

**SECTION 04 05 13  
MASONRY MORTARING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

Section specifies mortar materials and mixes.

**1.2 RELATED WORK:**

- A. Mortar used in Section:
  - 1. Section 04 72 10, STONE MASONRY.

**1.3 TESTING LABORATORY-CONTRACTOR RETAINED**

- A. Engage a commercial testing laboratory approved by COR to perform tests specified below.
- B. Submit information regarding testing laboratory's facilities and qualifications of technical personnel to COR.

**1.4 TESTS**

- A. Test materials proposed for use for compliance with specifications in accordance with test methods contained in referenced specifications and as follows:
- B. Mortar:
  - 1. Test for compressive strength and water retention; ASTM C270.
  - 2. Mortar compressive strengths 28 days as follows:
    - Type M: Minimum 17230 kPa (2500 psi) at 28 days.
    - Type S: Minimum 12400 kPa (1800 psi) at 28 days.
- C. Cement:
  - 1. Test for water soluble alkali (nonstaining) when nonstaining cement is specified.
  - 2. Non-staining cement shall contain not more than 0.03 percent water soluble alkali.
- D. Sand: Test for deleterious substances, organic impurities, soundness and grading.

**1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Certificates:
  - 1. Indicating that following items meet specifications:
    - a. Portland cement.
    - b. Masonry cement.
    - c. Mortar cement.

- d. Hydrated lime.
  - e. Fine aggregate (sand).
  - f. Color admixture (if required to match existing finish).
- C. Laboratory Test Reports:
- 1. Mortar, each type.
  - 2. Admixtures.
- D. Manufacturer's Literature and Data:
- 1. Cement, each kind.
  - 2. Hydrated lime.
  - 3. Admixtures.
  - 4. Liquid acrylic resin.

## **1.6 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver masonry materials in original sealed containers marked with name of manufacturer and identification of contents.
- B. Store masonry materials under waterproof covers on planking clear of ground, and protect damage from handling, dirt, stain, water and wind.

## **1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - C40-04 ..... Organic Impurities in Fine Aggregates for Concrete
  - C91-05 ..... Masonry Cement
  - C109-07 ..... Compressive Strength of Hydraulic Cement Mortars (Using  
2-in. or 50-MM Cube Specimens)
  - C144-04 ..... Aggregate for Masonry Mortar
  - C150-05 ..... Portland Cement
  - C207-06 ..... Hydrated Lime for Masonry Purposes
  - C270-07 ..... Mortar for Unit Masonry
  - C595-08 ..... Blended Hydraulic Cement
  - C780-07 ..... Preconstruction and Construction Evaluation of Mortars for  
Plain and Reinforced Unit Masonry
  - C979-05 ..... Pigments for Integrally Colored Concrete
  - C1329-05 ..... Mortar Cement

## **PART 2 - PRODUCTS**

### **2.1 HYDRATED LIME**

ASTM C207, Type S.

### **2.2 AGGREGATE FOR MASONRY MORTAR**

- A. ASTM C144 and as follows:
  - 1. Light colored sand for mortar for laying stone veneer.
- B. Test sand for color value in accordance with ASTM C40. Sand producing color darker than specified standard is unacceptable.

### **2.3 BLENDED HYDRAULIC CEMENT**

ASTM C595, Type IS, IP.

### **2.4 MASONRY CEMENT**

- A. ASTM C91. Type S, or M.

### **2.5 MORTAR CEMENT**

ASTM C1329, Type S or M.

### **2.6 PORTLAND CEMENT**

- A. ASTM C150, Type I.

### **2.7 LIQUID ACRYLIC RESIN**

A formulation of acrylic polymers and modifiers in liquid form designed for use as an additive for mortar to improve physical properties.

### **2.8 WATER**

Potable, free of substances that are detrimental to mortar, masonry, and metal.

### **2.9 MASONRY MORTAR**

- A. Conform to ASTM C270.
- B. Admixtures:
  - 1. Do not use mortar admixtures, except color admixtures if approved by COR.
  - 2. Submit laboratory test report showing effect of proposed admixture on strength, water retention, and water repellency of mortar.
  - 3. Do not use antifreeze compounds.
- C. Colored Mortar:
  - 1. Maintain uniform mortar color for exposed work throughout.
  - 2. Match mortar color in approved sample.
  - 3. Color of mortar for exposed work in alteration work to match color of mortar on the existing columbarium wall.

D. Color Admixtures:

1. Proportion as specified by manufacturer.

**2.10 COLOR ADMIXTURE**

- A. Pigments: ASTM C979.
- B. Use mineral pigments only. Organic pigments are not acceptable.
- C. Pigments inert, stable to atmospheric conditions, nonfading, alkali resistant and water insoluble.

**PART 3 - EXECUTION**

**3.1 MIXING**

- A. Mix in a mechanically operated mortar mixer.
  1. Mix mortar for at least three minutes but not more than five minutes.
- B. Measure ingredients by volume. Measure by the use of a container of known capacity.
- C. Mix water with dry ingredients in sufficient amount to provide a workable mixture which will adhere to vertical surfaces of masonry units.
- D. Mortar that has stiffened because of loss of water through evaporations:
  1. Re-tempered by adding water to restore to proper consistency and workability.
  2. Discard mortar that has reached its initial set or has not been used within two hours.

