

# Classic Stone Creations

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## CSI Specification Section 04720 Cast Stone

### 1. PART 1 - GENERAL

#### 1.1. SECTION INCLUDES - Architectural Cast Stone.

- A. Description, design requirements, fabrication, and installation.
  - 1. Manufacturer shall furnish Cast Stone covered by this specification.
  - 2. Installing contractor shall unload, store, furnish all anchors, set, patch, clean and seal (optional) the Cast Stone as required.

#### 1.2. RELATED SECTIONS

- A. Section - 01 33 00 - Submittal Procedures.
- B. Section - 04 05 13 - Masonry Mortaring.
- C. Section - 04 05 16 - Masonry Grouting.
- D. Section - 04 05 19 - Masonry Anchorage and Reinforcing.
- E. Section - 07 90 00 - Joint Protection.

#### 1.3. REFERENCES

- A. ACI 318 - Building Code Requirements for Reinforced Concrete.
- B. ASTM A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- C. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Reinforced Concrete.
- D. ASTM C 33 - Standard Specification for Concrete Aggregates.
- E. ASTM C 150 - Standard Specification for Portland Cement.
- F. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volume Method.
- G. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- H. ACI 440.1R-03 - Specification for Glass Fiber Reinforced Polymer.
- I. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
- J. ASTM C 426 - Standard Test Method for Linear Shrinkage of Concrete Masonry Units
- K. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete.
- L. ASTM C 666 - Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
- M. ASTM C 979 - Standard Specification for Coloring Pigments for Integrally Pigmented Concrete.
- N. ASTM C 1194 - Standard Test Method for Compressive Strength of Architectural Cast Stone.
- O. ASTM C 1195 - Standard Test Method for Absorption of Architectural Cast Stone.
- P. ASTM C 1364 - Standard Specification for Architectural Cast Stone.
- Q. ASTM D 2244 - Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- R. Cast Stone Institute<sup>SM</sup> Technical Manual (Current Edition)

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## 1.4. DEFINITIONS

- A. Cast Stone - a refined architectural concrete building unit manufactured to simulate natural cut stone, used in unit masonry applications.
- B. Chinking - a mortar-like synthetic grout used in joints between ends of cast stone pieces.

## 1.5. SUBMITTAL PROCEDURES

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Samples: Submit pieces of the Cast Stone 6" x 6" x 1" exemplifying color, and texture to be used in project.
- C. Test results: Submit manufacturers test results of Cast Stone previously made by the manufacturer.
- D. Shop Drawings: Submit manufacturers shop drawings including profiles, cross-sections, reinforcement, exposed faces, arrangement of joints (optional for standard or semi-custom installations), anchoring methods, anchors (if required), annotation of stone types and their location.

## 1.6. QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. Manufacturer should have a minimum of 3 years continuous successful experience in fabricating architectural cast stone with demonstrated abilities, facilities and manufacturing capacity required to furnish cast stone requirements of this project without delay of work in progress.
  - 2. Manufacturer should have a formal, written quality control program in effect when producing cast stone.
  - 3. Mock-up (Optional) Provide full size unit(s) for use in construction of sample wall. The approved mock-up shall become the standard for appearance and workmanship for the project.
- B. Contractor Requirements:
  - 1. Prequalify contracting company for work on this specific project.
  - 2. Employ skilled mechanics experienced and knowledgeable in cast stone application, and familiar with the requirements of the specified work.
  - 3. Contractor shall have successfully completed projects of similar size and complexity to the specified project.
  - 4. Provide the proper equipment, manpower and supervision on the job site to install the system in compliance with Classic Stone Creations published specifications and details, and this project's plans and specifications.

## 2. PART 2 - PRODUCTS

### 2.1. ARCHITECTURAL CAST STONE- Acceptable Manufacturer:

- A. Classic Stone Creations, LLC. Charlotte, North Carolina 704-525-2580, [www.classicstonecreations.com](http://www.classicstonecreations.com)
- B. Comply with ASTM C 1364
- C. Physical properties: Provide the following:
  - 1. Compressive Strength - ASTM C 1194: 6,000 psi minimum for products at 28 days.
  - 2. Absorption - ASTM C 1195: 6% maximum by the cold water method, or 10% maximum by the boiling method for products at 28 days.

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3. Air Content – ASTM C173 or C 231, for wet cast product shall be 4-8% for units exposed to freeze-thaw environments
  4. Freeze-thaw – ASTM C 1364: The CPWL shall be less than 5% after 300 cycles of freezing and thawing.
  5. Linear Shrinkage – ASTM C 426: Shrinkage shall not exceed 0.065%.
  - D. Job site testing – One (1) sample from production units may be selected at random from the field for each 500 cubic feet delivered to the job site.
    1. Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as allowed by ACI 318.
    2. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
    3. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195.
- 2.2. RAW MATERIALS
- A. Portland cement – Type I or Type III, white and/or grey, ASTM C 150.
  - B. Coarse aggregates - Granite, quartz or limestone, ASTM C 33, except for gradation.
  - C. Fine aggregates - Manufactured or natural sands, ASTM C 33, except for gradation.
  - D. Colors - Inorganic iron oxide pigments, ASTM C 979.
  - E. Admixtures- Comply with the following:
    1. ASTM C 494/C 495M Types A - G for water reducing, retarding, accelerating and high range admixtures.
    2. Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
  - F. Water – Potable
  - G. Reinforcing bars:
    1. ASTM A 615/A 615M. Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 inch.
    2. Welded Wire Fabric: ASTM A 185 where applicable for wet cast units.
    3. Glass Fiber Reinforced Polymer: per ACI 440.1R-03.
  - H. All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.
- 2.3. COLOR AND FINISH
- A. Generally match sample on file at Architect's office.
  - B. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/16 inch and the density of such voids shall be less than 3 occurrences per any 1 in.<sup>2</sup> and not obvious under direct daylight illumination at a 5 ft distance.
  - C. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 ft distance.
    1. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
      - a. Total color difference – not greater than 6 units.

