-directional service, with memory stop for throttling, metering or balancing service. Valve shall be certified to NSF 61 Hot/Cold and NSF 372 Low Lead. Valves shall be Victaulic Series 861.

H. Ball Valves:

1. Ball valves 2" and smaller shall be two-piece body bronze valves of a full port design, reinforced two-piece Teflon seat, blow-out proof stem, stainless steel ball and stem. ASTM B584 Alloy C87600 or C89833. Valves shall be rated for 600 psi CWP or 600 psi WOG and shall conform to Federal Specification WW-V-35B. Valves shall be Nibco S/T-585-66-LF, Watts, or Rigid.

I. Check Valves:

1. Check valves 2" and smaller shall be Class 125 bronze spring loaded in-line. B584 C87850 or C89833 Alloy. Valves shall be rated for 200 psi CWP or 300 psi WOG and shall conform to MSS SP-80. Valves shall be Nibco 480 series, or Watts 600 series.
2. Check valves 2-1/2" and larger shall be stainless steel mounted Class 125 ductile or cast-iron body swing check valves with bolted bonnets and renewable seat and disc. Valves shall be rated for 200 psi CWP or 200 psi WOG and shall conform to MSS SP-71, Type 1. Valves shall be Nibco F-908 series, or Watts 410 series.

3. **Manual Balancing Valves:** Balancing valves for the domestic hot water system shall be ANSI/NSF 61 Hot/Cold and ANSI/NSF 372 low lead certified Nibco or Watts balancing valves. Valves shall be Y-pattern globe type with fixed orifice, low lead brass CC768S body construction, brass plug with EPDM O-ring seat seal. Valve shall include metering test ports and calibrated hand wheel with position readout and memory stops. Valve shall be rated for a maximum temperature of 248°F and a maximum pressure of 400 psi. The Contractor shall furnish a differential pressure gauge for Contractor use in balancing the hot water system. After balancing and verification is complete, the differential pressure gauge shall be turned over to the Owner at the time of Substantial Completion.

J. Backflow Prevention and Cross Contamination:

1. A backflow control unit shall be installed at all locations in the domestic water system as follows:
  - a. Where a cross connection or potential cross connection could result in introduction of a health contaminant or non-health pollutant into the domestic water supply system.
  - b. Where required by the authority having jurisdiction.
  - c. Where recommended by the American Water Works Association (AWWA) Manual M14.
  - d. Where shown on the Drawings.
2. Backflow shall be controlled by one of the following methods or types of assemblies:
  - a. Air gap (AG)
3. The domestic water system shall be protected at terminations and equipment connections by methods and devices shown in AWWA Manual M14, Table 4-1.
4. Building premises isolation from the Utility shall utilize devices listed in AWWA Manual M14, Table 4-2.
5. Backflow prevention products manufactured by Watts, are acceptable provided they meet or exceed test standards of American Society of Sanitary Engineers (ASSE).
6. All new pipes, fittings, and related products must conform to American National Standards Institute/National Sanitation Foundation ANSI/NSF Standard 61 (including Annex G) and must be certified by an organization accredited by ANSI.
7. Underground Systems: Routing and crossing underground water and sanitary lines shall follow rules established by the local authority having jurisdiction for prevention of cross contamination.

K. Relief Valves:

1. Furnish and install relief valves where required and as indicated on the Drawings. Relief valve capacity shall be as required by the applicable code and as scheduled or as shown on the Drawings.

2. Relief valves shall be suitable for the working pressure and temperature of the system in which they are installed. Refer to Section 20 05 02, Design Criteria.
  3. Inlet and outlet piping from the relief valve shall be at least the size of the valve connections unless otherwise indicated on the Drawings.
  4. Liquid relief valves shall be direct spring-loaded type with a cast iron, bronze or steel body and stainless steel or bronze trim, lifting lever, and ASME Unfired Pressure Vessel Code stamp. Valves shall be selected for a maximum overpressure of 10%.
  5. If they comply with these Specifications, relief valves manufactured by Kunkel, Watts, Armstrong or Consolidated will be acceptable.
- L. Solenoid Valves: Cold water solenoid valves shall be similar to ASCO Red-Hat Series 8210, 120/1/60, brass body with Buna "N" Seals and Discs, 150 psi operating pressure. Valves shall be normally open or normally closed as called for in drawings.
- M. If it complies with these specifications, valves manufactured by one of the manufacturers listed above will be acceptable.



### 2.3 SERVICE WATER METERS

- A. Water meters shall be of the turbine type with magnetic drive and hermetically sealed register. Meter body casting shall be bronze. Trim shall be stainless steel.
- B. Flow shall be straight through the meter at all flow rates. All water measured by the meter shall be recorded on a single totalizing register.
- C. Meters shall meet or exceed AWWA Standard C-701-78 for Class II turbine meters at both normal flow ranges and sustained flow limits and must be approved for potable water use by the City Water Department. Meters shall be certified compliant with NSF61 Annex G, and shall comply with NSF61 Annex F.
- D. Meter shall be installed in accordance with the manufacturer's written recommendations. Provide a minimum of seven (7) pipe diameters of straight pipe immediately in front of the meter assembly and a minimum of five (5) pipe diameters of straight pipe immediately downstream of the meter assembly. Throttling valves, control valves, check valves, backflow preventers, or pressure reducing valves shall not be installed upstream of any domestic water meter regardless of pipe separation. Reducer connections to water meter assemblies where used shall be of the tapered concentric type. Reducing flanges and eccentric step-type reducers are unacceptable.
- E. Meters shall be furnished for various locations as noted below and shall be approved equal to the Sensus Model numbers listed:
  1. Main Domestic Water Service: Neptune HP Turbine (flanged connections).
  2. Cooling Tower Make-up: Neptune HP Turbine with flanged ends and 3" bronze strainer.
  3. Cooling Tower Blowdown: Neptune HP Turbine with flanged ends and 2" bronze strainer.



- F. Manufacturers: If they comply with these Specifications, water meters manufactured by Hersey, Sensus, Badger, Neptune, or an approved equal will be acceptable.
- G. Remote Readout: Provide one (1) water meter remote readout at location indicated on the Drawings. Architect to detail minimum 6" x 6" x 2" deep weatherproof enclosure suitable for installation of remote readout.
- H. Provide pulse to D.C. converter with 4-20 mA output proportional to flow rate for remote monitoring by the Building Control and Automation System (BCAS).

## 2.4 SANITARY SOIL WASTE AND VENT PIPING

- A. Below Ground: All underground waste and vent piping, including turns to the vertical to 12" above the grade floor slab, shall be constructed of service weight (SV) hub and spigot cast iron soil pipe and fittings (ANSI A.112.5, ASTM A74) with positive sealing neoprene gasket (ASTM C-564) joints. Gaskets shall be installed using "Lubrifax" lubricant/sealant. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute  and listed by NSF<sup>®</sup> International. Pour concrete thrust blocks at all below grade turns and offsets for waste piping 6" and larger.
  - 1. PVC Option: At the contractor's option, PVC pipe may be provided underground under the building floor slab. Provide schedule 40 PVC (ASTM D-2241, ASTM D-1785) with socket fittings and solvent welded connections. Bedding for PVC piping shall be in accordance with the requirements of ASTM D2321 to limit deflection of the pipe wall.
- B. Above Ground: Horizontal and vertical waste and vent stacks above grade shall be service weight (SV) hub and spigot cast iron pipe and fittings (ANSI A.112.5, ASTM A74) with positive sealing neoprene (ASTM C-564) gasket joints. Gaskets shall be installed using "Lubrifax" lubricant/sealant. All horizontal stack offsets shall be joint-strapped and supported using riser clamps and threaded rod. For 4" and 6" hubless piping, Contractor may use Holdrite 117 Series No Hub Fitting Restrainer in lieu of clamps and rods. Use hubless service weight cast iron (CISPI-301) pipe, fittings, and joints (ASTM C1540-20/ASTM C-564) on piping 6" and smaller. Couplings for hubless pipe shall be heavy-duty shielded couplings as defined in ASTM C1540 with a minimum of four clamps. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute  and listed by NSF<sup>®</sup> International. Arrange piping to eliminate joints in telephone and electrical rooms wherever possible. If joints must be made in these rooms, make up all hubless joints in telephone and electrical equipment rooms with "Lubrifax" joining material.
- C. Horizontal and vertical fixture and vent manifolds shall be connected with "No-Hub" cast iron soil pipe and fittings (CISPI-301) assembled with Stainless Steel No-Hub Coupling Assemblies meeting ASTM C1540-20 having a minimum of four clamps per coupling.
- D. Slope all waste and vent piping in accordance with local codes.
- E. This contractor shall be responsible for providing and connecting Mechanical Equipment condensate drains, drain receptacles and receptacle piping to the sanitary sewer system.

- F. Provide and install all cleanouts indicated and/or required by local codes.
- G. Cast iron pipe shall be as manufactured by Tyler Pipe, or Charlotte Pipe and Foundry.

## 2.5 GREASE TRAPS AND SAMPLING WELLS

- A. Furnish and install grease traps and sampling wells as shown on the drawings and required by local authorities. Grease traps and sampling wells may be pre-cast or cast-in-place concrete. Coordinate forming and pouring or purchase and setting of grease traps with the General Contractor. Grease trap shall be manufactured by Park Equipment Company, Hydro Recycle, or an approved equal.

## 2.6 STORM WATER PIPING - BUILDING

- A. Below Ground: All underground storm water piping including turns to the vertical to 12" above the grade floor slab, shall be constructed of service weight (SV) hub and spigot cast iron soil pipe and fittings (ANSI A.112.5, ASTM A74) with positive sealing neoprene gasket (ASTM C-564) joints. Gaskets shall be installed using "Lubrifest" lubricant/sealant. Hubless service weight cast iron (CISPI-301) pipe, fittings and joints meeting ASTM C1540-20 may be used on all piping 10" or smaller. Couplings for hubless pipe shall be heavy-duty shielded couplings as defined in ASTM C1540 with a minimum of four clamps. Pour concrete thrust blocks at all below grade turns and offsets for storm piping 6" and larger.
  - 1. PVC Option: At the contractor's option, PVC pipe may be provided underground under the building floor slab. Provide schedule 40 PVC (ASTM D-2441, ASTM D-1785) with socket fittings and solvent welded connections. Bedding for PVC piping shall be in accordance with the requirements of ASTM D2321 to limit deflection of the pipe wall.
- B. Above Ground: All storm drainage piping above ground within the building shall be service weight (SV) hub and spigot cast-iron pipe and fittings (ANSI A.112.5, ASTM A74) with positive sealing neoprene gasket joints (ASTM C-564). Gaskets shall be installed using "Lubrifest" lubricant/sealant. All horizontal stack offsets shall be joint-strapped and supported using riser clamps and threaded rod. For 4" and 6" hubless piping, Contractor may use Holdrite 117 Series No Hub Fitting Restrainer in lieu of clamps and rods. Use hubless service weight cast iron (CISPI-301) pipe, fittings, and joints (ASTM C1540-20/C-564) on piping 6" and smaller. Couplings for hubless pipe shall be heavy-duty shielded couplings as defined in ASTM C1540 with a minimum of four clamps. Arrange piping to eliminate joints in telephone and electrical rooms wherever possible. If joints must be made in these rooms, make up all hubless joints in telephone and electrical equipment rooms with "Lubrifest" joining material.
  - 1. Grooved Galvanized Carbon Steel Option: At the contractor's option, grooved galvanized carbon steel pipe may be provided for the horizontal and vertical waste and vent above grade. Couplings shall be Victaulic 107/177 for 2" to 12" or Victaulic AGS W07/W77 for 14" and larger. Grooved fittings are allowed. Victaulic flexible couplings may be used in approved locations to accommodate for pipe movement such as expansion/contraction, vibration, or pipe offsets.

- C. Provide and install all cleanouts indicated and/or required by local codes.
- D. Cast iron pipe shall be as manufactured by Tyler Pipe, Charlotte Pipe and Foundry, or MWI Cast Iron Products.

2.7 PLUMBING PIPING HANGER SPACING

- A. Maximum spacing between piping hangers shall be in accordance with the following table:

SIZE OF PIPING	DISTANCE BETWEEN SUPPORTS	
	COPPER/GALVANIZED STEEL	CAST IRON/GLASS
3/4"	6'	5'
1"	7'	5'
1-1/4"	8'	5'
1-1/2"	9'	5'
2" AND LARGER	10'	5'

- B. Supports shall be arranged so as to be near the weakest point of the span such as joints, turns and at the base of all vertical to horizontal offsets and at all waste traps.

2.8 CHASE AND WALL PIPING SUPPORTS

- A. All piping whether sanitary or water shall be rigidly installed in all chases or walls.
- B. Support inside the chase or wall for Sanitary Waste and Vent Piping shall be accomplished by utilizing fixture carrier bolt-downs, "UNI-STRUT" or similar structural bracing system, "U-bolts", nuts and lock-washers, all bolted to the floor and to the piping system.
- C. Support for Water Piping or other similar service piping shall be accomplished by using a "system" designed for that purpose. An approved system shall consist of preformed steel supports which shall be installed between studs or joints and preformed nonmetallic pipe holder inserts which are designed to rigidly support or hold the piping to the steel supports.
- D. In no case shall Sanitary Sewer Waste or Vent Piping depend on blocks, brick, stone or wood sleepers for its final support. In no case shall Water Piping or similar service piping depend on its final support on "tie-wires", soldering or brazing to metal studs or joints.
- E. Support system shall be as manufactured by "HOLDRITE" or an approved equal.

## 2.9 DRAIN PANS

- A. Furnish and install galvanized sheet metal drain pans under piping where shown on the Drawings and under all domestic water, waste, and storm drain piping installed in the ceiling space in the following locations:
1. Utility Company Transformer Vault
  2. Electrical Rooms
  3. Telephone Equipment Rooms
  4. IDF Rooms
  5. Audio/Visual Equipment Rooms
  6. Food Preparation Areas
  7. Food Serving Areas
  8. Food Storage Areas
  9. Intensive Care Rooms
  10. Imaging Rooms
- B. Drain pans shall be 3" deep, minimum 16-gauge galvanized steel with watertight solder joints. Drain pans shall be 3" wider in each dimension than the piping protected and shall be chain suspended. Pans shall be cross-broken or sloped to a 1/2" coupling welded to the pan for drain line connection.
- C. Route 1/2" copper or galvanized steel drain lines from each drain pan and terminate through the ceiling in "tell-tale" fashion above the nearest general use plumbing fixture. Drain pan and "tell-tale" locations shall be shown on the Record Drawings. A chrome escutcheon shall be provided where the drain line passes through the ceiling.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Submittals shall include, but not be limited to, the following:
1. Cut sheets for the following plumbing products:
    - a. Domestic water pipe, fittings, solder, etc.
    - b. Valves
    - c. Backflow preventers
    - d. Water meters
    - e. Sanitary soil waste and vent pipe and fittings
    - f. Sanitary soil waste and vent piping joint material
    - g. Storm water piping and fittings
    - h. Storm water piping and joint materials
    - i. Grease traps and sampling wells
    - j. Oil separators
    - k. Chase and wall pipe supports
    - l. Drain pans
  2. Piping fabrication drawings.

3. Additional information as required by Section 20 05 03.
4. Grooved products shall be shown on drawings and product submittals and shall be specifically identified with the applicable style or series number.

### 3.2 INSTALLATION

- A. General: Route all piping parallel or perpendicular to building lines. Grade piping for drainage and install hose connection drain valves at all system low points.
- B. Copper Pipe: All copper water piping shall be completely isolated from metal hangers, metal studs or any other electrically conductive building components. Provide dielectric unions at all connections between copper and galvanized pipe.
- C. CPVC Pipe: At the contractor's option the use of CPVC piping as a contractor's option for domestic water systems shall be approved prior by the engineer of record and shall be installed using the Victaulic PSG-300 grooved CPVC couplings, fittings and valves in accordance with the manufacture's requirements and specifications herein. Solvent welded or other joining methods shall not be allowed.
- D. Manufacturer's Instructions: Install all materials in accordance with the manufacturers written installation instructions.
- E. Domestic water piping shall be hydrostatically tested at 1.5 times system design pressure as specified in Section 22 05 93.
- F. Refer to Section 20 05 05 for domestic water pipe cleaning and sterilization.

### 3.3 CLEANING AND ADJUSTING

- C. This Contractor shall furnish all labor, tools, instruments and supervision required in the performance of all tests as specified in Section 22 05 93. All fixtures shall be cleaned and in good working order at project completion.

**END OF SECTION**

**SECTION 22 42 10**  
**PLUMBING FIXTURES AND TRIM**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Design Criteria - Section 20 05 02
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05
  - 5. Scope of Work - Section 22 05 01
  - 6. Startup, Testing, Adjusting, and Balancing - Section 22 05 93

**1.2 SCOPE**

- A. General: Furnish and install plumbing fixtures as shown, scheduled, specified, and required. Fixtures shall be water conserving type complete with carriers, trim brass, flush valves, seats, stops, and other required accessories as shown, scheduled, specified, and required.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Thermal Insulation - Section 20 07 00.

**1.3 QUALITY ASSURANCE**

- A. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. Fixtures (Water Closets, Urinals, Lavatories):
    - a. American Standard
    - b. Kohler
    - c. Crane
    - d. Eljer
  - 2. Closet Seats:
    - a. Beneke
    - b. Bemis

3. Multi-person Wash Fountains:
  - a. Willoughby
  - b. Bradley
  - c. Acorn
  
4. Faucets:
  - a. Chicago #
  - b. T and S Brass
  
5. Trim (Traps, Supplies, Stops):
  - a. Chicago
  - b. Kohler
  - c. McGuire
  - d. Zurn
  
6. Flush Valves:
  - a. Sloan -- Royal or Regal (186 or 110 series) with vandal resistant trim.
  
7. Water Coolers:
  - a. Halsey Taylor
  - b. Elkay
  - c. Murdock
  
8. Carriers:
  - a. Jay R. Smith
  - b. Josam
  - c. Zurn
  - d. MIFAB
  
9. Stainless Steel Sinks:
  - a. Elkay
  - b. Just
  - c. Franke
  
10. Emergency Showers/Eye Wash:
  - a. Acorn
  - b. Bradley
  - c. Haws
  - d. Speakman
  - e. Western

11. Hose Bibbs and Wall Hydrants:

- a. Interior
  - 1) Chicago
  - 2) T & S
- b. Exterior
  - 1) Acorn Model 8151 or 8156 – Basis of Design
  - 2) Wade
  - 3) Josam
  - 4) Zurn

B. Codes and Standards:

- 1. All materials, fixtures or devices used or entering into the construction of the plumbing system shall be listed for Uniform Plumbing Code (UPC) or shall conform to Alternate Standards recognized as "equal" by the Authorities Having Jurisdiction.
- 2. Trim for all sinks, lavatories, urinals, water closets, and showers, etc., shall comply with ADA and applicable water conservation standards. The force required to operate plumbing fixture controls shall not exceed 5 lb. force.
- 3. Fixture heights shall be required to comply with ADA requirements.
- 4. Shower spray units shall have a non-positive shutoff which complies with ADA requirements.

C. Index Tabs: All lavatory and sink trim in public areas and other high-profile areas shall have chrome-plated or neutral color index tabs. Colored index tabs will not be acceptable in these areas.

D. Lead Free: All components used in fixtures and trim shall be Third Party certified lead free, complying with NSF 372 and the Safe Drinking Water Act, Section 1417, as amended January 4, 2011. Drain systems, tub/shower valves, urinals and water closets are exempt.

## PART 2 - PRODUCTS

### 2.1 FIXTURE CARRIERS

- A. All wall-hung plumbing fixtures shall be supported from floor mounted and bolted carriers. No wall-hung water closet, lavatory, urinal, or sink shall depend upon its support from the vertical building system.
- B. All fixture carriers in the building shall be the product of one manufacturer unless otherwise noted on the drawings. In special instances and with the approval of the Engineer the foregoing may be waived in order to meet special building conditions.
- C. Carriers for wall-hung water closets shall be adjustable.



- D. Carriers for wall-hung lavatories shall be concealed and be constructed of rectangular steel. Where required by details on the Architectural drawings, carriers shall be provided with chrome spacers.
- E. Nipples and couplings on wall mounted water closet carriers shall be ABS, and floor mounted water closet floor flanges shall be galvanized, or cadmium plated.

## 2.2 FAUCET BRASS

- A. The faucet valves on all lavatories, service sinks, millwork sinks, and all other faucet valves with wrist blades shall be 1/4 turn type with a positive metal-to-metal stop. A sample valve shall be submitted if requested.

## 2.3 EXPOSED PIPING

- A. All exposed piping for supply, waste, and vent connections to plumbing fixtures and connected equipment in finished areas shall be polished chrome-plated unless noted otherwise on the Drawings. This shall include piping, fittings, and valves. Polished chrome-plated sleeves may be used over supply, waste, and vent piping provided that the finished installation presents the appearance of a fully chrome-plated system.

## 2.4 HANDRAILS AND GRAB BARS

- A. Handrails and grab bars, where specified shall meet all applicable code requirements, shall be rigidly attached and shall meet all applicable codes.

## 2.5 FIXTURE SCHEDULE

- A. Refer to Plumbing Drawings.

