

SECTION 04 71 00 CAST STONE

PART 1 - GENERAL

1.1 FABRICATOR

- A. The Fabricator of the Cast Stone products shall have a minimum of 5 years successful experience in fabrication of integrally colored architectural Cast Stone units, similar to units required for this project. Fabricator must be an APA (Architectural Precast Association) Certified Plant or a PCI (Pre-stressed/Precast Concrete Institute) certified Plant for category AT or A1 (Architectural Precast).
- B. The General Contractor shall submit certifications, literature and test reports of the Fabricator showing that the Cast Stone Fabricator meets the requirements of this specification.

1.2 SUBMITTALS

- A. Follow submittal procedures outlined in the General provisions.
- B. Fabricator information as listed above under section 1.1-A to demonstrate that the proposed fabricator is a qualified manufacturer.
- C. Shop Drawings showing layout, dimensions, and identification of each Cast Stone unit corresponding to sequence and procedure of installation. The Fabricator shall submit the shop drawings to the General Contractor who shall verify all drawing dimensions and coordinate the shop drawings with field conditions and other trades. The General Contractor shall submit the shop drawings to the Resident Engineer for approval.
- D. Samples: Minimum size – 6" x 6" x 2" to illustrate the quality, color, and surface finish texture. Fabricator shall develop a custom colored mix to match a colored sample provided by the Resident Engineer. Unless otherwise noted, all the Cast Stone units on the project will be the same color and finish and of the same mix design.
- E. Sealer Product Data: The installer shall submit product data on the proposed penetrating sealer.
- F. One (1) sample each of all precast units such as wall caps and wall veneers or other cast stone/architectural precast elements.
- G. Grout Samples.
- H. Sealant Samples.

1.3 DELIVERY, STORAGE, AND HANDLING:

- A. Handle precast members in position consistent with their shape and design. Lift and support only from support points.

- B. Store and protect units to prevent staining, chipping, or spalling of concrete.

PART 2 - PRODUCTS

2.1 PRECAST/CAST STONE ELEMENTS

- A. Cast Stone/Architectural Precast Elements or Units Include:
1. Columbarium Niche Wall Cap, sized per plans and details, refer to hardscape plans.
 2. Columbarium Niche Wall End Wall Cap Units, sized per plans and details, refer to hardscape plans.
 3. Columbarium pier cap, sized per plans and details, refer to hardscape plans.
 4. Precast Columbarium Pier Base Veneer, sized per plans and details, refer to hardscape plans.
 5. Precast Columbarium Pier Wall Veneer, by True Stone Corporation or approved equal. Sizes per plans and details, refer to hardscape plans.
 6. Precast Wall Veneer for Committal Screening Wall, by True Stone Corporation or approved equal. Sizes per plans and details, refer to hardscape plans.

2.2 MATERIALS

- A. Portland Cement: ASTM C150, Type I or Type III, Color to be white or gray as required to achieve proper color as determined by the Resident Engineer.
- B. Coarse Aggregate: ASTM C33, except for gradation.
1. Color to be White. Darker aggregates may be used as long as the proper color mix is achieved as determined by the Resident Engineer.
 2. Shell Aggregate. For 'Shellock' Paver Veneer. Florida seashells. Crushed to various sizes, 1/4" to 5/8" in size. Various colors. Various shapes.
- C. Fine Aggregate: ASTM C33, except for gradation. Color to be white. Darker aggregates may be used as long as the proper color mix is achieved as determined by the Resident Engineer.
- D. Pigments: ASTM C979; Inorganic, non-fading, resistant to lime and other alkalis. Pigments not to exceed 10% of the cement weight.
- F. Air-Entraining Admixture: ASTM C260.
- G. Water-Reducing, Retarding, or Accelerating Admixtures: ASTM C494, type as selected by Fabricator and containing not more than 0.1 percent chloride ions.
- H. Reinforcement: New billet steel reinforcing bars, as necessary for safe handling, setting and structural stress. Size of the reinforcing shall be specified with a minimum area of steel equal to one quarter of one percent of the cross section area. If the surfaces are to be exposed to the weather, the reinforcement shall be galvanized or epoxy coated when

covered with less than 2 inches of material for bars larger than 5/8 inch and 1-1/2 inches for bars 5/8 inch or smaller. The material covering in all cases shall be at least twice the diameter of the bars.

