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Product Guide Specification

Specifier notes: This product guide specification is written according to the Construction Specifications Institute (CSI) Format, including *MasterFormat*, *SectionFormat* and *PageFormat*, contained in the *CSI Manual of Practice*.

The section must be carefully reviewed and edited by the Architect to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the drawings.

Delete all "Specifier Notes" when editing this section.

SECTION 04720

ARCHITECTURAL CAST STONE

Specifier notes: This section covers architectural Cast Stone as manufactured by *Custom Cast Stone* companies. Cast Stone is a highly refined architectural precast concrete product manufactured to simulate natural cut stone.

Cast Stone is manufactured by *Custom Cast Stone* using the Vibrant Dry Tamp Casting Method. This casting method uses more carefully graded aggregate and less water than architectural precast concrete using the Wet Casting Method. The most noticeable benefits are the fine grained texture and the total absence of bug holes. This results in a product that more closely resembles natural cut stone.

Cast Stone components are custom fabricated for each project.

Consult *Custom Cast Stone* for assistance in editing this section for the specific application.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Architectural Cast Stone.

1.2 RELATED SECTIONS

Specifier notes: Edit the following list of related sections as required for the project. List other sections with work directly related to the Cast Stone.

- A. Section 04065 - Mortar and Masonry Grout.
- B. Section 04810 - Unit Masonry Assemblies.
- C. Section 04820 - Reinforced Unit Masonry Assemblies.
- D. Section 07900 - Joint Sealers

1.3 REFERENCES

Specifier notes: List standards referenced in this section, complete with designations and titles. This article does not require compliance with standards, but is merely a listing of those used.

- A. ACI 318 - Building Code Requirements for Reinforced Concrete
- B. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- C. ASTM C 33 - Standard Specification for Concrete Aggregates.
- D. ASTM C 150 - Standard Specification for Portland Cement.
- E. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
- F. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete.
- G. ASTM C 642 - Standard Test method for Specific Gravity, Absorption, and Voids in Hardened Concrete.
- H. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.
- I. ASTM C 1194 - Standard Test Method for Compressive Strength of Architectural Cast Stone.
- J. ASTM C 1195 - Standard Test Method for Absorption of Architectural Cast Stone.
- K. ASTM C 1364 - Standard Specification for Architectural Cast Stone.
- L. ASTM C 2244 - Standard Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.
- M. Cast Stone Institute Technical Manual.

1.4 DEFINITIONS

- A. Cast Stone: Highly refined architectural concrete stone product manufactured to simulate fine grain texture of natural stone.
- B. Vibrant Dry Tamp (VDT) Casting Method: Vibratory ramming of damp, zero-slop concrete against rigid framework until it is densely compacted and ready for immediate removal from form.

1.5 SUBMITTALS

- A. Comply with Section 01330 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data.

Specifier notes: *Custom Cast Stone* can assist in the design process by providing various degrees of customization according to the complexity of the project. Significant cost savings can be achieved by specifying standard of modular length units, instead of requiring the manufacturer to detail profiles and layout of piece lengths specific to the project. Consult *Custom Cast Stone* for additional information.

Specify **one** of the following **three** paragraphs.

- C. Shop Drawings: Submit manufacturer's shop drawings including profiles, cross sections, reinforcement, exposed faces, arrangement of joints, anchoring methods, anchors, annotation of components, and their locations in project as indicated on the drawings.
- C. Shop tickets: Submit manufacturer's shop tickets including profiles, cross sections, modular unit lengths, reinforcement, exposed faces, and annotation of components proposed for use in project according to cross sections as indicated on the drawings.
- C. Catalog Cuts: Submit manufacturer's catalog cuts showing page and part numbers of units proposed for use in project.
- D. Verification Samples: Submit pieces of actual Cast Stone components, 12 inches (305 mm) square, illustrating range of color and texture to be anticipated in components furnished for project.
- E. Test Results: Submit manufacturer's test results of Cast Stone components made previously by manufacturer using materials from same sources proposed for use in project.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A current producer member of Cast Stone Institute, with a minimum of 10 years of experience in producing Cast Stone of types required for project.
 - 1. Plant shall have adequate capacity to furnish quality, sizes, and quantity of Cast Stone required without delaying progress of the Work.
 - 2. Products previously produced by plant and exposed to weather shall exhibit satisfactory appearance.
- B. Standards: Comply with requirements of Cast Stone Institute Technical Manual.

Specifier notes: Mock-ups are optional and will add expense to the project. Scope of the mock-up construction must be clearly specified or indicated on the drawings.

Mock-ups allow the Architect to verify:

1. The color and texture of the Cast Stone.
2. The fit of adjacent components.
3. The quality of construction.

Revise as required for the project. Delete this paragraph if mock-up is not required.

- C. Mock-up: Provide full size Cast Stone components for installation in mock-up of exterior wall. Approved mock-up will become standard for appearance and workmanship.

Specifier notes: Delete **one** of the following **two** sentences.

