Division 04 Masonry
SECTION 04 72 00
CAST STONE MASONRY

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The Contractor is referred to the Instructions to Bidders and General Conditions, NYCHA Contracts; the Special Notice to Contractors; the Form of Proposal; the Form of Bid Bond; Division 01 - General Requirements of the Contract Specifications; the Contract Drawings and all Amendments and Addenda thereto; all of which govern the Work of this Section.

1.02 DESCRIPTION OF WORK

A. The Work of this Section includes all labor, materials, equipment and services necessary to:

1. Provide architectural cast stone sills, of profiles and dimensions indicated in the Drawings.
2. Provide architectural cast stone parapet copings of profiles and dimensions shown in the Drawings.

1.03 RELATED SECTIONS

A. Section 04 20 00 Unit Masonry

B. Section 05 50 00 Miscellaneous Metals

C. Section 07 92 00 Joint Sealants

D. Section 08 51 00 Aluminum Windows

1.04 REFERENCES, INDUSTRY STANDARDS AND DEFINITIONS

A. The recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work:

1. American Concrete Institute (ACI).
2. Concrete Reinforcing Steel Institute (CRSI).
3. Precast Concrete Institute (PCI).
4. The Cast Stone Institute (CSI)
5. American Society for Testing and Materials (ASTM).

B. Dry Cast Concrete Products: Manufactured from zero-slump concrete.

1. Vibrant Dry Hand Tamp Casting Method: Vibratory compaction by hand tamp of earth- moist zero-slump concrete against rigid mold until it is densely compacted.
2. Wet Cast Concrete Products: Manufactured from measurable slump concrete and consolidated into a mold. Wet-cast process only for Cast Stone units for Copings and Sills all exposed surfaces.

1.05 SUBMITTALS

A. Submit the following product information

1. Manufacturer's product data.
2. Copy of manufacturer’s Precast Concrete Institute (PCI) or Cast Stone Institute (CSI) certification.

B. Shop Drawings:

1. Submit manufacturer’s shop drawings, for cast stone sills and cast stone copings, including profiles cross sections, modular unit lengths, reinforcement, exposed faces, anchors and anchoring methods and annotation of cast stone types and location.

C. Samples

1. Cast Stone: For initial Selection submit 3 Samples approximately 8" x 8" x 2", that represent general range of texture and color proposed to be furnished for the project.
2. Joint Sealant: For Initial Selection of Joint Sealant Color Submit the full range of colors available. Label samples to indicate type used.
3. Submit 3 samples each of anchorages and other attachments and accessories.
4. Full Size Cast Stone Samples: Prior to start of installation, and after the review of finish Samples, submit one full size Sample cast stone sill and coping, delivered to the job site. Acceptable full size sample may be incorporated in the construction.

1.06 QUALITY ASSURANCE

A. Installers Qualifications

1. The installer must be CSI or PCI certified.
2. A firm with at least three (3) years’ continuous operating experience and have facilities for producing cast stone units of the shapes quantities and size required for this Project.

B. Manufacturer Qualifications

1. The manufacturer must be CSI or PCI certified.
2. Manufacturer shall demonstrate at least 5 years’ experience in the manufacture of cast stone units similar to those to be used in this project.

C. Laboratory Qualifications: An independent testing laboratory qualified according to ASTM E329 to conduct the testing specified, as documented according to ASTM E548.

D. Source Limitations: Obtain cast stone units through one source from a single manufacturer.

E. Mock-ups: May remain in place as part of the project If approved.

1.06 DELIVERY, STORAGE AND HANDLING

A. Delivery:

1. Deliver cast stone units secured to shipping pallets and protected from damage and discoloration.
2. Provide itemized shipping list and deliver in quantities and at times to assure continuity of construction.
3. Number each piece individually as required to match shop drawings and schedules.

B. Storage:

1. Store cast stone units and installation materials in accordance with manufacturer's instructions.
2. Store cast stone units on pallets with non-staining, waterproof covers.
3. Do not double stack pallets.
4. Ventilate units under covers to prevent condensation.
5. Prevent contact with dirt and splashing.

C. Handling:

1. Protect cast stone units, including corners and edges, during storage handling and installation to prevent chipping, cracking, staining and other damage.
2. Handle long units at center and both ends simultaneously to prevent cracking.
3. Do not use pry bars or other equipment in a manner that could damage the units. Any units damaged before final acceptance shall be replaced. Patching of units is not acceptable.

1.07 SCHEDULING

A. Schedule and coordinate production and delivery of cast stone units with unit masonry work.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Basis of Design Product:

1. Westbrook Concrete Block Co., Inc.
2. Or architect approved equal.

2.01 CAST STONE UNITS

A. Provide custom cast stone units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C666, Procedure A, as modified by ASTM C1364.

B. Compressive Strength: At 28 days after manufacture, not less than 6500 psi, when tested in accordance with Test Method ASTM C1194.

