

047200 – CAST STONE MASONRY
047200

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general construction provision of the Contract including Common Sections including Division I), and other Divisions and Sections of the Specifications to which the products, materials and system(s) specified herein are attached, supporting, protecting or related

1.2 SUMMARY

- A. The Section includes the following:
 - 1. Cast Stone Trim including the following:
 - a. <Insert Products Here>

1.3 DEFINITIONS

- A. Cast Stone: A high quality building material that simulates natural limestone. It is manufactured from graded aggregates, Portland cement, additives and color pigments.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cast stone units.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details, of reinforcement and anchorages if any, and indication of finished faces.
 - 1. Include building elevations showing layout of units and locations of joints and anchors.
- C. Mockup Samples: Furnish sample units for each color and texture of cast stone required, 10 inches square in size for installation purposes.

1.5 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A qualified manufacturer of cast stone units similar to those indicated for this Project, with sufficient production capacity to manufacture required units. Manufacturer shall have been in business for five years. Manufacturer shall comply with the recommendations for the manufacturing tolerances, procedures and production methods of the Cast Stone Institute.
- B. **Source Limitations for Cast Stone:** Obtain cast stone units through one source from a single manufacturer
- C. **Source Limitations for Mortar Materials:** Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone to minimize the need for on-site storage and to avoid delaying the Work.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
 - 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
 - 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store installation material on elevated platforms, under cover, and in a dry location.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided

1.7 PROJECT CONDITIONS

- A. **Cold-Weather Requirements:** Do not use frozen materials or materials mixed or coated with or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in ACI530.1/ASCE 6/TMS 602.
 - 1. **Cold-Weather Cleaning:** Use liquid cleaning methods only when air temperature is 40 de F and above and will remain so until cast stone has dried, but not less than 7 days after completing cleaing.

- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI530.1/ASCE 6/TMS602

PART 2 – PRODUCTS

2.1 CAST STONE MATERIALS

- A. General: Comply with ASTM C 1364 and the following:
- B. Portland Cement: ASTM C 150, Type I, containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation as needed to produce required textures and colors as need to produce required cast stone colors.
- D. Fine Aggregates: Natural Sand or crushed stone, recycled glass complying with ASTM C 33, gradation as needed to produce required textures and colors as needed to produce required cast stone colors.
- E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Do not use admixtures unless specified or approved in writing by Architect.
 - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - 2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 - 3. Air-Entraining Admixture: ASTM C 260
- G. Reinforcement: Deformed steel bars complying with ASTM A 615. Use galvanized or epoxy-coated reinforcement when covered with less than 1 ½ inches of cast stone material.
 - 1. Epoxy Coating: ASTM A 775.
 - 2. Galvanized Coating: ASTM A 767.
- H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666, Type 304

2.2 CAST STONE UNITS

- A. Manufacturers:
 - 1. Edwards Cast Stone Company
 - i. **GS Finish**

- B. Provide cast stone units complying with ASTM C 1364.
 - 1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364, or are made from cast stone that has a history or successful resistance to freezing and thawing.

- C. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
 - 1. Slope exposed horizontal surfaces 1:12, unless otherwise indicated.
 - 2. Provided raised fillets at back of sills and the ends indicated to be built into jambs.
 - 3. Provided drips on projecting elements, unless otherwise indicated

- D. Fabrication Tolerances:
 - 1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
 - 2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
 - 3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
 - 4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.

- E. Cure Units by one of the following methods:
 - 1. Cure units with steam in enclosed curing room at temperature of 105 deg F or above and 95 to 100 percent relative humidity for 6 hours.
 - 2. Cure units with dense fog and water spray in enclosed warm curing room at 95 to 100 percent relative humidity for 24 hours.
 - 3. Cure units to comply with one of the following:
 - i. Not less than 5 days at mean daily temperature of 70 deg F or above
 - ii. Not less than 6 days at mean daily temperature of 60 deg F or above
 - iii. Not less than 7 days at mean daily temperature of 50 deg F or above
 - iv. Not less than 8 days at mean daily temperature of 45 deg F or above

- E. Colors & Textures: As selected by Architect from manufacturer's full range.

2.3 **MORTAR MATERIALS**

- A. Provide mortar materials that comply with Division 04 Section "Unit Masonry"
- 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.
- C. Hydrated Lime: ASTM C 207, Type S
- D. 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.
- E. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone
 - 4. Color-Mortar Aggregates: Natural sand or crushed stone or color necessary to produce required mortar color.
- F. Water: Potable.

2.4 **ACCESSORIES**

- A. Anchors: Type and size indicated, fabricated from stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666, Type 304.
- B. Anchors: Type and size indicated, fabricated from steel complying with ASTM A 36, and hot-dip galvanized to comply with ASTM A 123.
- C. Dowels: Round stainless-steel bars complying with ASTM A 276, Type 304, and 1/2-inch diameter.
- D. Dowels: Round steel bars complying with ASTM A 36 or ASTM A 615, 1/2-inch diameter, and hot-dip galvanized to comply with ASTM A 123.

2.5 **MORTAR MIXES**

- A. Comply with requirements in Division 04 Section "Unit Masonry" for mortar mixes.