1. Mock-up shall remain as part of the completed Work.
1. Mock-up shall not remain as part of the completed Work. At Architect's direction, demolish mock-up and remove debris.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery :

1. Deliver Cast Stone components secured to shipping pallets and protected from damage and discoloration.
2. Protect corners from damage.
3. Number each piece individually to match shop drawings and schedules.

B. Storage:

1. Store Cast Stone components and installation materials in accordance with manufacturer's instructions.
2. Store Cast Stone components on pallets with nonstaining, waterproof covers.
3. Ventilate under covers to prevent condensation.
4. Prevent contact with dirt.

- C. Handling: Protect Cast Stone components during handling and installation to prevent chipping, cracking, or other damage.

1.8 SCHEDULING

Specifier notes: Revise as required for the project. Delete this article if not required.

- A. Schedule and coordinate production and delivery of Cast Stone components with unit masonry work to optimize on-site inventory and to avoid delaying the Work.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Custom Cast Stone Inc., 734 E. 169th Street, Westfield , IN 46074. Toll Free (888) 776-9960. Phone (317) 896-1700. Fax (317) 896-1701.

2.2 ARCHITECTURAL CAST STONE

A. Cast Stone: ASTM C 1364

Specifier notes: The Vibrant Dry Tamp (VDT) Casting Method enables as many as 100 pieces to be cast from a single mold in an eight hour day. This method is ideally suited to fast track construction projects due to its high production capability and low framework requirements.

The VDT process guarantees total absence of bug holes and a finish which is difficult to distinguish from natural stone. The limitation of the process is that it generally requires one flat, unexposed side to the design.

1. Casting Method: Vibrant Dry Tamp.
2. Compressive Strength, ASTM C 1194: 6,500 psi (44.8 MPa) minimum at 28 days.
3. Absorption, ASTM C 642 or C 1195: 6 percent maximum at 28 days.

B. Surface Texture:

1. Fine grained texture, similar to natural stone.
2. No bug holes, air voids, or other surface blemishes.

C. Color and Finish:

Specifier notes: Custom Cast Stone can assist in the color selection process by either providing color samples from the wide assortment of existing colors or by custom color matching a color or material chosen by the Architect. Specify **one** of the following **three** sentences.

1. Match sample on file at Architect's office.

Specifier notes: Insert Custom Cast Stone color number.

1. Custom Cast Stone Color: _____.

Specifier notes: Insert name of brick, natural stone, or other material to be matched.

1. Match Color: _____.

D. Color Variation:

1. Viewing Conditions: Compare in direct daylight at 10 feet (3 m), between components of similar age, subjected to comparable weathering conditions.
2. Maximum Variation, ASTM D 2244:
 - a. Hue: 2 units.
 - b. Lightness, Chroma, and hue Combined: 6 units.

2.3 CAST STONE MATERIALS

Specifier notes: Manufacturer will choose type and color of portland cement and aggregates based on the Cast Stone color specified by the Architect.

- A. Portland Cement: ASTM C 150, Type I, white or gray as required to match specified color.
- B. Coarse Aggregate: ASTM C 33, except for gradation; quartz, or limestone.
- c. Fine Aggregates: ASTM C 33, except for gradation; natural or manufactured sands.
- D. Pigments: ASTM C 979, inorganic iron oxides.
- E. Admixtures:
 - 1. ASTM C 494
 - 2. Integral water repellents and other chemicals for which no ASTM standard exists. Previously established as suitable for use in concrete by proven field performance or through laboratory testing.
- F. Water: Potable

Specifier notes: All reinforcing bars in Cast Stone components are either galvanized or epoxy coated.

- G. Reinforcing Bars: ASTM A 615/A 615M, galvanized or epoxy coated.

2.4 MORTAR MATERIALS

Specifier notes: Delete **one** of the following **two** sentences specifying the mortar.

- A. Mortar: ASTM C 270, Type N.
- A. Mortar: As specified in Section 04065.

2.5 ACCESSORIES

Specifier notes: Specify Type 304 stainless steel anchors for highly corrosive environments, such as coastal areas, and for 100-year type construction.

Anchor pins and dowels should be stainless steel. Shelf angles and other similar structural items should be galvanized.

Consult *Custom Cast Stone* for assistance in specifying anchors for the specific application.

- A. Anchors: Non-corrosive type, sized for conditions. [Brass] [Hot dip galvanized steel] [Type 304 stainless steel].
- B. Sealant: As specified in section 07900.
- C. Cleaner:
 - 1. Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces.
 - 2. Expressly approved for intended use by Cast Stone manufacturer and expressly approved by cleaner manufacturer for use on Cast Stone and adjacent masonry materials.

2.6 FABRICATION

- A. Shapes: Unless otherwise indicated on drawings, provide:
1. Suitable wash on exterior sills, copings, projecting courses, and components with exposed top surfaces.
 2. Drips on projecting components, wherever possible.
- B. Reinforcement:
1. As required to withstand handling and structural stresses.
 2. Comply with ACI 318
 3. Minimum of 0.25 percent of cross-sectional area of panels which exceed 12 inches (305 mm) in width.
 4. Minimum Reinforcing Cover: Twice diameter of reinforcing bars.
- C. Curing:

Specifier notes: Curing Cast Stone components with a direct fired steam generator as used at *Custom Cast Stone* provides the following benefits:

1. Increases the first day strength of the Cast Stone.
2. Increases the hardness of the corners of the Cast Stone.
3. Minimizes efflorescence. The carbonation in the steam interacts with the concrete matrix to prevent salts from traveling to the Cast Stone surface.

