

## **Division 04 – Masonry**

### **04720 Cast Stone**

*The following specification has been written for SavannaStone®, which is a Portland cement based cast stone manufactured by Harvey Cement Products, Inc. in accordance with the Dry Tamp Casting Method. The methods and standards shown below are strictly adhered to and ultimately represent a product free of bug holes, natural in appearance, with virtually limitless coloring potentials. Every unit is manufactured with an integral water repellent [Rainbloc®] which results in a water absorption rate of less than 3% on average when combined with the other aggregates and additives within our proprietary mix design.*

#### **Part 1 – General**

##### **1.1 Section Includes – Dry Tamp, Architectural Cast Stone**

- A. Scope includes all labor and materials used in the production of the cast stone units as shown within the architectural (CAD) drawings provided.
- B. Mason contractor shall unload, store, furnish all anchoring devices, install, patch, clean and seal the stone as required by the project architect.

##### **1.2 Design Considerations**

- A. Cast stone shall comply with ASTM C1364, *Standard Specification for Cast Stone* unless made by machine. Machine vibrant tamp should be tested according to ASTM C90.
- B. NCMA and Cast Stone Institute recommendations: unit should not exceed 15 times their smallest dimension. While larger sizes are available and frequently produced, it is recommended that an individual units design not exceed a volume 2.0 cubic feet, or an overall length of 6 feet. [This will insure that the cast stone works within the limits of manufacturing, transport, handling, installation, and structural integrity.]

##### **1.3 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 9000: Joint Protection.

#### 1.4 Definitions

- A. Cast Stone –architectural concrete building units manufactured with a fine grain texture, completely free of bug holes, with the intention of simulating natural cut stone used in unit masonry applications.
  - 1. Vibrant Dry Tamp (VDT) casting method: Vibrating fine, moist aggregates with zero-slump against a solid mold until compaction is extremely dense in nature.
  - 2. Casting by Machine Method: Manufactured with fine, moist aggregates from zero-slump concrete by use of machinery which utilizes vibration and pressure to densely consolidate the materials against the mold.

#### 1.5 References

- A. ASTM A36: Standard Specification for Carbon Structural Steel
- B. ASTM A136: Standard Specification for Zinc [Hot Dipped Galvanized] Coatings on Iron and Steel Products
- C. ASTM A615/A615M: Standard Specification for Deformed and Plain Billet-Steel Bars for Reinforced Concrete.
- D. ASTM C33: Standard Specification for Concrete Aggregates.
- E. ASTM C140: Methods of Sampling and Testing Concrete Units.
- F. ASTM C150: Standard Specification for Portland Cement.
- G. ASTM C270: Standard Specification for Mortar in Unit Masonry.
- H. ASTM C426: Standard Test Method for Linear Shrinkage of Concrete Masonry Units.
- I. ASTM C476: Standard Specification for Grout for Masonry
- J. ASTM C494/C 494M: Standard Specification for Chemical Admixture for Concrete.
- K. ASTM C666: Standard Test Method for Resistance to Rapid Freezing and Thawing.
- L. ASTM C979: Standard Specification for Coloring Pigment for Integrally Pigmented Concrete.
- M. ASTM C1194: Standard Test Method for Compressive Strength of Architectural Cast Stone.
- N. ASTM C1195: Standard Test Method for Absorption of Architectural Cast Stone.
- O. ASTM C1364: Standard Specification for Architectural Cast Stone.
- P. Cast Stone Institute Technical Manual: Most Recent Edition

#### 1.6 Submittal Procedures

- A. Comply with Section 01 33 00: Submittal Procedures.
- B. Product Data: Submit Manufacturer's Data Including:
  - 1. Physical Samples which represent the color and finished texture requested.
  - 2. Mockup Samples for site panel up to 3 CuFt/9 SqFt.
  - 3. Shop Drawings including building elevations, unit locations, dimensioned profiles, exposed face side, annotation of components, details of reinforcement if required, and location of control joints.
- C. Test Reports: Submit manufacturer's test results in accordance with all C1364 requirements [NOTE: Submit for ASTM C90 for machine-made wall units].

#### 1.7 Quality Assurance

- A. Manufacturer Qualifications: Producer with a minimum of 10 years experience which maintains the technical and physical capacity to meet all quantities, sizes, and quality required by the scope of the project.
- B. Cast stone shall be from one manufacturer to avoid dissimilarity in color, texture, and bonding characteristics.

