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**SECTION 04 05 13**  
**MASONRY MORTARING**  
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**PART 1 – GENERAL**

**1.1 SECTION INCLUDES**

- A. Masonry Cement Mortar.
- B. MasonryCement Integral Water-repellent (IWR) Mortar.
- C. MasonryCement Set Accelerated Mortar .
- D. MasonryCement Set Delayed Mortar.

**1.2 RELATED SECTIONS**

- A. Section 04 01 20.91 - Unit Masonry Restoration.
- B. Section 0405 13.91-Tuckpoint Mortaring.
- C. Section 04 20 00 - Unit Masonry
- D. Section 04 21 00 - Clay Unit Masonry
- E. Section 04 22 00 - Concrete Unit Masonry
- F. Section 04 43 00 - Stone Masonry

**1.3 REFERENCES**

- A. American Concrete Institute (ACI):
  - 1. ACI 530.1-02 - Specification for Masonry Structures.
- B. ASTM International (ASTM):
  - 1. ASTM C 91 - Standard Specification for Masonry Cement.
  - 2. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
  - 3. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
  - 4. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
  - 5. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
  - 6. ASTM C 595 - Standard Specification for Blended Hydraulic Cements.
  - 7. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
  - 8. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Masonry.
  - 9. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.



10. ASTM C 989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
  11. ASTM C 1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength.
  12. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Unit Masonry.
  13. ASTM C 1157 - Standard Performance Specification for Hydraulic Cement.
  14. ASTM C 1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
  15. ASTM C 1384 - Standard Specification for Admixtures for Masonry Mortars.
  16. ASTM C 1586 - Standard Guide for Quality Assurance of Mortar.
  17. ASTM C 1714 - Standard Specification for Pre-blended Dry Mortar Mix for Unit Masonry.
  18. ASTM E 329 - Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction.
  19. ASTM E 514 - Standard Test Method for Water Penetration and Leakage Through Masonry.
- C. International Masonry Industry All-Weather Council (IMIAC):
1. IMIAC - International Masonry Industry All-Weather Council (IMIAC): Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
  2. IMIAC - International Masonry Industry All-Weather Council (IMIAC): Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.
- D. National Concrete Masonry Association (NCMA):
1. NCMA TEK Bulletin #8-2A - Removal of Stains from Concrete Masonry.
  2. NCMA TEK Bulletin #8-3A - Control and Removal of Efflorescence.
- E. The Brick Industry Association (BIA):
1. BIA Technical Note 20 – Cleaning Brick.

#### **1.4 SYSTEM DESCRIPTION**

- A. Design and Performance Requirements: Provide mortar mixes that have been selected, manufactured, mixed and installed to comply with the following:
1. ASTM C 270.
  2. ASTM C1714.

#### **1.5 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data.
- C. Samples: Submit selection and verification samples of colored mortar.
- D. Quality Assurance/Control Submittals:
1. Submit manufacturer's certificates that products meet or exceed specified requirements.
  2. Submit test results prepared by a qualified testing laboratory.
- E. Installer shall warrant that only mortar containing integral water-repellent mortar admixture at the manufacturer's recommended addition rate has been placed in exterior walls.

#### **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Firm specializing in manufacture of masonry installation materials, including mortars, with minimum 10 years experience.
- B. Quality Assurance/Control Testing: Test Reports prepared by a qualified laboratory indicating compliance with the following performance requirements:



## SPECMIX, Inc. – Guide Specification

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1. Mortar samples tested in accordance with ASTM C 270.
2. Mortar samples tested in accordance with ASTM C 1714.
3. Water-Repellent Testing Standard: Mortar samples with integral water-repellent tested in accordance with the following:
  - a. ASTM E 514, extended to 72 hours.
  - b. ASTM C 1314.
  - c. ASTM C 1384.
- C. Mock-Up: Provide a mock-up of each type of masonry installation, using masonry specified elsewhere and mortar materials specified in this Section; include at least one example of each type of accessory material, for approval of mortar color and quality of workmanship.
  1. Size: 36 by 36 inches (915 by 915 mm), minimum.
  2. Size: \_\_\_\_\_, maximum.
  3. Location: As directed by Architect.
  4. Location: As indicated on drawings.
  5. Approved mock-ups may remain in the finished work.
  6. When directed by Architect, dismantle and remove mock-ups from Project site.
- D. Pre-Installation Meeting: At least three weeks prior to commencing masonry work conduct a meeting at the project site to discuss contract requirements and job conditions; require the attendance of masonry contractor, and installers of related materials; notify Architect in advance of meeting.
- E. Pre-Installation Conference: A representative of the water-repellent manufacturer shall be present prior to and at the beginning of wall construction to review the work with the Architect and the Contractor.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Cementitious materials shall be manufactured and stored off the ground, under cover and shall be kept dry in accordance with ASTM C1714.