## 2.6 CLEANOUTS

- A. General: Furnish and install cleanouts in piping and at fixtures as shown on the drawings and/or as required by local ordinance. The size of the cleanouts shall be identical with the size of the soil or waste line in which they are placed for 4" and smaller lines. The size of cleanouts in lines larger than 4" shall be 4" in all cases. Coordinate cleanout style, mounting, flange, and clamping ring with the construction and finishes where the cleanout is located. Cleanouts shall be manufactured by Zurn, Jay R. Smith, MIFAB, Watts, or Wade unless otherwise noted, and shall be of the following types:
  - B. (FCO) Floor Cleanout: Cast iron body with round adjustable nickel bronze cover, gasket seal, ABS plug and with carpet marker where required.
    - 1. Jay R. Smith #4020
  - C. (WCO) Wall Cleanout: Cast iron ferrule with lead seal, cast iron plug and round stainless-steel cover plate with center securing screw.
    - 1. Jay R. Smith #4422

- D. (COTG) Cleanout To Grade: Cast iron body with gasket seal, ABS plug and heavy duty cast iron scoriated cover.

1. Jay R. Smith #4220

## 2.7 WALL HYDRANTS AND HOSE BIBBS

- A. (WH-1) Wall Hydrant, Freeze-Proof: All bronze nickel-plated hydrant with integral vacuum breaker and stainless-steel box with full 180 degree door opening.

1. Jay R. Smith #5509-QT, 3/4" inlet.

- B. (HB-1) Hose Bibb, Inside: Polished chrome plated brass wall type with Nidel model 34HF vacuum breaker. Adjustable packing nut with deep stem guard, Teflon impregnated packing and standard "O" size washer. Tee handle.

1. Chicago, 3/4" inlet.

## 2.8 DRAINS

- A. General: Furnish and install drains as shown on the drawings. Drains shall be manufactured by Zurn, Jay R. Smith, MIFAB, or Josam, unless noted otherwise, and must meet the specifications for the particular installation. Roof, area, and trench drains shall be suitable for the type of construction and roofing system at the point of application. Refer to the Architectural Drawings and details for coordination and verification of roofing system construction. Provide funnels on floor drains at all locations where condensate, overflow, relief, seal drain, etc., pipes are routed to and terminated at the floor drain. Size funnels to receive all required drain pipes to be terminated at the drain. Provide extension rings for roof/overflow drains, if required, to accommodate roof insulation depth and ensure proper alignment of drain with roofing surface.

- B. (FD-1) Floor Drain: Zurn Model No. ZN-415-IC with 7" diameter type "B" nickel bronze strainer and inside caulk connection. (If trap primer connection to drain is indicated, use Zurn No. ZN-415-IP with female threaded outlet and No. Z-1023 (IP x NH) trap primer connector with 1/2" tapped primer connection).

- C. (FD-2) Floor Drain: Zurn Model No. Z-566 with a 12" x 12" square painted cast iron half-grate strainer and sediment bucket. In floors with waterproofing membrane, Zurn Z-610 12" x 12" dura-coated cast iron floor drain with sediment bucket, half-grate strainer and combination membrane flashing clamp.

- D. (RD-1) Roof Drain: Cast iron body with cast iron dome strainer, flashing flange/gravel stop combination.

1. Jay R. Smith #1010

- E. (RD-2) Roof Overflow Drain: Cast iron body with cast iron dome strainer, water dam collar.

1. Jay R. Smith #1080

2.9 P-TRAPS, SUPPLIES, ETC.

A. Trim shall be furnished as required for all fixtures. All stop valves shall be loose key. All risers shall be flexible smooth tube type. All P-traps shall be adjustable and have cleanout plugs. All stops, supplies, and traps shall have a finish to match the fixture brass.

B. Adjustable Cast Brass P-Trap with Cleanout Plug:

1. 1-1/4" x 1-1/4":

- a. Kohler K-8898
- b. McGuire 8872
- c. Zurn Z-8700-PC

2. 1-1/4" x 1-1/2":

- a. Kohler K-8895
- b. McGuire 8902
- c. Zurn Z-8701-PC

3. 1-1/2" x 1-1/2":

- a. Kohler K-9000
- b. McGuire 8912
- c. Zurn Z-8702-PC

C. Closet Supply-Loose Key:

- 1. Kohler K-7639
- 2. McGuire 2169-LK
- 3. Zurn Z-8802-CR-LK

D. Lavatory Supply-Loose Key:

- 1. Kohler K-7607
- 2. McGuire H-2165-LK
- 3. Zurn Z-8802-XL-LRLK-PC

2.10 SHOCK ABSORBERS

A. Shock absorbers shall be similar to Watts No. 15 Series. Sizes per Plumbing Drainage Institute recommendations. Shock absorbers manufactured by Zurn, Jay R. Smith, Wade, MIFAB, and Josam shall be acceptable.

2.11 WATER COOLERS

A. To be completely lead free and provided with stainless steel cabinet with 8 gph capacity.

- B. Access panels shall be removable without dismantling the unit.
- C. Provide chair carriers for all drinking fountains/water coolers.
- D. For new water coolers, provide with one water bottle filling station per bank of fountains.
- E. Vandal resistant type with push button dispensers.
- F. In existing facilities, water bottle filling station retrofit kits with filters by Halsey-Taylor and Elkay are acceptable.
- G. Accessible GFCI breaker reset without needing to remove water cooler panels.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Shop drawings submittals shall include, but not be limited to, the following:
  - 1. Fixture, brass, trim, closet seat, flush valve, and carrier cut sheets showing all features, finishes and options.
  - 2. Drain Specialties, Hose Bibbs, Shock Absorbers.
  - 3. Additional items as required in Section 20 05 03.

### 3.2 INSTALLATION

- A. Install and adjust all fixtures in accordance with manufacturers written instructions. Installation heights shall be as shown on the Architectural drawings, as per manufacturer's rough-in instructions, and as required to comply with the ADA. All wall mounted fixtures shall have floor mounted carriers.
- B. Where fixtures mount against wall surfaces, caulk between the fixture and surface with white silicone sealer.
- C. Piping with press fittings shall not be used for hot and cold water stub outs at fixtures. Install a ProPress 90° Elbow (or equal) in the wall and stub out with a threaded brass apple.
- D. Provide access doors for shock absorbers. Coordinate location with Architect.

**END OF SECTION**

**DIVISION**

**HEATING, VENTILATING, AND AIR CONDITIONING INDEX**

<b>SECTION</b>	<b>DESCRIPTION</b>
23 00 00	HEATING, VENTILATING, AND AIR CONDITIONING INDEX
23 05 01	SCOPE OF WORK
23 05 10	HVAC WATER PIPING ACCESSORIES
23 05 25	MISCELLANEOUS EQUIPMENT
23 05 93	START-UP, TESTING, ADJUSTING AND BALANCING
23 21 13	HVAC WATER PIPING
23 21 23	HVAC PUMPS
23 23 00	REFRIGERANT PIPING
23 31 13	DUCTWORK AND SHEET METAL
23 33 10	AIR DISTRIBUTION DEVICES AND DAMPERS
23 34 10	FANS
23 36 00	AIR TERMINAL UNITS
23 41 10	AIR FILTERING
23 62 13	AIR COOLED CONDENSING UNITS
23 64 16	WATER CHILLING UNITS - CENTRIFUGAL
23 64 33	WATER CHILLING UNITS - AIR COOLED
23 65 19	COOLING TOWERS - STEEL
23 73 00	AIR HANDLING UNITS
23 81 26	AIR COOLED SPLIT SYSTEM AIR CONDITIONING UNITS
23 82 16	DUCT MOUNTED COILS

**END OF INDEX**

## SECTION 23 05 01

### SCOPE OF WORK

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Refer to Specification Section 20 05 00 for related required Codes and Standards.
- C. Refer to Specification Section 20 05 04 for related required Schedule of Submittal Data.
- D. Requirements of Division 20 apply to all Work of Divisions 20-28.

##### 1.2 SCOPE

- A. Work Included: The Work includes but is not limited to the following systems, equipment, and services:
  1. A chilled water-cooling system consisting of all items indicated on the Drawings and/or specified herein, such as:
    - a. Water chilling units
    - b. Heat exchangers
    - c. Chilled water pumps
    - d. Chilled water piping
    - e. Water treatment
    - f. Insulation, controls, safety devices, vibration isolation, etc.
  2. A DX cooling system consisting of all items indicated on the Drawings and/or specified herein, such as:
    - a. DX air cooled condensing units
    - b. DX air cooled split system air conditioning units
    - c. Refrigerant piping
    - d. Insulation, controls, safety devices, vibration isolation, etc.
  3. A condenser water system consisting of all items indicated on the Drawings and/or specified herein, such as:
    - a. Cooling towers
    - b. Condenser water pumps
    - c. Condenser water piping
    - d. Water temperature controls

- e. Cooling tower make-up water controls
  - f. Water treatment system
4. Roof-top package air conditioning system consisting, or all items indicated on the Drawings and/or specified herein such as:
  - a. Manufacturer's roof curb
  - b. Refrigerant compressors, condenser fan motors, and supply fan motors
  - c. Vibration isolation, refrigerant piping, drains, and coils
  - d. Insulation, controls, accessories, and filters etc.
5. Factory-built air handling units consisting of all items indicated on the Drawings and/or specified herein, such as:
  - a. Chilled water-cooling coils.
  - b. Electric heating coils.
  - c. Hot water heating coils.
  - d. DX refrigerant cooling coils.
  - e. Vibration isolation, housing, blowers, insulation, drain pans with drains, filters, temperature controls, etc.
6. A hot water heating system consisting of all items indicated on the Drawings and/or specified herein, such as:
  - a. Boilers
  - b. Hot water pumps
  - c. Heat exchangers
  - d. Hot water piping
  - e. Heating coils
  - f. Hot water unit heaters
  - g. Water treatment
  - h. Insulation, controls, safety devices, vibration isolation, etc.
7. A steam heating system consisting of all items indicated on the Drawings and/or specified herein, such as:
  - a. Steam boilers
  - b. Steam to hot water exchangers
  - c. Steam and condensate return piping
  - d. Steam heating coils
  - e. Steam unit heaters
  - f. Steam sterilizers
  - g. Water treatment
  - h. Steam humidifiers
  - i. Insulation, controls, safety devices, vibration isolation, etc.
8. Electric heating system consisting of all items indicated on the Drawings and/or specified herein, such as:
  - a. Electric heating coils in HVAC terminal units

- b. Electric duct heaters
  - c. Electric unit heaters
  - d. Electric heating convectors
  - e. Electric cabinet heaters
  - f. Controls, insulation, vibration isolation, etc.
9. Air distribution system consisting of all items indicated on the Drawings and/or specified herein, such as:
- a. Sheet metal ductwork
  - b. Fire Rated Ductwork Systems
  - c. Grilles, registers, ceiling outlets, duct insulation, fire dampers, combination fire/smoke dampers, etc.
  - d. Acoustical treatment of ducts
  - e. Sound absorbing sections
  - f. Duct mounted heating coils
  - g. Fan powered terminal devices with and without heating coils
  - h. Variable air volume terminal devices with and without heating coils
  - i. Constant volume throttling devices
  - j. Dual duct constant volume terminal devices
10. Energy management and automatic temperature control systems (BCAS) consisting of all items indicated on the Drawings and/or specified herein, such as:
- a. Pneumatic control devices
  - b. Electric control devices
  - c. Electronic control devices
  - d. Computer control devices
  - e. Various relays
  - f. Valves, dampers, and sensors
  - g. Pneumatic piping, air compressors, air driers, etc.
  - h. Computer head-end equipment and communications network
  - i. Building Control and Automation System (BCAS)
  - j. Control system wiring
11. Ventilating systems consisting of all items indicated on the Drawings and/or specified herein, such as:
- a. Exhaust fans
  - b. Supply fans
  - c. Gravity ventilation hoods
  - d. Dampers, etc.
12. The mechanical subcontractors shall participate in and assist in the operation of the fire safety ventilation equipment as required during the performance testing and startup of the Division 28 fire detection, alarm and communication systems. Refer to Division 28 Section 28 31 00 titled "Fire Alarm and Communication Systems" for additional requirements.



### 1.3 WORK OF OTHER DIVISIONS

A. The following is a partial list of work not included in Division 23:

1. Electrical connections to motors.
2. Engine-driven generator exhaust silencers, flexible exhaust connectors, ventilated thimbles, and remote fuel storage day tank. Installations of exhaust silencers, flexible exhaust connections, ventilated thimbles, and remote fuel storage day tanks are included in the Work of this Division.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

**END OF SECTION**

## SECTION 23 05 93

### START-UP, TESTING, ADJUSTING AND BALANCING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. HVAC Testing, Adjusting, and Balancing - Section 01 45 23.01
  - 2. Basic Division 20-28 Requirements - Section 20 05 03
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. General Division 20-28 Materials and Methods - Section 20 05 05
  - 5. Scope of Work - Section 23 05 01

##### 1.2 SCOPE

- A. Testing, adjusting, and balancing of all air systems.
- B. Testing, adjusting, and balancing of all hydronic (and steam) systems.
- C. Hydrostatic pressure testing of all pressure piping systems.
- D. Sound measurement of equipment operating conditions.

##### 1.3 RELATED SECTIONS

- A. All Division 23 Sections.

##### 1.4 QUALITY CONTROL

- 1. Refer to Specification Section 01 45 23.01.

#### PART 2 - PRODUCTS (NOT APPLICABLE)

#### PART 3 – EXECUTION

In addition to all items listed in Section 01 45 23.01, the contractor shall perform the following.

##### 3.1 EXAMINATION

- A. Before commencing work, verify that systems are complete and operable to the following extent:

1. Equipment is operable and in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. All air filters are clean and in place. If required, install temporary media in addition to final filters.
5. Correct fan rotation.
6. Fire, smoke, and volume dampers are in place and open.
7. Coil fins have been cleaned and combed.
8. Access doors are closed, and duct end caps are in place.
9. Air outlets are installed and connected.
10. Duct system leakage is below specified level.
11. Hydronic systems have been flushed, filled, and vented.
12. Correct pump rotation.
13. Proper strainer baskets are clean and in place.
14. Service and balance valves are open.

- B. Report any defects or deficiencies noted during performance of services to Architect/Engineer.
- C. Promptly report abnormal conditions in mechanical systems or conditions that prevent system balance.
- D. If, for design reasons, system cannot be properly balanced, report as soon as observed.
- E. Beginning of work means acceptance of existing conditions.

### 3.2 PREPARATION

- A. Provide all material, equipment, and personnel, including factory personnel where specified or required, to fully check out and start up all equipment and systems as specified in accordance with manufacturer's requirements.
- B. No water piping systems shall be "pumped" until all piping has been hydrostatically tested, flushed, cleaned and water treated as applicable.
- C. Lubrication and fluid levels shall be checked prior to equipment start-up. Alignment on all motor driven equipment shall be checked and adjusted prior to start-up.

### 3.3 TESTING PROCEDURES

- A. Tests shall be made during the course of construction as specified and as required by authorities having jurisdiction.
- B. Test submittals shall include a preliminary submittal of all proposed test procedures and recording forms for Engineer's review prior to any testing and four (4) copies of all certified test results and completed reporting forms for approval.
- C. Gas Fired Boiler Safety Testing: Fire each gas-fired boiler make sure all safety devices are functioning properly. Run up temperature and pressure to relief valve settings and make them relieve pressure and shut off gas valve. Do not raise arm on relief valve for

checking. Make sure all other safety devices for gas fired appliances and air conditioning equipment are functioning properly and fail safe.

- D. Vibration Testing: Where a piece of equipment exhibits, in the Engineers opinion, excessive noise or vibration, the service of a certified acoustic Consulting Engineer shall be provided to perform noise and vibration testing on the equipment or system involved. The Consulting Engineer shall provide a written report concerning the noise and vibration of the equipment or system involved and the Contractor involved shall make changes or modifications as recommended by the Consulting Engineer. The above services and retroactive corrections shall be provided at no cost to the Owner or Architect/Engineer.
- E. Hydrostatic Testing: All pressurized piping (not listed herein) shall be leak tested prior to enclosure or cover-up. Piping shall be leak tested for 24 hours under a hydrostatic pressure of 150% of the system design working pressure. The Engineer shall be notified prior to all hydrostatic tests and may elect to witness any of the tests. Water shall not be drawn off of the piping, and the piping shall not be covered up until it has been observed by the Engineer. Care shall be taken to protect any equipment that may be damaged by hydrostatic testing.
- F. Refrigerant Leak Testing: Leak test and check refrigerant systems at final acceptance and at the end of the warranty period. Repair any leaks found and properly charge affected systems with refrigerant. Ensure refrigerant systems are properly charged and free from leaks at final acceptance and at the end of warranty (1 year from final acceptance).
- G. Water Testing: Provide water analysis and testing as specified in Section 23 25 10.
- H. Fire, Smoke and Fire/Smoke Damper Testing: Provide fire, smoke and fire/smoke damper testing and certification as specified in Section 23 33 10.
- I. Fire Alarm System Interface: Provide testing, in conjunction with the Fire Alarm System functional testing specified in Section 28 31 00, to verify that all Fire alarm related HVAC control functions and shutdowns operated as specified in Section 23 09 16, Division 28, and as shown on the drawings.
- J. Duct Leakage: Medium pressure low velocity duct: Duct leakage shall be tested and shall be less than 2% of the duct system flow up to 4" W.G. maximum duct pressure. Ductwork failing this test shall be reworked, resealed, and retested by this Contractor until it passes this test.
- K. Air Balance: Upon completion of the installation of air system components, the outside, supply, exhaust and return air volume for each air handling unit, supply fan and exhaust fan; and the supply, exhaust or return air volume for each air distribution device shall be adjusted to within 5% of "design" air flow. The amount of air indicated on the drawings through ceiling outlets etc. includes a 5% allowance for duct leakage. "Design" air-flow is thus 95% of the value indicated on the drawings. Air handling unit and fan volumes shall be adjusted by changing fan speed and adjusting volume dampers associated with the unit.

- L. Air Distribution Device Volume shall be adjusted using the spin-in tap damper for flexible duct connected devices and/or the device OBD for duct connected devices. Air distribution devices shall be balanced with air patterns as specified. Duct volume dampers shall be adjusted to provide air volume to branch ducts where such dampers are shown.
- M. Water Balance:
1. After initial start-up of the chilled water, condenser, and heating hot water systems, each system shall be balanced to provide proper water volume from all pumps and through all loops, heat exchangers, coils, bypass links, and cooling tower cells to within 5% of the volume shown on the drawings.
  2. The balanced position on all valves shall be permanently marked in the valve body insulation.
- N. Automatic Temperature Control Adjustment: Adjust and calibrate all thermostats, dampers, operators, controllers, and other devices, as required to put the Temperature Control system in proper working order as designed and specified.
- O. Completion Reports: Before the final inspection, but after all testing, balancing and adjusting, the Contractor shall furnish all labor, materials and devices necessary to prepare a completion report with the following information.
1. Motor data on all motors installed on the project. Motors shall be listed by the device on which they are installed, and information provided shall include:
    - a. Horsepower
    - b. Speed
    - c. Type
    - d. Location
    - e. Rated full load amperage
    - f. Rated voltage
    - g. Actual measured amperage for each leg
    - h. Actual measured voltage for each leg
  2. Belt and drive data for all belt-driven equipment installed on the project. Data shall be listed by the device on which the belts and drive are installed, and information provided shall include: number of belts, size of belts, size and type of drive installed, motor RPM and driven device RPM.
- P. IAQ Testing (LEED Projects): Provide IAQ Testing in accordance with USGBC requirements for the Indoor Air Quality Assessment Credit.

**END OF SECTION**

## SECTION 23 31 13

### DUCTWORK AND SHEET METAL

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. Schedule of Submittal Data - Section 20 05 04
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Scope of Work - Section 23 05 01
  - 5. Start-up, Testing, Adjusting, and Balancing - Section 23 05 93

##### 1.2 SCOPE

- A. General: Furnish and install all round and rectangular ductwork, flexible duct, hangers, supports, sleeves, flashings, vent flues and all necessary accessories as shown on the Drawings and as specified herein.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Thermal Insulation - Section 20 07 00
  - 2. Air Distribution Devices and Dampers - Section 23 33 10
  - 3. Sound Attenuators - Section 23 33 19
  - 4. Air Terminal Units - Section 23 36 00
  - 5. Air Filtering - Section 23 41 10

##### 1.3 QUALITY ASSURANCE

- A. Codes and Standards:
  - 1. Ductwork shall be constructed in accordance with construction requirements specified in the 2005 SMACNA Edition 3 of "HVAC Duct Construction Standards", except where SMACNA requirements are exceeded in these specifications.
  - 2. Kitchen hood and dishwasher hood exhaust ductwork - NFPA 96.
  - 3. Laboratory hood and chemical fume exhaust ductwork - NFPA 45.

## PART 2 - PRODUCTS

### 2.1 SYSTEM REQUIREMENTS

#### A. System Class:

1. All Ductwork upstream of air terminal units shall be constructed for static pressure class based on scheduled external static pressure from applicable air handling unit schedule. Material shall be 2500 FPM Class galvanized steel of "lock forming" quality unless otherwise noted.
2. All ductwork downstream of air terminal units, Multizone supply ductwork, and single zone air handling unit supply ductwork shall be built to +1" W.G., 2500 FPM Class Standards, unless noted otherwise on fan schedule. All +1" Class ductwork shall be constructed of "lock forming quality" galvanized sheet metal with a minimum gauge not less than that shown in SMACNA Standards.
3. All return and exhaust ductwork shall be built to -2" W.G., 2500 FPM Class Standards, unless noted otherwise on fan schedule.

