

SECTION 047200 – CAST STONE MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Trim units:
 - a. Windowsills.
 - b. Lintels.
 - c. Window surrounds.
 - d. Keystone lintels.
 - e. Copings.
 - f. Water tables.
 - g. Quoins.
 - h. Medallions.
 - i. Rosettes.
 - j. Banding.
 - k. Columns.
 - l. Pilasters.
2. Cast Stone Curbing.

B. Related Sections:

1. Section 040140.61 – Stone Repair.
2. Section 040140.62 – Stone Repointing.
3. Section 040120.63 – Brick and Terra Cotta Masonry Repair.
4. Section 040120.64 – Brick and Terra Cotta Masonry Repointing.
5. Section 042000 – Unit Masonry
5. Section 079200 – Joint Sealants.

C. Reference and Industry Standards

1. The following reference standards shall be applicable to this Section:
 - a. TMS – Publication 604 – Standards for Architectural Cast Stone.
 - b. CSI – Technical Bulletin #39 – Cleaning.
 - c. ASTM C1364 – Standard Specification for Architectural Cast Stone.
 - d. ACI 530.1/ASCE 6/TMS 602 – Specification for Masonry Structures.

 - e. The current Enterprise Green Communities (EGC) Criteria, and the current New York City Overlay.
2. Industry Standards
 - ACI (American Concrete Institute)

- ASTM (American Society for Testing and Materials)
- CSI (Cast Stone Institute)
- TMS (The Masonry Society)

D. The current NYC Overlay of the current Enterprise Green Communities Criteria:

1. Mandatory Requirements: See the NYC Overlay of the EGC reference standard for full specifications.
 - a. All projects must achieve compliance with the mandatory criteria measures that are applicable:
 - Criterion 6.9: Managing Moisture: Roofing and Wall Systems
 - Criterion 6.10 Construction Waste Management
2. Optional Project Requirements for Certification Points
 - a. Additionally, rehab projects are required to achieve **55** optional points. Criteria with optional points related to this Specification Section include, but may not be limited to:
 - Criterion 6.7: Regional Materials
 - Criterion 6.10: Construction Waste Management

1.2 ACTION SUBMITTALS

- A. Environmental Product Declaration (EPD) for each type of product.
- B. 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.
- C. Samples:
 1. For each color and texture of cast stone required, 10 inches square in size.
 2. For each trim shape required, 4 inches in length.
 3. For colored mortar, sample to use same sand and mortar ingredients to be used on Project. Samples to be labeled to indicate amounts and type of pigments used.

1.3 INFORMATIONAL SUBMITTALS

- A. Material test reports: For each mix required to produce cast stone, based on testing according to ASTM C1364, including test for resistance to freezing and thawing.
- B. Documentation for compliance with Enterprise Green Communities Criteria.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by [CSI] [or] [APA] [or] [PCI for Group A, Category AT].

- B. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.
- C. 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.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
 - 1. 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.
 - 2. Store cast stone units on wood skids or pallets with non-staining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained, and contamination can be avoided.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.
 - 2. Hot-Weather Requirements: Comply with hot-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 CAST STONE UNITS

- A. Cast Stone Units: Comply with ASTM C1364.
 - 1. Units shall be manufactured using the manufacturer's selected method.
 - 2. Trim units including [**windowsills**] [**lintels**] [**surrounds**] [**mullions**] [**copings**] [**cornices**] [**wall caps**] [**belt courses**] [**water tables**] [**quoins**] [**keystones**] [**items as indicated on Drawings**].

3. Decorative elements including **[pilasters] [column covers] [medallions][curbing] [items as indicated on Drawings]**.
- B. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
 3. Provide drips on projecting elements unless otherwise indicated.
- C. Cure Units as Follows:
1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
 2. Keep units damp and continue curing to comply with one of the following:
 - a. No fewer than five days at mean daily temperature of 70 deg F or above.
 - b. No fewer than seven days at mean daily temperature of 50 deg F or above.
- D. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
- E. Colors and Textures: **[Match existing units] [As selected by Design-Professional-of-Record from manufacturer's full range]**.

2.2 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from steel complying with ASTM A36 and hot-dip galvanized to comply with ASTM A123.
- B. Dowels: 1/2-inch-diameter round bars, fabricated from steel complying with ASTM A36 and hot-dip galvanized to comply with ASTM A123.
- C. 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 cast stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.3 MORTAR MIXES

- A. Comply with requirements in *Section 042000 – Unit Masonry* for mortar mixes.
- B. Comply with ASTM C270, Proportion Specification.
1. For setting mortar, use Type N ASTM C270
 2. For pointing mortar, use Type N.
- C. Preblended dry mortar mix complying with ASTM C1714 and capable of producing mortar strength as indicated in ASTM C270.

1. For setting mortar, use Type N.
 2. For pointing mortar, use Type N.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

2.4 SOURCE QUALITY CONTROL

- A. Engage a qualified independent testing agency to sample and test cast stone units according to ASTM C1364.

PART 3 - EXECUTION

3.1 SETTING CAST STONE IN MORTAR

- A. Set cast stone as indicated in The Masonry Society (TMS) Publication 604.
- B. Install cast stone units to comply with requirements in *Section 042000 – Unit Masonry*.
- C. Set units in full bed of mortar with full head joints unless otherwise indicated.
1. Fill dowel holes and anchor slots with mortar.
 2. Fill collar joints solid as units are set.
 3. Build concealed flashing into mortar joints as units are set.
 4. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
 5. Keep joints at shelf angles open to receive sealant.
- D. 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.
- E. 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.
- F. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.
- G. Rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.
- H. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.
1. Keep joints free of mortar and other rigid materials.
 2. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in *Section 079200 – Joint Sealants*.

3.2 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS

- A. Set cast stone as indicated in The Masonry Society (TMS) Publication 604.
- B. Set cast stone [**as instructed by Design-Professional-of-Record**] [**as indicated on Drawings**]. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
 - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
 - 2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.
- C. Fill anchor holes with sealant.
 - 1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
- D. 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.
- E. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in *Section 079200 – Joint Sealants*.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/2 inch maximum.
- B. Variation from Level: Do not exceed 1/2 inch maximum.
- C. 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.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.4 ADJUSTING AND CLEANING

- A. 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 Design-Professional-of-Record.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
 - 1. Remove mortar fins and smears before tooling joints.
 - 2. Remove excess sealant immediately, including spills, smears, and spatter.

- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
 5. Clean cast stone by methods described in Cast Stone Institute Technical Bulletin #39.
 6. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200