# SECTION 04 05 13

# MASONRY MORTARING

## PART 1 - GENERAL

### 1.1 DESCRIPTION:

A. Section specifies mortar materials and mixes.

### 1.2 RELATED WORK:

A. Mortar used in Section:

1. Section 04 05 16, MASONRY GROUTING.
2. Section 04 20 00, UNIT MASONRY.

### 1.3 TESTING LABORATORY-CONTRACTOR RETAINED

A. Engage a commercial testing laboratory approved by Resident Engineer to perform tests specified below.

B. Submit information regarding testing laboratory's facilities and qualifications of technical personnel to Resident Engineer.

### 1.4 TESTS

A. Test mortar and materials specified.

B. Certified test reports.

C. Identify materials by type, brand name and manufacturer or by origin.

D. Do not use materials until laboratory test reports are approved by Resident Engineer.

E. After tests have been made and materials approved, do not change without additional test and approval of Resident Engineer.

F. Testing:

1. Test materials proposed for use for compliance with specifications in accordance with test methods contained in referenced specifications and as follows:
2. Mortar:

   a. Test for compressive strength and water retention; ASTM C270.
   b. Mortar compressive strengths 28 days as follows:

      1) Type M: Minimum 2500 psi at 28 days.
      2) Type S: Minimum 1800 psi at 28 days.
      3) Type N: Minimum 750 psi at 28 days.

3. Cement:

   a. Test for water soluble alkali (nonstaining) when nonstaining cement is specified.
   b. Nonstaining cement shall contain not more than 0.03 percent water soluble alkali.

4. Sand: Test for deleterious substances, organic impurities, soundness and grading.
5. High Bond Mortar: Test for compressive strength, tensile strength, flexural strength, and brick bond strength.

G. During progress of work, testing laboratory specified in Section 01 45 29, TESTING LABORATORY SERVICES, takes and tests samples as specified in that section. Testing procedures and test methods in ASTM C780.

**1.5 SUBMITTALS**

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Certificates:

1. Testing laboratory's facilities and qualifications of its technical personnel.
2. Indicating that following items meet specifications:

   a. Portland cement.
   b. Masonry cement.
   c. Mortar cement.

d. Hydrated lime.

e. Fine aggregate (sand).

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
C307-03.....Tensile Strength of Chemical - Resistant Mortar, Grouts, and Monolithic Surfacing

C321-00/R05.....Bond Strength of Chemical-Resistant Mortars
C348-02.....Flexural Strength of Hydraulic Cement Mortars
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**

A. ASTM C207, Type S.

**2.2 AGGREGATE FOR MASONRY MORTAR**

A. ASTM C144 and as follows:

1. White plastering sand meeting sieve analysis for mortar joints for pointing except that 100 percent passes No. 8 sieve, and not more than 5 percent retained on No. 16 sieve.

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**

A. ASTM C595, Type IS, IP.

**2.4 MASONRY CEMENT**

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

**2.5 MORTAR CEMEMT**

A. ASTM C1329, Type N, S or M.

**2.6 PORTLAND CEMENT**

A. ASTM C150, Type I.

**2.7 LIQUID ACRYLIC RESIN**

A. 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**

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

**2.9 POINTING MORTAR**

A. Proportion by volume; One part white Portland cement, two parts white sand, and 1/5 part hydrated lime.

**2.10 MASONRY MORTAR**

A. Conform to ASTM C270.

B. Admixtures:

1. Do not use mortar admixtures, except for high bond mortar, and color admixtures unless approved by Resident Engineer.
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.

**2.11 HIGH BOND MORTAR**

A. Mixture by volume, one-part Portland cement, 1/4-part hydrated lime, three-parts sand, water, and liquid acrylic resin.

B. Mortar properties when tested in accordance with referenced specifications.

1. Compressive Strength, ASTM C109: Minimum 2800 psi, using 2-inch cubes.
2. Tensile Strength, ASTM C307: 560 psi, using the 1-inch briquettes.
3. Flexural Strength, ASTM C348: Minimum 880 psi, using flexural bar.
4. Bond Strength, ASTM C321: Minimum 430 psi, using crossed brick.

**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.

E. Pointing Mortar:

1. Mix dry ingredients with enough water to produce a damp mixture of workable consistency which will retain its shape when formed into a ball.
2. Allow mortar to stand in dampened condition for one to 1-1/2 hours.
3. Add water to bring mortar to a workable consistency prior to application.

**3.2 MORTAR USE LOCATION**

A. Use Type M mortar for precast concrete panels and waterproof parging below grade.

B. Use Type S mortar for masonry containing vertical reinforcing bars and masonry below grade.

C. Use Type N mortar for other masonry work, except as otherwise specified.

D. Use pointing mortar for items specified.

END OF SECTION 04 05 13