### 2.2 GENERAL CONSTRUCTION

- A. All ductwork shall be constructed of G60 coated galvanized steel of ASTM Standards A653 and A924 grades.
- B. Minimum gauge of any ductwork, round or rectangular, shall be 26 gauge.
- C. The interior surface of all ductwork shall be smooth with no sheet metal or other parts projecting into the air stream. All seams and joints shall be external. The inside of all ductwork shall be thoroughly cleaned, and all fans operated to remove any debris prior to connection of air distribution devices.
- D. All ductwork dimensions on the Drawings are clear inside dimensions. Refer to Section 20 07 00 for ductwork liner and insulation.
- E. All flexible round take-offs to Air Distribution Devices shall be made with a spin-collar with integral manual volume damper. Spin-ins shall be installed with their damper axis parallel to air flow.
- F. Ductwork Leakage: Maximum allowable ductwork leakage, as a percentage of air system volume, shall be 2%.
- G. Ductwork Sealing:
  1. All transverse duct joints, longitudinal seams and duct wall penetrations shall be sealed regardless of duct pressure classification.
  2. Sealer shall be rated by manufacturer and shall be suitable for use at the system static pressure classification of the ductwork applied.
  3. Ductwork sealant shall be Hardcast "Versa-Grip 181" or approved equal. Sealant shall be suitable for use indoors and outdoors. Sealant shall be water based. Sealant shall have a flame spread rating of 25 or less and a smoke

- developed rating of 50 or less. Sealant shall be listed in accordance with UL 181A or UL 181B, as required in the International Energy Conservation Code.
4. Duct sealant shall be applied per manufacturer's instructions. Minimum drying time shall be allowed per manufacturer's instructions. Additional time for drying shall be allowed in climates where temperature and humidity may affect the curing of the sealant. Sealant shall be allowed to completely dry and harden before air is circulated through the ductwork.
  5. The use of duct tape for sealing of metal ducts is prohibited unless the tape is part of, and used, in conjunction with a multi-part sealing system (i.e., adhesive, tape, coating, etc.).

### 2.3 RECTANGULAR DUCTWORK

- A. Transverse Bead: Transverse bead all flat surfaces which are more than 12" wide. Transverse beading shall be on 12" centers and shall be minimum of 1/8" deep at the center of the bead and 3/8" wide at the base of the bead. Do Not cross-break negative pressure ductwork.
- B. Longitudinal Seams: All longitudinal seams shall be "Pittsburgh Lock" or Button Punch Snap Lock at corner seams and Grooved (ACME) Seam or Seam Welded in sides between corners.
- C. Transverse Joints: All transverse joints and intermediate reinforcement shall be as shown in SMACNA Tables 1-4 through 1-9, and Figure 1-4 with Drive Slip connections (reinforced or un-reinforced as required) on the short sides and hemmed "S" slip connections (reinforced or un-reinforced as required) on the long sides. "S" and drive connectors are acceptable for use on ducts with pressure classification of  $\pm 1$ " w.g. (maximum). At the Contractor's option, transverse joints may be transverse duct connectors by one of the following manufacturers. The proposed gasket material, flange, corner piece, and connection details shall be submitted for review.
  1. Transverse Duct Flange (TDF or TDC)
  2. Ductmate EP12/11 prefabricated galvanized "Ductmate" sections
  3. MEZ Industries 140 Series transverse duct connectors
  4. Exanno (Nexus)
  5. Ward Industries, Inc.
- D. Plenums: Sheet metal plenums shall be constructed and reinforced in accordance with SMACNA Standards. Where plenums are connected to louvers, the Plenum bottom shall be watertight, sloped and sealed to drain water to the outside face of the building through the face of the louver.
- E. Support: All ductwork supports shall be per Table 4-1 of the SMACNA manual with all supports directly anchored to the building structure. Supports shall be on maximum 8'-0" centers with additional supports as required to prevent sagging.
- F. Fabric Connections: Flexible duct fabric connections shall be installed on the inlet and outlet connections to all powered air moving equipment not connected with flexible duct attached directly to inlet or discharge plenum. A minimum of 1" of slack shall be allowed in all flexible connections to ensure vibration isolation. Flexible fabric shall be a



minimum of 3 inches wide with "Grip-Loc" seam to 24-gauge galvanized metal side connectors a minimum of 3 inches wide each. Flexible connections are to be fabricated with Duro Dyne Excelon "Metal-Fab" vinyl coated 22 oz. nylon with 24-gauge galvanized iron side connectors or "approved equal". Provide UV rated connections where exposed to sunlight.

- G. Splitter Dampers: Install manual splitter dampers in splits and branch take-offs in all constant volume air flow systems, and where shown on Drawings. Splitter dampers shall be minimum 16-gauge galvanized sheet metal and shall be 3/4 of the width of the smallest take-off but no less than 6" long. Dampers shall have 1/8" of clearance to the duct in which they are installed. Splitter dampers shall be controlled by one or more control rods. Where splitters are in concealed inaccessible locations, submit proposed control rod details for approval.
- H. Transitions: Ductwork transitions and offsets shall be constructed in accordance with Fig. 2-7 of the SMACNA manual.
- I. Branch Taps: Branch taps, including taps to terminal units, shall be 45° entry expanded taps and shall be in accordance with Fig. 2-6 of the SMACNA manual. Taps to terminal units may be Flexmaster STO side takeoff fittings. Dovetail joints on round taps are not permitted. All branches in constant volume systems and branches in ducts downstream of air terminal units shall be equipped with balancing dampers.
- J. Turning Vanes: Turning vanes shall be installed where shown on the Drawings and in all abrupt elbows and bends greater than 45°. For ducts less than 12" in height, single vane blades may be installed. For ducts 12" high and above, double airfoil blades shall be used. Turning vanes shall be constructed in accordance with Figures 2-3 and 2-4 of the SMACNA manual.
- K. Radius Elbows: Radius elbows shall be used where shown on the Drawings and may be used for all 45° and 90° elbows if they fit in the available space, and all elbows 12" and smaller. Radius elbows shall be constructed in accordance with Figure 2-2 of the SMACNA manual.
- L. Weather Exposed: Ductwork that is exposed to weather shall be painted with a suitable epoxy coating. Sections shall be joined using Ductmate or TDF joining method, no substitutes.

#### 2.4 LOW VELOCITY ROUND DUCTWORK (BRANCH RUN-OUTS)

- A. Rigid round low pressure, low velocity ductwork material, gauge, transverse joints and longitudinal seams shall be in accordance with SMACNA Standards, with the following exceptions:
  - 1. Draw band transverse joints are not acceptable.
  - 2. Minimum duct/fitting gauge shall be 26 gauge.
  - 3. "Adjustable" elbows and fittings are not acceptable.
  - 4. All longitudinal seams shall be "Groovelock".

## 2.5 FLEXIBLE DUCTWORK

- A. General: Flexible duct shall be used where flexible duct connections are shown on the Drawings to air distribution devices and terminal units. Maximum length shall be 4'-0" for terminal units and 5'-0" for air distribution device connections. Where longer runs are required, provide rigid round ductwork.
- B. Flexible Duct:
1. Insulated flexible duct shall be a factory-fabricated assembly consisting of a galvanized steel or spiral aluminum helix.
  2. Inner liner shall be a smooth, airtight CPE film.
  3. Insulation shall be fiberglass with a maximum thermal conductance of 0.167 BTUH/HR/SF/°F at 75°F mean temperature (R Value = 6).
  4. The assembly shall be sheathed in a reinforced metalized Mylar vapor barrier outer jacket with permeance not exceeding 0.17 perms/sf at 1" pressure.
- C. Standards: The flexible duct assembly shall be suitable for a minimum working pressure of +6" w.g. and -4" w.g. and shall be listed Class I Air Duct by the Underwriters Laboratory (UL-181) at a flame spread of not over 25 and a smoke developed rate of not over 50. Ducts shall also comply with NFPA Standard 90A.
- D. Connections: All joints and connections shall be made with 1/2" wide stainless-steel duct clamps or 100% nylon self-locking clamps. Refer to Details on Drawings.
- E. Installation: Flexible ducts shall be supported in such a manner to prevent sags and kinks. Bends in any length of flexible duct shall not exceed a total turning of 90°. Extend insulation and outer jacket over the secured clamp and tape down to the sleeve/collar to maintain vapor barrier integrity. "R-value" of 6 must be maintained through installation. Insulation on flexible duct shall not be compressed.
- F. Manufacturers: If it complies with these Specifications, flexible ductwork of the following types will be acceptable:
1. Thermaflex M-KE
  2. Peppertree Type HM
  3. Or approved substitution
- G. Acoustical Flexible Ductwork: *Core material shall be an acoustical Spun Bond Nylon fabric supported by helically wound galvanized steel. The fabric shall be mechanically fastened to the steel helix without the use of adhesive. The core shall maintain it free area and a centerline radius of 1.0 or better. Flexible ductwork shall be tested in accordance with ASTM E477. The R-value shall be at least 6.0 at a mean temperature of 75°F. The ductwork shall be UL 181 listed, Class 1 air duct and comply with NFPA 90A and 90B.*

1. *Minimum Acoustic Performance*

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
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8" diameter	27	27	32	33	37	33
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2. Acoustical flexible ductwork shall be Flexmaster Type 6MR6 or approved equal.

## 2.6 ACCESS DOORS

- A. Provide Flexmaster "The Inspector Series" - Spin Door for Field Fabrication and Tab Door for Shop Fabrication, or approved equal dual wall, insulated, access doors in ductwork as required for access to fire, smoke and fire/smoke dampers, duct smoke detectors, sampling tubes, humidifiers, hot water coils (one door on each side), and other duct mounted devices. Door size shall not be less than 2" in diameter smaller than the depth of the duct in which it is to be installed.

## 2.7 PROVISIONS FOR LOUVERS

- A. Louvers with 1/2" mesh birdscreen shall be furnished and installed by the General Contractor under another Division. This division shall furnish motorized or gravity control dampers, insulated sheet metal plenums, and duct connections to louvers as required, and where shown on the Drawings. All unused portions of louvers shall be blanked off with 18-gauge galvanized sheet metal and insulated with 1-1/2" rigid fiberglass board insulation.

## 2.8 PARTITION PENETRATION SLEEVES

- A. Provide 22-gauge sheet metal sleeves in all non-ducted air path partition penetrations shown on the Drawings where return air boots (RAB), combination fire and smoke dampers (FSD), fire dampers (FD), etc., are not provided. Coordinate location and size of all partition penetration sleeves with the partition Contractor. Sleeves shall be fabricated with 1/2" flanges, turned out on one end. Sleeves shall extend through wall on both sides.

## 2.9 KITCHEN EXHAUST DUCTWORK

- A. All exhaust ductwork serving kitchen hoods; ranges and ovens shall be fabricated of minimum 18-gauge 316 stainless steel with liquid tight continuous external welds in accordance with NFPA 96-2001 and applicable SMACNA Standards. Access doors of the type, size and spacing required by NFPA and shown on the Drawings shall be provided. No turning vanes, dampers, or other interior intrusions shall be installed in kitchen exhaust ductwork. All changes in direction shall be with radius elbows (centerline radius equal 1.5 x duct width). Slope duct towards hood connections and cleanout points as shown on the drawings. Refer to Section 20 07 00 for insulation of kitchen exhaust ductwork. Coordinate required rated enclosure of kitchen exhaust duct with the General Contractor. Provide rated access doors for installation by the General Contractor at duct access door locations.

## 2.10 STAINLESS STEEL EXHAUST DUCTWORK

- A. Provide stainless steel exhaust ductwork for battery charging rooms, dishwasher exhaust systems, and where shown on the Drawings. Ductwork shall be rectangular or round duct fabricated with minimum 18-gauge 316 stainless steel with liquid tight continuous external welds and shall conform in all respects to NFPA 45 (Current Edition) and applicable SMACNA Standards. Duct shall have access panels on the side of the duct large enough to permit inspection and cleaning at each change of direction and at 20 feet on center for horizontal or vertical runs. Access panels shall be of the same material or gauge as the duct and shall be liquid tight when in place.

## 2.11 ALUMINUM EXHAUST DUCT

- A. Aluminum exhaust duct serving kitchen dishwasher hoods shall be rectangular or round duct fabricated with minimum 14-gauge aluminum with liquid tight continuous external welds and constructed in accordance with applicable SMACNA Standards. Ducts shall have access panels on change of direction and at 20 feet on center for horizontal or vertical runs. Access panels shall be liquid tight when in place. Slope exhaust duct to drain towards hood connections or exhaust grilles for drainage of condensation.

## 2.12 MEDIUM PRESSURE SPIRAL SEAM DUCTWORK

- A. Medium pressure duct shall be round spiral seam sheet metal constructed as specified herein and in accordance with the Second Edition (2005) of SMACNA "HVAC Duct Construction Standards".
- B. Duct and fittings shall be manufactured from galvanized sheet metal outlined in Section 2.02, Paragraph A. All fittings shall be factory fabricated, machine formed and welded from galvanized sheet metal with built-in couplings. The minimum gauge of duct and fittings shall be 26 gauge.
- C. Spiral duct and fittings joints shall be assembled, suspended, sealed, and taped per manufacturer's published assembly and installation instructions. Horizontal and vertical ductwork supports shall be as recommended by the duct manufacturer and shall not have any screws through the ductwork.
- D. Duct cements for use at couplings shall be United Sheet Metal Uni-Weld metal cement or an approved substitute and shall be used per the manufacturer's recommendations. Duct sealer shall be the United Sheet Metal Uni-Cast System, or an approved substitute utilizing an adhesive, tape and coating to obtain a complete duct seal.
- E. Provide standard 90-degree conical fittings connections for branch takeoffs.
- F. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. United McGill
  - 2. Gowco, Inc.
  - 3. GRACO
  - 4. TD Mechanical

## 2.13 HIGH VELOCITY SPIRAL ROUND DUCTWORK

- A. Dust Collector Systems: All ductwork connected to dust collector systems shall be high pressure, high velocity, single wall spiral round ductwork and fittings.
- B. High velocity, high pressure duct shall be round spiral seam sheet-metal constructed as specified herein and in accordance with the Second Edition (2005) of SMACNA "HVAC Duct Construction Standards".
- C. Duct shall be capable of withstanding duct pressures up to 6" W.G. and duct velocities in the 2000-4000 FPM range. Duct leakage in excess of 1% will not be acceptable.
- D. Duct and fittings shall be manufactured from galvanized sheet metal outlined in Section 2.02, Paragraph A. All fittings shall be factory fabricated, machine formed and welded from galvanized sheet metal with built-in couplings. The minimum gauge of duct and fittings shall be 26 gauge.
- E. Spiral duct and fittings joints shall be assembled, suspended, sealed, and taped per manufacturer's published assembly and installation instructions. Horizontal and vertical ductwork supports shall be as recommended by the duct manufacturer and shall not have any screws through the ductwork.
- F. Duct cements for use at couplings shall be United Sheet Metal Uni-Weld metal cement or an approved substitute and shall be used per the manufacturer's recommendations. Duct sealer shall be the United Sheet Metal Uni-cast System or an approved substitute utilizing an adhesive, tape and coating to obtain a complete duct seal.
- G. Provide standard 90° conical fittings connections for branch takeoffs.
- H. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. United McGill
  - 2. Gowco, Inc.
  - 3. GRACO
  - 4. TD Mechanical

## 2.14 DUAL-WALL SPIRAL SEAM DUCTWORK

- A. Exposed Systems: All ductwork exposed within occupied areas shall be spiral round dual wall with internal insulation and perforated inner wall similar to United McGill Acusti-K-27. Finish on duct (painting, etc.) shall be as shown on Drawings.
- B. Round supply air spiral seam dual-wall ductwork shall have a perforated or solid inner liner with 2" thick, 1PCF density fiberglass insulation between the inner liner and the duct itself. At the contractor's option, two (2) layers of 1-1/2" thick, 3/4 PCF insulation compressed to 2". Average thermal conductivity (k - value) shall be not more than 0.23 Btu•In/Hr•SF•°F at 75°F mean temperature. "R" value of insulation shall be a minimum of 8 if installed outdoors or in an unconditioned space, and 6 if installed indoors.

- C. All outer shell materials, gauges, and sealing shall conform to Table 3-2A and referenced publications as noted in the 2005 SMACNA Duct Construction Standards.
- D. Duct and fittings shall be manufactured from galvanized sheet metal outlined in Section 2.02, Paragraph A. All fittings shall be factory fabricated, machine formed and welded from galvanized sheet metal with built-in couplings. The minimum gauge of duct and fittings, internal and/or external wall, shall be 26 gauge.
- E. Spiral duct and fittings joints shall be assembled, suspended, sealed, and taped per manufacturer's published assembly and installation instructions. Horizontal and vertical ductwork supports shall be as recommended by the duct manufacturer and shall not have any screws through the ductwork.
- F. Duct cements for use at couplings shall be United Sheet Metal Uni-Weld metal cement or an approved substitute and shall be used per the manufacturer's recommendations. Duct sealer shall be the United Sheet Metal Uni-Cast System or an approved substitute utilizing an adhesive, tape and coating to obtain a complete duct seal.
- G. Provide standard 90-degree conical fitting connections for branch takeoffs.
- H. The General Contractor shall paint all exposed ductwork, with a color selected by the architect.
- I. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. United McGill
  - 2. Gowco, Inc.

## 2.15 FLUE GAS VENTS

- A. Furnish and install double wall vent flues and accessories for all boilers and water heaters as indicated on the Drawings.
- B. Factory-built flues shall be laboratory tested and listed by the Underwriter's Laboratories, Inc. for use with the specified equipment burning gas or liquid fuels as described in NFPA 211, which produce exhaust flue gasses at a temperature not exceeding 1400°F under continuous operating conditions.
- C. The double wall flue shall have an outer jacket of Type 304 stainless steel 0.025" thick for sizes 6" through 24" and 0.034" thick for larger diameters. There shall be minimum 1" air space between the walls. The inner liner shall be 0.035" nominal thickness for all diameters.
- D. The flues shall comply with all national safety standards and building codes when installed according to the manufacturer's pre-printed installation instructions and the limits of its listing.

- E. Inner pipe joints shall be sealed by use of V bands and RTV Silicone sealant for flue gas temperature up to 600°F. For flue gas temperatures above 600°F, joints shall be sealed with V bands and High Temperature Joint Cement as outlined in the installation instructions supplied by the manufacturer.
- F. Flues extending above the roof shall be terminated as required by local codes or as required by NFPA 211, whichever is more stringent and shall be a minimum of 4 feet above the finished roof with a factory supplied flue cap. Wind bracing or tiebacks shall be provided as required.
- G. The actual design of each vent flue system shall follow the layout shown on the Drawings but shall be completely laid out and calculated by the flue manufacturer to suit actual equipment served, field conditions and thermal expansion considerations. Provide straight sections, elbows, offset, increasers, tees, equipment, connections, supports, drains, ventilated roof thimble/flashing assemblies, stack caps and other required accessories. If recommended by the manufacturer for the proposed installation, a drain section with drain piping and trap shall be provided in vertical stacks.
- H. Flues shall be Model PS as manufactured by Amerivent or Selkirke Metalbestos, or Unit-Stack 1400 Series as manufactured by United McGill Corporation.

#### 2.16 DOUBLE WALL METAL VENTS

- A. Available Manufacturers: Subject to compliance with requirements of applicable codes, provide Type B double wall gas vents as manufactured by Selkirk Metalbestos or acceptable equal.
- B. Double wall gas vents, UL listed for Type B, consisting of an inner pipe of sheet aluminum, and outer pipe of galvanized sheet steel, with the following minimum thickness.

SIZE	INNER PIPE	OUTER PIPE
ROUND, UP TO 6"	0.012"	28 GAUGE
ROUND, 7" TO 18"	0.014"	28 GAUGE

- C. Provide UL labeled tees, elbows, increasers, draft hood connectors, metal cap with bird barrier, adjustable roof flashing, storm collar, support assembly, thimbles, fire stop spacers and fasteners, fabricated of similar materials and design as vent pipe straight sections.

#### 2.17 RADIATION PROTECTION

- A. Provide lead wrap on ductwork penetrating protected partitions of various radiotherapy rooms to meet requirements of the Owner's radiation physicist.

## PART 3 - EXECUTION

### 3.1 SUBMITTAL

- A. Ductwork shop drawings shall be made after job site measurements are made and shall be coordinated with all other trades. Ductwork construction details and materials shall be submitted and approved prior to fabrication of any ductwork. Ductwork submittal shall include ductwork fabrication drawings and submittal data on ductwork specialties and construction details.
- B. Ductwork fabrication drawings shall be drawn to scale on 1/8" or larger scale building floor plans and shall indicate duct sizes, duct material, duct insulation type, locations of transverse joints, fittings, ductwork bottom elevation, offsets, ductwork specialties, fire and fire/smoke dampers and all other information required for coordination with other trades and fabrication of ductwork. All fire and fire/smoke partitions shall be clearly designated on the ductwork shop drawings. Detail drawings for mechanical rooms and air handling unit locations shall be drawn to 1/4" scale.
- C. Duct fabrication drawings shall be coordinated with other trades and building construction prior to submittal for approval, and shop drawings shall be so certified on each drawing.