#### 1.8 Delivery, Storage, and Handling

- A. Delivery:
  - 1. All stone shall be delivered on pallets, covered in a waterproof sheeting material to avoid damage and discoloration prior to installation.
  - 2. Pallets should not be stacked in any instance other than level ground areas with flat units, on full cubes. Pallets should never be stacked on one another.
  - 3. Pieces shall be individual marked with easily removable label to match the shop drawings.
  - 4. Provide an itemized list of products to confirm all delivered units.
- B. Storage:
  - 1. Cast stone should be stored on flat ground above grade.
  - 2. Avoid contact with other onsite aggregates by storing stone and mortar where contamination will not occur.
- C. Handling:
  - 1. If direct contact with the stone is required due to lifting heavy weight units, use wide-belt slings if lifting inserts are not accessible.
  - 2. Female threaded inserts shall be installed in every unit over 150 lbs. that allows for vertical lifting of the cast stone unit to its final destination. Installer is responsible for furnishing the (male) swivel hoist ring in the size required. Hoist rings should be used in the lifting process. Eye bolts are not recommended.
  - 3. Protect all cast stone units during the installation to prevent unnecessary chips, scratches, and/or breakage.
  - 4. Delivery ticket should be signed by accepting contractor after inspection and confirmation that all cast stone units are present and in proper condition.

#### 1.9 Project Conditions

- A. During construction, cover the tops of walls with waterproof sheeting at the end of each day's work. [Manufacturer's Note: Materials with integral water repellents will lock the water *inside* the wall as well as work to keep the water out. If water is allowed inside the wall do not apply sealer until wall is completely dry.]
- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings and other rubble falling down the wall.
  - 3. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- C. Cold Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged

by frost or by freezing conditions. Comply with cold-weathered construction requirements contained in ACI530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 degree F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI530.1/ASCE 6/TMS602.
1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

## Part 2 – Products

### 2.1 Manufacturer

- A. SavannaStone® by Harvey Cement Products, Inc. 16030 Park Ave., Harvey-IL 60426  
Ph: 708-333-1900  
Fax: 708-333-1910  
Email: [sales@harveycement.com](mailto:sales@harveycement.com)  
Website: [www.harveycement.com](http://www.harveycement.com)

### 2.2 Dry-Tamp Cast Stone

- A. Comply exclusively with ASTM C1364 [ASTM C90 when referring to machine made stone]
- B. Physical properties:
1. Color to be determined by architect and integral throughout unit.
  2. Compressive strength of units: >7500 p.s.i. at 28 days.
  3. Absorption: ASTM C1195-03 <2.5% at 28 days.
  4. Density: ASTM C140 > 120lbs/ft<sup>3</sup>
  5. Freeze-Thaw: ASTM C666 < 4.0% at 300 cycles.
  6. Curing: in exposed chamber at 95%RH and 95 to 120 degrees F for 12 to 18 hours.
  7. Water Repellant: Integral throughout units entirely.
- C. Cast Stone Materials:
1. Portland Cement: ASTM C150, Type I or III, white or grey as required to match specified color.
  2. Coarse Aggregates: ASTM C33 except for gradation, granite, quartz or limestone.
  3. Fine Aggregates: ASTM C33 except for gradation, manufactured or natural sands.
  4. Pigments: ASTM C979, except do not use carbon black pigments, inorganic iron oxide.
  5. Water Reducing, Retarding and Accelerating Admixtures, inherent throughout the unit; ASTM C494
  6. Water: Potable.
  7. Reinforcing Bar: ASTM A 615/A 615M. Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 inches or 37mm.

### 2.3 Mortar & Grout Materials

- A. Mortar-Follow Cast Stone Institute Standard Specification under Section 04 0513.

- B. Provide mortar and grout complying with ASTM C270 or ASTM C476 (for reinforced masonry) and requirements of architect of record. Type N based on proportion specification, unless type S is mandated by the engineer of record.
- C. 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. Dowels: Round steel bars complying with ASTM A 36, or ASTM A 615, ½ inch diameter, and hot-dip galvanized to comply with ASTM A 123, or stainless steel.
- C. Cleaner: Use 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. [Must be approved for intended use by Harvey Cement Product's, Inc. and by the cleaner manufacturer for use on cast stone and adjacent masonry materials.]

