

SECTION 04810 –UNIT MASONRY ASSEMBLIES

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. Furnish and install unit masonry complete, including reinforcing, ties and special shapes for structure or aesthetic quality in place. Coordinate with other trades for the installation of systems, connections or block-outs.
- B. Refer to structural drawings for specific reinforcing, grouting and other requirements.
- C. This Section includes:
 - 1. Face brick.
 - 2. Anchors, reinforcing and flashings.
 - 3. Mortar and grout.
 - 4. Miscellaneous accessories.

1.2 RELATED SECTIONS SPECIFIED ELSEWHERE

- A. Section 03450 “Architectural Precast Concrete”

1.3 SUBMITTALS FOR APPROVAL

- A. Masonry Certificates that all masonry units shipped to job site are not less than 28 days old and are in conformance with ASTM C-90 for normal weight units.
 - 1. ASTM C 140; test reports showing strength, moisture content, and water absorption of block being supplied to project.
 - 2. ASTM C 426; test report showing drying shrinkage of similar block.
 - 3. ASTM E 447; grout mix design and mortar mix design.
 - 4. Product data on masonry materials and accessories being used, including batch or lot number being shipped.
- B. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars.
- C. Material test reports from a qualified independent testing laboratory for mortar grout mixes, and masonry units.

1.4 QUALITY ASSURANCE

- A. As specified in Section 01315 - Project Coordination.
- B. Reference Standard: ACI 530.1 “Specifications for Masonry Structure”
- C. 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, through one source from a single manufacturer for each product required.
- D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- E. Submit samples of masonry units for approval at the job site.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

1.6 PROJECT CONDITIONS

- A. Standards of construction shall be as required by American Concrete Institutes (ACI) Standard 530.1 latest edition. Copy of which shall be maintained on site during masonry construction for reference.
- B. Cold-Weather Requirements: Do not build on frozen subgrade or setting beds. Remove and replace unit masonry damaged by frost or freezing conditions. Comply with the following requirements:
 - 1. Cold-Weather Construction: Heat mixing water and sand to produce mortar and grout temperatures between 32 deg. And 40 deg F. Maintain mortar and grout above freezing. Heat masonry units to 40 deg F if grouting.
 - 2. Cold-Weather Protection: Cover masonry with insulating blankets or provide enclosure and heat to maintain temperatures above 32 deg F for 48 hours after construction. Install wind breaks when wind velocity exceeds 15 mi./h.
 - 3. Extend cover a minimum of 24" down both sides and hold cover securely in place.
 - 4. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
 - 5. Remove all masonry determined to be frozen or damaged by freezing conditions.
- C. Perform the following construction procedures while the work is progressing:
 - 1. When air temperature is from 32°F to 25°F, heat sand or water to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing.
 - 2. When air temperature is from 25°F to 20°F, heat sand and mixing water to produce mortar temperatures between 40°F and 120°F; maintain temperature of mortar on boards above freezing; use salamanders or other heat sources on both sides of walls under construction; use wind breaks when wind is in excess of 15 mph.
 - a. Position salamanders or other auxiliary heating device so that heated air flow is not against masonry surfaces.
 - 3. When air temperature is 20°F and below, heat sand and mixing water to produce mortar temperatures between 40°F and 120°F; provide enclosures and auxiliary heat to maintain air temperatures above 32°F; do not lay units which have a surface temperature of 20°F.
- D. Perform the following protections for completed masonry and masonry not being worked on:
 - 1. When the mean daily air temperature is from 40°F to 32°F, protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
 - 2. When mean daily air temperature is from 32°F to 25°F, completely cover masonry with weather-resistive membrane for at least 24 hours.
 - 3. When mean daily air temperature is from 25°F to 20°F, completely cover masonry with insulating blankets or similar protection for at least 24 hours.
 - 4. When mean daily temperature is 20°F and below, maintain masonry temperatures above 32°F for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other acceptable methods.
- E. Hot-Weather Requirements: Protect unit masonry work from excessive evaporation of water from mortar and grout. Do not apply mortar to substrates with temperatures of 100 deg F and above.
- F. Staining: Prevent grout or mortar from staining the face of masonry to be left exposed. Remove immediately grout or mortar in contact with such masonry.
- G. Protect concrete, asphalt concrete, sills, ledges, projections and any other adjacent work from droppings of mortar.

PART 2 – PRODUCTS

2.1 BRICK UNITS

- A. General: Provide shapes indicated and as follows for each form of brick required.
- B. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.
 - 1. Face Brick: ASTM C 216, Type FBS, Grade SW, IRA less than 20, 8,000 psi minimum compressive strength.
- C. Application: Use where brick is exposed, unless otherwise indicated.
- D. Where shown to "match existing," provide face brick matching color, texture, and size of existing adjacent brickwork.
- E. Products:
 - 1. Brick Type 1: Belden Brick Co., Modular Burbank Blend A
 - 2. Brick Type 2: Match brick at existing Shaw's

2.2 MORTAR AND GROUT MATERIALS

- A. Mortar and Grout Materials: As follows:
 - 1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction with approval of Architect or Construction Manager.
 - 2. Hydrated Lime: ASTM C 206, Type S special hydrated lime for finishing purposes.
 - 3. 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, Type S. Standard masonry cement is not acceptable. Provide one of the following portland cement-lime mix products:
 - a. Eaglebond; Blue Circle Cement, Inc.
 - b. Portland and lime; Cement Quebec, Inc.
 - 4. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch, use aggregate graded with 100 percent passing the No. 16 sieve. Match color of existing mortar.
 - 5. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.
 - a. Product: Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
 - 6. Aggregate for Grout: ASTM C 404.
 - 7. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
 - 8. Water: Potable.