- B. Do not used 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
 - 2. Limit cementitious materials in mortar to Portland and lime.
- C. Comply with ASTM C 270, Proportion Specification.
 - 1. For setting mortar, use Type N.
 - 2. For pointing mortar, use Type N.
- D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color and white cement as necessary to produce required mortar color.
 - 1. Mix to match Architect's sample.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Examine surfaces to receive cast stone work and conditions under which materials will be installed. Report in writing any conditions in which do not comply with specified requirements. Do not proceed with installation until surfaces and conditions meet requirements for acceptable installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordination: Verify that installation of items required for stonework to be installed by others are proper type, size, finish and are located at proper spacing with proper anchorage.
- B. Cleaning: Clean stone surfaces prior to setting, using only water or mild cleaning compounds containing no caustic or abrasives.

3.3 ERECTION

- A. General: Install/set all units and accessories accurately, using skilled, experienced personnel, according to approved shop and setting drawings. Use stone-fitters to perform field-cutting with power saws, when required.
 - 1. Clean stone surfaces before setting, using only water or mild cleaning compounds containing no caustic or abrasives.

2. Drench all stone units thoroughly with water just before setting.
3. Provide chases, reveals, openings and other spaces required to accommodate other work. Close up after other work is complete with cast stone which matches stone already set.
4. Where an open cavity is indicated between cast stone and backup material, keep cavity free of mortar and grout.
5. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure stonework in place. Attach anchors securely to stone and to supporting surfaces. Place anchors and dowels firmly and fill holes with mortar or non-shrink grout.
6. Set cast stone accurately, in patterns and locations indicated, with uniform joints of dimensions indicated, and with edges and faces aligned according to established relationships and indicated tolerances.
7. Shim and adjust anchors, supports, and accessories.
8. Set stones supported on solid structural members on setting buttons, shims, or sheets, or a combination of setting buttons, and mortar.
9. After setting each stone, rake all joints; sponge off mortar smears and splashes.
10. Embed only ends of lugged sills and similar stones; leave remainder of joint open and tuckpoint on faces only.
11. Set all partially or fully horizontal stone with unfilled vertical joints. After setting, install backer rod, prime ends and caulk.

B. Setting Tolerances: Set cast stone units to the following tolerances unless detailed otherwise.

1. Variation from plumb of lines and surfaces of columns, walls, and arises:
 - a. Maximum $\frac{1}{4}$ inch (6mm) in 10 feet (3.05m); $\frac{3}{8}$ inch (9mm) in a maximum story height of 20 feet (6.1m); maximum $\frac{1}{2}$ inch (13mm) in any length over 40 feet (12.2m)/
2. Variation from level of grades indicated for floors, exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:
 - a. Maximum $\frac{1}{2}$ inch (13mm) in any bay of 20 feet (6.1m); maximum $\frac{3}{4}$ inch (19mm) in any dimension over 40 feet (12.2m)
3. Variation of linear building lines from position in plan:
 - a. Maximum $\frac{1}{2}$ inch (13mm) in any 20 foot (6.1m) bay; maximum $\frac{3}{4}$ inch (19mm) in any dimension over 40 feet (12.2m)
4. Variation in cross-sectional dimensions of column and wall thickness.
 - a. From dimensions indicated, maximum minus $\frac{1}{4}$ inch to plus $\frac{1}{2}$ inch (minus 6mm to plus 13mm).
5. Variation between faces of adjacent pieces and panels in not permitted.

C. Pointing: Before pointing, clean all faces to remain exposed with fiber brushes, soap powder and clean water. Rinse thoroughly.

1. Point joints with pointing mortar in 3 layers. Place 2 layers, each filling approximately two-fifths of joint depth. Fill remaining joint depth with third layer. Compact each layer fully and allow to become thumbprint hard before applying next layer.
- F. Tooling: Tool joints when mortar is thumbprint hard with round joiner having a diameter 1/8 inch larger than width of joint.

3.4 FIELD QUALITY CONTROL

- A. Inspection: Verify that on-going and completed cast stone work meets specified tolerance appearance requirements. Remove and replace work that is broken, chipped, stained, or otherwise damaged; work that does not match approved samples or approved mock-up; and work containing defective joints.
1. Replace unacceptable materials using methods and procedures approved by the cast stone manufacturer, which leaves no visible evidence of replacement.
- B. Acceptable Appearance: Cast Stone shall show no obvious repairs or imperfections, other than minimal color variations, when viewed with the unaided eye at a 10 foot (3.1m) distance in normal daylight conditions.

3.5 CLEANING

- A. General: Perform final cleaning as soon as possible after mortar has set and been tooled. Clean faces of stone at pointed joints immediately. Remove soiled areas, streaks and stains from prefinished panels using clean water and soft bristle brush, followed by clear water rinse.
- B. Use no wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods which could damage, discoloration, etching of surfaces or joints, without written approval from cast stone manufacturer.

3.6 PROTECTION

- A. Protect work from staining or damage to finished surfaces by on-going construction, until acceptance by owner.

END OF SECTION 04720