SECTION 04815 – GLASS UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior glass unit masonry assemblies.

B. Related Sections include the following:

1. Division 3 Section “Plant – Precast Architectural Concrete” recessed area’s to receive field applied glass unit masonry assemblies.
2. Division 4 Section "Unit Masonry Assemblies" for masonry walls surrounding the glass unit masonry assemblies.
3. Division 5 Section "Metal Fabrications" for steel channel frames and loose steel lintels at glass unit masonry assemblies.
4. Division 7 Section "Joint Sealants" for sealants installed in joints of glass unit masonry assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include glass block, cementitious materials, waterproofing admixtures for mortar, and accessories.

B. Samples for Initial Selection: Manufacturer's actual glass-block units for each form, pattern, and color indicated and mortar samples showing the full range of colors available.

1.4 QUALITY ASSURANCE

A. Source Limitations for Glass Block: Obtain each type and pattern of glass block through one source from a single manufacturer.

B. Source Limitations for Accessory Materials: Obtain each cementitious material, admixture, and accessory component from a single manufacturer and each aggregate from one source or producer.

C. Product Designations: Drawings indicate size, designs, colors, and other characteristics by referencing indicated manufacturer's trade designations. Other manufacturers' products of equal characteristics complying with requirements may be considered. Refer to Division 1 Section "Substitutions."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store glass block in unopened cartons on elevated platforms, under cover, and in a dry location.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation of glass unit masonry assemblies only when ambient and material temperatures are 40 deg F and rising.

1. Maintain temperature in installation areas at 40 deg F or above for 48 hours after installing.

1.7 SEQUENCING AND SCHEDULING

A. Sequence and coordinate completion of glass unit masonry assemblies so sealants can be installed immediately after mortar has attained final set.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hollow Glass Block:
   a) Oberland Glas AG, Bauglas Div.; Solaris Glasstein.
   b) Pittsburgh Corning Corporation.
   c) Vegla Vereinigte Glaswerke GmbH (Saint-Gobain).
   d) Weck: J. Weck GmbH u. Co.
   e) Circle-Redmont, Inc.
2. Portland Cement, Masonry Cement, and Portland Cement-Lime Mix:
   a) Blue Circle Cement.
   b) Essroc Materials, Inc.
   c) Glen-Gery Corporation.
   d) Holnam, Inc.
   e) Lafarge Corporation.
   f) Lehigh Portland Cement Co.
   g) National Cement Company, Inc.
   h) Riverton Corporation (The).
   i) Southdown, Inc.
3. Mortar Pigments:
   a) Davis Colors.
   b) Lafarge Corporation.
   c) Solomon Grind-Chem Services, Inc.
4. Water-Repellent Admixtures:
   a) Hydrocide Powder; Sonneborn, Div. of ChemRex, Inc.

b) Mortar Tite; Addiment Inc.

c) Dry-Block Mortar Admixture; W. R. Grace & Co., Construction Products Division.

d) Rheopel; Master Builders.

2.2 GLASS BLOCK

A. Hollow Glass Block: Non-load-bearing blocks made by fusing together two halves of pressed glass to produce partially evacuated hollow units complying with the following requirements for color, pattern, size, and other characteristics:

1. Glass Colors: Colorless
2. Patterns: Manufacturer's standard pattern with light-diffusive wavy design on inner faces, and smooth outer faces.
3. Edge Coating: Manufacturer's standard edge coating.
4. Square Unit Sizes: Actual sizes as indicated below:

a) 7-3/4 inches square by 2 inches thick.

2.3 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, natural color, white, or a blend to produce mortar color indicated.

1. Where joints are indicated to be raked out and pointed, gray cement may be used for setting mortar.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.

1. For pigmented mortar, use colored portland cement-lime mix of formulation required to produce color indicated or, if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 10 percent of portland cement by weight for mineral oxides or 2 percent for carbon black.

D. Masonry Cement: ASTM C 91.

1. For pigmented mortar, use colored masonry cements of formulation required to produce color indicated or, if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 5 percent of masonry cement by weight for mineral oxides or 1 percent for carbon black.

E. Aggregate: ASTM C 144 and as indicated below:

1. For pointing mortar and joints narrower than 1/4 inch, use aggregate graded with 100 percent passing No. 16 sieve.
2. White Aggregates: Natural white sand or ground white stone.
3. Colored Aggregates: Natural colored sand or ground marble, granite, or other durable stone, as required to match Owner’s sample.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in glass-block masonry mortar.

G. Water-Repellent Admixture: Liquid polymeric water-repellent mortar admixture that does not reduce flexural bond strength of mortar.

H. Water: Potable.

2.4 GLASS UNIT MASONRY ACCESSORIES

A. Panel Reinforcement: Ladder-type units, butt welded, not lapped and welded, complying with ASTM A 951 in straight lengths of not less than 10 feet, and as follows:

1. Stainless-steel wire for exterior walls.
2. Wire Size: W1.7 or 0.148-inch diameter.
3. Spacing of Side Rods: 1-3/4 inches o.c.
4. Spacing of Cross Rods: Not more than 16 inches apart.

B. Panel Anchors: Glass-block manufacturer's standard perforated steel strips, 0.0359 inch by 1-3/4 inches wide by 24 inches long, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.