1. Cure Cast Stone components with a direct field steam generator at a minimum temperature of 105 degrees F (41 degrees C) for a minimum of 6 hours, within 12 hours of fabrication.
2. Cure Cast Stone components in presence of carbon monoxide and carbon dioxide to promote carbonation at surface, to minimize efflorescence.

- D. Finishing: Remove cement film from exposed surfaces before packaging for shipment.
- E. Tolerances: Fabricate Cast Stone components within tolerances in accordance with Cast Stone Institute Technical Manual, unless otherwise specified.
1. Dimensions: Plus or minus 1/8 inch (3 mm).
 2. Maximum Bow, Camber, or Twist: Length/360.

2.7 SOURCE QUALITY CONTROL

- A. Testing: Test compressive strength and absorption of specimens selected at random from plant production.
1. Test in accordance with referenced testing standards.
 2. Select samples at rate of 3 per 500 cubic feet (14m³), with a minimum of 3 per production week.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine construction to receive Cast Stone components. Notify Architect if construction is not acceptable. Do not begin installation until unacceptable conditions have been corrected.
- B. Examine Cast Stone components for fit and finish before installation. Do not install

unacceptable components.

3.2 INSTALLATION

- A. General: Install Cast Stone components in conjunction with masonry, complying with requirements of Section 04810.
- B. Setting:
 - 1. Drench Cast Stone components with clear, running water immediately before installation.
 - 2. Do not use pry bars or other equipment in a manner that could damage Cast Stone components.
 - 3. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
 - 4. Set Cast Stone components in a full bed of mortar, unless otherwise indicated on the drawings.
 - 5. Fill vertical joints with mortar.
 - 6. Make joints 3/8 inch (9 mm), unless otherwise indicated on the drawings.
 - 7. Leave head joints in copings and similar components open for sealant.
 - 8. Rake mortar joints 3/4 inch (19 mm) for pointing. Sponge face of each stone to remove excess mortar.
 - 9. Tuck point joints to a slight concave profile.
- C. Sealant Joints:
 - 1. Comply with requirements of Section 07900.
 - 2. Prime ends of Cast Stone components, insert properly sized foam backing rod, and install sealant using sealant gun.
 - 3. Provide sealant joints at following locations and as indicated on the drawings.
 - a. Cast stone components with exposed tops.
 - b. Joints at relieving angles.
 - c. Control and expansion joints.

3.3 TOLERANCES

- A. Installation Tolerances: Comply with requirements of Cast Stone Institute Technical Manual.
 - 1. Variation from Plumb: Do not exceed 1/8 inch in 5 feet (3 mm in 1.5 m) or 1/4 inch in 20 feet (6 mm in 6 m) or more.
 - 2. Variation from Level: Do not exceed 1/8 inch in 5 feet (3 mm in 1.5 m), 1/4 inch in 20 feet (6 mm in 6 m), or 3/8 inch (9 mm) maximum.
 - 3. Variation in joint width: Do not vary joint thickness more than 1/8 inch (3 mm) or 1/4 of nominal joint width, whichever is greater.
 - 4. Variation in Plane Between Adjacent Surfaces: Do not exceed 1/8-inch (3-mm) difference between planes of adjacent components or adjacent surfaces indicated to be flush with components.

3.4 REPAIR

- A. Surface Repair:
 - 1. Repair chipping and other surface damage noticeable when viewed in direct daylight at 20 feet (6 m).
 - 2. Repair with matching touch-up material provided by manufacturer and in accordance with manufacturer's instruction.
 - 3. Repair methods and results to be approved by Architect.

3.5 PROTECTION

- A. Protect Cast Stone components from splashing and other damage.

3.6 CLEANING

- A. In-Progress Cleaning:
 - 1. Clean Cast Stone components as work progresses.
 - 2. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning:
 - 1. Clean exposed Cast Stone, after mortar is thoroughly set and cured.
 - 2. Cleaner:
 - a. Wet surfaces with water before applying cleaner.
 - b. Apply cleaner to Cast Stone in accordance with manufacturer's instructions.
 - c. Remove cleaner promptly by rinsing thoroughly with clear water.

3.7 INSPECTION AND ACCEPTANCE

- A. Inspect in accordance with Cast Stone Institute Technical Manual.

Specifier notes: The following is optional. Delete if not required. Consult *Custom Cast Stone* for additional information regarding the use of a water repellent.

3.8 WATER REPELLENT

- A. Apply silane or siloxane water repellent for weatherproofing Cast Stone in accordance with manufacturer's instructions.
- B. Apply water repellent after pointing, patching, cleaning, and inspection are completed.

END OF SECTION