C. Absorption, Cold Water: At 28 days after manufacture, not greater than 6%, when tested in accordance with Method A, Cold Water of Test Method ASTM C1195.

D. Absorption, Hot Water: At 28 days after manufacture, not greater than 10%, when tested in accordance with Method B, Boiling Water Test of Test Method ASTM C1195.

E. Make exposed edges sharp, straight, and square. Make flat surfaces into a true plane.

F. Warped, cracked, broken, spalled, stained, and otherwise defective units will not be acceptable.

G. Place and secure in the forms all anchors, clips, stud bolts, inserts, lifting devices, shear ties, and other devices required for handling and installing the precast units and for attachment of subsequent items as indicated or specified.

H. Casting Method: Vibrant dry hand tamp or wet cast as specified and/or required.

I. Texture: Smooth.

J. Color: Custom to match brickwork.

K. L. Curing: Cure in enclosed chamber at 100 percent relative humidity and minimum 90 degrees F for up to 15 hours and yard cure for a minimum of 3 days. Acid etch units to remove cement film from surfaces indicated to be finished.

2.02 CAST STONE MATERIALS

A. Portland Cement: ASTM C150, Type I or Type lll white and/or gray as required to match specified color.

B. Coarse Aggregates: ASTM C33 except for gradation. Granite, Quartz or Limestone. Used for wet mix process.

C. Fine Aggregates: ASTM C33, except for gradation. Manufactured or Natural Sands.

D. Pigments: ASTM C979, except do not use carbon black pigments. Inorganic iron oxide pigments.

E. Admixtures:

1. Water Reducing, Retarding and Accelerating Admixtures: ASTM C 494.
2. Air-Entraining Admixture: ASTM C260.
3. 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.
4. Mineral Admixtures: ASTM A 618.
5. Ground Granulated Blast-furnace Slag.

F. Water: Potable.

G. Reinforcing Bars: ASTM A 615, deformed steel bars. Epoxy coated or galvanized when covered with less than 1-1/2 inches of material.

1. Galvanized Coating: ASTM A 767.

2.03 TEXTURE AND COLOR

A. General: Match texture and custom color to architect approved sample to match facing brick.

B. Texture of Surfaces Exposed to View:

1. Fine grained texture similar to natural stone.
2. Approximately equal to approved sample when viewed in direct daylight at 10 feet.

C. Surface Air Voids:

1. Size: Maximum 1/32 inch.
2. Density: Less than 3 occurrences per any 1 square inch.
3. Viewing Conditions: Not obvious under direct daylight at 10 feet.

D. Finish:

1. Smooth.

E. Color Variation:

1. Viewing Conditions: Color shall be uniform and consistent for all units. Compare in direct daylight at 10 feet, between units pf similar age, subject to similar weathering conditions.
2. Total Color Difference: ASTM C 1364, 6 units.
3. Hue Difference: ASTM C 1364, 2 units.

2.04 MORTAR

E. Mortar Materials:

1. Portland Cement: ASTM C150, Type I custom color to match copings and sills.
2. Hydrated Lime: ASTM C207, Type S.
3. Sand: Clean, washed, white, ASTM C144.
4. Water: Potable.

B. Mortar Mixes

1. Mortar: Comply with ASTM C 270, Proportion Specification, Type N.

2.05 ACCESSORIES

A. Anchors: Non corrosive Type 304 stainless steel anchors sized for conditions by Westbrook Concrete Block.

B. Sealant: Sealant as specified in Section 07 92 00.

C. Cleaner: Prosoco Sure Klean Custom Masonry Cleaner, Prosoco Sure Klean 600 Detergent, Prosoco Sure Klean Vana Trol, Prosoco Light Duty Cleaner, or equal.

1. On darker units use a less aggressive cleaner to avoid ‘stripping and maintain color.

2.06 FABRICATION

A. Fabricate the Work of this Section to the sizes and shapes indicated, and of color and texture matching the approved Samples.

B. Shapes:

1. Provide suitable wash on exterior sills and copings with exposed top surfaces.
2. Provide drips on all protecting units.

2.07 TOLERANCES

A. General: Manufacture custom cast stone masonry veneer units within tolerances in accordance with Cast Stone Institute Technical Manual.

1. Cross Sectional Dimensions: Do not deviate by more than length/369 or plus or minus 1.8 inch, whichever is greater, not to exceed plus or minus 1/4 inch.
2. Length of Units: Do not deviate by more than length/360 or plus or minus 1/8 inch, whichever is greater.

2.08 SOURCE AND FIELD QUALITY CONTROL

A. Source Quality Control:

1. Mix Designs: Test new and existing mix designs for applicable compressive strength and absorption compliance before manufacturing cast stone units.
2. Plant Production testing: Test Compressive Strength and absorption from specimens selected at random from plant production. Tests to be conducted bay certified laboratory testing technicians appointed by the Agency.
3. Custom Cast Stone Units: Test in accordance with ASTM C1194 and C 1195.