C. Asphalt Emulsion: Cold-applied asphalt emulsion complying with ASTM D 1187 or ASTM D 1227.

1. Product: Subject to compliance with requirements, provide "Karnak 100" by Karnak Corp.

D. Sealants and related materials, including primers, cylindrical sealant backing, and bond-breaker tape, are specified in Division 7 Section "Joint Sealants."

E. Plastic-Foam Expansion Strips: Polyethylene foam complying with requirements of glass-block manufacturer; 3/8 inch thick by 4 inches .

F. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M; of diameter and length indicated.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.5 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, or antifreeze compounds, unless otherwise indicated. Do not use calcium chloride.

1. Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer, unless otherwise indicated. Mix mortar to produce a stiff but workable consistency that is drier than mortar for brick or concrete masonry. Discard mortar when it has reached initial set.

B. Mortar for Glass Unit Masonry Assemblies: Provide mortar, mixed according to glass-block manufacturer's listing with testing and inspecting agency, for fire-resistance rating indicated.

1. For mortar in exterior panels, use water-repellent admixture according to admixture manufacturer's written instructions.

C. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required.

1. Mix to match Owner's sample.
2. Limit mineral-oxide pigments to no more than 10 percent of cement content by weight.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine sills, jambs, and heads surrounding glass unit masonry assemblies for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Advise installers of other construction about specific requirements for placement of dovetail slots and other inserts required to anchor and support glass unit masonry assemblies. Furnish installers of other construction with Drawings or templates showing locations of these items.

3.3 GLASS UNIT MASONRY ASSEMBLY CONSTRUCTION

A. Apply a heavy coat of asphalt emulsion to sill and adhere expansion strips to jambs and heads with asphalt emulsion. Allow asphalt emulsion to dry before placing mortar. Trim expansion strips to width required to fit glass block and to full lengths of heads and jambs.

B. Set glass block with completely filled bed and head joints, with no furrowing, accurately spaced and coordinated with other construction. Maintain 1/4-inch exposed joint widths, unless otherwise indicated.

C. Install panel reinforcement in horizontal joints at spacing indicated and continuously from end to end of panels; comply with the following requirements:

1. Vertical Spacing of Panel Reinforcement for Exterior Panels: Every other course but not more than 16 inches o.c., starting with first course above sill .
2. Do not bridge expansion joints with panel reinforcement.
3. Lap panel reinforcement not less than 6 inches if more than one length is necessary.
4. Embed panel reinforcement in mortar bed by placing lower half of mortar bed first, pressing panel reinforcement into place and covering with upper half of mortar bed, and then troweling it smooth.

D. Install panel anchors at locations indicated and in same horizontal joints where panel reinforcement occurs. Extend panel anchors at least 12 inches into joints, and bend within expansion joints at edges of panels and across the head. Attach panel anchors as follows:

1. For in-place unit masonry assemblies, attach panel anchors with 1/4-inch-diameter expansion anchors, 2 per panel anchor.
2. For new unit masonry assemblies, embed other ends of panel anchors, after bending portions crossing expansion joint, in horizontal mortar joints closest in elevation to joints in glass unit masonry assemblies containing panel anchors.
3. For steel members, attach panel anchors with 1/4-inch-diameter steel bolts in tapped holes in steel members.

E. Use rubber mallet to tap units into position. Do not use steel tools, and do not allow units to come into contact with metal accessories and frames.

F. Use plastic spacers or temporary wedges in mortar joints to produce uniform joint widths and to prevent mortar from being squeezed out of joints.

G. Keep expansion joints free of mortar.

H. Pointing of joints with sealant, including installation of primer and bond-breaker tape or cylindrical sealant backing, is specified in Division 7 Section "Joint Sealants."

I. Tool exposed joints slightly concave when pointing mortar is thumbprint hard. Use a smooth plastic jointer larger than joint width.

J. Remove temporary wedges, if used, and fill voids with mortar.

K. Clean glass unit masonry assemblies as work progresses. Remove mortar fins and smears immediately, using a clean, wet sponge or a scrub brush with stiff fiber bristles. Do not use harsh cleaners, acids, abrasives, steel wool, or wire brushes when removing mortar or cleaning glass unit masonry assemblies.

L. Installation of sealant at jambs, heads, mullions, and other locations indicated, including installation of primer and bond-breaker tape or cylindrical sealant backing, is specified in Division 7 Section "Joint Sealants."

M. Construction Tolerances: Set glass block to comply with the following tolerances:

1. Variation from Plumb: For lines and surfaces of vertical elements and arris, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more.
2. Variation from Level: For bed joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
3. Variation of Linear Building Line: For positions shown in plan and related portions of walls and partitions, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.
4. Variation in Mortar-Joint Thickness: Do not vary from joint thickness indicated by more than plus or minus 1/16 inch.

3.4 CLEANING

A. On surfaces adjacent to glass unit masonry assemblies, remove mortar and other residue resulting from glass-block installation, in a manner approved by manufacturers of materials involved.

B. Remove excess sealants with commercial solvents of type recommended by sealant manufacturer. Exercise care not to damage sealant in joints.

C. Perform final cleaning of glass unit masonry assemblies when surface is not exposed to direct sunlight. Start at top of panel using generous amounts of clean water. Remove water with clean, dry, soft cloths; change cloths frequently to eliminate dried mortar particles and aggregate.

END OF SECTION 04815