### 3.2 INSTALLATION

- A. Install all ductwork tight to structure unless otherwise noted. The Mechanical Contractor shall coordinate with all other trades prior to the construction or installation of ductwork.
- B. Install duct mounted sensors and control devices furnished under Section 23 09 16. Furnish and install access doors at each duct mounted control device. Coordinate location of devices and installation requirements with the Automatic Temperature Control Subcontractor.
- C. Install duct type smoke detectors furnished under Division 28. Furnish and install access doors at each sampling tube assembly. Coordinate location of detectors and installation requirements with the Electrical Subcontractor.
- D. Furnish and install access doors at all fire dampers, smoke dampers, and combination fire/smoke dampers.
- E. Ductwork shall be thoroughly cleaned or verified as clean prior to fan startup. Reference Section 20 05 05 for related issues.
- F. Roof mounted duct shall be secured to roof with equipment support curbs as per Section 20 05 02. Refer to 20 05 02 for wind design criteria.

### 3.3 LEAK TESTING

- A. Ductwork constructed to operate at +2" w.g. or greater or -2" w.g. or less shall be leak tested in accordance with the following:



1. Contractor shall test duct for leakage in accordance with the "System Pressure Testing for Leaks" publication by United McGill Corporation apparatus used for testing shall be as noted in referenced publication. Deviations from this shall not be permitted.
  2. Duct systems shall be pressurized to 125% of rated system pressure classification as described in Subsection 2.01 of this Section.
  3. Maximum allowable leakage shall be in accordance with Subsection 2.02 of this Section.
- B. Ductwork constructed to operate at pressures between -2" w.g. and +2" w.g. shall be visually inspected for leakage.
1. Engineer may request ductwork leakage test, in accordance with Paragraph A. of this Subsection, if in his opinion, testing is warranted due to installation of duct systems or information contained in test and balance report.
- C. Ductwork leak testing and/or inspection shall be performed prior to installation of external ductwork insulation.
- D. If requested by the Engineer, Contractor shall schedule duct leakage testing and/or inspection so that it may be witnessed by Engineer.

**END OF SECTION**

## SECTION 23 33 10

### AIR DISTRIBUTION DEVICES AND DAMPERS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. Schedule of Submittal Data - Section 20 05 04
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Scope of Work - Section 23 05 01
  - 5. Start-up, Testing, Adjusting, and Balancing - Section 23 05 93

##### 1.2 SCOPE

- A. General: Furnish and install air distribution devices as shown, scheduled, specified, and required. Devices shall be complete with all required mounting accessories for installation in the actual construction at the installation location.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Ductwork and Sheet Metal - Section 23 31 13

##### 1.3 QUALITY ASSURANCE

- A. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. Air Distribution Devices:
    - a. Krueger
    - b. Metal\*Aire
    - c. Nailor
    - d. Price Company
    - e. Tuttle & Bailey
    - f. Titus
  - 2. Dampers:
    - a. Air Balance, Inc.
    - b. American Warming and Ventilating Company

- c. Greenheck
- d. National Controlled Air
- e. Ruskin Manufacturing Company
- f. Nailor
- g. Flexmaster
- h. Pottorff

## PART 2 - PRODUCTS

### 2.1 AIR DISTRIBUTION DEVICE GENERAL REQUIREMENTS

- A. General: Provide air distribution devices of the size, shape, and type constructed of materials and components and with finishes as specified, scheduled, and shown. Grilles, registers, and ceiling diffusers shall be provided with neoprene or soft felt gaskets. If a manufacturer other than the one scheduled is used, the sizes shown on the Drawings shall be checked for performance, noise level, face velocity, throw, pressure drop, etc., before the submittal is made. Selections shall meet the manufacturer's own published data for the above performance criteria. The throw shall be such that the velocity at the end of the throw in the five-foot occupancy zone will be not more than 50 fpm nor less than 25 fpm. Noise levels shall not exceed those published in the ASHRAE Applications Handbook for the type of space being served (NC level) except none shall exceed NC 35.
- B. Surface Compatibility: Air distribution devices shall have frames fully compatible with the ceiling, wall, and floor surfaces in which they are installed and shall be provided with all required mounting accessories for installation in the actual construction at the installation location. Provide concealed fastening on all surfaces.
- C. Finishes: All ceiling and wall mounted air devices shall have corrosion resistant treated surfaces and be painted white or off-white with baked enamel unless specified otherwise and all air devices shall be the same color. Where the factory finish on all devices is not the same as determined by the Architect/Engineer, the Division 23 Contractor shall be responsible for coordinating field painting of all air devices by the Division 9 Contractor. The Division 23 Contractor shall be responsible for all costs associated with Division 9 field painting of white or off-white air devices. Special color painting of air devices shall be the responsibility of the Division 9 Contractor. The Architect/Engineer's decision on white color compatibility is final. The interior of all perforated plate diffusers shall be painted flat black. All steel components shall be fully phosphatized prior to painting and there shall be no unpainted steel parts.
- D. Ceiling Diffusers: Provide opposed blade volume control dampers with supply air diffusers where diffusers are installed above inaccessible ceilings and where scheduled. Where applicable, provide adapters with diffusers to permit connection to round supply duct. Perforated plate supply air diffusers shall have pattern control blades installed in the diffuser neck unless noted otherwise. Pattern controllers attached to the perforated plate are not acceptable. Provide concealed fastening on all ceiling diffusers. Device neck size shall be as shown on the Drawings.

E. Registers and Grilles: Provide registers that contain a key-operated opposed blade damper operable from the face side where registers are ducted and installed in inaccessible surfaces. Supply air registers shall be of the double deflection type. Return air grilles and registers shall have fixed face blades and match the face of the supply air ceiling diffusers, unless otherwise indicated. Provide concealed fastening for all registers and grilles.

F. High Induction Perimeter Supply/Return Slot Diffuser:

1. Provide slot-type supply/return (where scheduled) diffuser with length and width scheduled or shown on the Drawings. The supply/return diffuser shall be installed above the ceiling and located as indicated on the Architectural and Mechanical Drawings. The perimeter supply linear slot diffusers shall have an internal, fixed, curved, extruded aluminum, aerodynamically shaped outlet designed to provide the maximum amount of induced secondary room air. The return air slot (where scheduled) shall be located so that the supply air pattern will not be affected. The supply air shall be discharged horizontally along the ceiling with a down discharge center section (where scheduled).
2. The diffuser shall be designed, tested, and constructed in a manner so as to comply with the performance criteria and sound level requirements specified hereinafter. Diffuser shall be constructed of at least 24-gauge galvanized steel and shall be reinforced as required. The air volume, length and duct connection size shall be as scheduled or shown on the Drawings. The diffuser manufacturer shall coordinate the attachment, support, tee spacing, and similar features of the diffuser with the ceiling Sub-contractor.
3. The entire assembly shall be tested as a unit at the manufacturer's laboratory. Submit certified copies of the test results to the Engineer for review. The test data shall include AK factors for an Anor velometer, sound data, diffuser static pressure drop, horizontal air throw, and drop for the air supply rates per lineal foot of diffusers indicated below. The test data shall be based on a 55°F air supply temperature, a 20°F temperature differential and an 85°F heating supply air temperature.
4. The diffuser shall be painted flat black on interior surfaces and the exposed surfaces as viewed from below the ceiling system shall be painted flat black.
5. The perimeter ceiling supply/return linear slot diffuser shall be similar to the Titus Model scheduled and detailed on the Drawings and shall be designed to equal or exceed the following performance characteristics:

TITUS NOVA MODEL - N1 (R WITH RETURN SLOT)			
CFM/LIN. FT. DIFFUSER	MAX. DIFFUSER STATIC PRESSURE LOSS – IN. W.C.	THROW @ 50 FPM TERMINAL VELOCITY	NC LEVEL*
30	0.1	7'	LESS THAN 20
50	0.1	12'	LESS THAN 20
70	0.1	17'	LESS

			THAN 20
80	0.13	20'	LESS THAN 25
90	0.16	25'	LESS THAN 30
100	0.18	27'	LESS THAN 35

\*Based on 10 dB room absorption.

## 2.2 AIR DISTRIBUTION DEVICES

- A. Perforated Plate Supply Air Device - Type A: Perforated plate supply air devices shall be aluminum and/or steel construction with an aluminum face and aluminum or steel pans. Frames shall have miter joint corners and steel frames shall be one-piece integral with the back pan. Perforated faces shall have a concealed hinge mechanism such that the plate remains attached to the frame when opened. Diffusers shall incorporate internal pattern control louvers. The use of pattern control devices attached to the perforated plate is not acceptable. Air devices shall have 4-way diffusion pattern unless noted otherwise on the drawings. Metal\*Aire Series 7600, Titus Type PSS-AA, Carnes Model SPFC, or Price Co. Model APDN.
- B. Fire Rated Perforated Plate Supply Air Device - Type A: Perforated plate supply air devices shall be aluminum and/or steel construction with an aluminum face and steel back pan and shall be U.L. listed for use in roof/ceiling assemblies specified for this project. Frames shall have miter joint corners and steel frames shall be one-piece integral with the back pan. Perforated faces shall have a concealed hinge mechanism such that the plate remains attached to the frame when opened. Diffusers shall incorporate internal pattern control louvers. The use of pattern control devices attached to the perforated plate is not acceptable. Air devices shall have 4-way diffusion pattern unless noted otherwise on the drawings. Air devices shall be provided with all required dampers, thermal links and ceramic fiber blankets. Ceramic fiber blankets shall be enclosed in an approved mesh material to allow easy handling of the blankets. Air device shall be supported in accordance with UL requirements. Refer to Radiation Damper requirements herein for additional requirements. Metal\*Aire Series 7600, Titus Type PCS-AB, Carnes Model SPFC, or Price Co. Model APDN.
- C. Perforated Plate Exhaust/Return Air Device - Type B: Perforated plate exhaust and return air devices shall be aluminum and/or steel construction with an aluminum face and aluminum or steel pans. Frames shall have miter joint corners and steel frames shall be one-piece integral with the back pan. Perforated faces shall have a concealed hinge mechanism such that the plate remains attached to the frame when opened. Titus Type PAR-AA, Metal-Aire Series 7000, Carnes Model SPJB, or Price Co. Model APDDR.
- D. Fire Rated Perforated Plate Exhaust/Return Air Device - Type B: Perforated plate exhaust and return air devices shall be aluminum with all steel back pan and shall be U.L. listed for use in roof/ceiling assemblies specified for this project. Frames shall have miter joint corners and steel frames shall be one-piece integral with the back pan.

Perforated faces shall have a concealed hinge mechanism such that the plate remains attached to the frame when opened. Air device shall be supported in accordance with U.L. requirements. Refer to Radiation Damper requirements herein for additional requirements. Titus Type PAR, Metal-Aire series 7500R, Carnes Model SPJB, or Price Co. Model APDDR.

- E. Louver Face Ceiling Supply Air Device - Type C: Louver face square ceiling supply diffusers shall be all aluminum construction with mitered corner frames. The entire grille shall have a factory applied white or off-white baked enamel finish. Air devices shall have 4-way diffusion pattern unless noted otherwise on the drawings. Titus Model TMS-AA, Metal-Aire Series 5800, Carnes Model SFTB, or Price Co. Model ASCD.
- F. Plaque Face Supply/Return Air Device - Type D/E: Plaque face supply air devices shall be aluminum construction with an aluminum face and aluminum or steel pans. Frames shall have miter joint corners and steel frames shall be one-piece integral with the back pan. Plaque face shall extend a maximum of 1/4" below face of diffuser. Air devices shall have 4-way diffusion pattern unless noted otherwise on the drawings. Titus Type Omni-AA, or Nailor AUNI.
- G. Double Deflection Wall Supply Grille - Type F: Wall supply grilles shall be louver face all aluminum construction with 3/4" airfoil front vertical and rear horizontal double deflection blades, mitered frames and an opposed blade balancing damper. Titus 272FS5, or Price Co. Model C22C.
- H. Louver Face Wall Exhaust/Return Air Device - Type G: Louver face wall exhaust/return grilles shall be all aluminum construction with horizontal 45° louvers set down on 1/2" centers, mitered frames and an opposed blade balancing damper where scheduled. Titus Core 4FL Metal-Aire Model RHD, Carnes Model RWNSH, or Price Co. Model 530/F/3.
- I. Sidewall Stair Pressurization Register - Type H: Extruded register with horizontal fixed blade removable core (no vertical adjustable rear blades), key-operated opposed blade volume control and curved gasketed frame with concealed screw fastening. Titus Model 1735, Price Model LBMR/3, Metal\*Aire Series Revers-A-Core 41.
- J. Linear Slot Air Devices - Type I: Devices shall be continuous, extruded aluminum slot diffusers with mitered corners. Diffusers shall have 3/4" slots and shall have steel or extruded aluminum pattern control blades (supply slots only). The pattern control blades shall have a factory applied flat black baked enamel finish. Provide insulated supply air plenums as shown on the Drawings. Titus Type ML-38 (supply slot)/MLR-38 (return slot), Metal\*Aire Model 6075 (supply and return slots), or Price Co. Model SDS 75/SDR 75.
- K. Linear Bar Slot Air Devices - Type J: Linear bar slot air devices shall be continuous, extruded aluminum slot diffusers with mitered corners. Diffusers shall have bars on 1/2" centers with 0° or 15° deflection as scheduled. Provide insulated supply air plenums as shown on the Drawings. Titus CMT-15 (0° deflection)/CMT-16 (15° deflection), Metal\*Aire Series 2000, or Price Co. Model LBP16C.

- L. Tee-Bar Slot Air Devices - Type K: Devices shall be high induction, side inlet slot diffusers with length and neck size as shown on the Drawings. The diffusers shall have an aerodynamically designed, extruded aluminum, Venturi shaped air outlet designed to direct supply air from the ends of the diffuser horizontally across the ceiling and to provide maximum aspiration and entrainment of room air. The supply air shall maintain a ceiling pattern with varying volumes of air to minimum flow. Supply air from the center section shall be in a downward vertical throw pattern. The diffuser shall have a maximum height of 9" and shall be completely supported by two ceiling tees on nominal 2-3/4" centers. The diffuser shall be constructed of minimum 24-gauge non-rusting steel and all surfaces exposed to view below the ceiling shall be painted flat black. Titus Nova N-1-D and N-4-D Series, Price Co. Model TBDV675, or Metal\*Aire Series HPD-DB.
- M. Tee-Bar Slot Air Devices - Type L: Devices shall be high induction, side inlet slot diffusers with length and neck size as shown on the Drawings. The diffusers shall have an aerodynamically designed, extruded aluminum, Venturi shaped air outlet designed to direct supply air from the ends of the diffuser horizontally across the ceiling and to provide maximum aspiration and entrainment of room air and a 2" outside return air slot to draw return air over the back and top of the diffuser to improve induction and minimize outside wall effect. The supply air shall maintain a ceiling pattern with varying volumes of air to minimum flow. Supply air from the center section shall be in a downward vertical throw pattern. The diffuser shall have a maximum height of 9" and shall be completely supported by two ceiling tees on nominal 5-1/4" centers. The diffuser shall be constructed of minimum 24-gauge non-rusting steel and all surfaces exposed to view below the ceiling shall be painted flat black. Titus Nova N-1-DR and N-4-DR Series, Price Co. Model TBDV675R, or Metal\*Aire Series HPDR-DB.
- N. Architectural Linear Supply Slot Diffuser - Type M: Continuous slot diffuser with 1-1/2" slot and "jet throw" pattern controller. Titus "High Throw" Flowbar FL-15-JT, or Nailor Flowline FLV15.
- O. Architectural Linear Supply Slot Diffuser - Type N: Continuous slot diffuser with 1-1/2" slot and "jet throw" pattern controller. Titus "High Throw" Flowbar FL-15-HT, or Nailor Flowline FLH15.
- P. Underfloor Air "Swirl" Supply Diffuser - Type Q: Round swirl diffuser shall be nominal 8" diameter and constructed of high impact polycarbonate plastic, complying with UL Std. 94-5V for flammability. The diffuser shall incorporate a removable dust/dirt collection basket. The diffuser shall incorporate adjustable mounting claps which allow installation from above the floor without removal of the floor panel. Swirl diffuser shall be provided with a flow regulating damper, adjustable without removing core, with visual open/closed indication and adjustable minimum volume stop. Finish color shall be gray. Nailor ANFD or approved equal. Furnished under Tenant Improvement contract.
- Q. Troffer Supply Boots - Type P: Boots shall be low leakage dual outlet type suitable for use with the light troffers installed on the project. Troffer boot inlet neck size shall be as shown on the Drawings. Each troffer boot shall consist of a supply plenum on each side of the light fixture with a cross-over plenum and duct connection. The plenums shall be internally insulated at the factory and shall be factory painted flat black on exposed and inner surfaces visible from below the ceiling. Plenums shall be minimum 24-gauge galvanized steel and shall be airtight, with alignment tabs and a stiffening flange on each

side. The troffer boot manufacturer shall coordinate attachment and design of the troffer boot with the furnished light fixtures such that the troffer and boot combination will direct the supply air horizontally across the ceiling with minimum leakage. Titus LTTI/LPTI Type, Price Co. Model LTL/LP, Metal\*Aire DSI, or listed manufacturer approved equal.

- R. Troffer Supply Boots - Type Q: Boots shall be low leakage single outlet type suitable for use with the light troffers installed on the project. Troffer boot inlet neck size shall be as shown on the Drawings. Each troffer boot shall consist of a supply plenum on one side of the light fixture with a duct connection. The plenums shall be internally insulated at the factory and shall be factory painted flat black on exposed and inner surfaces visible from below the ceiling. Plenums shall be minimum 24-gauge galvanized steel and shall be airtight, with alignment tabs and a stiffening flange. The troffer boot manufacturer shall coordinate attachment and design of the troffer boot with the furnished light fixtures such that the troffer and boot combination will direct the supply air horizontally across the ceiling with minimum leakage. Titus LTTI/LPTI Type, Price Co. Model LTL/LP, Metal\*Aire Series BT, or listed manufacturer approved equal.
- S. Jet Air Diffuser - Type R: Diffusers shall have multiple 15" diameter cylindrical/conical type assemblies capable of delivering either a jet-type air stream or a diffused air pattern depending on their position adjustment. Units shall have directional control capable of directing flow vertically within a 60° arc. Diffusers shall deliver scheduled air flow with maximum 0.10-inch static pressure loss, and group NC less than 35 NC. The contractor shall adjust direction and jet, or diffuse supply air orientation as required to evenly distribute air to the atrium floor area. Provide plenum mounted opposed blade dampers for volume control. Diffusers shall be Anemostat Model DJ or approved equal.
- T. Tee Bar Return Air Boots - Type S: Boots shall be minimum 24-gauge galvanized sheet metal, constructed as detailed on the Drawings. The entire boot shall be painted flat black and shall have an appearance similar to the project supply air slot diffusers when installed. Price Model TBR.
- U. Automatic Supply Air Device - Type T: Automatic supply air devices shall have an 18-gauge steel face panel mounted on an aerodynamically shaped, one-piece, seamless steel back-pan. The exposed surface of the face panel shall be smooth, flat, and free of visible fasteners, and have an aerodynamically shaped, hemmed edge. Finish shall be a thermoset alkyd melamine enamel paint, properly applied. Diffusers shall incorporate an electronic mechanical device variable air volume mechanism to vary the diffuser discharge air opening to adjust supply air volume in response to room temperature. The VAV mechanism shall be a totally self-contained and replaceable module. Controls shall be microprocessor based and shall be normally open on power failure or disruption. Provide one remote hand-held digital display unit for adjustment of temperature setpoints. Titus Zeon series, or approved equal.
- V. Round Supply Air Ceiling Diffuser - Type U: Round ceiling diffusers shall have three (3) round cones and round neck inlets (sizes shown on plans). Diffusers shall have two (2) horizontal discharge settings and 360° discharge pattern. Titus TMR-AA or approved equal.
- W. Louver Face Ceiling Return Air Device - Type V: Louver face square ceiling return diffusers shall be all aluminum construction with mitered corner frames. The entire grille



shall have a factory applied white or off-white baked enamel finish. Titus Model TMS-AA, Metal-Aire Series 5800, Carnes Model SFTB, or Price Co. Model ASCD.

## 2.3 DAMPERS

### A. Fire Dampers:

1. Furnish and install dynamic fire dampers at all locations shown on the drawings and as required. All fire dampers shall be UL labeled as Dynamic Fire Dampers and shall meet all the requirements of the current edition of NFPA 90A and UL Standard 555.
2. Dampers shall be activated by a UL approved fusible link that shall automatically close the damper upon operation. Fusible links shall operate at approximately 50°F above the maximum temperature in the duct system in normal operation, but not less than 165°F. All dampers associated with Life Safety Systems shall have minimum 212°F fusible links. Hinged dampers shall have stainless or cadmium plated spring steel catches. All dampers shall have spring closure to ensure positive shut-off at velocities up to 4000 fpm and pressures up to 4" w.g.
3. Dampers installed in one-hour and two-hour rated assemblies shall be UL rated at one and one-half (1-1/2) hours per UL Standard 555 and shall be Ruskin Type DIBD2 Style B and C, Air Balance Type B or C, National Controlled Air, or listed manufacturer approved equal.
4. Dampers shall be sized so that the free area space is not less than 90% of the connected duct free area space for low velocity, low pressure ductwork and 100% of the connected duct free area space for high velocity, high pressure ductwork. Dampers shall be installed so as to provide a positive barrier to the passage of air when in the closed position. Dampers shall be installed with angle iron frames and slip joint connections per manufacturer's installation requirements and SMACNA Standards such that they are self-supporting in the case of duct destruction due to heat. The installing contractor shall be responsible for coordinating locations that require special sleeves.
5. Provide access doors as specified under DUCTWORK for all internally actuated dampers. Where duct access doors are installed in non-accessible locations, provide ceiling or wall access doors. Label duct access doors "FIRE DAMPER ACCESS" with 1/2" high black stencil letters.

