

SECTION 044313.13 - ANCHORED STONE MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stone masonry anchored to concrete or unit masonry backup.

1.2 ACTION SUBMITTALS

A. Product Data: For each variety of stone, stone accessory, and manufactured product. Manufacturer's specification and data sheets for each type of product indicated, including:

1. Samples for Verification: For each stone type indicated, provide at least two Samples in each set and show the full range of color and other visual characteristics in completed work.
 - a. A 2'x2' approximate portable size sample board should be submitted for each product specification.
 - b. Include manufacturer's color selection charts showing the full range of colors available for each stone veneer product exposed to view.
2. Shop Drawings: Provide detailed cut sheets of Manufactured Stone products and fastening methods to be used.
3. Manufacturer's Certificate: Certify that products meet those requirements set forth in the ICCES Testing Requirements for Manufactured Stone Masonry, including all related product testing and building codes.
4. Closeout Submittals: Submit following items:
 - a. Maintenance Instructions
 - b. Storage and Handling Recommendations
 - c. Quality Stone Veneer Installation and Product Warranties

1.3 FIELD CONDITIONS

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work.
- B. Delivery, storage and handling:
 1. Delivery: Coordination of onsite delivery to be planned in advance between Quality Stone Veneer Shipping Department and on-site project team to determine staging area and placement of materials in order to avoid work delays.
 2. Store and handle products in manufacturer's unopened packaging until ready for installation in order to prevent damage from moisture, temperature or outside forces.
 3. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 LIMESTONE

- A. Material Standard: Comply with ASTM C568/C568M.
 - 1. Classification: **[I Low Density] [II Medium Density] [II Medium Density, except as follows: absorption, 5 percent by weight maximum; density, 150 lb/cu. ft. minimum; compressive strength, 8000 psi minimum; and modulus of rupture 800 psi minimum] [III High Density].**
- B. Varieties and Sources: Subject to compliance and approval by the Engineer.

2.2 OTHER STONE

- A. Material Standards:
 - 1. Maximum Absorption in accordance with ASTM C97/C97M: **[7.5] [3]**
 - 2. Minimum Compressive Strength in accordance with ASTM C170/C170M: **[4000 psi].**
- B. Varieties and Sources: Subject to compliance and approval by the Engineer.

2.3 MORTAR MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.
 - 1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Masonry Cement: ASTM C91/C91M.
- D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in stone masonry mortar.

- E. Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix produces color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments do not exceed 10 percent of portland cement by weight.
- F. Colored Masonry Cement Mix: Packaged blend of masonry cement and mortar pigments. Mix produces color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments do not exceed 5 percent of masonry cement by weight.
- G. Aggregate: ASTM C144 and as follows:
 - 1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.
 - 2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
- H. Water: Potable.

2.4 VENEER ANCHORS

- A. Materials:
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M; with ASTM A153/A153M, Class B-2.
 - 2. Stainless Steel Wire: ASTM A580/A580M, [**Type 304**].
 - 3. Hot-Dip Galvanized-Steel Sheet: ASTM A1008/A1008M, cold-rolled, carbon-steel sheet, hot-dip galvanized after fabrication to comply with ASTM A153/A153M, Class B-2.
 - 4. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, [**Type 304**].
- B. Size: Sufficient to extend at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face.
- C. Wire Veneer Anchors: Wire ties formed from W1.7 or 0.148-inch-diameter, [**hot-dip galvanized**] steel wire.
- D. Corrugated-Metal Veneer Anchors: Not less than [**0.030-inch**] thick by 7/8-inch-wide [**hot-dip galvanized**] [**stainless**] steel sheet with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch.
- E. Adjustable Masonry-Veneer Anchors:
 - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
 - 2. Fabricate sheet metal anchor sections and other sheet metal parts from [**0.075-inch-thick steel sheet, galvanized after fabrication**] [**0.105-inch-thick steel sheet, galvanized after fabrication**] [**0.078-inch-thick, stainless-steel sheet**] [**0.109-inch-thick, stainless-steel sheet**].
 - 3. Fabricate wire ties from [**0.187-inch-**] diameter, [**hot-dip galvanized-steel**] [**stainless steel**] wire unless otherwise indicated.

4. Fabricate wire connector sections from **[0.187-inch-]** diameter, **[hot-dip galvanized-steel] [stainless steel]** wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
6. Masonry-Veneer Anchors; Slotted Plate: Sheet metal anchor section, with screw holes at top and bottom; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie. **[Use self-adhering tape to seal penetration behind anchor plate.]**
7. Masonry-Veneer Anchors; Slotted Plate with Prongs: Sheet metal anchor section, with screw holes at top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie. **[Use self-adhering tape to seal penetration behind anchor plate.]**
8. Masonry-Veneer Anchors; Single-Barrel Screw: Self-drilling, single-barrel screw designed to receive wire tie. Screw has a smooth barrel the same thickness as insulation **[with factory-installed gasketed washer to seal at face of insulation and sheathing] [and a coating to reduce thermal conductivity]**.
9. Masonry-Veneer Anchors; Single-Barrel Screw with Double-Pintle Wingnut: Self-drilling, single-barrel screw with **[wingnut head] [thermally resistant wingnut head] [thermally resistant clip]** designed to receive double-pintle wire tie. Screw has a smooth barrel the same thickness as insulation **[with factory-installed gasketed washer to seal at face of insulation and sheathing] [and a coating to reduce thermal conductivity]**.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from **[neoprene] [urethane] [or] [PVC]**.
- B. Cementitious Damp proofing **[for Limestone]**: Cementitious formulation recommended by ILI and nonstaining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.
- C. Asphalt Dampproofing: **[Cut-back asphalt complying with ASTM D4479/D4479M, Type I] [or] [asphalt emulsion complying with ASTM D1227, Type III or Type IV]**.
- D. Weep/Vent Products: Use **[one of]** the following unless otherwise indicated:
 1. Wicking Material: Absorbent rope, made from **[cotton] [or] [UV-resistant synthetic fiber]**, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity behind stone masonry. Use only for weeps.
 2. Round Plastic Tubing: Medium-density polyethylene, 3/8-inch OD by thickness of stone masonry.