2.3 TIES AND ANCHORS

- A. Ties and Anchors, General: Galvanized carbon steel wire complying with ASTM A 82, coating class as required by referenced unit masonry standard for application indicated. Wire diameter as indicated.
- B. Miscellaneous Anchors: as follows:
 - 1. Unit-Type Masonry Inserts in Concrete: Cast iron or malleable iron inserts of type and size indicated.
 - a. Dovetail Slots: Furnish dovetail slots, with filler strips, fabricated from 0.0336 inch (22 gage) galvanized sheet metal.

- b. Anchor Bolts: 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, Class C; of diameter, length, and configuration indicated.
- C. Post installed Anchors: Anchors as indicated, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.
 - 1. Corrosion Protection: Stainless steel components complying with ASTM F 593 and ASTM F 594, Group 1 alloy 304 or 316.

2.4 EMBEDDED FLASHING MATERIALS

- A. Embedded Flashing Materials: As follows:
 - 1. Sheet-Metal Flashing: Comply with requirements specified in Section 07600 "Flashing and Sheet Metal".
 - 2. Rubberized Asphalt Sheet Flashing: Manufacturer's standard composite flashing product consisting of a pliable and highly adhesive rubberized asphalt compound, 26 mils thick, bonded completely and integrally to a high-density, cross-laminated polyethylene film, 4 mils thick, to produce an overall thickness of 30 mils.

2.5 MASONRY CLEANERS

- A. Masonry Cleaners: As follows:
 - 1. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other stains from masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.

2.6 MORTAR MIX

- A. Mortar Type S for concrete block and brick.
- B. Water-Repellent Admixture: Use water-repellent admixture in mortar for masonry block containing water-repellent admixture.
 - 1. Add water-repellent admixture to mortar at the rate required by the admixture manufacturer.
 - 2. No other admixtures will not be allowed.

2.7 GROUT

- A. Grout Mixture: ASTM C476, grout for reinforced masonry, 3000 psi, 28-day strength, maximum slump 9"+ 1"; fine or coarse aggregate grout as required by the grout space.

PART 3 – EXECUTION

3.1 EXAMINATION / PREPARATION

- A. Examine surfaces indicated to receive unit masonry, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in the project.
- B. Cut masonry units with motor-driven saws. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

- C. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- D. Construction Tolerances: As follows:
 - 1. Variation from Plumb: For vertical lines and surfaces do not exceed 3/16 inch in 10 feet, nor 1/4 inch in 20 feet. For vertical alignment of head joints, do not exceed plus or minus 1/8 inch in 10 feet nor 1/2 inch maximum.
 - 2. Variation from Level: Do not exceed 1/4 inch in 20 feet nor 1/2 inch in 40 feet.
 - 3. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet nor 3/4 inch in 40 feet.
 - 4. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.
 - 5. Variation in Mortar-Joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from head-joint thickness indicated by more than plus or minus 1/8 inch.
- E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness. During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar.
- F. Remove and replace loose, chipped, broken, stained, or otherwise damaged masonry units.
- G. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
- H. Provide continuous horizontal-joint reinforcement as indicated. Install with a minimum cover of 5/8 inch on exterior, 1/2 inch elsewhere. Lap a minimum of 6 inches. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections.
- I. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:
 - 1. Provide a 1-inch open space between masonry and structural member, unless otherwise indicated.
 - 2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.
- J. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- K. Grouting: Comply with requirements of ACI 530.1/ASCE 6 / TMS 602.
 - 1.
 - 2. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 - 3. Pours shall be stopped 1-1/2 inches below the top of a course to form a key at pour joints.
 - 4. Pours shall be placed in not more than 48" depths, then wait a minimum of one half hour and maximum of one hour before placing another 48" depth pour.
 - 5. All grout shall be vibrated in place.
 - 6. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM E 447, Method B, and as follows: 1 set of prisms at 7 days and 1 set at 28 days.
- L. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints. Maintain masonry surface temperature above 32°F for 7 days minimum after cleaning.

3.3 ADJUSTING AND CLEANING

- A. Final Cleaning: After mortar is thoroughly set and cured, remove mortar particles with nonmetallic scrapers, and clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 2. Protect adjacent surfaces from contact with cleaner.
 3. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 4. Clean brick by bucket and brush method described in BIA Technical Note No. 20 Revised, using the specified masonry cleaner.
 5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain.
- B. Masonry Waste Disposal: Dispose of clean masonry waste, including broken masonry units, waste mortar, and excess or soil-contaminated sand.

3.4 PROTECTION

- A. Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at the time of Substantial Completion.

END OF SECTION 04810