



**SPECIAL PROVISIONS
FOR
CAST STONE**

**Dubuque County
NHSX-032-1(39)--3H-31**

**Effective Date
January 17, 2018**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150380a.01 DESCRIPTION.

A. Summary.

This specification includes cast stone units.

B. Definitions.

Cast Stone: Architectural precast concrete building units intended to simulate natural cut stone.

C. Submittals.

1. **Product Data:** Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cast stone units.
2. **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. Include riser elevations showing layout of units and locations of joints and anchors.
3. **Samples for Verification:** For each color and texture of cast stone required, 10 inches square in size.
4. **Material Test Reports:** From a qualified testing agency including and interpreting test results for compliance of cast stone with requirements indicated.

D. Quality Assurance.

1. **Manufacturer Qualifications:** A firm experienced in manufacturing cast stone units similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to manufacture required units.

2. Source Limitations for Cast Stone: Obtain cast stone units through one source from a single manufacturer.
3. 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.

E. Delivery, Storage, and Handling.

1. Coordinate delivery of cast stone with concrete work to minimize the need for on-site storage and to avoid delaying the Work.
2. Pack, handle, and ship cast stone units in suitable packs or pallets.
 - a. 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.
 - b. 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.
3. Store installation materials on elevated platforms, under cover, and in a dry location.
4. Store mortar aggregates where grading and other required characteristics can be maintained and contamination avoided.

F. Coordination.

Coordinate production and delivery of cast stone unit masonry work to minimize the need for on-site storage and to avoid delaying the Work.

150380a.02 MATERIALS.

A. Cast Stone Unit Manufacturers.

- Edwards Cast Stone Company.
- American Artstone Co., Inc.
- Continental Cast Stone Manufacturing, Inc.
- Stonco.

B. Cast Stone Materials.

1. Provide cast stone units complying with the "Cast Stone Institute" specifications and ASTM C 1364 using the vibrant dry tamp or wet-cast method. 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.
2. Portland Cement: ASTM C 150, Type I, containing not more than 0.60% total alkali when tested according to ASTM C 114.
3. Coarse Aggregate: Granite, quartz, or limestone complying with ASTM C 33; gradation as needed to produce required textures.
4. Fine Aggregates: Manufactured or natural sands complying with ASTM C 33; gradation as needed to produce required textures.
5. Color Pigments: ASTM C 979, inorganic, natural or synthetic iron oxide pigments, lime-proof. Cement grade carbon black pigment is not acceptable.

6. Air Entraining Admixture: ASTM C 260, certified by the manufacturer to be compatible with other admixtures used. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 5% to 7%.
7. Reinforcement: Deformed steel bars complying with ASTM A 615. Epoxy coating: ASTM A 775.
8. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 276 and ASTM A 666, Type 304.
9. Welded Wire Fabric: Galvanized, complying with ASTM A 185.

C. Cast Stone Units.

1. Provide cast stone units complying with ASTM C 1364. 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.
2. Reinforce units as required by ASTM C 1364. Use epoxy-coated reinforcement of galvanized welded wire fabric. Coat ends of reinforcement with epoxy. Cast stone units greater than 12 inches wide shall be reinforced along their length and width.
3. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.
 - a. Slope exposed horizontal surfaces at least 1:12, unless otherwise indicated.
 - b. Provide drips on projecting elements, unless otherwise indicated.
4. Cure and finish units as follows:
 - a. Cure units in totally enclosed curing room under dense fog and water spray at 95% relative humidity for 24 hours.
 - b. Yard cure units until the sum of the mean daily temperatures for each day equals or exceeds 350°F.
 - c. Acid etch units to remove cement film from surfaces indicated to be finished.
5. Color and Texture: To be selected by the Engineer.

D. Portland Cement-Lime (PCL) Mortar Materials and Mixes.

1. Portland Cement: ASTM C 150, Type I, II or III. The maximum percent of alkalis shall be 0.60. Air-entraining cement is not permitted. The use of blended cements, including Portland blast-furnace slag cement, Portland-pozzolan cement, slag cement and natural cement is not permitted.
2. Hydrated Lime: ASTM C 207, hydrated, Type S.
3. Mortar Aggregate: Complying with ASTM C 144, well graded and free of gypsum.
4. Water: Clean, potable.
5. The following ingredients shall not be used:
 - a. Antifreeze additives.
 - b. Calcium chloride, Thiocyanates or other materials containing chloride ions.
 - c. Ready mix mortar (ASTM C 1142).
 - d. Masonry cement.
 - e. Other admixtures without prior approval of the Engineer.