B. Field Quality Control:

1. The Authority will assign a Special Inspector who will inspect the masonry construction under the requirements of Section BC 1704.5 of the 2014 NYC Building Code.
2. If quality control issues arise the Authority may direct the Contractor to employ an independent testing agency to sample and test the cast stone according to ASTM C1364. If any test specimens fail, the entire batch shall be rejected and the Contractor is responsible for the cost of testing and the cost of replacing the cast stone.
3. Defective Work: Cast Stone units that do not comply with the specified requirements, including compressive strength, manufacturing tolerances, and finishes, are unacceptable. The Contractor shall remove and replace defective Work with cast stone units that comply with the specified requirements at no cost to the Authority.
4. Additional testing, at Contractor's expense, will be performed by the Authority's testing laboratory to determine compliance of corrected Work with specified requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine construction to receive cast stone units. Notify Architect if construction is not acceptable. Do not begin installation until unacceptable conditions have been corrected.

B. Examine cast stone units before installation. Do not install unacceptable units. Of unacceptable units are installed, replacement od stones and all costs associated are the responsibility of the installer.

1. All Architectural Cast Stone products are shipped on a pallet and have one unfinished side. Smooth units are stacked ‘face up’, on the pallet.
2. Returns and finished ends must be ordered and noted on the shop drawings.

3.02 INSTALLATION

A. Refer to NCMA TEK Bulletin 3-6B ‘Concrete Masonry Veneers’ for proper veneer anchoring.

1. Install units in conjunction with masonry as specified in Section 04810.
2. Protect grout and cast stone units from freezing during construction and maintain an ambient temperature for cast stone work of at least 32^0F for a period of at least 72 hours.
3. Pull units from multiple cubes during installation to minimize variation in color and help with natural blending.

4. Cut units using motor-driven masonry saws. Finished ends should be turned to the visible side and the saw cut turned to the inside of the mortar joint to hide exposed aggregates and saw marks.
5. Do not use pry bars or other equipment in a manner that could damage units.
6. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
7. Use Westbrook Concrete Block Type N mortar ASTM C270Set units in full bed of mortar.
8. Per ACI 4350.1, it is not recommended to wet units prior to installation.
9. Lead, Plastic or hard rubber buttons shall be used in setting large units to sustain the weight until mortar has set.
10. Set units in full bed of mortar. It is not necessary to rake joints for tuck pointing. Standard full mortar application with tooling is all that is necessary. Cast Stone sills are to be set in non-shrink grout. Provide flexible adhesive stainless steel flashing below. See drawings for additional details.
11. Fill vertical joints with mortar.
12. Leave head joints in copings and sills open for sealant.
13. Make joints 3/8 inch.
14. Mortar joints should have a slightly concave profile.
15. Remove excess mortar immediately.
16. Remove mortar fins and smears before tooling joints.
17. Cover wainscot for protection and bond separation with plastic, felt paper or other approved products.
18. Cover freshly installed masonry products as required to assist with the curing process.
19. Sealant joints:
    a. As specified in Section 07 90 00
    b. Prime ends of units, inserting properly sized backing rod and install sealant.
    c. Provide sealant joints at following locations:
        i. Copings and cast stone units with exposed tops.
        ii. Joints at relieving angles.
        iii. Control and expansion joints.
        iv. As indicated on the Drawings.

B. Discrepancies
1. Immediately notify Architect/Engineer Of Record.
2. Do not proceed until fully corrected

3.03 TOLERANCES

A. Installation Tolerances:

1. Variation from Plumb: Do not exceed 1/8 inch in 5 feet or ¼ inch in 20 feet or more.
2. Variation from Level: Do not exceed 1/8 inch in 4 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 or 1/4 of nominal joint width, whichever is greater.
4. Variation in Plane Between Adjacent Surfaces: Do not exceed 1/8 inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.04 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples.

B. Clean exposed units after mortar is thoroughly set and cured. Clean in conjunction with the cleaning of all other masonry work. Do not clean in temperature below 50 degrees

1. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
1. Perform test of cleaner on small area of 4'x 4' ln each type and color and receive approval by Architect before full cleaning. Let test area dry 4 to 5 days before inspection. Keep test area for future comparison.
2. Clean units by wetting down the surface first, before using the specified cleaner. Brush on cleaner, let dwell for 2 to 3 minutes. Reapply cleaner, scrub surface with masonry brush and rinse off thoroughly, Areas with heavy soiling use a wood block or non-metallic scraper.
3. Apply cleaner to units in accordance with cleaner manufacturer's instructions.
4. Do not use the following to clean units:
    a. Muriatic acid.
    b. Power washing.
    c. Sandblasting.
    d. Harsh cleaning materials or methods that would damage or discolor surfaces.

END OF SECTION