

DIVISION 04

MASONRY

SECTION 04100 MORTAR

1.00 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all materials, labor, equipment, plant, tools, required to complete
 - plaster
 - masonry work and
 - patching mortaras shown in the drawings and specified in the Summary of Materials and Finishes herewith.
- B. Unless otherwise indicated on drawings or specified herein, all materials or work under the division shall be subject to the provisions under Division 3 CONCRETE

2.00 PRODUCTS

2.10 MATERIALS

Refer to Section 01020 Summary of Materials and Finishes.

2.02 MIXES

Cement Mortar:
1 part Portland Cement
2 parts sand, but not more than 1 part Portland Cement, 3 parts sand.
For plaster works thicker than 25 mm (1"), use plaster mix with FIBRIN – 23 as per manufacturer's specifications.

3.00 EXECUTION

3.01 INSTALLATION

- A. Application of Cement Plaster
 - 1. Scratch Coat: Apply with sufficient force and material to form full keys or bond. Cross scratch as soon as scratch coat has attained initial set and apply brown coat as soon as practicable.
 - 2. Brown Coat: Scratch or broom for bond of finish coat and allow to set hard. Keep brown coat moist until finish coat is applied.

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3. Finish Coat: Bring to true, even surfaces with rods and trowel smooth, leaving finished surface free from tool marks and blemishes. Keep cement plaster moist for at least 3 days and protect against rapid drying until cured.
- B. Application of masonry mortar
Lay all concrete hollow blocks with 10 mm (3/8") horizontal and vertical mortar joints.
- C. Application of patching mortar
 1. Provide the same mixture of gray and white cement for patching mortar and used to fill holes and imperfections, but should be richer mixture and the cement and sand proportions should be the same as those used in the concrete.
 2. Never steel trowel patches, but finish with wood or cork floats.
 3. Allowing the mixed patching mortar to stand for an hour or two before using it, reduces the amount of shrinkage, but never add water in remixing it.
 4. No cement dusting is allowed to hasten any phase of surface for floors and wall finishing.

END OF SECTION 04100

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SECTION 04200 UNIT MASONRY

1.00 GENERAL

1.01 SCOPE

Furnish all materials, labor, equipment, plant, tools, required to complete:

- concrete unit masonry

1.02 HANDLING AND STORAGE

- A. Handle in a manner to prevent undue chipping and breakage
- B. Protect storage piles, stacks and bins from heavy traffic.
- C. Provide platforms to protect bottom piles from contact with soil.

1.03 VISUAL INSPECTION

- A. All units shall be sound and free from cracks or other defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction.
- B. Units that are intended to serve as a base for plaster shall have sufficiently rough surface to afford good bond.

2.00 PRODUCTS

Refer to Section 01020 Summary of Materials and Finishes.

3.00 EXECUTION

3.01 CONCRETE UNIT MASONRY

- A. Lay all masonry unit, plumb, true to line, level and with accurately spaced course.
- B. Let the Architect approve sample of special stone arrangement where required.
- C. Keep bond plumb throughout. Keep corners and reveals plumb and true.
- D. Build in anchors, wall plugs and accessories to masonry as erection progresses.
- E. Bed solidly each course in Portland Cement mortar. Keep all units damp when laid.
- F. Wedge units terminating against beam or slab soffits tightly with mortar and reinforcement properly secured to dowels.
- G. Consult drawings as to the schedule of reinforcements.
- H. Masonry joints

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1. Unless otherwise specified or detailed on plans, make horizontal and vertical mortar joints 10 mm (3/8") with full mortar coverage on the face shells and on the webs. Fill surrounding cells.
2. Fill all joints solidly.
3. Do not permit furrowing of the mortar.
- I. Tooled joints
 1. Use concave joints where tooled mortar joints are called for in the drawings.
 2. Joints must be neat and clean, plumb and true to line.

3.02 UNFINISHED WORK

- A. Step back unfinished work for joining with new work.
- B. Before new work is started, remove all loose mortar and wet the exposed joint thoroughly not less than one hour before laying new work.

3.03 CLEANING

Wash finished surface in a manner most appropriate and satisfactory to the Architect. No cement dusting is permitted for any cement finish.

END OF SECTION 04200

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SECTION 04720 CAST STONE

1.00 GENERAL

1.01 SCOPE OF WORK

Furnish all materials, labor, equipment, plant, tools, required to complete:

- Cast stone elements for Window sills, Wall caps, outdoor landscape elements

1.02 HANDLING AND STORAGE

- A. Handle in a manner to prevent undue chipping and breakage
- B. Protect storage piles, stacks and bins from heavy traffic.
- C. Provide platforms to protect bottom piles from contact with soil.