6. Factory Pre-blended PCL mortar mixes shall comply with ASTM C 270, Type N, Property Method using component materials listed above. Limit air content to 10% (maximum). Blend cementitious materials, aggregate, and admixtures under factory controlled conditions, which require only the addition of water at the project site. Oven dry aggregates prior to measuring and inclusion in the pre-blended mix.

E. Accessories.

1. Anchors: Type and size required, fabricated from stainless steel complying with ASTM A 276 or ASTM A 666, Type 304.
2. Joint Sealant and Backing: Elastomeric sealant shall comply with ASTM C 920 and be appropriate for use with cast stone to establish and maintain a water and air-tight continuous joint seal without staining or deteriorating joints substrates. Sealant color is to be selected by the Engineer from the manufacturer's standard color pallet. Obtain sealant from one source from a single manufacturer. Store and handle materials in accordance with the manufacturer's written recommendations. Sealant backing shall comply with ASTM C 1330, Type C or B, and shall be nonstaining and compatible with joint substrates, sealants, primers and other joint fillers used.
3. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

150380a.03 CONSTRUCTION.

A. Examination.

Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Setting Cast Stone in Mortar.

1. Set cast stone as indicated on plans. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
2. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
3. Set units in full bed of mortar with full head joints, unless otherwise indicated.
 - a. If not indicated, set units with joints 3/8 to 1/2 inch wide.
 - b. Build anchors and ties into mortar joints as units are set.
 - c. Fill dowel holes and anchor slots with mortar.
 - d. Fill collar joints solid as units are set.
 - e. Build concealed flashing into mortar joints as units are set.
 - f. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
 - g. Keep joints at shelf angles open to receive sealant.
4. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

5. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
6. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
7. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated. Keep joints free of mortar and other rigid materials. Form open joint of width indicated, but not less than 3/8 inch.
8. Rake out mortar to depths of not less than 3/4 inch nor less than that required for sealant and sealant backing. Rake joints to uniform depths with square bottoms and clean sides.
9. Prepare joints indicated to receive sealant and apply sealant of type and at locations indicated to comply with manufacturer's recommendations. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant, unless otherwise indicated.

C. Setting Anchored Cast Stone with Sealant-Filled Joints.

1. Locations, General: All head joints at coping stones and joints at column covers, cornices, platforms, soffits, window sills and in general, all stone sections with projecting profiles, exposed top joints or rigid suspension connections to the supporting structure
2. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
 - a. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
 - b. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.
3. Keep cavities open where unfilled space is indicated between back of cast stone units and backup wall; do not fill cavities with mortar or grout.
4. Fill anchor holes with sealant. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
5. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.
6. Keep joints free of mortar and other rigid materials. Remove temporary shims and spacers from joints after anchors and supports are secured in place and cast stone units are anchored. Do not begin sealant installation until temporary shims and spacers are removed. Form open joint of width indicated, but not less than 3/8 inch.
7. Prepare joints and apply sealant of type and at locations indicated to comply with manufacturer's recommendations. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant, unless otherwise indicated.

D. Installation Tolerances.

1. Variation from Plumb: Do not exceed 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.

2. Variation in Vertical Alignment Along Wall Profile: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch maximum.
3. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

E. Adjusting and Cleaning.

1. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by the Engineer.
2. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
3. In-Progress Cleaning: Clean cast stone as work progresses.
 - a. Remove mortar fins and smears before tooling joints.
 - b. Remove excess sealant immediately, including spills, smears, and spatter.
4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
 - a. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - b. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before proceeding with cleaning of cast stone.
 - c. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 - d. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 - e. Clean cast stone by bucket-and-brush hand-cleaning method described in Brick Institute of America (BIA) Technical Notes No. 20.
 - f. Clean cast stone per Cast Stone Institute Cleaning Care & Maintenance - Technical Bulletin No. 39.

150380a.04 METHOD OF MEASUREMENT.

Measurement will be per lump sum for the Cast Stone units successfully installed.

150380A.04 BASIS OF PAYMENT

Payment of Cast Stone as measured shall be full compensation for all materials, labor, tools, equipment, testing, inspection services, and incidentals necessary to perform the work in accordance with the contract documents. Payment for cast stone shall also include furnishing and installing Portland cement-lime mortar and all accessories.