### 1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
  1. Cold Weather Requirements: In accordance with "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction" by IMIAC.
  2. Hot Weather Requirements: "Recommended Practices and Guide Specifications for Hot Weather Masonry Construction" by IMIAC.
- B. Do not build or apply mortar products on frozen substrates.
  1. Remove and replace unit masonry damaged by frost or by freezing conditions.
- C. Vent temporary heaters to exterior to prevent damage to masonry work from carbon dioxide build-up.

## **PART 2 – PRODUCTS**

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: SPEC MIX®, Inc., which is located at: 1230 Eagan Industrial Road, Suite 160, Eagan, MN 55121; Toll Free Tel: 888-SPEC-MIX (773-2649); Tel: 651-994-7120; Email: [request info \(info@specmix.com\)](mailto:request_info@specmix.com); Web: [www.specmix.com](http://www.specmix.com)
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00 – Substitution Procedures.



- C. Obtain products from a single manufacturer.

## 2.2 MORTAR

- A. **Masonry Cement & Sand Mortar:** SPEC MIX Masonry Cement & Sand Mortar is a dry, pre-blended mortar mix containing masonry cement and dried masonry sand formulated for superior bond workability and boardlife.
  - 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 1093, ASTM C 1157, ASTM C 1314, ASTM C 1586, ASTM C 1714, ACI 530.1, IMIAC.
- B. **Colored Masonry Cement & Sand Mortar:** SPEC MIX Masonry Cement & Sand Color Mortar is a dry, pre-blended mortar mix containing masonry cement, dried masonry sand and pigment formulated for superior bond, workability and board life.
  - 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Pigments:
    - a. Natural and synthetic, milled, blended iron oxides.
    - b. Carbon added for darker colors shall not exceed 4 percent.
    - c. Produce uniform and consistent color.
    - d. Inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime proof and nonbleeding.
    - e. Free of deleterious fillers and extenders.
  - 5. Color: Custom color.
  - 6. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 979, ASTM C 1093, ASTM C 1157, ASTM C 1314, ASTM C 1586, ASTM C 1714, ACI 530.1, IMIAC.
- C. **Integral Water-Repellent Masonry Cement & Sand Mortar:** SPEC MIX Integral Water-Repellent (IWR) Masonry Mortar is a dry, pre-blended mortar mixture containing masonry cement, dried masonry sand and dry Integral Water-Repellent Mortar Admixture.
  - 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 979, ASTM C 1072, ASTM C 1329, ASTM C 1384, ASTM E 514, ACI 530.1, IMIAC.
- D. **Colored Integral Water-Repellent Masonry Cement & Sand Mortar:** SPEC MIX Integral Water-Repellent (IWR) Color Masonry Mortar is a dry, pre-blended mortar mixture containing masonry cement, dried masonry sand, color pigments, and dry Integral Water-Repellent Mortar Admixture.
  - 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Pigments:
    - a. Natural and synthetic, milled, blended iron oxides.
    - b. Carbon added for darker colors shall not exceed 4 percent.
    - c. Produce uniform and consistent color.
    - d. Inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime proof and nonbleeding.



- e. Free of deleterious fillers and extenders.
  - 5. Color: Custom color.
  - 6. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 979, ASTM C 1072, ASTM C 1329, ASTM C 1384, ASTM E 514, ACI 530.1, IMIAC.
- E. **Set Accelerated, Masonry Cement & Sand Mortar:** SPEC MIX Set Accelerated, Masonry Cement & Sand Mortar is a dry pre-blended mortar mix containing masonry cement, dried masonry sand, and Non-Chloride, Set-Accelerating admixture.
- 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 1072, ASTM C 1093, ASTM C 1157, ASTM C 1314, ASTM C 1384, ASTM C 1586, ASTM C 1714, ACI 530.1, IMIAC.
- F. **Set Accelerated, Colored, Masonry Cement & Sand Mortar:** SPEC MIX Set Accelerated, Masonry Cement & Sand Color Mortar is a dry pre-blended mortar mix containing masonry cement, dried masonry sand, color pigments, and Non-Chloride, Set-Accelerating admixture.
- 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Pigments:
    - a. Natural and synthetic, milled, blended iron oxides.
    - b. Carbon added for darker colors shall not exceed 4 percent.
    - c. Produce uniform and consistent color.
    - d. Inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime proof and nonbleeding.
    - e. Free of deleterious fillers and extenders.
  - 5. Color: Custom color.
  - 6. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 979, ASTM C 1072, ASTM C 1093, ASTM C 1157, ASTM C 1314, ASTM C 1384, ASTM C 1586, ASTM C 1714, ACI 530.1, IMIAC.
- G. **Set Delayed, Masonry Cement & Sand Mortar:** SPEC MIX Set Delayed, Masonry Cement & Sand Mortar is a dry pre-blended mortar mix containing masonry cement, dried masonry sand, and Set-Delaying Admixture.
- 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 1072, ASTM C 1093, ASTM C 1157, ASTM C 1314, ASTM C 1384, ASTM C 1586, ASTM C 1714, ACI 530.1, IMIAC.
- H. **Set Delayed, Colored, Masonry Cement & Sand Mortar:** SPEC MIX Set Delayed, Masonry Cement & Sand Color Mortar is a dry pre-blended mortar mix containing masonry cement, dried masonry sand, color pigments, and Set-Delaying admixture.
- 1. Mortar Type: M.
  - 2. Mortar Type: S.
  - 3. Mortar Type: N.
  - 4. Pigments:
    - a. Natural and synthetic, milled, blended iron oxides.
    - b. Carbon added for darker colors shall not exceed 4 percent.