1. Reinforcing Bars: ASTM A615, Grade 60, deformed.
 2. Epoxy-Coated Reinforcing Bars: ASTM A775.
 3. Galvanized Reinforcing Bars: ASTM A767, Class II (2.0 oz. zinc psf), hot-dip galvanized after fabrication and bending.
 4. Welded Wire Fabric: ASTM A185.
- I. Anchorages: The Setting Contractor is to provide all loose hardware (dowels, anchors, plates, etc.) necessary for securing Cast Stone units to supporting and/or adjacent members. Anchors to be non-corrosive; galvanized, brass or stainless steel Type 304.
- J. Grout. Non-shrinking grout.
- K. Caulking/Joint Sealant. Color to match color of precast /cast stone units. Waterproof caulk.
- L. Sealant.

2.3 MIX PROPERTIES

- A. Precast Elements: Minimum 5000 psi compressive strength at 28 days using 6" x 12" cylinders per ASTM C39-86; Total Air Content not less than 4% nor more than 8%; Water Absorption is not to exceed 6% by weight when tested per ASTM C642.
- B. For 'Shellock' Paver Veneer: Minimum 9,000 psi average per ASTM C67. Coefficient of friction, dry neolite: 0.70 & wet neolite: 0.61, per ASTM C1028-84. Flexural strength: >700psi average, per ASTM C67.

2.4 SURFACE FINISH

- A. Remove all surface cement paste by means of acid etching to provide a smooth, dense, fine-grained texture with no streaks or blotches. Texture and quality of finish to be generally equal to the approved sample when viewed in direct daylight at a 10 foot distance.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchorages: The Setting Contractor is to provide loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other miscellaneous loose steel shapes not provided by other trades, necessary for securing Cast Stone units to supporting and/or adjacent members.

- B. Do not install any Cast Stone units that have any defects that exceed the acceptable PCI MNL-117 tolerances for dimensions and color if installation would result in unsatisfactory performance or appearance in the opinion of the Architect.
- C. Install Cast Stone concrete members plumb, level, and in alignment in accordance with PCI MNL-117 erection tolerances and the contract documents provide temporary supports and bracing as required to maintain position, stability, and alignment as members are being permanently connected.
- D. Grout joints. Top of wall joints shall be Sealed/Caulked with a waterproof caulk.
- E. Protect the Cast Stone units from discoloration and staining when washing down the surrounding masonry by covering the Cast Stone units with plastic sheeting and/or by thoroughly soaking them with clear water to prevent dirty washdown water from being absorbed into them. If dirty washdown water gets on the Cast Stone, hose it off immediately with clear water.
- F. Patching: The repair of chipped or damaged Cast Stone shall be done with materials and instructions furnished by the Fabricator. The Cast Stone shall show no obvious repairs or imperfections other than minimal color variations when viewed with the unaided eye under good typical day lighting at a 20 foot distance. Resident Engineer reserves the right to reject any materials deemed unacceptable.
- G. Cleaning: Before pointing and/or caulking, the face of all Cast Stone shall be scrubbed with a fiber brush, using mild detergent and water and shall then be thoroughly rinsed with clean running water. Any mortar on the face of the Cast Stone shall be removed. No acids or prepared cleaners shall be used without the approval of the Cast Stone Fabricator.
- H. Sealing: Seal cast stone units with a penetrating sealer approved by the Resident Engineer. The sealer is to be applied in accordance with the sealer manufacturer's instructions after the units have been installed, cured, patched, and cleaned. Do not apply sealer before installation since it may prevent mortar, joint sealant and patches from adhering.

3.2 PERFORMANCE REQUIREMENTS

- A. Applicable standards for inspection and quality control shall be Appendix J 9(Architectural Trim Requirements) in PCI MNL – 117 “Manual for quality Control for Plants and Production of Architectural Precast Concrete Products” (3rd Edition) and PCI’s “Architectural Precast Concrete Design Manual, 2nd Edition.
- B. The Architectural Cast Stone units shall show no obvious repairs or imperfections other than minimal color variations when viewed with the unaided eye at a 20 foot distance in

good typical daylight illumination. Resident Engineer reserves the right to reject any materials deemed unacceptable.

- C. Any unacceptable Cast Stone units that cannot be repaired to the Resident Engineer's satisfaction in accordance with the aforementioned criteria are deemed unacceptable and are to be replaced by the Contractor.

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