### B. Fire/Smoke Dampers:

1. Furnish and install dynamic fire/smoke dampers at all duct penetrations of smoke partitions, and as shown on the Drawings or required. Dampers shall be multi-blade opposed blade type combination fire/smoke dampers and shall possess a 1-1/2-hour UL label in accordance with UL Standard 555S and shall meet all requirements of the latest edition of NFPA 90A and 101. Dynamic dampers shall be tested and certified in accordance with AMCA Standard 500-89 and shall be leakage Class I, 250°F per UL Standard 555S.
2. Fire/smoke dampers and operators shall be UL listed and labeled in the sizes used on the project and all dampers on the project shall be by the same manufacturer. UL labeling of damper sizes used on the project shall be clearly indicated on shop drawing submittal.

3. Dampers shall be suitable for opening and closing at static pressure up to 4" w.g. and at air velocities up to 4000 fpm. Damper leakage shall not exceed 4 CFM/SF at 1" w.g. or 8 CFM/SF at 4" w.g.
4. All combination fire/smoke dampers shall include an operating shaft which, when rotated, causes the damper to operate between open and closed. Operating shaft and damper combination by any standard electric damper operator having sufficient torque characteristics. Combination fire/smoke dampers shall be Ruskin Type FSD-60 or an approved equal by Air Balance, Greenheck, National Controlled Air, Safe-Air, or other listed manufacturer with 212°F thermal links and rectangular, round, or oval duct connections as required.
5. Each combination fire/smoke damper shall be furnished complete with factory sleeve, damper operator, thermal link, and position indicating end switch factory installed. The installing contractor shall be responsible for coordinating locations which require a special sleeve and N.O./N.C. features. All dampers shall spring closed upon activation of firestats and fusing of fusible links. Fusible links shall be rated for 212°F. Actuators shall be 120 Volt electric two-position type. Damper operators shall be UL listed as fire damper operators, shall bear the appropriate UL fire damper operator label, and shall be rated for continuous operation at 250°F. Damper operators shall have the following configurations:
  - a. Smoke exhaust system applications: Provide normally closed (N.C.) type operators of the power open/spring - return fail closed type that will close the damper upon loss of control power. Provide end switches for positive position indication.
  - b. HVAC system applications: Provide normally open (N.O.) type operators of the power closed/spring - return fail open type that will open the damper upon loss of control power. Provide end switches for positive position indication.
6. All power and control wiring, and relays to interface the controls with the fire detection and alarm systems shall be furnished and installed under Division 28. Dampers shall be installed with angle iron frames and slip joint connections per manufacturer's recommendations and SMACNA Standards such that they are self-supporting in the case of duct destruction due to heat. The installing contractor shall be responsible for coordinating locations which require special sleeves.
7. Provide access doors as specified under DUCTWORK AND SHEET METAL for all internally actuated dampers and for maintenance inspection of all externally actuated dampers. Where duct access doors are installed in non-accessible locations, provide ceiling or wall access doors. Label duct access doors "FIRE-SMOKE DAMPER ACCESS" with 1/2" high black stencil letters.
8. At the Contractor's option, Fire/Smoke Dampers with manual air balancing capability may be used in lieu of Fire/Smoke Dampers and adjacent Volume Dampers.

C. Radiation Dampers:

1. Ceiling radiation type fire dampers shall be installed in all U.L. design assembly fired rated ceilings in strict accordance with manufacturers U.L. listed installation instructions. Ceiling dampers shall conform to U.L. Standard 555C.

2. Provide Ruskin Model #CFD-EC or listed manufacturer approved equal rectangular or round neck, extended collar, fusible link for up to 20-inch diameter round neck or up to 18 x 18-inch square neck, T-bar 24 x 24 face lay-in diffuser. Air device pan shall be minimum of 24-gauge steel as required by U.L.
3. Diffuser pan insulation shall be 1/2" thick ceramic insulation blanket or 3/4" thick mineral wool insulation blanket. Thermal insulation blankets shall be totally enclosed in an approved jacket material to keep fibers out of the plenum return air stream.
4. Damper blades requiring radiation protection shall utilize sheetrock (gypsum board) attached to the blades.
5. Fusible links shall be accessible from the face of the unit in the open or closed position for test and reset purposes. Removal of duct shall not be required to replace fusible links.

#### D. VOLUME BALANCING DAMPERS

1. Balancing dampers shall be provided in all zones of multi-zone air handling units, branch taps to all air devices, and where shown on the Drawings. Except for spin-in type, balancing dampers shall consist of single blade dampers on rectangular duct up to 11" high and opposed blade dampers in ducts 12" and larger. Single blade dampers shall be in accordance with Fig. 2-11 of the SMACNA manual and opposed blade dampers shall be in accordance with Fig. 2-12 of the SMACNA manual. Dampers shall be of the following types:
  - a. Single blade dampers for rectangular duct shall be Ruskin MD35 Single Blade Series or an approved equal.
  - b. Opposed blade dampers for rectangular duct shall be Ruskin MD 35/OB or listed manufacturer approved equal.
  - c. Rigid round duct dampers shall be 26-gauge, G90 galvanized damper blade, 3/8" square damper shaft supported by nylon bearings and DuroDyne KR3 quadrant on an elevated platform. Flexmaster SLBO, or approved equal.
  - d. Spin-in damper fittings serving individual air devices shall be Dace Model SMD. Where regulators are installed on externally insulated ductwork, provide stand-off platforms at least 1/4" higher than the insulation thickness.
2. Damper regulators for concealed accessible applications shall be Young Valcalox 400 series or an approved equal. Where regulators are installed on externally insulated ductwork, provide stand-off platforms at least 1/4" higher than the insulation thickness. Where regulators are required in non-accessible locations, provide access doors or Young or equal extension rods, couplings, 90° gear drives, etc., as required, and Young 301 or approved equal flush mounted remote regulator as directed by the Architect.

- E. Automatic Dampers: See Section "Building Control and Automation System" for requirements, including blank-off and transition provisions. Provide access doors for dampers as required.

F. Backdraft Dampers - Counterbalanced:

1. Furnish and install counterbalanced backdraft dampers where indicated on the Drawings. Each damper shall be sized as indicated on the Drawings and shall be suitable for installation in the mounting arrangement shown.
2. Backdraft damper shall be the heavy-duty pressure relief counterbalanced shutter type similar to Ruskin Type CBS4, or listed manufacturer approved equal as follows:
  - a. Damper frame shall be at least 16-gauge galvanized steel or 16-gauge aluminum. Damper frame shall be of channel construction for ductwork mounting or have a front flange when installed in a wall.
  - b. Damper blades shall be at least 16-gauge galvanized steel or aluminum. Provide individual counterweights on each blade. The damper shall be capable of maintaining static pressures of 0.05 to 0.20 inches w.g. Furnish tie bars constructed of at least 16-gauge galvanized steel or aluminum on damper sections over 24" wide. After damper has been installed, counterweights shall be adjusted to balance the system static pressure as directed by the Engineer.
  - c. Damper blades shall have polyurethane foam, neoprene, or vinyl gaskets glued, riveted, or rolled into blade edges.
  - d. Damper bearings shall be bronze oilite, nylon, or cycoloy.
  - e. Furnish counterbalanced backdraft dampers with No. 1-1/2 mesh aluminum bird screen for rear mounting where counterbalanced backdraft dampers are mounted in outside walls.

G. Backdraft Dampers:

1. Furnish and install backdraft dampers where indicated on the Drawings. Each damper shall be sized as indicated on the Drawings and shall be suitable for installation in the mounting arrangement shown. Backdraft dampers mounted in roof curbs shall be secured to galvanized steel support angles fastened to the curb.
2. Backdraft dampers shall be heavy relief type suitable for wall and duct mounting or installation at a fan discharge. Backdraft dampers shall be similar to Ruskin Type BD2-A1 for face velocities to 1500 fpm and Ruskin Type BD2-A2 for face velocities to 2500 fpm, or listed manufacturer approved equal as follows:
  - a. Damper frame shall be constructed of at least 0.090" thick aluminum or at least 18-gauge galvanized steel. Damper frame shall be on channel construction when installed in ductwork or have a front flange when installed in a wall.
  - b. Damper blades shall be constructed of at least 22-gauge extruded aluminum suitable for face velocities up to 1500 fpm and at least 16 gauge extruded aluminum for face velocities to 2500 rpm. Damper blades shall have neoprene or vinyl gaskets riveted or rolled into the blade edge. Each backdraft damper section shall be furnished with tie bars constructed of at least 16-gauge aluminum. Furnish two tie bars on damper sections over 40 inches wide.
  - c. Damper bearing shall be bronze oilite, nylon, or cycoloy.

- d. Furnish backdraft dampers with 2 x 2 mesh aluminum bird screen for rear mounting where backdraft dampers are mounted in outside walls.
- e. Damper leakage shall not exceed 12 cfm per square foot of damper face area at 0.5 inches w.g. differential.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Shop drawing submittals shall include, but not be limited to, the following:
  - 1. Cut sheets on air distribution devices and dampers showing dimensions, type, construction materials, features, and listing agency details (UL, FM).
  - 2. Performance data on air devices including noise data, throw velocity/distance and pressure drop.

### 3.2 INSTALLATION

- A. General: Install all materials in accordance with manufacturer's written installation instructions, applicable standards, and recognized industry practices.
- B. Location Coordination: Where air distribution devices are installed in acoustical tile and other ceilings, they shall be either centered on tile or ceiling joints as directed by Architect at job site. Coordinate location of all ceiling air devices with Architectural reflected ceiling plans.
- C. Dampers: All fire, motorized and radiation dampers shall be installed in strict accordance with UL listed installation procedures provided by manufacturer.
- D. Balancing Dampers: Install balancing dampers a minimum of three feet (3') upstream of supply diffusers served and three feet (3') downstream of return/exhaust diffusers served.
- E. Testing: Fire, Fire/smoke, and Radiation damper operation shall be tested after installation is complete. Provide written certification of each damper location, type, size, and date tested as specified in Section 20 05 03.
- F. Access Doors: Provide access doors in ductwork and building construction for dampers as required.

**END OF SECTION**

**DIVISION 26**  
**ELECTRICAL INDEX**

<b>SECTION</b>	<b>DESCRIPTION</b>
26 00 00	ELECTRICAL INDEX
26 05 01	SCOPE OF WORK
26 05 07	TESTING
26 05 19	CONDUCTORS
26 05 33	CONDUIT
26 05 34	OUTLET BOXES
26 24 17	CIRCUIT BREAKER LIGHTING AND POWER PANELBOARDS
26 27 26	WIRING DEVICES

**END OF INDEX**

## SECTION 26 05 01

### SCOPE OF WORK

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Refer to Specification Section 20 05 00 for related required Codes and Standards.
- C. Refer to Specification Section 20 05 04 for related required Schedule of Submittal Data.
- D. Requirements of Division 20 apply to all Work of Divisions 20-28.

##### 1.2 SCOPE

- A. Work Included: The Work includes but is not limited to the following systems, equipment, and services:
  - 1. Switchboard, power distribution equipment, power distribution panels, panelboards, residential load centers, individual motor controllers, transformers, SPD systems, etc.
  - 2. A complete system of electrical conductors installed in conduit for electrical service equipment, bussed weatherhead equipment, switchboard, distribution panelboards, panelboards, general equipment, motors, refrigeration equipment, space heating equipment, lighting fixtures, wiring devices, disconnect switches, and special systems.
  - 3. Connection of all motors, equipment, interlocks, interconnections, and other components, including all motor controllers.
  - 4. Lighting fixtures, receptacles, switches, etc. Refer to the Architect for exact location of all these Devices.
  - 5. Lighting and power junction boxes including homeruns, in the unfinished areas.
  - 6. A system of empty conduits and other provisions as required for installation of the telephone system, data system, and fire alarm system shall be provided.
  - 7. If exposed low voltage wires/cables, plenum rated or otherwise, are routed above ceilings, provide conduit raceways where these wires/cables enter or transition mechanical rooms, electrical rooms, or other rooms without ceilings. Exception: telephone and data cables within dedicated MDF, IDF, or server rooms.
  - 8. Place all conduits and boxes in slabs, walls and ceilings in cooperation with other trades.
  - 9. Lightning protection system.

### 1.3 WORK OF OTHER DIVISIONS

A. The following is a partial list of work not included in Division 26:

1. Building Controls shall be furnished and installed under Division 25. Control power for Temperature Control equipment shall be provided by Division 26. Refer to Division 25 for additional requirements.

END OF SECTION



## SECTION 26 05 07

### TESTING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. General Division 20-28 Materials and Methods - Section 20 05 05
  - 3. Schedule of Submittal Data - Section 20 05 04
  - 4. Scope of Work - Section 26 05 01

##### 1.2 SCOPE

- A. All building electrical system additions and new equipment shall be tested and adjusted for proper operation. All faulty equipment and material shall be repaired or replaced. Specified tests requiring submittal of test results are outlined herein and in other sections.
- B. All instruments, materials, personnel, and documentation of test results shall be included in the Work of this contractor.
- C. Provide all testing of the electric system required by the Authorities Having Jurisdiction. Tests shall include but shall not be limited to the items specified herein.
- D. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Conductors - Section 26 05 19
  - 2. Grounding - Section 26 05 26
  - 3. Service Provisions - Section 26 05 44
  - 4. Dry Type Transformers – Section 26 22 13
  - 5. Switchboards - Section 26 24 13
  - 6. Circuit Breaker Distribution Panels – 26 24 16
  - 7. Circuit Breaker Lighting and Power Panelboards – 26 24 17
  - 8. Dual Purpose Docking Stations – 26 25 50
  - 9. Elevator Distribution Equipment – 26 27 29
  - 10. Safety and Disconnect Switches – 26 28 16 16
  - 11. Individual Motor Controllers – 26 29 13

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 SUBMITTALS

- A. Submittals shall include, but not be limited to, the following:
  - 1. Four (4) copies of certified test results for each test indicated herein, for approval and future references.
  - 2. Certifications as required herein.
  - 3. Additional information as required in Section 20 05 03.

3.2 CONDUCTOR TESTS (600 VOLTS OR LESS)

- A. Prior to energizing of all new feeders, test all conductors for continuity of circuitry and for short circuits. No submittal is required for this test. Each wiring system with devices connected must test free from short circuits and grounds.
- B. Each new feeder conductor shall have its insulation resistance tested after its installation is completed except for connection at its source and point of termination.
- C. Test shall be made using a Biddle Megger or equivalent at a voltage of not less than 1000 VDC, and after one minute of operation at slip speed. Resistance shall be measured by connecting one terminal of megger to conductor and other terminal to conduit in which conductor is installed. Reading shall be observed after 15 seconds of operation of the megger.
- D. Conductors which do not meet or exceed the following insulation resistance values shall be removed, replaced, and retested.

WIRE SIZE (AWG)	INSULATION RESISTANCE (OHMS)
NO. 12	1,000 K
NO. 10 THROUGH NO. 8	250 K
NO. 6 THROUGH NO. 2	100 K
NO. 1 THROUGH NO. 4/0	50 K
LARGER THAN NO. 4/0	25 K

- E. Conductor test results shall indicate weather conditions, temperature, relative humidity, date and time, feeder tested, conductor size and type and resistance measurements.

### 3.3 SERVICE SWITCHBOARD GROUND RESISTANCE TEST

- A. Perform a ground resistance test on the switchboard grounding system for comparison of future inspection and testing data by the Owner. Overall system resistance shall not exceed 10 ohms. Eliminate any stray currents, shorts, or non-consistencies in the grounds system.
- B. The test shall be performed using a Biddle Megger Earth Tester or equivalent test instrument and shall not be performed during the 48 hours immediately following wet weather conditions.
- C. Switchboard ground resistance test results shall indicate weather conditions for test, grounding system tested, grounding configuration and test results.

### 3.4 GROUND FAULT PROTECTION SYSTEM TESTS

- A. Factory test: The switchboard ground fault protection system shall be factory tested prior to shipment. The switchboard manufacturer shall provide factory ground fault interlocking and protection system test for circuit testing, and verification of interlocking and tripping characteristics. The manufacturer shall pass predetermined values of current through the relay sensors, and measure the relay tripping time for each phase, and neutral. The measured time/current relationships shall be compared to the relay trip characteristics curves. If the relay trips outside the range of values indicated on the curve, the relay shall be replaced. This test shall include verification of polarity of the ground sensor circuits' interconnection.
- B. Certified "factory test" results shall indicate relay number, device served, actual characteristic curves, design characteristic curves and overall test results.
- C. Field test: Following completion of the construction and prior to final acceptance testing, the ground fault protection system shall be field tested and reset to the manufacturer's recommended setting for both time and current, by a representative of the Manufacturer's Engineering Service Department. The field test shall be conducted in a similar manner to the factory test in that a cable from a low voltage, high-current test set shall be passed through each current sensor. This test shall also demonstrate the complete system reliability in that it must operate the associated shunt trips and show that the overcurrent devices which they operate will actually open.
- D. Certified "field test" results shall indicate relay tested, relay settings, and test results.

### 3.5 ARC ENERGY REDUCING SYSTEM TESTS

- A. Factory test: For equipment requiring Arc Energy Reduction per NEC or per this specification, The Arc Energy Reducing(AER) system shall be factory tested prior to shipment. The manufacturer shall provide factory interlocking and system testing with verification of performance.
- B. Certified "factory test" results shall indicate panel, device served, settings, actual characteristic curves with and without AER system engaged, and overall test results.

- C. Field test: Following completion of the construction and prior to final acceptance testing, the AER system shall be field tested by a representative of the Manufacturer's Engineering Service Department. The field test shall be conducted in a similar manner to the factory test. This test shall also demonstrate the complete system reliability.
- D. Certified "field test" results shall indicate AER system tested, panel name, device served, settings, and test results.

### 3.6 DRY-TYPE TRANSFORMER - LOAD, VOLTAGE AND TAP SETTING

- A. Measure and record load current and voltage on each dry-type transformer, while loaded, to verify proper tap setting. Include tap selection with submittal data.
- B. Transformer test results shall show transformer tested, load current (secondary), input and output voltage, neutral/ground bond verification, and tap setting.

### 3.7 BALANCING OF ELECTRICAL CIRCUITS

- A. The system of feeder and branch circuits for power and lighting shall be connected to panelboard buses in such a manner that loads connected thereto will be balanced on all phases as close as practicable.
- B. Should there be any unfavorable condition of imbalance on any part of the electrical system phase to phase measured on average over 5 business days, the electrical contractor shall make such changes that may be necessary to remedy the imbalanced condition.
- C. Prior to completion of the project, provide a complete list of all panels stating the measured loads on each phase. Test results shall indicate panels tested, amperage per phase, and any remedial action taken.

### 3.8 OPERATIONAL TESTING

- A. Take voltage and currents readings for each feeder and motor circuit under maximum operating conditions. Questionable readings shall be repeated at no cost for confirmation.
- B. Controls for lighting and receptacle circuits shall be demonstrated.
- C. Demonstrate running of motors with controls and interlocks.
- D. Demonstrate operation of electrical equipment appliances.

### 3.9 THERMOGRAPHIC TESTS

- A. Contractor shall provide a thermographic test using an independent testing laboratory. Testing shall apply to, but not be limited to, the following:
  - 1. Switchboards
  - 2. Distribution Panelboards

3. Panelboards
  4. Other electrical distribution devices
- B. After the entire electrical system has been checked and adjusted and is under load but just prior to project completion, equipment and connections shall be subjected to a thermographic test using an infrared temperature scanning unit. Any connections found to have higher temperature than acceptable shall be corrected as required and re-tested.

**END OF SECTION**

## SECTION 26 05 19

### CONDUCTORS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. Schedule of Submittal Data - Section 20 05 04
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Scope of Work - Section 26 05 01
  - 5. Testing - Section 26 05 07

##### 1.2 SCOPE

- A. Furnish and install conductors for all new circuits as shown, scheduled, specified, and required. All conductors for power and lighting shall be installed in conduit.
- B. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Testing - Section 26 05 07
  - 2. Conduit - Section 26 05 33

##### 1.3 QUALITY ASSURANCE

- A. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. Wire and Cable:
    - a. Southwire
    - b. Cerro
    - c. Encore Wire Corporation
    - d. Service Wire
  - 2. Cable Lugs and Termination Fittings:
    - a. T&B
    - b. Burndy
    - c. Ideal
    - d. IlSCO
    - e. Penn Union

- f. Thomas & Betts
3. Pre-Insulated Spring Type Connectors:
- a. Buchanan
  - b. Ideal
  - c. 3-M Scotchlock
  - d. GB

- B. Codes and Standards: All conductors furnished and installed shall comply with the requirements and latest revisions of the National Electrical Code (NEC), National Electrical Safety Code (NESC), and Standards of the Underwriter's Laboratories (UL), National Electrical Manufacture's Association (NEMA), Institute of Electrical and Electronic Engineers (IEEE).

