Note to User:
This section **contains macros** to aid the editing process. By default Microsoft Word **disables** macros for virus security reasons. When you open a file that has macros, the yellow message bar appears with a shield icon and the enable content button.To enable these macros, click the**Enable Content** button.

SECTION 04 05 13
MASONRY MORTARING

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PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Portland Cement and Lime Mortar.

B. Blended Cement and Lime Mortar.

C. Portland Cement and Lime Integral Water-repellent (IWR) Mortar.

D. Portland Cement and Lime Set Accelerated Mortar .

E. Portland Cement and Lime 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 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
   2. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
   3. ASTM C 150 - Standard Specification for Portland Cement.
   4. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
   5. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
   6. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
   7. ASTM C 595 - Standard Specification for Blended Hydraulic Cements.
   8. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

9. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Masonry.
10. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.
11. ASTM C 989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
12. ASTM C 1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength.
13. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Unit Masonry.
14. ASTM C 1157 - Standard Performance Specification for Hydraulic Cement.
15. ASTM C 1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
16. ASTM C 1384 - Standard Specification for Admixtures for Masonry Mortars.
17. ASTM C 1586 - Standard Guide for Quality Assurance of Mortar.
18. ASTM C 1714 - Standard Specification for Pre-blended Dry Mortar Mix for Unit Masonry.
19. ASTM E 329 - Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction.
20. 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:
   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); Web: 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. **Portland Cement, Lime& Sand Masonry Mortar**: SPEC MIX Portland Cement Lime & Sand Masonry Mortar is a dry pre-blended mortar mix containing Portland cement, hydrated lime and dried masonry sand formulated for superior bond, workability and board life.
1. Mortar Type: M.
2. Mortar Type: S.
3. Mortar Type: N.
4. Applicable Standards: ASTM C 144, ASTM C 150, ASTM C 207, 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.

B. **Blended Cement, Lime & Sand Masonry Mortar**: SPEC MIX Blended Cement Lime & Sand Masonry Mortar is a dry pre-blended mortar mix containing a Blended Hydraulic cement, hydrated lime and dried masonry sand formulated to contribute to recycled content requirements. The product achieves superior bond, workability and board life characteristics.
1. Mortar Type: M.
2. Mortar Type: S.
3. Mortar Type: N.
4. Applicable Standards: ASTM C 144, ASTM C 150, ASTM C 207, 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.

C. **Colored Portland Cement Lime & Sand Masonry Mortar**: SPEC MIX Portland Cement Lime & Sand Color Masonry Mortar is a dry pre-blended mortar mix containing Portland cement, hydrated lime, dried masonry sand and color pigments 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 144, ASTM C 150, ASTM C 207, 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.

D. **Integral Water-Repellent Portland Cement Lime & Sand Masonry Mortar**: SPEC MIX Integral Water-Repellent (IWR) Masonry Mortar is a dry, pre-blended mortar mixture containing Portland cement and hydrated lime, 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 144, ASTM C 150, ASTM C 207, 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. **Colored Integral Water-Repellent Portland Cement Lime& Sand Masonry Mortar**: SPEC MIX Integral Water-Repellent (IWR) Color Masonry Mortar is a dry, pre-blended mortar mixture containing Portland cement and hydrated lime, 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 144, ASTM C 150, ASTM C 207, 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.

F. **Set Accelerated, Portland Cement Lime& Sand Masonry Mortar**: SPEC MIX Set Accelerated, Portland Cement Lime & Sand Masonry Mortar is a dry pre-blended mortar mix containing Portland cement, hydrated lime, 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 144, ASTM C 150, ASTM C 207, 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.

G. **Set Accelerated, Colored Portland Cement Lime & Sand Masonry Mortar**: SPEC MIX Set Accelerated, Portland Cement Lime & Sand Color Masonry Mortar is a dry pre-blended mortar mix containing Portland cement, hydrated lime, 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 144, ASTM C 150, ASTM C 207, 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.

H. **Set Delayed, Portland Cement Lime& Sand Masonry Mortar**: SPEC MIX Set Delayed, Portland Cement Lime & Sand Masonry Mortar is a dry pre-blended mortar mix containing Portland cement, hydrated lime, dried masonry sand , and Set-Delaying admixture.
   1. Mortar Type: M.
   2. Mortar Type: S.
   3. Mortar Type: N.
   4. Applicable Standards: ASTM C 144, ASTM C 150, ASTM C 207, 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.

I. **Set Delayed, Colored Portland Cement Lime & Sand Masonry Mortar**: SPEC MIX Set Delayed, Portland Cement Lime & Sand Color Masonry Mortar is a dry pre-blended mortar mix containing Portland cement, hydrated lime, 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 144, ASTM C 150, ASTM C 207, 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 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, NCMA TEK Bulletin #8-2A and/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 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