SP-151005
(New)

SPECIAL PROVISION
FOR
CAST STONE PANELS

Greene County
FM-C037(51)--55-37

Effective Date
November 15, 2016

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.

151005.01 DESCRIPTION.

A. General.

This section specifies the requirements for fabricating and installing cast stone insignia panels as indicated in the contract documents. The cast stone panels are an architectural precast concrete unit intended to simulate natural cut stone.

B. 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 wall elevations showing layout of units and locations of joints and anchors. Indicate sealant, if proposed for use.

3. Samples: For each color and texture of cast stone required, two samples 10 inches square in size. Deliver samples to the (1) Engineer and (2) Iowa DOT, Office of Bridges and Structures, Attn: Aesthetics Coordinator, 800 Lincoln Way, Ames, IA 50010 for review and approval prior to fabrication.

4. Material Test Reports: From a qualified testing agency including and interpreting test results for compliance of cast stone with requirements indicated.

C. 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.

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.

D. Product Delivery, Storage and Handling.

1. 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 non-staining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

2. Store installation materials on elevated platforms, under cover, and in a dry location.

3. Store mortar aggregates where grading and other required characteristics can be maintained and contamination avoided.

E. 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.

151005.02 MATERIALS.

A. Manufacturers.

Provide products by one of the following:

1. American Artstone Co., Inc.
2. Continental Cast Stone Manufacturing, Inc.
3. Edwards Precast Concrete Co.
4. Stonco.

B. Cast Stone Materials.

1. General: Comply with ASTM C 1364 and the following:

2. Portland Cement: ASTM C 150, Type I, containing not more than 0.60 % total alkali when tested according to ASTM C 114; white cement as required to produce desired finish color.

3. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation as needed to produce required textures; color as required to produce desired finish color.

4. Fine Aggregates: Manufactured or natural sands complying with ASTM C 33; gradation as needed to produce required textures; color as required to produce desired finish color.

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 or 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 or galvanized welded wire fabric. Coat ends of reinforcement with epoxy.

   Stones 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 raised fillets at backs of sills and at ends to be built into jambs.
   c. 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 % to 100 % relative humidity and temperature of 100 °F for 12 hours or 70 °F for 16 hours.
   b. Yard cure units until the sum of the mean daily temperatures for each day equals or exceeds 350 °F. Keep units damp during yard cure period.
   c. Acid etch units after curing to remove cement film from surfaces to be exposed to view. Resulting finish shall be a consistent, smooth sand textured surface.

5. Color and Texture: Provide units with fine-grained sand texture and light grey color with less

than 5% dark colored aggregates visible in the finished surface.

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

1. Portland cement: ASTM C 150, Type I, II or III. The maximum percent of alkalies 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, Thyocyanates or other materials containing chloride ions.

   c. Ready mix mortar (ASTM C 1142).

   d. Masonry Cement.

   e. Other admixtures without the prior approval of the Engineer.

6. Factory Pre-blended PCL mortar mixes shall comply with ASTM C 270, Type M, 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 indicated, 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 joint substrates. Sealant color is to match the color of the cast stone units. Obtain sealant through one source from a single manufacturer. Store and handle materials in compliance with manufacturer's written recommendations. Sealant backing shall comply with ASTM C 1330, Type C or B, and shall be non-staining and compatible with joint substrates, sealant, 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.

   Provide one of the following:
   a. 202V Vana-Stop; Diedrich Technologies, Inc.
   b. Sure Klean Vana Trol; ProSoCo, Inc.

151005.03 CONSTRUCTION.

A. Examination.

1. Examine substrates and conditions with both cast stone installer and Engineer present, for compliance with requirements for installation tolerances and other conditions affecting performance of cast stone.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Masonry Construction, General.

1. Cast stone masonry work shall be done by skilled installers, fully instructed as to requirements of this Specification, and adequately supervised during Work.

2. Cold weather masonry shall conform to Cold Weather Masonry Construction and Protection Recommendations, and IMI Recommended Practices & Guide Specifications for Cold Weather Masonry Construction and the following:

   a. Do no masonry work when outdoor temperature is less than 40°F unless provisions are made to adequately protect materials and finished work from frost by heating materials, enclosing work, and heating enclosed spaces.

   b. If masonry work must be done when ambient temperature is freezing or below, all masonry material must be at temperature between 50 °F and 90 °F, and mortar, when used, shall have a temperature between 60 °F and 80 °F. In addition, all masonry shall be protected from temperatures below 40 °F for at least 48 hours after being laid.

3. Verify suitability of substrate to accept stone work prior to beginning installation of cast stone.

C. Installation.

1. Set cast stone as indicated on plans. Do not install cast stone insignia panels until after the abrasive blast finishing of the abutment tower icon concrete surfaces is complete. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

2. Drench units with clear water just before setting.

3. Set units in full bed of mortar with full head joints, unless otherwise indicated. Build anchors and ties into mortar joints as units are set. Fill dowel holes and anchor slots with mortar.

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 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 as required. Keep joints free and clear of mortar.

8. Prepare and seal joints in accordance with ASTM C 1193 and sealant manufacturer's written recommendations, and only when ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer. Clean out joints immediately before installing sealant backing and joint sealant. Do not contaminate adjacent surfaces with sealant. Clean off excess sealants or sealant smears adjacent to joints as the work progresses by methods and with cleaning materials in compliance with sealant manufacturer's written recommendations.

D. Mortar.

1. Mix Mortar materials a minimum of 5 minutes, but not more than 10 minutes. Adjust consistency to satisfaction of mason subject to compliance with specified criteria. Comply with Brick Institute of America Standard MI-72.

2. If mortar begins to stiffen, it may be re-tempered in accordance with ASTM C 270, Subparagraph 7.4.

E. 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.

4. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

F. 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 unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

4. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   a. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

b. Clean installed cast stone with a high pressure water spray to remove any remaining mortar residue. Ensure that cleaning does not mar or remove the mineral silicate paint coating. Repair damaged mineral silicate paint as required in the special provisions to the satisfaction of the Engineer.

151005.04 METHOD OF MEASUREMENT.

Installed cast stone will be not be measured, but will be based on plan quantities.

151005.05 BASIS OF PAYMENT.

Payment for cast stone shall be full compensation for all materials, labor, tools, equipment, testing, inspection, services and incidentals necessary to perform the work of this section. Payment for cast stone shall also include furnishing and installing Portland Cement-lime mortar and all accessories.