- c. Produce uniform and consistent color.
- d. Inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime proof and nonbleeding.
- e. Free of deleterious fillers and extenders.
- 5. Color: Custom color.
- 6. Applicable Standards: ASTM C 91, ASTM C 144, ASTM C 270, ASTM C 595, ASTM C 780, ASTM C 979, ASTM C 1072, ASTM C 1093, ASTM C 1157, ASTM C 1314, ASTM C 1384, ASTM C 1586, ASTM C 1714, ACI 530.1, IMIAC.

### **2.3 ACCESSORY MATERIALS**

- A. Water: Clean and free from deleterious acids, alkalis, and organic matter.
- B. Admixtures: Complying with ASTM C 1384.

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- A. Examine surfaces to receive masonry work and conditions under which masonry will be installed.
- B. Do not proceed with masonry work until surfaces and conditions comply with requirements indicated in referenced masonry installation standard and manufacturer's printed instructions.

### **3.2 INSTALLATION**

- A. Mixing: As recommended by manufacturer.
- B. Re-tempering:
  - 1. Re-temper mortar by adding additional mixing water only to replace water lost due to evaporation.
  - 2. Do not re-temper colored mortars.
  - 3. Discard mortar 2.5 hours after initial mixing.
- C. Installation of mortar shall be as specified under each of the following Sections and in accordance with ACI/ASCE-530.1:
  - 1. Section 04 20 00 - Unit Masonry
  - 2. Section 04 21 00 - Clay Unit Masonry
  - 3. Section 04 22 00 - Concrete Unit Masonry
  - 4. Section 04 43 00 - Stone Masonry
- D. Colored Mortar: Consistency of appearance shall be maintained throughout the project.
- E. Protection: Cover the top of unfinished masonry work to protect it from the weather and to prevent accumulation of water in the cores of the masonry units.

### **3.3 CLEANING**

- A. Comply with cleaning procedures and recommendations of the manufacturers of both the cleaning solution and the unit masonry.
  - 1. Utilize the same approved cleaning procedure as used on the sample panel or mock-up.
- B. Remove efflorescence from masonry wall exposed in the finished work in accordance with manufacturer's recommendations, NCMA TEK Bulletin #8-3A and/or BIA Technical Note 20 – Cleaning Brick.



- C. Remove dirt or stains from masonry walls exposed in the finished work in accordance with the manufacturer's recommendations, and and NCMA TEK Bulletin #8-2Aand/or BIA Technical Note 20 – Cleaning Brick.
- D. Promptly remove excess wet mortar containing integral water-repellent mortar admixture from the face of the masonry as work progresses.
- E. Comply with applicable environmental laws and restrictions.

### **3.4 PROTECTION**

- A. Protect installed work from damage due to subsequent construction activity on the site.

### **3.5 FIELD QUALITY CONTROL**

- A. Tests:
  - 1. Frequency: As determined by the Architect based upon total time for construction of masonry with not less than two tests per each level of masonry construction, foundation to roof or floors.
  - 2. Testing Laboratory: Independent of the Owner, Architect and Contractor; the testing laboratory, in addition to meeting requirements of ASTM E-329, and must be an approved laboratory competent to perform cement physical testing. All tests must be performed in strict accordance with the applicable ASTM standard.
  - 3. Distribution of Results of Tests: Within 24 hours of results of tests, copies of the results shall be submitted to the Architect, Contractor, masonry contractor, and the grout supplier if applicable.
- B. Mortar Testing:
  - 1. Testing per ASTM C 780 when the property specification is specified.
  - 2. When the proportion specification is specified, field quality control shall be performed by inspection only.
  - 3. For determining hardened mortar properties, prepare three test specimens for each test age and property. A strength test shall be the average of the strengths of the specimens at the age specified.
  - 4. Specimens shall be tested at 7 and 28 days.
  - 5. In case of dispute, the mortar proportions must be tested in accordance with the property specification of ASTM C 270.

**END OF SECTION**