3. Mesh Weep Holes/Vents: Free-draining mesh; made from polyethylene strands, full width of head joint and 2 inches high by thickness of stone masonry; in color selected from manufacturer's standard.
- E. 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 wide, with dovetail-shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.
 - b. Strips, not less than **[3/4 inch]** thick and 10 inches wide, with dimpled surface designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
 - c. Sheets or strips full depth of cavity and installed to full height of cavity.
 - d. Sheets or strips not less than **[3/4 inch]** thick and installed to full height of cavity with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from being clogged with mortar.

2.6 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

2.7 FABRICATION

- A. Select stone to produce pieces of thickness, size, and shape as indicated by Owner.
1. Shape stone specified to be laid in three-course, random range ashlar pattern.
- B. Thickness of Stone: Provide thickness indicated, but not less than the following:
1. Thickness (minimum): 2 inches plus or minus **[1/4 inch]**. [**Thickness does not include projection of pitched faces.**]
- C. Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples.
1. Finish: [**Mixed split face, seam face, and rock face (pitched face)**] or as indicated.

2.8 MORTAR MIXES

- A. General: Do not use admixtures unless otherwise indicated.
1. Do not use calcium chloride.
 2. Use [**portland cement-lime**] [**or**] [**masonry cement**] mortar unless otherwise indicated.
 3. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp,

unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

- B. Mortar for Stone Masonry: Comply with ASTM C270, Proportion Specification.
 - 1. Mortar for Setting Stone: [**Type S**].
 - 2. Mortar for Pointing Stone: [**Type N**]. Pigmented sandy color, beige or similar.
- C. Pigmented Mortar: Use colored cement product [**or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products**].
 - 1. Pigments do not exceed 10 percent of portland cement by weight.
 - 2. Pigments do not exceed 5 percent of masonry cement by weight.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coat concrete and unit masonry backup with asphalt dampproofing.

3.2 INSTALLATION OF STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
 - 1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
- B. Arrange stones in broken-range ashlar pattern with uniform course heights, random lengths, and uniform joint widths.
- C. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- D. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than [**3/8 inch**] at narrowest points or more than [**5/8 inch**] at widest points.
- E. Provide sealant joints of widths and at locations indicated.
 - 1. Keep sealant joints free of mortar and other rigid materials.
- F. Install embedded flashing [**and weep holes**] at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
- G. Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, and at flashing.

1. Use [**wicking material**] [**round plastic tubing**] [**mesh weep holes/vents**] [**or**] [**open head joints**] to form weep holes.
 2. Use wicking material to form weep holes above flashing in stone sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
 3. Space weep holes [**24 inches**] on center.
 4. Trim wicking material used in weep holes flush with exterior wall face after mortar has set.
 5. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- H. Install vents in head joints at top of each continuous cavity at spacing indicated. Use [**round plastic tubing**] [**mesh weep holes/vents**] [**or**] [**open head joints**] to form vents.
- I. Coat limestone with cementitious dampproofing as follows:
1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches above finish-grade elevations.
 2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.

3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- B. Variation from Level: For [**bed joints and**] lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.

3.4 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated. Secure anchors by inserting dovetailed ends into dovetail slots in concrete.
- B. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face.
- C. Space anchors not more than 16 inches o.c. vertically and 24 inches o.c. horizontally. Install additional anchors within 12 inches of openings, sealant joints, and perimeter at intervals not exceeding 12 inches.
- D. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.

- E. Fill [**collar joint**] [**space between back of stone masonry and weather-resistant sheathing paper**] with mortar as stone is set.
- F. Provide [**1-inch**] cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.
 - 1. Slope beds toward cavity to minimize mortar protrusions into cavity.
 - 2. Do not attempt to trowel or remove mortar fins protruding into cavity.
- G. Rake out joints for pointing with mortar to depth of not less than [**1/2 inch**] before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

3.5 POINTING

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers of not more than 3/8 inch deep. Compact each layer thoroughly and allow to it become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
 - 1. Joint Profile: Concave or as indicated.

3.6 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before cleaning stone masonry.
 - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
 - 4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
 - 5. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20, Revised II, using job-mixed detergent solution.
 - 6. Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's written instructions, if applicable.
 - 7. Clean limestone masonry to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.7 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.

END OF SECTION 044313.13