**3.2 MORTAR USE LOCATION**

- A. Use Type S mortar for masonry containing vertical reinforcing bars (non-engineered)
- B. For stone veneer use Type M portland cement-lime mortar or Type S masonry cement or mortar cement mortar.

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## **SECTION 04 72 10 STONE MASONRY**

### **PART 1 - GENERAL**

#### **1.1 DESCRIPTION**

- A. This section includes the performance criteria, materials, production, and erection of columbarium pylon veneer and columbaria cap units. The work performed under this section includes all labor, material, equipment, related services, and supervision required for the manufacture and erection of the architectural stone work shown on the contract drawings.

#### **1.2 RELATED WORK**

- A. Section 03 48 24, PRECAST CONCRETE COLUMBARIUM UNITS.  
B. Section 04 05 13, MASONARY MORTARING.  
C. Section 07 92 00, JOINT SEALANTS.

#### **1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.  
B. Samples:  
1. Stone cap, 12" x 12" x 3/4".  
2. Pylon veneer, 12" x 2 1/4" x 4"  
C. Shop Drawings:  
1. Stone showing exposed faces, profiles, cross sections, anchorage, reinforcing, jointing and sizes.  
2. Setting drawing with setting mark.

#### **1.4 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Store stone under waterproof covers on planking clear of ground.  
B. Protect from handling, dirt, strain, and water damage.  
C. Package units and protect them from staining or damage during shipping and storage.

#### **1.5 PROJECT CONDITION**

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.  
1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.  
B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining the face of stone masonry.  
1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread

on the ground and over the wall surface.

2. Protect sills, ledges, and projections from mortar droppings.
3. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## **1.6 COORDINATION**

A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.

## **1.7 WARRANTY**

Warranty stone walls against any defects and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be two years.

## **1.8 APPLICABLE PUBLICATIONS**

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Society for Testing and Materials (ASTM):

A167-99 (2004).....	Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
A185-07.....	Steel, Welded Wire Fabric, Plain for Concrete
A615/A615M-09.....	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C33-07.....	Concrete Aggregates
C150-07.....	Portland Cement
C979-05.....	Pigments for Integrally Colored Concrete
C1194-06.....	Compressive Strength of Architectural Cast Stone
C1364-07.....	Architectural Cast Stone
D2244-07.....	Calculation of Color Differences from Instrumentally Measured Color Coordinates.

## **1.9 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters. Stone setter must have five (5) years experience setting natural building stone.
- B. Source Limitations for Stone: Obtain stone from one quarry with resources to provide

materials of consistent quality in appearance and physical properties.

- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

## **PART 2 - PRODUCTS**

### **2.1 STONE**

- A. Limestone Wall Caps: Provide sound cut limestone cap and cladding as shown on Drawings. Color: Light Gray. Grade: Select.
- B. Splitface Ashlar Marble Pylon Veneer: Provide sound veneer to match stone used on the existing columbarium. Color: Cherokee, produced by Polycor Georgia Marble.
- C. Stone Plaques: Provide sound marble plaques as shown on the Drawings to match plaques used on the existing columbarium. Color: Georgia White, produced by Polycor Georgia Marble.

### **2.2 STAINLESS-STEEL ANCHORS AND TIES**

- A. Stainless-Steel Dovetail anchoring system

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine surfaces indicated to receive stone masonry, with for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine substrate to verify that veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.

### **3.2 PREPARATION**

- A. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- B. Deliver anchorage devices that are embedded in or attached to the structure or foundation before start of such work. Provide locations, setting diagrams, and templates for the proper installation of each anchorage device.
- C. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance. Proceed with installation only after unsatisfactory

conditions have been corrected.

- D. Do not install units until supporting structure is structurally ready to receive loads from stone.

### **3.3 SETTING OF STONE CAPS AND PLAQUES, GENERAL**

- A. Set stone to comply with requirements indicated on Drawings. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

### **3.4 CONSTRUCTION TOLERANCES STONE CAPS**

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/8 inch in 10 feet. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/8 inch in 10 feet.
- B. Maintain uniform joint widths. Lay units with joints as indicated on drawings. Maximum joint width at caps is 1/2 inch. Centerline and width of cap joints must align with centerline and width of joints between precast columbarium units, except at wall spacer locations, where terminal or corner cap unit will extend over terminal or corner wall spacer to meet the end or corner pilaster, per the drawings. Field verify the required lengths for caps at end or corner wall spacer locations.
- C. Use shim spacers sized for joint thickness in bed joints; not less than two shims per unit.
- D. Variation in Plane between Adjacent Stones: Do not exceed 1/16".

### **3.5 POINTING**

- A. Rake out joints 3/4-inch; clean, wet and pack solid with pointing mortar.
- B. Tool smooth to concave profile.

### **3.6 ADJUSTING AND CLEANING**

- A. Remove and replace stone masonry broken, chipped, stained, or otherwise damaged or stone masonry not matching approved samples and mockups.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry. Remove large mortar particles. Clean stone masonry by bucket and brush hand cleaning method described in BIA Technical Note No. 20 using job-mixed detergent solution.

END OF SECTION

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