## PART 2 - PRODUCTS

### 2.1 CONDUCTORS

A. General:

1. All feeder and branch circuit conductors shall be soft drawn, annealed copper, having a conductivity of not less than 98% of that of pure copper, and meeting before stranding, the requirements of ASTM B-3, "Standard Specifications for Soft or Annealed Copper Wire for Electrical Purposes", latest edition.
2. Aluminum conductors with type XHHW-2 insulation and AA-8000 series aluminum alloy, compact stranded configuration will be acceptable for conductors larger than #1 AWG where specifically indicated on Drawings.

B. Insulation:

1. No. 10 and Smaller: Unless otherwise specified or noted, all conductors No. 10 and smaller shall be solid copper THHN or THWN-2 with an insulating outer jacket suitable for conductor temperatures of 75°C wet or 90°C dry, except for NEC Class 1, 2, or 3 conductors which may be stranded if terminated as required herein.
2. No. 8 and Larger: Unless otherwise specified or noted, all conductors No. 8 and larger shall be THWN-2/THHN, 600 volts, stranded, with a thermoplastic insulating compound and an outer jacket suitable for conductor temperatures of 75°C wet or 90°C dry, inclusive. Stranded wire shall be terminated as specified herein.
3. High Temperature Areas: In the ceiling areas of equipment rooms where the temperature may exceed 102°F under operating conditions, higher temperature insulation shall be used on conductors. Acceptable types are RHH, THHN, and XHHW.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Shop drawing submittals shall include, but not be limited to, the following:
1. The Contractor shall submit to the Engineer for review, a list of the proposed manufacturers of conductors, cable lugs, cable connectors, and termination fittings listed herein. The Contractor may install wire, cable, cable lugs, cable connectors and termination fittings furnished by any manufacturer listed on the approved submittal.
  2. Cut sheets on all 600-volt conductors with manufacturers name, ratings and capacities, insulation characteristics, and available colors, clearly listed.
  3. Cut sheets indicating all cable lugs, termination fittings and cable connectors.
  4. Cut sheets indicating types of conductor identification bands.
  5. Additional information as required in Section 20 05 03.

### 3.2 INSTALLATION

- A. Mains and feeders are to be run their entire length in continuous pieces without joints or splices, unless otherwise indicated.
- B. Conductors may be run in multiple sizes 1/0 through 750 MCM inclusive, provided all multiple conductors are the same size, length, and type of insulation, and they shall be so arranged and terminated as to insure equal division of the total current between all conductors involved.
- C. All underground feeders shall be type THWN-2.
- D. Home Runs: Except where specifically indicated, provide branch circuit home runs with not more than two different line conductors and a common neutral in a single raceway for 3-wire, single-phase systems, no more than three different line conductors and a common neutral in a single raceway for 4-wire, 3-phase systems. For all ground fault circuits, provide a separate neutral conductor for each GFI breaker. A maximum of nine (9) current carrying conductors are allowed in a single conduit. NEC conduit fill ratio shall not be exceeded. Use home run circuit numbers as indicated for panelboard connections.
- E. For 20 ampere branch circuits operating at 150 volts or less line to neutral, utilize No. 10 AWG wire minimum for the entire branch circuit when the last outlet is in excess of 75 feet of cable length from the panelboard.
- F. For 20 ampere branch circuits operating at 150 volts or less line to neutral, utilize No. 8 AWG wire minimum for the entire branch circuit when the last outlet is in excess of 150 feet of cable length from the panelboard. This minimum requirement applies to general purpose outlets. This requirement shall not apply to dedicated circuits with load less than 10 amps.



- G. For 20 ampere branch circuits operating at 151 to 300 volts line to neutral, utilize No. 10 AWG wire minimum for the entire branch circuit when the last outlet is in excess of 150 feet of cable length from the panelboard.
- H. For 20 ampere branch circuits operating at 151 to 300 volts line to neutral, utilize No. 8 AWG wire minimum for the entire branch circuit when the last outlet is in excess of 300 feet of cable length from the panelboard. This minimum requirement shall not apply to any circuits with load less than 10 amps.
- I. No conductor smaller than No. 12 AWG copper shall be used for power or lighting purposes, including switch legs.
- J. Control circuit conductors may be No. 14 AWG and may be run in the same conduit with power wiring, subject to compliance with control system performance requirements and NEC conductor insulation requirements. No conductor smaller than No. 18 AWG shall be used for control circuits.
- K. Conductors for connection to individual light fixtures in grid type ceilings, using 72-inch-long (max.) by 3/8 inch (minimum) flexible metal conduit fixture-tails, from their associated junction boxes, shall be #14 AWG THHN, 600 volts, solid, with a thermoplastic insulating compound and an outer jacket suitable for conductor temperature of 90°C. MC cable will also be acceptable for this application. Reference conduit section for MC cable requirements.
- L. All conductors in vertical conduits or raceways shall be supported in the manner set forth in the latest edition of the National Electric Code.
- M. Lighting fixtures shall not be used for raceways for circuits other than parallel wiring of fixtures.
- N. On communication and signal systems, minimum conductor size shall be 18 gauge. Multi-conductor PVC insulated, and jacketed cables shall be used unless otherwise noted.
- O. Before any conductor is pulled into any conduit, the conduit shall be thoroughly swabbed in such a manner as to remove all foreign material and to permit the wire itself to be pulled into a clean, dry conduit.
- P. Powdered soapstone, Ideal Yellow 77, or Polywater may be used as a lubricant where necessary.
- Q. Wire pulling lubricant shall not be used when installing branch circuit conductors from panelboards with "isolation" transformers.
- R. All conductors shall be new, unused, in good condition, and shall be delivered in standard coils, packaged, or rolls. Samples of all conductors shall be submitted by the Contractor when requested by the Engineer for the purpose of determining acceptability.

- S. Wire which has been rejected by the Engineer shall not be used again. Decisions as to the quality of the wire furnished, and the acceptance of such wire shall be made by the Owner's duly authorized representative.

3.3 IDENTIFICATION OF 600 VOLT CONDUCTORS

- A. Reference Division 20 for requirements.

3.4 COLOR CODING OF 600 VOLT CONDUCTORS

- A. The color of the insulation of the conductors shall be selected to conform in all instances to the following table. However, if colored insulation is not available, three bands of adhesive-backed colored tape corresponding to the color required by the following table shall be wrapped at every termination or tap of the conductor.

COLOR PHASE TABLE FOR INSULATED WIRE			
PHASE	120V/208V SYSTEM COLOR OF WIRE	120V/240V SYSTEM COLOR OF WIRE	480V/277V SYSTEM COLOR OF WIRE
A	BLACK	BLACK	BROWN
B	RED	ORANGE	PURPLE
C	BLUE	BLUE	YELLOW
NEUTRAL	WHITE	WHITE	GRAY
GROUND	GREEN	GREEN	GREEN

- B. Gray and white colors shall be used only as specified above. All control conductors shall be distinctively color coded, and where run in the same conduit as power conductors, shall be of different colors to the power conductors.

3.5 SPLICES, TAPS, AND TERMINATIONS FOR 600 VOLT CONDUCTORS

- A. Splices and taps on branch circuits shall occur only when such circuits divide and shall consist of one "through" circuit to which the remaining circuit shall be spliced or tapped.
- B. No splices or taps shall be made in any conductor except in outlet boxes, junction boxes, splice boxes, or other devices and equipment in exposed and accessible locations approved for the purpose by the latest edition of the NEC.
- C. All No. 10 AWG and smaller solid conductors shall be spliced with pre-insulated spring connectors. All No. 10 AWG and smaller stranded conductors for NEC Class 1, 2, 3 wiring shall be terminated with AMP "PIDG" UL, listed premium grade insulated fork connectors, or approved equal, and shall be spliced in a junction box with AMP "Plastic-Grip" UL listed standard grade insulated butt splices, or approved equal.
- D. All No. 8 AWG and larger copper conductors shall be connected with high conductivity, wrought copper, color-keyed compression connectors. Compression connectors for all feeders shall be Thomas & Betts Series 54200, or equal, two-hole connectors. Where equipment or devices cannot be provided by the manufacturer to accept two-hole

connectors, T & B Series 54100, or approved equal, single-hole connectors with anti-rotation lug or restraint shall be used. Where equipment or devices cannot be provided by the manufacturer to accept either two-hole or single-hole compression connectors, set-screw type connectors may be used.

- E. All No. 8 AWG and larger copper conductors which are to be spliced or tapped in wireways, gutters, or junction boxes shall be sliced or tapped using hydraulically applied, high conductivity compression connector, T & B 54700 or approved equal, compression taps, and 3-M electrical tape or manufactured connector covers approved for the purpose.
- F. The manufacturer's recommended installing tool shall be used for the installation of all hydraulically applied compression type lugs or connectors. Modifications of connectors are not acceptable.
- G. All bolt and screw connections shall be torqued in accordance with the manufacturer's recommendations. Submittals shall include these recommendations.
- H. Where conductor splices or reducers are specifically noted on the drawings or where specifically approved by the engineer, Polaris #ISR series insulated splicer/reducers shall be used. Contractor shall provide a junction box of suitable size for the splice and associated conductors. Splices shall not be made in equipment enclosures.

### 3.6 FIELD TESTING

- A. Refer to Section 26 05 07 for field testing of 600-volt wire and cable.

**END OF SECTION**

## SECTION 26 05 33

### CONDUIT

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. Schedule of Submittal Data - Section 20 05 04
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Scope of Work - Section 26 05 01
  - 5. Testing - Section 26 05 07

##### 1.2 SCOPE

- A. General: Furnish and install conduit and raceways as shown, scheduled, specified, and required.
- B. Types: The types of conduit and raceways include, but are not limited to, the following:
  - 1. Rigid Steel Conduit
  - 2. PVC Coated Rigid Steel Conduit (Plastibond)
  - 3. Electrical Metallic Tubing (EMT)
  - 4. Aluminum EMT and Rigid
  - 5. Flexible Metal Conduit
  - 6. Liquid-Tight Flexible Metal Conduit
  - 7. High Density Polyethylene (HDPE)
  - 8. Type "MC" Metal Clad Cable
  - 9. Type "MI" Cable (2-Hour Fire Resistive)
  - 10. Type "HCF" Armored Cable
  - 11. PVC Conduit
  - 12. Surface Metal Raceway
  - 13. Underfloor Metal Raceway
- C. Related Sections: Other Division 20-28 Sections contain requirements related to the work of this Section. These may include, but not be limited to, the following sections:
  - 1. Conductors - Section 26 05 19

##### 1.3 QUALITY ASSURANCE

- A. Codes and Standards: Conduit, raceways, hangers, supports, and their installations shall comply with all requirements of the National Electrical Code (NEC).

## PART 2 - PRODUCTS

### 2.1 METAL CONDUIT

- A. Furnish and install metal conduit as specified herein and as indicated on the drawings.
- B. All electrical conductors shall be installed in conduit, or surface metal raceways. Conduit shall be as specified herein. In addition, empty conduit or surface metal raceways shall be installed for the telephone system, and for other systems as indicated on the Drawings and in the Specifications.
- C. For the purpose of this Specification, the term "metal conduit" shall be defined as rigid steel conduit and steel electrical metallic tubing.
- D. Rigid Steel Conduit:
1. Rigid steel conduit shall be used where conduit is underground, in a concrete slab with a vapor barrier, exposed to the weather, in damp or other wet locations, where exposed to view, where subject to physical damage, or in sizes greater than 4" in diameter. Use locator tape 12" above conduits for all underground conduit outside slab area.
  2. All exterior conduit shall be rigid galvanized. Locknuts for exterior applications shall be sealing type.
  3. Conduit shall be joined with threaded couplings and shall be secured in cabinets, outlets, etc., with double locknuts and shall be provided with insulated bushings as manufactured by Crouse-Hines (Midwest), Steel City (Thomas & Betts), Raco, OZ - Gedney, Appleton, Bridgeport Fittings, Myers Electrical Products, Picoma Industries, etc., shall be threaded.
  4. All conduit and fittings shall in all respects, meet the requirements of the latest edition of Underwriters' Laboratories Standards for Rigid Metallic Conduit.
  5. Rigid steel conduit shall be hot-dipped galvanized in accordance with the National Electrical Code - Article 344, inside and out. Full lengths of pipe with threads on both ends or uncouple shall have galvanized or zinc-coated produced to ANSI Specifications C-80.1 and Federal Specifications WW-C-581E and shall carry the Underwriters Laboratories Label.
  6. Rigid steel conduit shall be Allied Tube and Conduit, Wheatland Tube, and Western Tube and Conduit, or approved equal.
  7. Pulling Elbows are to be malleable iron only. Die cast aluminum is not acceptable. Where conduit is required to have epoxy coating, pulling elbows are to be "Plasti-Bond" coated or equal to match.
- E. PVC Coated Rigid Steel Conduit
1. All rigid steel conduit and fittings exposed to extreme humidity such as adjacent to cooling towers shall be Rob Roy "Plasti-Bond", Occidental Coating Co., Perma-Cote Industries, or approved equal.

F. Electrical Metallic Tubing (EMT):

1. EMT may be used indoors where concealed or exposed above grade, except where rigid steel conduit is required. Electrical metallic tubing shall be made of thin-wall steel tubing up to 4" conduit size, and shall be galvanized inside and outside.
2. EMT shall be joined with steel set screw type couplings and conduits shall be secured with steel set screw type connectors at panels, junction boxes, outlets, etc. EMT, which is cast in concrete, shall be joined using concrete-tight compression fittings. Die-cast type connectors are not acceptable.
3. EMT and fittings shall, in all respects, meet the requirements of the latest edition of the National Electrical Code - Article 358, and Underwriters' Laboratories Standards for Electrical Metallic Tubing.
4. Provide insulating bushings at terminations, and on the open end of conduits not terminated in panels, junction boxes, outlets, etc. Provide insulated throats for sizes 3/4" and 1", and provide nylon bushings for sizes 1-1/4" and larger conduits.
5. If it complies with these Specifications, conduit manufactured by one of the following manufacturers will acceptable: LTV Steel, Allied Tube and Conduit, Wheatland Tube, and Western Tube and Conduit, or approved equal.
6. If it complies with these Specifications, connectors manufactured by one of the following will be acceptable: Crouse-Hines (Midwest), Steel City (Thomas & Betts), Raco, OZ - Gedney, Appleton, Bridgeport Fittings, Picoma Industries, etc., or approved equal.

2.2 ALUMINUM CONDUIT

- A. Aluminum rigid conduit shall be manufactured of 6063 alloy in temper designation T-1. Fittings shall be of same alloy. Conduit shall be listed under UL 6 "Standard for Rigid Metal Conduit," shall be manufactured to ANSI C80.5, and shall in all respects meet the requirements of the latest edition of the National Electrical Code - Article 344.
- B. Aluminum EMT shall be manufactured of 6005 alloy. Fittings shall be of same alloy. EMT and elbows shall be listed under UL/ANSI 797, "Standard for Electrical Metallic Tubing", and shall in all respects, meet the requirements of the latest edition of the National Electrical Code - Article 358. Aluminum set screw couplings shall be listed under UL 514B "Standard for Fittings for Cable and Conduit."
- C. Conduit shall be joined and secured as described in Subsection 2.01; however, all materials must be aluminum or UL approved for the application. Provide insulated bushings and throats for EMT as described in Subsection 2.01.
- D. Aluminum conduit and fittings shall be manufactured by Sapa Extrusions, or approved equal.
- E. All rigid aluminum conduit and fittings exposed to weather shall be PVC coated conduit by Sapa Extrusions or approved equal.

## 2.3 FLEXIBLE METAL CONDUIT

- A. Furnish and install flexible metal conduit as specified herein and as shown on the drawings.
- B. Flexible metal conduit shall be hot-dipped galvanized steel strip, spirally wound and interlocked, and shall be provided with insulated anti-short bushings at all terminations.
- C. Flexible Metal Conduit shall be secured with galvanized or sherardized connectors with insulating bushings suitable for connection to the associated boxes and conduits. Die cast connectors are not acceptable.
- D. Flexible Metal Conduit may be used indoors at any height, in lengths not to exceed 48 inches, to extend conduit connections to motors, transformers, busway switches, air distribution terminal units, control equipment and devices, permanently connected equipment or appliances, or for equipment and devices requiring adjustment and/or removal for maintenance. Flexible metal conduit shall not be used for Utility Connections and in Elevator Machine Rooms. A "green" insulated copper grounding conductor shall be installed with the circuit conductors and sized in accordance with Table 250-122 of the latest edition of the National Electrical Code. Refer to the CONDUCTORS section for wiring and color coding requirements.
- E. Flexible Metal Conduit (minimum 3/8" diameter) may be used for fixture-tails, for connection of individual lighting fixtures to their associated lighting system junction boxes in lengths not to exceed 6 feet, and provided the circuit conductors contained therein are protected by overcurrent devices rated at 20 amperes or less. A "green" insulated copper grounding conductor shall be installed with the circuit conductors and sized in accordance with Table 250-122 of the latest edition of the National Electrical Code. Refer to the CONDUCTORS section for wiring and color-coding requirements. Verify maximum length with the City Electrical Inspection Department. MC Cable is also acceptable for this application.
- F. Continuity of the equipment ground across flexible metal conduit connections shall be maintained for all systems that are over 150 volts to ground. The continuity shall be maintained by installing a bare copper bonding conductor sized in accordance with Table 250-122 of the latest edition of the National Electrical Code. The bare copper bonding conductor shall be installed outside the flexible conduit and shall be connected on one end of the flexible conduit by a suitable binding post and similarly connected on the opposite end with another suitable binding post.
- G. If it complies with these Specifications, flexible metal conduit manufactured by one of the following will be acceptable: American Flexible Conduit Company, Anamet, Alflex or Electriflex.
- H. If it complies with these Specifications, connectors manufactured by one of the following will be acceptable: Crouse Hines (Midwest), Appleton, or Steel City (Thomas & Betts), Raco, OZ - Gedney, Appleton, Bridgeport Fittings, etc., or approved equal.
- I. Flexible Metal conduit shall not be used for Patient Care Areas in Healthcare Facilities except where specifically permitted by NEC Article 517.

## 2.4 LIQUID-TIGHT FLEXIBLE METAL CONDUIT

- A. Furnish and install liquid-tight flexible metal conduit as specified herein and as shown on the drawings.
- B. When equipment or motor connections are exposed to the weather or other wet locations and for Utility Connections and in Elevator Machine Rooms, liquid-tight flexible metal conduit with PVC jacket and water-tight insulated throat fittings shall be used, in lengths not to exceed 48".
- C. Liquid-tight flexible metal conduit may also be used in lengths not to exceed 48 inches, to extend conduit connections to motors, transformers, control equipment and devices, permanently connected equipment or appliances, or for equipment and devices requiring adjustment and/or removal for maintenance that are exposed to the weather or other wet locations (i.e., kitchens or associated areas).
- D. Liquid-tight flexible metal conduit shall be complete with a "green" insulated copper grounding conductor installed inside the conduit with the phase conductors. Refer to Section 26 05 19 for conductor and conductor color coding requirements.
- E. If it complies with these Specifications, liquid-tight flexible metal conduit manufactured by one of the following will be acceptable: American Flexible Conduit Company "American Tite", Electric-flex "Liquatite".
- F. If it complies with these specifications, fittings for liquid-tight flexible metal conduit manufactured by one of the following will be acceptable: Crouse-Hines (Midwest), Steel City (Thomas & Betts), Raco, OZ - Gedney, Appleton, Bridgeport Fittings, etc., or approved equal.
- G. Shall not be used for Patient Care Areas in Healthcare Facilities except where specifically permitted by NEC Article 517.

## 2.5 TYPE "MC" METAL CLAD CABLE

- A. Metal clad cable "MC" is only acceptable for connection of lighting fixture whips no greater than 6' in length. In such instances, MC cable shall have #12 through #8 "THHN OR XHHN" solid copper insulated phase conductors with an equipment grounding conductor as required for said terminations
- B. Metal clad cable shall be provided with insulated anti-short bushings at all terminations. Metal clad cable connectors shall be steel galvanized, suitable for connection to associated boxes. Die cast connectors are not acceptable.
- C. Type "MC" Cable shall have a full color-coding system which will allow for identification of assembly voltage. Voltage assembly for 120/208 and 277/480 shall have color-coded conductor/s to provide full phase identification for application requirements.
- D. Type "MC" Cable shall be high strength, lightweight steel with a high degree of EMI shielding. Aluminum wound sheath is not acceptable.



- E. If it complies with the specifications, Metal clad cable manufactured by one of the following will be acceptable: American Flexible Conduit, General Cable, Alfex.
- F. If it complies with the specifications, connectors manufactured by one of the following will be acceptable: Crouse-Hines (Midwest), Steel City (Thomas & Betts), Raco, OZ - Gedney, Appleton, Bridgeport Fittings, etc., or approved equal.
- G. Metal Clad Cable shall not be used in laboratory spaces, hazardous locations, or exposed work. Metal Clad cable shall be permitted for individual drops to receptacles and switches in offices, classrooms, café, and conference rooms. MC Cable shall not be used for runs between junction boxes and shall not be run horizontally in partitions.

