

Architect's Supplemental Instructions

Architect's Project No:
04561.01

Architect's ASI No: 011

Project:
Webster University
Interdisciplinary Science
Building

Date Issued: 07/12/2016

Contract Date:

Reason Code: 05 A/E Scope

Discipline Code: 07 7 General Construction
(Architectural)

St. Louis
Baltimore
Boston
Buffalo
Calgary
Chicago
Houston
Los Angeles
Mumbai
New York
Phoenix
San Francisco
Shanghai
Toronto
Vancouver
Victoria
Washington DC

Owner:
Webster University

Architect:
Cannon Design
1100 Clark Avenue
St. Louis, MO 63102

Contractor:
Paric Construction

Contract For: General construction

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Indicate your acceptance of these instructions for minor change to the Work as consistent with the Contract Documents and return a copy to the Architect within fourteen (14) business days of the date of issuance of these instructions. If you feel a change in Contract Sum or Contract Time is warranted, please submit an itemized quotation for the changes for approval within fourteen (14) business days of the date of issuance of these instructions prior to proceeding on the Work. Proceeding with the Work in accordance with these instructions indicates your acknowledgement that there will be no change.

Attachments:

Specifications:
042000 - UNIT MASONRY

1100 Clark Avenue
St. Louis, Missouri
63102
T: 314.241.6250
F: 314.241.2570
www.cannondesign.com

Reason Codes:
#1. Jurisdictional Agency
#2. Constructor Driven
#3. Document Inconsistency
#4. Fast Track Driven
#5. A/E Scope
#6. Owners Scope
#7. Unforeseeable Conditions
#8. Other

Discipline Codes
#1. Demo-demolition
#2. Div1-Division 1 items on the spec book
(this item is not used)
#3. Electrical
#4. Elevator
#5. Equipment (Changes in equipment,
Owner Purchased)
#6. Fire Protection

Discipline Codes
#7. General Construction (Architectural)
#8. General Conditions (Div. 1)
#9. HVAC
#10. Other
#11. Plumbing
#12. Site Work/Landscaping
#13. Structural

Architect's Supplemental Instructions

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Description:

Added self-adhering flexible flashing to stainless steel sheet metal flashing where it has been welded, soldered, or there is a joint.

Please submit an itemized proposal for changes in contract Sum and Contract Time for proposed modifications to the Contract Documents described herein:

Issued by Architect:

Kelvin Patel, Cannon Design.

Accepted by Contractor:

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes unit masonry assemblies consisting of the following:
 - 1. Brick units.
 - a. Clay face brick.
 - 2. Mortar and grout materials.
 - 3. Reinforcement.
 - a. Masonry joint reinforcement.
 - 4. Ties and anchors.
 - 5. Embedded flashing materials, coordinate with Division 07 Section "Sheet Metal Flashing and Trim."
 - 6. Miscellaneous masonry accessories.
 - 7. **Non-Load bearing concrete masonry units (CMU's) (BP #3)**
- B. Products Installed but not Furnished under This Section:
 - 1. Steel lintels in unit masonry.
 - 2. Steel shelf angles for supporting unit masonry.
 - 3. Cavity wall insulation.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Sustainable Design Submittals:
 - 1. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
- C. Shop Drawings: For the following:
 - 1. Special Brick Shapes: Provide minimum 1/2 inch = 1 foot drawings indicating special shapes prior to fabrication.
 - 2. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
 - 4. **Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls. (BP #3)**
- D. Samples for Verification: For each type and color of the following:
 - 1. concrete masonry units.
 - 2. Clay face brick, in the form of straps of five or more bricks.
 - 3. Special brick shapes.
 - 4. mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
 - 5. Weep vents.

1.3 INFORMATIONAL SUBMITTALS

- A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- B. Material Certificates: For each type and size of the following:
1. Masonry units.
 - a. For exposed brick, include test report for efflorescence according to ASTM C 67.
 2. Cementitious materials. Include name of manufacturer, brand name, and type.
 3. Preblended dry mortar mixes. Include description of type and proportions of ingredients.
 4. Joint reinforcement.
 5. Anchors, ties, and metal accessories.