1.03 VISUAL INSPECTION

- A. All units shall be sound and free from cracks or other defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction.
- B. Units that are intended to serve as a base for plaster shall have sufficiently rough surface to afford good bond.

1.04 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 the Cast Stone Institute or the Architectural Precast Association.
- B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- C. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.
- D. 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. Mockups: Furnish cast stone for installation in mockups specified in Division 4 Section "Unit Masonry Assemblies."

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1.05 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 nonstaining, 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.

2.00 PRODUCTS

2.01 CAST STONE MATERIALS

- A. General: Comply with ASTM C 1364 and the following:
- B. Portland Cement: ASTM C 150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural grey color cement.
- C. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation and colors as needed to produce required cast stone textures and colors.
- D. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to produce required cast stone textures and colors.
- E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
- F. Admixtures: Use only admixtures specified or approved in writing by Architect.
 - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.

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2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 3. Air-Entraining Admixture: ASTM C 260. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
 4. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 5. Water-Reducing, Retarding Admixture: ASTM C 494/C 494M, Type D.
 6. Water-Reducing, Accelerating Admixture: ASTM C 494/C 494M, Type E.
- G. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M, Grade 60. Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches of cast stone material.
1. Galvanized Coating: ASTM A 767/A 767M.
 2. Recycled Content: 80%.
- H. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.

2.02 CAST STONE UNITS

- A. Provide cast stone units complying with ASTM C 1364 using either the vibrant dry tamp or wetcast method.
1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.
- 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. Fabrication Tolerances:
1. Variation in Cross Section: Do not vary from indicated dimensions by more than 3 mm (1/8 inch).
 2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.

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3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
 4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
- D. Cure units as follows:
1. Cure units in enclosed moist curing room at 95 to 100 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.
- E. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
- F. Colors and Textures: As selected by Architect from manufacturer's full range.

2.03 MORTAR MATERIALS

- A. Provide mortar materials that comply with Division 4 Section "Unit Masonry Assemblies."
- B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Masonry Cement: ASTM C 91.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Capital Materials Corporation; Flamingo Color Masonry Cement.
 - b. Cemex S.A.B. de C.V.; Dixie Type S.
 - c. Essroc, Italcementi Group; Brixment.
 - d. Lafarge North America Inc.; Magnolia Masonry Cement.
 - e. Lehigh Cement Company; Lehigh Masonry Cement.
 - f. National Cement Company, Inc.; Coosa Masonry Cement.
- F. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

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2. For joints less than 6mm (1/4 inch) thick, use aggregate graded with 100 percent passing the No. 16 sieve.

G. Water: Potable.

2.04 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.
- B. Dowels: 1/2-inch-diameter, round bars, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.
- 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.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.
- D. Weeps: As specified in Section 04810.

2.05 MORTAR MIXES

- A. Comply with requirements in Division 4 Section "Unit Masonry Assemblies" for mortar mixes.
- B. Do not use admixtures including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
 1. Do not use calcium chloride in mortar or grout.
 2. Use masonry cement mortar unless otherwise indicated.
- C. Comply with ASTM C 270, Proportion Specification.
 1. For setting mortar, use Type S.

3.00 EXECUTION

3.01 EXAMINATION

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

3.02 SETTING CAST STONE IN MORTAR

- A. Install cast stone units to comply with requirements in Division 4 Section "Unit Masonry Assemblies."
- B. 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.
 - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
 - 2. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints unless otherwise indicated.
 - 1. Set units with joints 1/4 to 3/8 inch wide unless otherwise indicated.
 - 2. Build anchors and ties into mortar joints as units are set.
 - 3. Fill dowel holes and anchor slots with mortar.
 - 4. Fill collar joints solid as units are set.
 - 5. Build concealed flashing into mortar joints as units are set.
 - 6. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
 - 7. Keep joints at shelf angles open to receive sealant.
- E. 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.
- F. 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.
- G. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

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- H. Provide sealant joints at 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. Build in compressible foam-plastic joint fillers where indicated.
 - 3. Form joint of width indicated, but not less than 3/8 inch.
 - 4. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
 - 5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Division 7 Section "Joint Sealants."

3.03 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 3mm in 3000 mm; 6.35 mm in 6100 mm or 13 mm maximum (1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum).
- B. Variation from Level: Do not exceed 3mm in 3000 mm; 6.35 mm in 6100 mm or 13 mm maximum (1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum).
- C. Variation in Joint Width: Do not vary joint thickness more than 3mm in 914 mm (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 1.6 mm (1/16 inch), except where variation is due to warpage of units within tolerances specified.

3.04 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 the Owner or Owner's representative.
- 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.

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1. Remove mortar fins and smears before tooling joints.
- 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 with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 04720

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