## 2.6 PVC CONDUIT

- A. Furnish and install PVC conduit as specified herein and as shown on the drawings.
- B. PVC conduit may be used for underground raceways except where specifically indicated or specified to be galvanized rigid steel conduit. Use locator tape 12" above conduits for all underground conduit outside slab area.
- C. PVC conduit shall not be used above the ground floor slab in the building unless it is encased in a minimum of 3 inches of concrete.
- D. An insulated ground wire sized per Article 250 of the NEC shall be included in each PVC conduit. It shall be the Contractor's responsibility to verify and provide the proper size of conduit for the feeder with the added ground wire.
- E. PVC conduit shall consist of 90°C, UL listed, Schedule 40, high impact virgin polyvinyl chloride. PVC conduit used for primary and secondary service feeders and distribution feeders shall be concrete encased burial Type EB, UL labeled utility duct, rated 90°C. Concrete encasement shall be red in color.
- F. If it complies with these Specifications, PVC conduit manufactured by one of the following will be acceptable: Carlon, Cantex, or JM Manufacturing.

## 2.7 CABINETS AND PULL BOXES

- A. Cabinets for lighting and power or any other purposes hereinafter specified or shown on the Drawings shall be constructed of panelboard code gauge galvanized steel with sides formed and corner seams welded before galvanizing.
- B. All cabinets and boxes shall be made of sheet metal unless otherwise indicated on drawings, and shall be provided with standard knockouts by the manufacturer, or without knockouts and shall be cut in the field by an approved cutting tool which will provide a clean, symmetrically cut opening.
- C. Pull boxes shall include all boxes used to reduce the run of conduit to the required number of feet or bends for cable, supports, taps, troughs, and similar applications and shall likewise be constructed as specified above.

- D. All cabinets and boxes shall be provided with panelboard code gauge fronts or doors as required which may be hinged or screwed as specified.
- E. Where required by the nature of the application or where specified, locks shall be provided and shall be Yale spring latch for single doors or vault type for double doors.
- F. Site pull or junction boxes shall be Quazite PC style or PG style polymer concrete or approved equal. Provide Tier 22 rating for boxes 10 feet or less from vehicular drives or parking areas. Tier 8 rating is acceptable for areas more than 10 feet from vehicular drives and parking areas.
- G. Pull or Junction boxes located in vehicular drives and parking areas shall be heavy duty re-enforced concrete type, traffic rated, and shall meet AASHTO H-20 unless specified otherwise on drawings.
- H. Boxes or cabinets shall not be less than 4-1/2" inches deep and their minimum size shall be determined per as follows:
  - 1. For straight pulls involving conductors of No. 4 and larger and for raceways of 3/4 inch and larger, the length shall be minimum of eight (8) times the diameter of the largest raceway plus the sum of the diameters of all other raceways in the same side of box or cabinet.
  - 2. For angle pulls or direction changes, distance between any entering raceway and the opposite side of the box shall be minimum of six (6) times the diameter of the largest raceway, and the minimum distance between raceway entries enclosing the same conductor shall not be less than six (6) times the diameter of the larger raceway. Additional raceways in the same wall shall require increase of these dimensions by the sum of the diameters of the other raceways.
  - 3. For below grade boxes in low voltage cable applications, the minimum size shall be 36 inches in the direction of travel and 24 inches wide for straight pulls. For angle pulls the minimum size shall be 36"x36".
- I. In no event shall any cabinet or box contain more than 20% of its cross-sectional area in conductors.
- J. Where conductors cross a box, a maximum of nine conductors may be laid parallel without the use of a barrier or compartment.
- K. Where junction box or pull box has dimensions over 36 inches on any side, conductors crossing such distances must be supported on approved racks or clamps in such a manner as to avoid unsupported spans greater than 36 inches.
- L. Where such boxes exceed 60 inches in any dimension, all conductors shall be supported, regardless of direction of travel.
- M. No conductors entering or leaving a cabinet or box shall be deflected in such a manner as to cause pressure to exist on the conductor insulation.

- N. All conduit, entering or leaving a cabinet or box shall be provided with insulated throat bushings or fittings for each size conduit involved.

## 2.8 SURFACE METAL RACEWAY

- A. Unless otherwise specified on drawings, furnish and install Wiremold surface metal type 2400 Plugmold and G-4000 series raceways, or an approved equal, as specified herein.
- B. The G-4000 raceway shall be divided into two separate compartments, one for data/communications cable and the remaining compartment for power. Provide appropriate receptacles, Cat 3 and Cat 5/6 data outlets as indicated on the Drawings.
- C. The 2400 Plugmold raceway shall have 20-amp single receptacles (white for normal power and red for emergency power) spaced every 12 inches on centers.
- D. Raceways shall be constructed with 0.050 inch galvanized steel and painted per Architect's specifications. The raceway shall be a minimum of 4-3/4 inches width and 1-3/4 inches deep.
- E. The coverplate shall be constructed of 0.040 inch galvanized steel and painted to match the raceway finish.
- F. Cover plates for receptacles shall match each device style. Data and telephone outlets shall have grommeted knockouts. Coverplate for all devices and outlets shall be gang under a common coverplate.
- G. The raceway system shall be installed with all required accessories needed for a complete surface metal raceway system.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Shop drawing submittals shall include, but not be limited to, the following:
  - 1. The Contractor shall submit to the Engineer for review, a list of the proposed manufacturers for each type of conduit, fittings and hangers selected from the manufacturers listed herein. The Contractor may install conduit, fittings and hangers furnished by any manufacturer listed on the approved submittal.
  - 2. Cut sheets of all conduits and fittings proposed.
  - 3. Additional information as required in Section 20 05 03.

### 3.2 INSTALLATION - GENERAL

- A. Conduit:
  - 1. All conduits shall be concealed in pipe chases, walls, furred spaces, or above the ceilings of the building unless otherwise indicated. Conduit shall not be

- embedded in any structural slab or structural member unless approved in writing by the structural engineer.
2. Conduit may be run exposed in mechanical rooms, duct and piping chases, but only where necessary. All exposed conduit shall be run in the neatest, most inconspicuous manner, and parallel or perpendicular to the building lines.
  3. Boxes shall be installed in accessible locations.
  4. Conduit shall be sized in accordance with the percent fill requirements of the National Electrical Code, and as indicated on the drawings.
  5. All conduit and surface raceways shall be adequately and properly supported from the building structure by means recommended by the manufacturer, or by the use of hanger rods or clamps as herein specified.
  6. Where limited space is available above the ceilings and below concrete beams or other deep projections, conduit shall be hung below them and in a manner to provide maximum above-floor clearance with full coordination with other trades.
  7. Run conduit to avoid proximity to heat producing equipment, piping and flues, keeping a minimum of 8 inches clear.
  8. Whenever possible, install horizontal conduit runs above water piping.
  9. Conduit systems which are exposed to the weather or water, or installed underground shall be made watertight. All exterior conduit shall be rigid galvanized. Use locator tape 12" above conduits for all underground conduit outside slab area.
  10. Conduit routed above grade for telephone, signal, communication, fire alarm, security, audio/visual, or other low voltage systems shall be provided with pull boxes of approved sizes at intervals not exceeding 100 feet in length or after 270 degrees of bends, whichever occurs first, and/or where indicated on drawings.
  11. Conduit routed below grade for telephone, signal, communication, fire alarm, audio/visual, security, or control systems shall be provided with pull boxes of approved sizes at intervals not exceeding 350 feet in length or after 270 degrees of bends, whichever occurs first, and/or where indicated on drawings.
  12. Install all conduits to allow for adequate maintenance and access clearances to all equipment.
  13. The Contractor shall study all Construction Documents and carefully lay out all work in advance of fabrication and erection in order to meet the requirements of limited spaces. Where conflicts occur, the Contractor shall take all steps necessary to resolve the conflict prior to erection of any work in the area involved.

B. Hangers and Supports:

1. All supports required for the proper installation of equipment and conduit shall be provided as hereinafter specified unless otherwise indicated on the Drawings.
2. All conduits throughout the building shall be supported 8 feet on centers horizontally and supported 6 feet on centers vertically, unless specifically noted differently on the Drawings or in the Specifications. The supports shall be from the structure on line of grade, with proper provision for expansion, contraction, vibration elimination, and anchorage.
3. Vertical conduits shall be supported from floor lines with riser clamps sized to fit the conduit and to adequately allow for contraction. At the bases of conduit, where required for proper support, provide anchor base fittings or other approved supports.

4. Conduit shall not be supported from ductwork, piping, ceiling suspension wires, ceiling support system, or other equipment.
5. All electrical conduits and surface raceways shall be run parallel or perpendicular to the adjacent building construction. All hangers shall be fastened to the building structure as specified herein.
6. Single conduits running horizontally in concealed areas shall be supported by B-line series, or approved equal, adjustable conduit hangers.
7. Where multiple conduits are run horizontally in concealed areas, they may be supported by trapeze channels suspended on rods or pipes. Channels shall be as manufactured by Kindorf, B-Line, Unistrut or approved equal.
8. Vertical conduits, both concealed and exposed, shall be supported by clamping to vertical surfaces or by means of clamps resting on adjacent beams, or floor slabs, or both as required by the installation.
9. Conduits and raceways run against building surfaces shall be supported by means recommended by the manufacturer, or by means of single or two hole rigid conduit clamps located 4 feet on center. Two-hole clamps shall be provided where size of conduit and installation conditions warrant.

C. Attachment:

1. The load and spacing on each hanger and/or insert shall not exceed the safe allowable load for any component of the support system, including the concrete which holds the inserts. Reinforcement at inserts shall be provided as required to develop the strength required.
2. All conduits not embedded in concrete or masonry shall be securely and independently supported so that no strain will be transmitted to outlet box and pull box supports, etc. Supports shall be rigid enough to prevent distortion of conduits during wire pulling.
3. Inserts shall be of a type which will not interfere with structural reinforcing, and which will not displace excessive amounts of structural concrete. All methods of attachment to the structure and the use of afterset inserts shall be approved in writing by the Structural Engineer.
4. All supports shall be designed and installed to avoid interference with all other conduits, hangers, ducts, building structures, piping, and equipment.

- D. Excavation and Backfill: The Contractor shall perform all excavation and backfill required for the installation of the underground raceway systems, duct banks and similar items, and shall resurface with materials to match the existing surface in all respects.

3.3 METAL CONDUIT - INSTALLATION

- A. Metal conduit shall be of ample size to permit the ready insertion or withdrawal of conductors without abrasion. All joints shall be cut square, reamed smooth, and drawn up tight. No non-flexible metal conduit shall be smaller than 3/4".
- B. Metal conduit shall not be embedded in structural slabs without prior written permission from the Structural Engineer. Metal conduits embedded in structural slabs shall be installed in the middle of the slab below the top and above the bottom reinforcing steel. Maintain a minimum concrete coverage of 1" except where penetration is made. Metal conduits embedded in structural slabs shall have watertight metal joints.

- C. Do not locate conduit in the following construction:
1. In concrete slab where conduit has an outside diameter greater than one third of slab thickness.
  2. In a concrete slab less than 3-1/2" thickness. Local offsets are an exception.
  3. Between concrete slab reinforcing steel and bottom of slab.
- D. Concealed metal conduits shall be run in a direct manner, basically parallel to, and at right angles with the lines of the building, and with as long a bend as possible. Exposed metal conduit shall be run parallel to and at right angles with the lines of the building. All bends shall be field made using an approved bending machine designed for the purpose, or using standard ells having a radius no less than that shown in Chapter 9 - Table 2 of the National Electrical Code, and with approved fittings or connectors. All bends shall be free from dents or flattening. Not more than the equivalent of four quarter bends shall be used in any run between terminals and cabinets, or between outlets, junction or pull boxes.
- E. Keep conduits within the furring lines established on the architectural drawings unless conduits are shown or noted exposed.
- F. Provide all necessary sleeves and chases required where conduits pass through floors or walls. Seal all openings with approved fire stopping material to maintain integrity of wall or floor being penetrated. Finish to match adjacent surfaces after installation.
- G. Metal conduit shall be continuous from outlet to outlet, or from outlet to cabinets, junction or pull boxes, and shall enter and be secured at all boxes in such a manner that each system shall be electrically continuous throughout.
- H. Terminals of all conduit shall be furnished with bushings, double locknuts, connectors, etc., as specified herein and as required by the NEC. Install insulating bushings on the open ends of conduit not terminated in a panel, junction box, outlet, etc.
- I. So far as practicable, all exposed metal conduit shall be run without traps. Where traps or dips are unavoidable, a junction or pull box shall be placed at each low point.
- J. Metal conduit hangers and fasteners shall be of the types appropriate in design and in dimension for the particular applications and shall be securely fastened in place as specified herein.
- K. Each entire metal conduit system shall be installed complete before any conductors are drawn in. To guard against obstructions and omissions, each run of conduit shall be finished before plastering is installed. All metal conduits shall be swabbed after plaster is finished and dry.
- L. As soon as conduit has been permanently installed in place, conduit shall be capped or plugged with standard accessories.
- M. Where galvanized rigid steel conduit is used for underground raceways, they shall be field wrapped with 0.010-inch-thick anti corrosion tape 3M scotchwrap 51 or equal,

applied with a 50% overlap, or shall have a factory-applied plastic resin, epoxy, or coal-tar coating system. The coating system or field wrapping shall be applied in all locations conduit is in contact with earth or in contact with concrete. Wrapping or coating shall encompass fittings. Zinc coating may be omitted from steel conduit which has a factory-applied epoxy system.

- N. At the Contractor's option, PVC conduit may be used for underground raceways in lieu of the galvanized rigid steel conduit or PVC coated rigid aluminum.
- O. Use locator tape 12" above conduits for all underground conduit outside slab area.
- P. All empty conduit systems shall have a 1/8" braided polypropylene rope or #14 galvanized steel pull wire installed. At least 12" of properly secured rope or wire shall be folded back into each end of the empty conduits. All empty conduits shall be labeled with a purpose.
- Q. Furnish and install approved expansion fittings with bonding jumpers where metal conduits cross building expansion joints. Expansion fittings shall be as manufactured by: OZ Gedney, Appleton or Crouse-Hinds.

#### 3.4 FLEXIBLE METAL CONDUIT, LIQUID TIGHT FLEXIBLE METAL CONDUIT, MC CABLE - INSTALLATION

- A. Flexible metal conduit, liquid tight flexible metal conduit and MC cable shall be secured no less than every 54" and within 12" of a junction box. It is not acceptable to lay cables on ceiling, ductwork, etc.
- B. Where permitted by the local authority - MC Cable may be used indoors only for individual light fixture whips - provided the following conditions are met:
  - 1. The branch circuit homerun wiring is installed in the accessible ceiling plenum using metal conduit.
  - 2. Junction boxes are located in the accessible ceiling plenum in which fixtures are installed.
  - 3. Length of horizontal MC cable above ceiling is not greater than 6'-0".
  - 4. MC Cable shall not be run horizontally in partitions or to connect junction boxes.
- C. MC cable shall not be used for homerun wiring. Homeruns shall be hard piped with the use of metal conduit.

#### 3.5 PVC CONDUIT - INSTALLATION

- A. Where PVC is used for cable systems with cable provided by other divisions, such as utility primary and low voltage systems, all elbows shall be Rigid Metal (RMC) with 36" minimum radius unless otherwise specified by the cable installer.
- B. For PVC conduit systems with cabling provided in this division, elbows shall be Rigid Metal (RMC). Bend radius may be standard or long sweep.

- C. All stub-ups above finished grade or finished floor shall be galvanized rigid steel(RMC) where exposed.
- D. All underground PVC conduit installed in ductbanks shall be installed using 2" duct spacers on 10' centers. All PVC conduits in slabs shall be securely tied and shall be run in a neat and orderly manner.
- E. Provide expansion fittings for PVC conduits where runs cross a building expansion joint, or where conduit is above grade and crosses from conditioned to unconditioned space.
- F. Unless otherwise noted on drawings, PVC conduit used for underground primary and secondary service or distribution shall be encased in minimum 3 inches of concrete with adequate steel reinforcing as required, and shall be installed using duct spacers on minimum 10' centers. The sides of trenches shall be formed in a manner to result in a concrete encasement plumb, straight, true without rough surfaces, off-sets, voids, or honeycomb. Reference Utility Company standards for additional information.

### 3.6 SURFACE METAL RACEWAY SYSTEM

- A. Surface metal raceway system shall be installed per manufacturers specifications and recommendations.
- B. Devices shall not be installed facing upwards unless specifically listed for this purpose.
- C. The raceway system shall be installed at the height specified by the Architect. The exact length of the raceway may require field adjustment in order to fit into the allocated space.
- D. The complete raceway shall be painted a color to match the Architects requirements.
- E. All receptacle devices and data outlets shall be installed at locations indicated on Drawings.

**END OF SECTION**



## SECTION 26 05 34

### OUTLET BOXES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. Schedule of Submittal Data - Section 20 05 04
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Scope of Work - Section 26 05 01
  - 5. Testing - Section 26 05 07

##### 1.2 SCOPE

- A. Furnish and install outlet, switch and junction boxes as shown, scheduled, specified and required.

##### 1.3 QUALITY ASSURANCE

- A. Codes and Standards: Outlet, switch, and junction boxes and their installations shall comply with all requirements of the National Electric Code (NEC).

#### PART 2 - PRODUCTS

##### 2.1 OUTLET, SWITCH, AND JUNCTION BOXES

- A. All metal outlet and junction boxes, except where otherwise specified, shall be of one- piece construction, and shall be protected against corrosion by an appropriate sheradizing process.
- B. All junction boxes shall be provided with covers of the same manufacturer as the boxes. The type of cover selected shall meet the conditions imposed in every case. All such boxes shall be left in a neat, clean and workmanlike manner.
- C. Outlet, switch and junction boxes for various uses shall be as manufactured by Appleton or an approved equal and shall be of the following types:

1. CONCRETE BOXES:

- a. In concrete slabs, where no fixtures are involved and the conduit size is 1/2 inch and 3/4 inch, the following shall be used: 4-inch octagonal concrete boxes of the appropriate depth, No. OCR Series; and No. OCP no-stud back plates.
- b. In concrete slabs, where fixtures are involved and the conduit size is 1/2 inch and 3/4 inch, the following shall be used: No. OCR Series inch octagonal concrete boxes of the appropriate depth, No. OCR Series; and No. OCP 3/8 back plate with fixture stud.
- c. All floor boxes containing power & data outlets are to be cast iron. Floor boxes shall be multi-gang recessed style with flip-top cover. No cast metal fittings. PVC floor boxes are not acceptable.
- d. For kitchen and wet areas provide tombstone outlet installed above floor surface area. Do not install floor boxes in wet areas such as kitchen, locker rooms, or training rooms.
- e. All floor boxes are to be recessed and shall have flush-mounted brass or stainless steel cover.
- f. If it complies with these Specifications, floor box equipment manufactured by one of the following will be acceptable: Hubbell, Wiremold, FSR.

2. RECEPTACLE BOXES:

- a. In standard partitions, where 3/4-inch conduits are employed: 4-inch square by 2-1/8-inch-deep boxes with 1-gang or 2-gang plaster covers shall be used, No. 4SD-SPL.
- b. In standard partitions, where conduits of a size greater than 3/4-inch are employed: 4-11/16-inch square by 2-1/8-inch-deep boxes with 1-gang or 2-gang plaster covers shall be used, No. 4SJD Series.
- c. In thin partitions measuring 3-1/2 inches or less: 4-inch square by 1-1/2-inch-deep boxes with 1-gang or 2-gang plaster covers shall be used, No. 4S-SPL.

3. WALL FIXTURE BOXES: For wall or bracket lighting fixture outlets, provide No. 400-SPL boxes in standard walls and No. 40SPL boxes in thin walls.

4. SWITCH BOXES:

- a. In standard partitions, where 3/4-inch conduits are employed: 4-inch square by 2-1/8-inch-deep boxes with 1-gang or 2-gang plaster covers shall be used, No. 4SD-SPL.
- b. 3-gang and up switch boxes, in standard walls or partitions, shall be 2-1/2" deep drawn style device boxes, with appropriate "gang" plaster covers as required. Field ganged type boxes are not acceptable for use.
- c. 1-gang/2-gang switch boxes in thin walls or partitions, shall be 1-1/2" deep square corner boxes with appropriate mounting bracket for attachment to studs, No. 222V Series.

- d. Provide gang barriers where required by the NEC.
- D. If it complies with these Specifications, equipment manufactured by one of the following will be acceptable: Raco, Steel City, or Appleton.
- E. Junction boxes and covers shall with identified and painted with the following scheme:
  - 1. Lighting System: Yellow
  - 2. Emergency Power System: Red
  - 3. 120V Power System: Blue
  - 4. HVAC System Power: Green
  - 5. Panel and circuit number shall be completely legible on junction box cover at the completion of the project, prior to final punch list walk through.

## 2.2 TYPE FS AND FD SERIES UNILET BOXES

- A. Furnish and install type FS and FD series (copper free) Unilet boxes as specified herein and as shown on the drawings. Die-cast aluminum boxes are not acceptable.
- B. Type FS or FD Series (copper free) Unilet boxes with gasket cover plates shall be used in the following areas:
  - 1. Where an atmosphere laden with moisture exists.
  - 2. Exterior areas where exposed to the weather or other wet locations. PVC coated.
  - 3. In commercial kitchens and associated areas. PVC coated.
  - 4. In Parking Garages 6'-0" AFF and below.
- C. If it complies with these specifications, equipment manufactured by one of the following manufacturers will be acceptable: Appleton, Crouse-Hinds, Killark, Red-Dot.