1.4 QUALITY ASSURANCE

- A. Sample Panels: **Construct sample panels in accordance with Division 01 Section "Quality Assurance."** ~~Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.~~
1. ~~Build sample panels for each type of exposed unit masonry construction in sizes approximately 60 inches (1500 mm) long by 48 inches (1200 mm) high by full thickness, including insulation, AVB, sheathing and studs.~~
 2. ~~Build sample panels facing south.~~
 3. ~~Clean one half of exposed faces of panels with masonry cleaner indicated.~~
 4. ~~Protect approved sample panels from the elements with weather-resistant membrane.~~
 5. ~~Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.~~
 - a. ~~Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing. ADD 1-1~~
- B. Mockups: **Construct mockups in accordance with this Section and Division 01 Section "Quality Assurance." Test mockups in accordance with Division 08 Section "Structural Sealant Glazed Curtainwall."** ~~Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.~~
1. ~~Build mockups for typical exterior wall in sizes approximately 96 inches (2400 mm) wide by long by (72 inches) (1800 mm) high by full thickness, including face and backup wythes and accessories.~~
 - a. ~~Include a sealant-filled joint at least 16 inches (400 mm) long in exterior wall mockup.~~
 - b. ~~Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches (300 mm) wide by 16 inches (400 mm) high.~~

- ~~c. — Include through-wall flashing installed for a 24-inch (600-mm) length in corner of exterior wall mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit masonry above half of flashing).~~
- ~~d. — Include metal studs, sheathing, water-resistive barrier, sheathing joint and penetration treatment, veneer anchors, flashing, cavity drainage material, and weep holes in exterior masonry veneer wall mockup.~~
- ~~e. — Include window opening.~~
- ~~2. — Protect accepted mockups from the elements with weather-resistant membrane.~~
- ~~3. — Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.~~
 - ~~a. — Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.~~
 - ~~b. — Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.~~
- ~~4. — Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion. ADD 1-1~~

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three (3) days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry and will be within 20 feet (6 m) vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to Authorities Having Jurisdiction.
 - 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.3 BRICK

- A. Regional Materials: Brick shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. General: Provide shapes indicated and as follows:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where:
 - a. Provide special shapes in dimensions coordinated with base bid and alternates to accommodate geometry indicated on plan drawings without mitered masonry joints and maintain bond pattern. Refer to section details on drawings and as indicated below.
 - b. Stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.

- c. Requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
- d. Shapes produced by sawing would result in sawed surfaces being exposed to view.
- e. Lintel/shelf angle lip brick; used at all shelf angles and loose lintels.
- f. Lintel/shelf angle brick left corners; used at all shelf angles.
- g. Lintel/shelf angle brick right corners; used at all shelf angles.
- h. Solid brick at top of wall as indicated on drawings.

C. Clay Face Brick:

- 1. Basis of Design Brick Type #1: ASTM C-216, Grade SW, Type FBS.
 - a. Ragland Clay Products, LLC - Architectural Line - Full Range Select Smooth.
 - b. Size: Modular
 - c. Bond Pattern: Running bond.
 - d. Mortar:
 - 1) Batch plant mixed colored mortar ~~with integral water repellent~~. **ADD 1-1**
 - 2) Color: custom color to match red brick.
 - 3) Type: N.

2.4 MORTAR AND GROUT

- A. Regional Materials: Aggregate for mortar and grout, cement, and lime shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.
- B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Mortar Cement: ASTM C 1329.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 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. Davis Colors; True Tone Mortar Colors.
 - b. Solomon Colors, Inc.; SGS Mortar Colors.
- F. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
- G. Water: Potable.
- H. Aggregate for Grout: ASTM C 404. (BP #3)**

2.5 REINFORCEMENT

- A. Engineered Masonry Reinforcement: Provide engineered reinforcement where dimension from back of face brick to face of CMU **or face of stud walls** exceed 4-1/2 inches.