#### 2.5 Manufacturing Tolerances

- A. Cross section dimensions shall not deviate by more than  $\pm 1/8''$  (3mm) from approved dimension.
- B. Length of units shall not deviate by more than length/ 360 or  $\pm 1/8''$  (3mm), whichever is greater, not to exceed  $\pm 1/4''$  (6mm).
- C. Warp, bow or twist of the unit shall not exceed length/ 360 or  $\pm 1/8''$  (3mm), whichever is greater.
- D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features on formed sides of unit,  $1/8''$  (3mm), on unformed sides of unit,  $3/8''$  (9mm) maximum deviation.

#### 2.6 Production Quality Control

- A. Testing
  1. Test compressive strength and absorption from specimens selected at random from plant production.
  2. Perform tests in accordance with ASTM C1194 and C1195.
  3. New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.

#### 2.7 Delivery, Storage & Handling

- A. Label production units with identification that can be referenced to 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.

## **Part 3 – Execution**

### 3.1 Examination

- A. Installing contractor shall check Cast Stone materials for fit and finish prior to installation. Never set unacceptable units.
  - 1. Report in writing any conditions in which do not comply with specified requirements.
  - 2. Do not proceed with installation until surfaces and conditions meet requirements for acceptable installation.
  - 3. Visually inspect cast stone components for fit and finish in accordance with ASTM C 1364 before installation.
  - 4. Notify architect if construction is unacceptable.

### 3.2 Jointing

- A. At stone/brick joints 3/8" (9.5mm)
- B. Joint materials
  - 1. Mortar: Type N, ASTM C270.
  - 2. Full bed of mortar at all bed joints.
  - 3. Flush vertical joints full with mortar.
  - 4. Leave all head joints, adjoining joints with exposed tops, and joints under relieving angles open for sealant.
- C. Location of Joints
  - 1. As shown on HCP produced shop drawings,
  - 2. At control and expansion joints unless otherwise shown.
  - 3. Comply with NCMA guidelines for control joints of no farther than 1-1/2 times the height of the wall, no greater than 25 LF.
  - 4. Provide control joints at edges of window openings over 4' long and at the center of openings 20' long or greater.

### 4.3 Setting/Installation

- A. General: Install cast stone components in conjunction with masonry, complying with Section 04 7200 Cast Stone Masonry.
- B. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
- C. Sponge face of each stone to remove excess mortar.
- D. Fill vertical joints with mortar.
- E. Produce joints of 3/8" (9mm), unless otherwise indicated on the drawings.
- F. Leave head joints in copings and similar situations open for sealant.
- G. Set cast stone components in a full bed of mortar unless otherwise indicated on the drawings.

### 4.4 Joint Protection

- A. Comply with requirements of Section 07 9000.
- B. Provide sealant joints at cast stone components with exposed tops, joints at relieving angles, and control/expansion joints.

### 4.5 Repair and Cleaning

- A. General: Clean all cast stone components as the work progresses. 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. Repair all chips with patch furnished by manufacturer.
  - C. Protect units and surrounding masonry prior to cleaning.
  - D. Saturate all units with water prior to applying an approved masonry cleaner.
  - E. Consult with manufacturer for appropriate cleaners.
  - F. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods which could damage, discolor, or etch the surface.
  - G. Remove cleaner promptly by rinsing thoroughly with water.

4.6 Field Quality Control

- A. Inspections and Acceptance: Cast Stone Institute Standard Specification.
  - 1. Inspect finished installation according to Bulletin #36
  - 2. Do not field apply water repellent until repair, cleaning, inspection and acceptance is completed.
  - 3. Verify that on-going and completed cast stone work meets specified tolerance appearance requirements.
  - 4. Remove and replace work that is broken, chipped, stained, or otherwise damaged; including work that does not match approved samples or approved mock-up.

4.7 Water Repellant

- A. Apply water repellent after pointing, repair, cleaning, inspection, and acceptance are completed.
- B. Apply water repellent for weatherproofing cast stone in accordance with repellent manufacturer's instructions.

4.8 Protection

- A. Protect cast stone components from splashing and other damage to finished surfaces by on-going construction, until acceptance by owner.

**END OF SECTION**