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Shop drawing submittals shall include, but not be limited to, the following:
  - 1. A list of the proposed manufacturers for each type of outlet, switch and junction boxes selected from the manufacturers listed herein. The Contractor may install outlet, switch and junction boxes furnished by any manufacturer listed on the approved submittal.
  - 2. Cut sheets of outlet, switch and junction boxes clearly highlighted.
  - 3. Additional information as required in Section 20 05 03.

### 3.2 INSTALLATION - GENERAL

- A. Refer to architectural drawings to determine whether outlets occur in wainscot or cabinet spaces and coordinate mounting heights as required by architectural form. For example, mounting heights of outlets occurring in a tile or brick wall should be adjusted so that the outlet may occur entirely within a single course. However, all outlets in a given space shall be mounted at the same height. Exact location of all outlets shall be as shown on the Architectural Drawings and as approved by the Architect.
- B. In general, unless noted otherwise on Architectural or Electrical Drawings, mounting heights to device centerline shall be as follows:

EQUIPMENT/DEVICE	MOUNTING HEIGHT TO CENTERLINE
WALL SWITCHES	42" ABOVE FINISHED FLOOR.
RECEPTACLES, TELEPHONE, AND DATA OUTLETS	18" ABOVE FINISHED FLOOR.
RECEPTACLES	6" ABOVE COUNTERTOPS WITHOUT SPLASHBACKS AND 4" ABOVE SPLASHBACKS FOR COUNTERTOPS WITH SPLASHBACKS, MOUNTED WITH THEIR LONG AXIS HORIZONTAL.
CLOCK OUTLETS	90" ABOVE FINISHED FLOOR.
PANELBOARDS	72" FROM FINISH FLOOR TO TOP OF PANELBOARD.
STAIRWAY LIGHTING FIXTURES	WALL MOUNTED 7'-6" ABOVE FINISHED FLOOR OR MID-LANDING
FIRE ALARM PULL STATIONS	42" ABOVE FINISHED FLOOR. COORDINATE WITH ARCHITECTURAL GRAPHICS PACKAGED FOR ACTUAL MOUNTING HEIGHTS.
FIRE ALARM WALL MOUNTED AUDIO/VISUAL SIGNALS	6'-8" ABOVE FINISHED FLOOR.
WALL TELEPHONE OUTLETS	42" ABOVE FINISHED FLOOR.

- C. All receptacles shall be mounted with their long axis vertical, unless noted otherwise.

### 3.3 OUTLET, SWITCH AND JUNCTION BOXES - INSTALLATION

- A. All junction boxes shall be marked to identify the circuit(s) within the box.
- B. Junction boxes utilized for emergency circuits shall be painted red in color where emergency circuits are indicated on drawings.
- C. Outlet boxes with plaster rings shall be finished to 1/8 inch of the finished surface.
- D. Outlet boxes installed in fire-rated partitions (2 hour or less) shall not exceed 16 square inches, with a maximum of 100 square inches of wall opening per 100 square feet of wall area.

- E. The outlet boxes on opposing sides of fire and smoke rated partitions shall be located whereby no two (2) outlet boxes are installed closer than 24" on center laterally, and securely attached to the partition studs, with at least one (1) partition stud separating the outlet boxes.
- F. Where outlet or switch boxes are not supported from studs or joints directly, they shall be supported by expandable clip type bar hangers, Appleton Catalog No. SX 18 or SX 26. In no case shall conduit be used to support switch or outlet boxes. It is not acceptable to support switch or outlet boxes from drywall material only.
- G. The following requirements shall apply to exposed as well as concealed conduit systems when "gang" boxes shall be used. These "gang" boxes shall have dimensions which are not smaller than those shown in the following table:

NUMBER IN GANG	SIZE
3	4-1/2" x 8-5/8"
4	4-1/2" x 10-1/2"
5	4-1/2" x 10-1/2"
6	4-1/2" x 14"

- H. In instances in which "gang" boxes are located in woodwork, wooden partitions, or all plaster partitions; the depth of the boxes shall be reduced to 1-5/8".
- I. Switch boxes shall not be used as junction boxes.
- J. On all ceiling outlets involving fixture-hanging boxes, 1/2" no-bolt fixture studs shall be used for heavy loads.
- K. Pull boxes, junction boxes, and outlet boxes shall be located no more than 30" above an accessible ceiling or 30" above an access panel unless noted otherwise on drawings.

### 3.4 FS AND FD UNILET BOXES - INSTALLATION

- A. Standard wiring devices may be used for cord and cap connection of portable equipment provided the FS or FD Unilet boxes are mounted not less than 18 inches above the finish floor or finish grade, and the gasketed cover plates employed shall be adapted for the particular application involved. In all cases, brass screws shall be used.
- B. Type FS or FD Series (copper-free) Unilet boxes used for connections to permanently install, free standing equipment in all areas of kitchens and associated areas shall be provided with gasketed cover plates and shall be wired to the equipment utilizing plates and shall be wired to the equipment utilizing water tight flexible metal conduit and approved watertight fittings. Boxes shall be installed no less than 18" above finish floor or finish grade.

- C. Due provisions shall be made in all cases for the escape of any condensate which might accumulate.

**END OF SECTION**

## SECTION 26 24 17

### CIRCUIT BREAKER LIGHTING AND POWER PANELBOARDS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. Schedule of Submittal Data - Section 20 05 04
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Scope of Work - Section 26 05 01
  - 5. Testing - Section 26 05 07

##### 1.2 SCOPE

- A. General: Furnish and install circuit breaker lighting and power panelboards as shown, scheduled and specified.
- B. All service equipment shall be marked in the field to comply with NEC Section 110.
- C. Provide Arc Flash Hazard Analysis to comply with NFPA 70E Section 130.3.

##### 1.3 QUALITY ASSURANCE

- A. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
- B. Lighting and Power Panelboards:
  - 1. GE by ABB
  - 2. Square D / Schneider Electric
  - 3. Siemens
- C. Codes and Standards:
  - 1. All products shall be manufactured in the USA.
  - 2. Power distribution equipment shall be listed by Underwriter's Laboratories and shall bear the UL label.
  - 3. Lighting and power panelboards shall be in accordance with Underwriter's Laboratories, Inc., "Standard for Panelboards".

## PART 2 - PRODUCTS

### 2.1 LIGHTING AND POWER PANELBOARDS

- A. General: Furnish and install circuit breaker lighting and receptacle panelboards as specified herein and as shown on the drawings. Panelboards shall be automatic circuit breaker, dead front type and shall be rated for the intended voltage.
- B. Cabinets: Panelboards shall be mounted in enclosing cabinets, consisting of a code gauge galvanized sheet steel box with trim and door. Panelboard cabinets shall be of sufficient size to allow a width of gutter to conform with Underwriters' Laboratories standards. Cabinets shall be NEMA 1 for indoor installations. All exterior installations shall be in a NEMA 3R enclosure. Provide NEMA 4X stainless steel or other enclosures where indicated on the plans.
- C. Cabinet Trim: The trim shall be manufactured from one piece of full finish sheet steel, finished with two coats of paint, the first being a prime coat and the second a finish coat of light gray lacquer. Trim for panelboards installed in kitchens shall be stainless steel. The trim on surface mounted panels shall be fastened to the cabinet by means of screws or "approved" adjustable clamps. Trims on flush mounted panels shall have concealed fasteners. All trims shall have a door equipped with tumbler lock catch combination, two keys being supplied with each lock. All locks shall be keyed alike.
- D. Directory Cards: Circuit directory cards shall be provided. Cardholder shall be permanently attached on the inside face of the panelboard door. Directory cards shall be typewritten with description of loads served.
- E. Bus: Panelboard busing shall be silver plated copper. Bus structure and mains shall have ratings as shown and scheduled. Such ratings shall be established as shown and scheduled. Such rating shall be established by heat rise tests with maximum hot spot temperature on any connector or bus bar not to exceed 65°C rise above 40°C ambient. Heat rise test shall be conducted in accordance with UL 67. The use of conductor dimensions will not be accepted in lieu of actual heat test. All bus joints shall be bolted with medium carbon steel, cadmium plated hardware equipped with lock washers and torqued to the Manufacturer's recommended settings. Furnish an isolated neutral bus and an insulated ground bus inside each panelboard enclosure. All two-section panelboards shall be connected with copper cable, with an ampacity meeting or exceeding the main bus ampacity. Provide 200% neutral bus and isolated ground bus where indicated on the drawings or panel schedules.
1. Busing shall be of the "sequence" type so that multi-pole breakers can be substituted for single-pole breakers without bus or assembly rearrangement. All 208Y/120V receptacle panelboards shall be furnished with a separate ground bus and an isolated neutral bus.
- F. Lugs: Panel bus shall be arranged to accommodate copper bodied, compression connectors at the main lug connection of #8 AWG, or larger copper conductors and aluminum alloy compression connectors all aluminum conductors. See the Section entitled "Conductors" for connector specifications. Bolts shall be captive or shall be



studs to facilitate re-installation of the lugs with the wire attached. Adequate wiring space shall be provided to accommodate the compression connectors.

- G. Spaces and Spares: Where space for future breakers are shown, panelboard enclosure shall include removable blank panels or knockouts to allow installation of future breakers and panelboards busing shall be complete, including all required connectors.
1. Unless otherwise indicated on Drawings, all spaces shall be filled with spare breakers.
  2. Unless otherwise indicated on Drawings, assume all panels are minimum 60 circuits.
  3. All breaker spaces shall accommodate breakers with KAIC ratings matching the panel KAIC.
- H. Short Circuit Rating: Panelboards shall be braced for an integrated equipment rating equal to the interrupting rating of the branch breaker with the lowest interruption rating. Where no AIC is indicated on Drawings, the minimum integrated equipment rating shall be 10,000 AIC for 120/208 Volt panel boards and 65,000 AIC for 277/480-volt panel boards.
- I. Circuit Breakers:
1. All single-pole circuit breakers shall be either ambient or case-compensated (calibrated 40°C.) thermal-magnetic type breakers, with inverse time delay on overloads and instantaneous magnetic trip on short circuits. (Twin, tandem and half-size single-pole breakers are not acceptable.)
  2. All multiple-pole breakers shall be common trip, thermal-magnetic type, calibrated 40°C.
  3. The breakers shall employ quick-make, toggle mechanism for manual operation, as well as automatic operation. The breakers shall have provisions for manually testing the tripping mechanism with the breaker removed from the panel. Automatic tripping shall be indicated by the breaker handle assuming a clearly distinctive position from the manual "on" and "off" positions.
  4. All breakers 15 ampere through 100 ampere shall be heating, air conditioning and refrigeration rated (HACR).
  5. Circuit breakers used as switches in 120V and 277V fluorescent lighting circuits, the circuit breakers shall be approved for such switching duty and shall be marked "SWD".
  6. 480Y/277V, 3 phase, 4 wire, panelboards shall have circuit breakers with bolt-in connections to the main buses. Interrupting rating of the branch breakers shall be 14,000 AIC, unless noted otherwise.
  7. 208Y/120V, 3 phase, 4 wire, panelboards shall have circuit breakers with bolt-in connections to the main buses. Interrupting rating of the branch breakers shall be minimum 10,000 AIC, unless noted otherwise.
  8. Provide breakers suitable for reverse-feed or back-feed where indicated for connection to green energy production systems such as solar photovoltaic or wind systems.

## PART 3 - EXECUTION

### 3.1 LIGHTING AND POWER PANELBOARDS

A. Shop drawing submittal shall include, but not be limited to, the following:

1. Cut sheets of the circuit breaker lighting and receptacle panelboards, construction, with circuit breaker type, amperage, poles and interrupting ratings, integrated equipment ratings and quantities clearly listed, and with bus amperage, voltage, phase and wires, and all associated accessories clearly indicated.
2. Additional information as required in Section 20 05 03.

B. INSTALLATION

1. Install panelboards and enclosures, as shown, including electrical connections, in accordance with the applicable requirements of NEC and recognized industry practices to ensure that products serve the intended function.
2. Coordinate installation of panelboards and enclosures with cable and raceways installation work.
3. Anchor enclosures firmly to walls and structural surfaces ensuring that they are permanently and mechanically secured. Provide unistrut racks where walls cannot support panels.
4. Refer to Section 20 05 05 for panelboard engraved nameplates.
5. Contractor shall provide a thermographic test using an independent testing laboratory. Refer to Section 26 05 07 for testing requirements.
6. Type the panelboard circuit directory card upon completion of work.
7. For renovation projects, provide a new circuit directory card for any and all panels where additions or modifications to existing circuits have been performed. The new circuit directory card shall show existing and new load descriptions. Directory card shall match existing load descriptions for any existing panelboard schedules on new panelboard inserts.

**END OF SECTION**

## SECTION 26 27 26

### WIRING DEVICES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary Conditions, Division 1, Division 20, and Drawings apply to all Work herein.
- B. Requirements of the following Division 20-28 Sections apply to this section:
  - 1. Basic Division 20-28 Requirements - Section 20 05 03
  - 2. Schedule of Submittal Data - Section 20 05 04
  - 3. General Division 20-28 Materials and Methods - Section 20 05 05
  - 4. Scope of Work - Section 26 05 01
  - 5. Testing - Section 26 05 07

##### 1.2 SCOPE

- A. General: Furnish and install wiring devices as shown, scheduled, specified, and required.
- B. Types: The types of wiring devices include, but are not limited to, the following:
  - 1. Receptacles
  - 2. Plugs
  - 3. Wall Switches
  - 4. Wall Plates
  - 5. Wall Box Dimmer Switches
- C. All wiring devices shall be side-wired.

##### 1.3 QUALITY ASSURANCE

- A. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:
  - 1. Hubbell
  - 2. Leviton
  - 3. Lutron
  - 4. Pass & Seymour-Legrand

## PART 2 - PRODUCTS

### 2.1 WIRING DEVICES – ALL TYPES

- A. All devices shall be specification grade or higher.
- B. Wiring device color shall be reviewed with the owner/architect and required local codes and standards.
  - 1. General purpose receptacles: Gray
  - 2. Isolated ground receptacles: Orange
  - 3. Emergency receptacles: Red
- C. All device wall plates shall be stainless steel.
- D. All wiring devices shall be rated for 20 amps minimum.

### 2.2 RECEPTACLES – NON-TAMPER RESISTANT

- A. Public facing duplex receptacles shall be flush, NEMA 5-20R, 20A, 125V, 3 wire, integral one-piece grounding backstrap, decorator style. Receptacles shall be specification grade.
- B. Non-public facing duplex receptacles in equipment rooms or similar locations shall be NEMA 5-20R, 20A, 125V, 3 wire, side and back wire, integral one-piece grounding backstrap, standard style. Fed Spec W-C-596. Receptacles shall be specification grade.

### 2.3 RECEPTACLES – TAMPER RESISTANT

- A. Duplex receptacles shall be flush, NEMA 5-20R, 20A, 125V, 3 wire, grounding, type. Receptacles shall be specification grade, decorator style, tamper resistant with Brass mounting strap.

### 2.3 RECEPTACLES – TYPICAL REQUIREMENTS

- A. Ground Fault Circuit Interruption (GFI) duplex receptacles wired to "normal" power circuits shall be flush, NEMA 5-20R, 20A, 125V, 2 pole, 3 wire, self-test technology, weather resistant duplex, decorator style with nominal sensitivity to earth leakage of 4-6 mill amperes, and feed through capabilities. Receptacles shall be specification grade.
- B. USB Charger type receptacles shall be 20A, 125V commercial specification grade, tamper resistant with two USB Type 2.0 ports, minimum 5.0A, 5V DC output total Decorator Type Duplex receptacle.
- C. Special receptacles shall be provided with NEMA configuration as shown on the drawings and a matching NEMA configuration plug for installation on the equipment cord.
- D. Twist lock receptacles shall be industrial grade Hubbell Twist-Lock Series, Leviton locking series, or Pass & Seymour "Black and White" series.

- E. All weatherproof duplex receptacles shall have cast aluminum or stainless steel weatherproof while-in-use cover with NEMA 3R rating and flip lid; Hubbell #WP26E series or approved equal.

#### 2.4 PLUGS

- A. Cord connectors and plugs with twist lock devices shall be industrial specification grade Hubbell Twist-Lock series, Pass & Seymour "Turnlock" series.
- B. Cord connectors and plugs with straight blade shall be specification grade Hubbell Insulgrip Plugs and Connector Bodies, Pass & Seymour "Black and White" series.

#### 2.5 WALL SWITCHES

- A. All locally switched lighting circuits in public areas, such as those areas accessible to employees, residents, or patrons shall be supplied with 20A, 120/277 Volt, specification grade, AC quiet, rated for 50,000 operations, decorator style rocker type switches as follows:
  - 1. Single pole rocker switches shall be Hubbell DS120X, Leviton #5621-2X.
  - 2. Double pole rocker switches shall be Hubbell DS220 X, Leviton #5622-2 X.
  - 3. Three-way rocker switches shall be Hubbell DS320 X, Leviton #5623-2 X.
  - 4. Four-way toggle switches shall be Hubbell DS420 X, Leviton #5624-2 X.
  - 5. Locally switched "emergency" power lighting circuits shall be supplied with toggle switches similar to "normal" power circuits specified above, except color shall be "red, Hubbell DSx20R series."
- B. All locally switched normal power lighting circuits in non-public areas, such as equipment rooms, shall be supplied with 20A, 120/277 Volt, specification grade, AC quiet, toggle type switches as follows:
  - 1. Single pole toggle switches shall be Hubbell #1221X, Pass & Seymour CSB20AC1X
  - 2. Double pole toggle switches shall be Hubbell #12212X, Pass & Seymour SB20AC2X.
  - 3. Three-way toggle switches shall be Hubbell #1223X, Pass & Seymour CSB20AC3X.
  - 4. Four-way toggle switches shall be Hubbell #1224X, Pass & Seymour CSB20AC4X.
  - 5. Locally switched "emergency" power lighting circuits shall be supplied with toggle switches similar to "normal" power circuits specified above, except color shall be "red".
- C. Key-operated switches shall be specification grade Hubbell #HBL1221LW, Leviton #1221-2WL with white key guide, or Pass & Seymour #PS20AC1L and shall meet all the requirements of the rocker type switches. Key-operated switches shall have full size key cylinders that shall utilize Fort Bend ISD standard key way locks. Coordinate with Fort Bend ISD for key way type.

- D. General purpose toggle type (snap) disconnect switches for single phase equipment (i.e., water heaters, etc.) shall be Hubbell #HBL3031-I, Pass & Seymour #PS30AC1-I, 30A 120/277-volt, grounding, and shall be mounted in metallic single gang box with coverplate, located adjacent to the unit or equipment being served.
- E. Timer switches shall be Intermatic #FD series, 125 Volt, 20 Amp, 3 Wire, 10 Amp @ 277V, 1 Horsepower or as specified on Drawings. Equals will be accepted.

## 2.6 WALL PLATES

- A. Device plates for single and multi-gang wiring devices in all areas shall be 302 stainless steel configured to match the installed device, unless specified otherwise. Multi-gang installations shall be provided with a common coverplate.
- B. Combination receptacle, TV and communication outlets shall be combined with a single wall plate to match each outlet.
- C. Twistlock receptacles shall be provided with a 302 stainless steel coverplate for interior spaces to match the installed device, Hubbell SS series.

## 2.7 WALL BOX DIMMER SWITCHES

- A. Where wall box dimmer switches are indicated or specified, they shall be solid-state, specification grade, with stainless steel coverplate to match adjacent wiring devices, as follows:
  - 1. 600W single pole, Lutron #NT-600.
  - 2. 1000W single pole, Lutron # NT-1000.
  - 3. 1500W single pole, Lutron # NT-1500.
  - 4. 1500W single pole, low voltage, Lutron #NTLV-1500

## PART 3 - EXECUTION

### 3.1 SUBMITTALS

- A. Submittals shall include, but not be limited to, the following:
  - 1. Cut sheets of the specified receptacles, wall switches, wall plates, dimmer switches, etc.
  - 2. Additional information as required in Section 20 05 03.

### 3.2 INSTALLATION

- A. Receptacles throughout shall be installed with the ground pin receiver in the "up" position.
- B. Special purpose switches and/or outlets not covered by the specifications but noted on the drawings shall be of the amperage, voltage rating, and NEMA configuration indicated. The switches and/or outlets shall be specification grade of the same quality as those specified.

- C. Coordinate with the owner the exact receptacle type required for owner furnished equipment.
- D. When equipment only, or J-Box only, is indicated for equipment, it shall be the responsibility of the Electrical Sub-contractor to obtain from the supplier, the complete data as related to the electrical portion of the equipment, including rough-ins, mounting height, type of outlet, items furnished by the supplier, etc. The Electrical Sub-contractor shall be responsible for furnishing and installing all materials that are usually the Electrical Subcontractor's responsibility with the installation of the equipment.
- E. For typical areas, multi-gang wall plates shall be used for each group of ganged devices. Mounting screws shall be installed for each device covered by the wall plate.
- F. Wall plates for concealed work shall be flush against the finished wall and shall completely cover the wall opening. Wall plates shall not be installed until all painting has been completed. Devices shall be protected by masking tape or other coverage until painting is complete. Any device with paint on it shall be replaced at no expense to the Owner.
- G. Where normal power and emergency power receptacles or switches are ganged together in one box, install a permanent partition to separate normal and emergency power.

**END OF SECTION**