1. Delegated Design: Design engineered masonry reinforcement by comprehensive engineering analysis by qualified professional engineer registered in the state where the Project is located using performance requirements and design criteria indicated.
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
 1. Exterior Walls: Hot-dip galvanized carbon.
 2. **Interior Walls: Hot-dip galvanized, carbon steel. (BP #3)**
- ~~C. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry Veneer Anchors: Single 0.187-inch (4.76 mm) diameter, hot-dip galvanized carbon steel continuous wire. ADD 1-1~~
- D. **Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420). (BP #3)**
- E. **Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated. (BP #3)**
 1. **Products:: Subject to compliance with requirements, provide one of the following:**
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner. (BP #3)
- F. **Masonry Joint Reinforcement for Single-Wythe Masonry: Ladder with single pair of side rods. (BP #3)**
- G. **Reinforcement Fabrication: Fabricate bars used in masonry reinforcement in accordance with the fabricating tolerances of ACI 315. (BP #3)**
 1. **Unless otherwise required, bend bars cold; do not heat bars.**
 2. **Minimum Inside Diameter of Bend for Stirrups: 5 bar diameters.**
 - a. **Do not bend Grade 40 bars in excess of 180 degrees. (BP #3)**
 3. **Minimum Inside Bend Diameter for Other Bars:**
 - a. **No. 3 through No. 8 (M#10 through 25): 6 bar diameters.**
 - b. **No. 9 through No. 11 (M#29 through 36): 8 bar diameters. (BP #3)**
 4. **Provide standard hooks that conform to the following:**
 - a. **180-Degree Hook: 180-degree bend plus minimum extension of 4 bar diameters or 2-1/2 inches (64 mm) whichever is greater.**
 - b. **135-Degree Hook: 135 -degree bend plus minimum extension of 6 bar diameters or 4 inches (102 mm) whichever is greater.**
 - c. **90-Degree Hook: 90-degree bend plus minimum extension of 12 bar diameters.**
 - d. **For stirrups: a 90 degree or 135 degree bend plus a minimum of 6 bar diameters or 2-1/2 in. (64 mm) whichever is greater. (BP #3)**
 5. **Fabricate joint reinforcement, anchors, and ties in accordance with requirements specified in this Section and with published specifications of accepted manufacturer. (BP #3)**

2.6 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.
- Wire Ties: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.
- B. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
- Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
 - Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
 - Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Adjustable Masonry-Veneer Anchors
- General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
 - ~~**Seismic Masonry Veneer Anchors: Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in the veneer mortar joint.**~~
 - ~~**Products: Subject to compliance with requirements, provide the following:**~~
 - ~~**Hohmann & Barnard, Inc.; DW-10-X Seismiclip.**~~
 - ~~**Anchor Section: Gasketed sheet metal plate, 1 1/4 inches (32 mm) wide by 6 inches (150 mm) long, with screw holes top and bottom; top and bottom ends bent to form pronged legs to bridge insulation or sheathing and contact studs; and raised rib-stiffened strap, 5/8 inch (16 mm) wide by 6 inches (150 mm) long, stamped into center to provide a slot between strap and plate for inserting wire tie. Provide anchor manufacturer's standard, self-adhering, modified bituminous gaskets manufactured to fit behind anchor plate and extend beyond pronged legs.**~~
 - ~~**Connector Section: Triangular wire tie and rigid PVC extrusion with snap-in grooves for inserting continuous wire. Size wire tie to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face.**~~
 - ~~**Fabricate sheet metal anchor sections and other sheet metal parts from 0.097-inch (2.5 mm) thick, steel sheet, galvanized after fabrication.**~~
 - ~~**Fabricate wire connector sections from 0.188-inch (4.8 mm) diameter, hot-dip galvanized, carbon steel wire. ADD 1-1**~~
 - Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.**
 - Products: Subject to compliance with requirements, provide one of the following:**
 - Heckmann Building Products Inc.; Pos-I-Tie.**