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- b. Total hue difference – not greater than 3 units.
  - D. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft distance.
  - E. The occurrence of crazing or efflorescence shall not constitute a cause for rejection.
  - F. Remove cement film, if required, from exposed surfaces prior to packaging for shipment.
- 2.4. REINFORCING
- A. Reinforce the units as required by the drawings and for safe handling and structural stress.
  - B. Minimum reinforcing shall be 0.25 percent of the cross section area.
  - C. Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 in. (38 mm) of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.
  - D. Panels, soffits and similar stones greater than 24 inches in one direction shall be reinforced in that direction. Units less than 24 inches in both their length and width dimension shall be non-reinforced unless otherwise specified.
- 2.5. MANUFACTURING TOLERANCES
- A. Cross section dimensions shall not deviate by more than  $\pm 1/8$  in. from approved dimensions.
  - B. Length of units shall not deviate by more than length/ 360 or  $\pm 1/8$  in., whichever is greater, not to exceed  $\pm 1/4$  inch.
    - 1. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
  - C. Warp, bow or twist of units shall not exceed length/ 360 or  $\pm 1/8$  in., whichever is greater.
  - D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features – On formed sides of unit, 1/8 inch, on unformed sides of unit, 1/2 inch maximum deviation as shown on shop drawings.
- 2.6. PRODUCTION QUALITY CONTROL
- A. Testing.
    - 1. Test compressive strength and absorption from specimens selected at random from plant production.
    - 2. Samples shall be taken and tested from every 500 cubic feet of product produced.
    - 3. Perform tests in accordance ASTM C 1194 and C 1195.
    - 4. New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.
- 2.7. DELIVERY, STORAGE AND HANDLING
- A. Mark production units with the identification marks as shown on the shop drawings.
  - B. Package units and protect them from staining or damage during shipping and storage.
  - C. Provide an itemized list of product to support the bill of lading.

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## 3. PART 3 EXECUTION

### 3.1. EXAMINATION

- A. Installing contractor shall check Cast Stone materials for fit and finish prior to installation. Do not set unacceptable units.

### 3.2. SETTING TOLERANCES

- A. Comply with Cast Stone Institute<sup>SM</sup> Technical Manual.
- B. Set stones 1/8 in. (3 mm) or less, within the plane of adjacent units.
- C. Joints, plus - 1/16 in. (1.5 mm), minus - 1/8 in. (3 mm).

### 3.3. JOINTING

- A. Joint size:
  - 1. At stone/brick joints 3/8 in. (9.5 mm).
  - 2. At stone/stone joints in vertical position 1/4 in. (6 mm) (3/8 in. (9.5 mm) optional).
  - 3. Stone/stone joints exposed on top 3/8 in. (9.5 mm).
- B. Joint materials:
  - 1. Mortar joint, traditional -
    - a. Mortar, Type N, ASTM C 270.
    - b. Use a full bed of mortar at all bed joints.
    - c. Flush vertical joints full with mortar.
    - d. Leave all joints with exposed tops or under relieving angles open for sealant.
    - e. Leave head joints in copings and projecting components open for sealant.
  - 2. Chinking, *preferred joint material* -
    - a. Follow all manufacturer's instructions for handling, storage, and preparation.
    - b. Place strippable painters masking tape continuously on either side of joint at the edge of the cast stone piece.
    - c. Use specified chinking color and caulking gun, apply the chinking material into the joint. Use of backer rod may be desirable to avoid unnecessary high-volume use of chinking material.
    - d. Use the convex side of a spoon or thumb tip, force the chinking into the joint and against the edge of the cast stone pieces, and make the chinking slightly convex and flush with the outside face of the cast stone piece ("tooling the joint").
    - e. Remove masking tape immediately after the chinking has been tooled.
- C. Location of joints:
  - 1. As shown on shop drawings.
  - 2. Unless otherwise specified, at control and expansion joints unless otherwise shown.

### 3.4. SETTING

- A. Drench units with clean water prior to setting.
- B. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
- C. Set units in full bed of mortar, unless otherwise detailed.
- D. Rake mortar joints 3/4 in. (18 mm) for pointing.
- E. Remove excess mortar from unit faces immediately after setting.

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- F. Tuck point unit joints to a slight concave profile.
- 3.5. JOINT PROTECTION
- A. Comply with requirements of Section 07 90 00.
  - B. Prime ends of units, insert properly sized backing rod and install required sealant.
- 3.6. REPAIR AND CLEANING
- A. Repair chips with touchup materials furnished by manufacturer.
  - B. Saturate units to be cleaned prior to applying an approved masonry cleaner.
  - C. Consult with manufacturer for appropriate cleaners.
- 3.7. INSPECTION AND ACCEPTANCE
- A. Inspect finished installation according to CSI technical bulletin #36.
  - B. Do not field apply water repellent until repair, cleaning, inspection and acceptance is completed.