- 2) **Hohmann & Barnard, Inc.; 2-Seal Tie with Byna-Lok Wire Tie.**
- 3) **Wire-Bond; SureTie**

- b. **Anchor Section: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to serve as head for drilling fastener into framing. Barrel length to suit insulation and sheathing thickness.**
- c. **Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.25-inch-diameter, hot-dip galvanized steel wire. ADD 1-1**

- D. **Partition Top anchors: 0.105-inch-thick metal plate with 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication. (BP #3)**

2.7 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual " and as follows:
 - 1. Stainless Steel: ASTM A 666, Type 304, 0.016 inch (0.4 mm) thick.
 - 2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.6 m). Provide splice plates at joints of formed, smooth metal flashing.
 - 3. Fabricate through-wall flashing with 1/4 inch drip edge, unless otherwise indicated.
 - 4. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
 - 5. Provide shop-fabricated and soldered inside and outside corners.
- B. Solder and Sealants for Sheet Metal Flashings:
 - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn50, with acid flux of type recommended by stainless-steel sheet manufacturer.
 - 2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- D. **Self-Adhered Flashing: Where stainless steel has been welded, soldered, or there is a joint, apply Carlisle Coatings & Waterproofing Aluma-Grip 701 to the joint with a minimum of 3 inches of coverage on both sides of the joint. (ASI #011)**

2.8 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.
- B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- C. Weep/Vent Products: Use the following, unless otherwise indicated:
 - 1. Polyester Mesh: 90% open, non-woven polyester mesh to fill open head joints at the base and head of the wall.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) CavClear: Weep Vents.

2) Mortar Net: WeepVent.

- D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Provide one of the following configurations:
 - a. Strips, full-depth of cavity and 10 inches (250 mm) wide, with dovetail shaped notches 7 inches (175 mm) deep that prevent mesh from being clogged with mortar droppings.
 2. Products: Subject to compliance with requirements, provide the following:
 - a. Mortar Net Solutions; Mortar Net.

- E. ***Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated. (BP #3)***

2.9 CAVITY-WALL INSULATION

- ~~A. Extruded Polystyrene Board Insulation with Increased R-Value: ASTM C 578, Type IV, but with an aged thermal resistance (R-value) for 1-inch thickness of 5.6 deg F x h x sq-ft./Btu at 75 deg F at 5 years; closed-cell product with a carbon black filler and extruded with an integral skin. ADD 1-5~~
- B. ***Polyisocyanurate Board Insulation: ASTM C 1289.***
- ~~1. Provide high impact styrene drainage panels with non-woven drainage fabric bonded to exterior face. ADD 1-6~~
 - a. ***Products: Subject to compliance with requirements, provide the following:***
 - 1) ***Hunter Xci CG panels.***
 2. ***Adhesive: Type recommended by insulation board manufacturer for application indicated. ADD 1-5***

2.10 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use Portland cement-lime mortar, unless otherwise indicated.
 3. For exterior masonry and reinforced masonry, use portland cement-lime.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type S.
 2. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 - ~~3. For interior non-load-bearing partitions, Type O may be used instead of Type N. ADD 1-1~~

D. Grout for Unit Masonry: Comply with ASTM C476.

- 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.**
- 2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).**
- 3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M. (BP #3)**

2.11 CONCRETE MASONRY UNITS (CMUs)

- A. Regional Materials: CMUs shall be manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.**
- B. Non-Load-Bearing CMUs: ASTM C 129.**
- 1. Density Classification: Lightweight.**
 - 2. Size: 7-5/8-inches by 7-5/8-inches by 15-5/8-inches(162 by 162 by 365 mm).**
 - 3. Exposed Faces: Provide manufacturer's standard color and texture suitable for paint finish. (BP #3)**
- C.**

PART 3 - EXECUTION

3.1 EXAMINATION

- A.** Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - Verify that foundations are within tolerances specified.
 - Verify that substrates are free of substances that impair mortar bond.
- B.** Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C.** Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A.** Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B.** Build chases and recesses to accommodate items specified in this and other Sections.
- C.** Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D.** Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E.** Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.
- F. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements - Maximum Variation:

1. Dimensions in Cross Section or Elevation: Plus 1/2-inch (12 mm) or minus 1/4-inch (6 mm).
2. Location of Elements in Plan - From That Indicated: Plus or minus 1/2-inch (12 mm) or plus 3/4-inch (19 mm) maximum.
3. Location of Elements in Elevation - From That Indicated: Plus or minus 1/4-inch (6 mm) in a story height or 3/4-inch (19 mm) total.
4. Grout Space or Cavity Width: Plus 3/8-inch (9.5 mm) or minus 1/4-inch (6 mm).

B. Lines and Levels - Maximum Variation:

1. Bed Joints and Top Surfaces of Bearing Walls - From Level: 1/4-inch in 10 feet (6 mm in 3 m), or 1/2-inch (12 mm) maximum.
2. Conspicuous Horizontal Lines (such as lintels, sills, parapets, and reveals) From Level: 1/8-inch in 10 feet (3 mm in 3 m), (1/4-inch in 20 feet) (6 mm in 6 m), or 1/2-inch (12 mm) maximum.
3. Vertical Lines and Surfaces - From Plumb: 1/4-inch in 10 feet (6 mm in 3 m), (3/8-inch) (9.5 mm) (in 20 feet) (9 mm in 6 m), or 1/2-inch (12 mm) maximum.
4. Conspicuous Vertical Lines (such as external corners, door jambs, reveals, and expansion and control joints) - From Plumb: 1/8-inch in 10 feet (3 mm in 3 m), (1/4-inch in 20 feet) (6 mm in 6 m), or 1/2-inch (12 mm) maximum.
5. Lines and Surfaces - From Straight: 1/4-inch in 10 feet (6 mm in 3 m), (3/8-inch) (9.5 mm) (in 20 feet) (9 mm in 6 m), or 1/2-inch (12 mm) maximum.
6. Vertical Alignment of Exposed Head Joints - From Plumb: 1/4-inch in 10 feet (6 mm in 3 m), or 1/2-inch (12 mm) maximum.
7. Faces of Adjacent Exposed Masonry Units - From Flush Alignment: 1/16-inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.
8. Alignment of Columns and Walls (Bottom Versus Top): 1/2-inch (12 mm) for bearing walls and 3/4-inch (19 mm) for non-bearing walls.

C. Joints - Maximum Variation:

1. Bed Joints - From Thickness Indicated: Plus or minus 1/8-inch (3 mm), with a maximum thickness limited to 1/2-inch (12 mm).
2. Exposed Bed Joints - From Bed-Joint Thickness of Adjacent Courses: 1/8-inch (3 mm).
3. Head and Collar Joints - From Thickness Indicated: Plus 3/8-inch (9 mm) or minus 1/4-inch (6 mm).
4. Exposed Head Joints - From Thickness Indicated: Plus or minus 1/8-inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8-inch (3 mm).
5. Exposed Bed Joints and Head Joints of Stacked Bond - From a Straight Line: 1/16-inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches (100-mm). Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above, unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. ***Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c., unless otherwise indicated. (BP #3)***

3.5 MORTAR BEDDING AND JOINTING

- A. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- B. Set trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Wet joint surfaces thoroughly before applying mortar.
 - 3. Rake out mortar joints for pointing with sealant.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.6 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
 - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints as follow unless otherwise required to suit coursing or to comply with requirements of authorities having jurisdiction and applicable building codes. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.
 - a. Adjustable 2-Piece Ties: One metal tie for 1.77 sq. ft. (0.16 sq. m) of wall area spaced not to exceed 16 inches (406 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically.

- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with ~~seismic~~ masonry-veneer anchors to comply with the following requirements: **ADD 1-1**
 - 1. Fasten screw-attached ~~and seismic~~ anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener. **ADD 1-1**
 - 2. Embed connector sections and continuous wire in masonry joints.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than one anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.
- B. Provide not less than 1-1/4 inch (25 mm) of airspace between back of masonry veneer and face of insulation.
 - 1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
 - 1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 - 2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
 - 3. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Form expansion joints in brick as follows:
 - 1. Build in compressible joint fillers where indicated.
 - 2. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

- D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch (10 mm).

3.9 LINTELS

- A. Install steel lintels where indicated. Refer to Section 055000 "Metal Fabrications" for steel lintels.

3.10 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- B. Flashing: Install flashing as follows, unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations and joints in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of substrate at least 8 inches (200 mm); with upper edge tucked in reglet and under air barrier lapping at least 4 inches (100 mm). Deform horizontal portion of through wall flashing with ball peen hammer prior to setting brick.
 - 3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2-1/2 inches (50 mm) to form end dams.
 - 4. Interlock end joints of ~~ribbed~~ sheet metal flashing by overlapping ~~ribs~~ not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated. **ADD 1-1**
 - 5. Extend flashing to 1/4 inch beyond face of brick.
 - 6. Lap flashing a minimum of 6 inches and bed lap in five beads of sealant installed parallel to the lap joint.
- C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
 - 1. Use specified weep/vent products to form weep holes.
 - 2. Space weep holes 24 inches (600 mm) o.c., unless otherwise indicated.
- E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in Part 2 "Miscellaneous Masonry Accessories" Article.
- F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.
 - 1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.
- G. ***Install self-adhering flexible flashing to stainless steel sheet metal in accordance with manufacturer's written instructions. (ASI #011)***

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting:

1. **~~Owner-Contractor~~** will engage qualified, independent special inspectors and testing agency to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense. **ADD 1-1**
 2. Refer to "Testing Agency Qualifications" in "Quality Assurance" article in Part 1 - General above for testing agency requirements.
 3. **Refer to "Field Quality Control" in Division 08 Section "Structural Sealant Glazed Curtainwalls" for testing requirements and areas to be tested on the building.**
 4. **Contractor to test all flashing laps and end dams by placing a glazing putty containment wall around the flashing seam and filling it with water for a two hour duration. If no leaks occur, brick installation may proceed. ADD 1-1**
- B. Inspections: Level 1 and Level 2 special inspections according to the "International Building Code."
1. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 2. Place grout only after inspectors have verified proportions of site-prepared grout.
 3. Testing Prior to Construction: One set of tests.
- C. Inspections: Special inspections according to Level [B] [C] in TMS 402/ACI 530/ASCE 5.
1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (465 sq. m) of wall area or portion thereof.
- E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- 3.12 REPAIRING, POINTING, AND CLEANING
- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. Air Barriers: Repair any damage to air barriers resulting from masonry construction at no additional cost to Owner in compliance with following requirements:
1. Seal penetrations in air barrier created by screws or other fasteners used to secure veneer in accordance with recommendations of air barrier manufacturer and as directed by air barrier installer. Provide all repair work necessary and as required to ensure continuance of applicable warranties for the air barrier.
 2. Seal holes or tears in air barrier resulting from masonry construction in accordance with the instructions and recommendations of air barrier installer and air barrier manufacturer. Provide all repair work necessary and as required to ensure continuance of applicable warranties for the air barrier.
 3. Test repairs to air barrier for air tightness and water tightness to ensure repaired air barrier complies with requirements specified in applicable air barrier technical sections. Submit field test reports to Architect.

- a. Repeat testing and additional repair efforts until testing results are acceptable and demonstrate compliance with specified requirements for air barrier. Do not proceed with additional masonry construction until repair and testing of repaired air barrier demonstrate compliance with specified air barrier requirements.
- 4. Prior to beginning masonry construction, obtain inspection by air barrier manufacturer of proposed construction and field conditions and obtain letter of acceptance from air barrier manufacturer, submitting copy of letter to Architect.
- D. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- E. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.13 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Do not dispose of masonry waste as fill within (450 mm) of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000