SECTION 04 05 13

MORTAR

PART 1 GENERAL

1.1 SUMMARY

A. Examine all Drawings, General Conditions, and General Requirements which are part of this Contract. Furnish all labor, materials, and equipment necessary for masonry mortar.

1.2 RELATED SECTIONS

A. Section 04 21 13: Brick Masonry

B. Section 04 22 00: Concrete Unit Masonry

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM-most recent issue)
   1. ASTM C94, Specification for Ready-Mixed Concrete
   2. ASTM C109 Specification for Compressive Strength of Hydraulic Cement Mortars.
   3. ASTM C143, Test Method for Slump of Hydraulic Cement Concrete
   4. ASTM C144, Specification for Aggregate for Masonry Mortar
   5. ASTM C150, Specification for Portland Cement
   6. ASTM C207, Specification for Hydrated Lime for Masonry Purposes
   7. ASTM C270, Specification for Mortar for Unit Masonry
   8. ASTM C404, Specification for Aggregates for Masonry Grout
   9. ASTM C476, Specification for Grout for Masonry
   10. ASTM C780, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
   11. ASTM C1019, Specification for Method of Sampling and Testing Grout
   12. ASTM C1142, Specification for Ready-Mixed Mortar for Unit Masonry
   13. ASTM C1329, Specification for Mortar Cement
   14. ASTM C1714, Specification for Pre-Blended Dry Mortar Mix for Unit Masonry
   15. TMS 402/602 Building Code Requirements and Specifications for Masonry Structures.

B. TMS 402/602 Masonry Code: Recommended Practices and Guide Specifications for Cold Weather Masonry Construction and Hot Weather Masonry Construction .

1.4 SUBMITTALS

A. Comply with Section 01 33 00.

B. Submit Certification of mortar components and type for pre-blended masonry mortars such as “Spec Mix” or other approved manufacturers, dated within 12 months of contract date.

1.5 GENERAL REQUIREMENTS

A. Deliver materials in unbroken bags or containers, plainly marked and labeled with Manufacturer's name, brand and mortar type.

B. Storage of Materials
   1. Cement and hydrated lime: Stored in a manner to afford ready access for inspection and in suitable building to protect material from dampness. Insure protection against inclusion of foreign materials in cements and limes. MASONRY CEMENT WILL NOT BE ALLOWED IN MORTAR.
   2. Aggregates - use only clean, dry materials. Use no frozen materials.

C. Build in all sheet metal work, anchors, anchor bolts, hangers, sleeves, thimbles, frames, structural members, etc. as shown and as required for other trades.

D. Environmental Requirements: See Section 04 22 00 for temperature and laying restrictions.
   1. Cold Weather Requirements
      a. Comply with TMS 402/602 Masonry Code - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
      b. When the ambient air temperature is below 40 degrees F, heat mixing water to maintain mortar temperature between 40 degrees F and 120 degrees F until placed. When the ambient air temperature is below 32 degrees F and holding, dropping, or predicted to drop below 32 degrees, no mortar is to be mixed.
   2. Hot Weather Requirements
      a. Comply with TMS 402/602 Masonry Code - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

E. Remove any materials that have partially hardened or set. DO NOT USE.

F. Build in door and window frames and their anchors. Slush steel door frame jambs and heads full of mortar. Slush cells full or mortar where excessive cutting for conduit or other devices has weakened masonry.

PART 2 PRODUCTS

2.1 MATERIALS

A. The mortar for all masonry, block, and brick shall meet the minimum requirements of the International Building Code.

B. Mortar shall conform to the minimum proportion requirements given in Table II of ASTM C270, based on 28-day laboratory testing ONLY. Select mortar type based on the criteria below:
   1. Type “S”: For walls in contact with earth or below grade, and load-bearing interior and exterior walls.
   2. Type “S”: For load-bearing interior and exterior walls above grade.
   3. Type “N”: For non-load-bearing walls no higher than 20’-0”.
   4. Use Type “S” for non-load-bearing walls higher than 20’-0”.
   5. Use Type ‘N’ only for masonry veneer.

C. Pigment should NOT exceed 10 percent of the weight of Portland cement. Limit carbon black, if used, to 2 percent of the total allowed color additive.

D. The mortar for all masonry shall be color pigmented mortar where exposed to view, match existing color where final appearance will be exposed mortar. Use standard gray color in other areas.

E. Provide only pre-mixed mortar of types specified manufactured by "Spec-Mix" or approved alternate substitution. **Mixing of any mortar on-site will not be allowed.**

F. Use same manufacturer's products throughout project.

G. Use of anti-freeze compound or other additives are not to be used without written approval of the Architect.

H. Bond Beams and cells with vertical reinforcement shall be filled with 2000 psi grout - NOT MORTAR.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C150, normal. Type I or III; gray color. Fly ash, slag, and pozzolans are NOT permitted as substitutes for Portland Cement.
   1. For pigmented mortars, use premixed, colored cements of formulation required to produce color to match existing. Pigments shall not exceed 5 percent of cement by weight for mineral oxides nor 1 percent for carbon black.

B. Hydrated Lime: ASTM C 207, Type S, and UBC 21-13 hydrated lime for masonry purposes.
   1. Manufactured by Chemstar of approved equal.
   2. For pigmented mortars, use colored Portland cement-lime mix of formulation required to produce color indicated, or if not indicated, as selected from manufacturer’s standard formulations. Pigments shall not exceed 10 percent of Portland cement by weight for mineral oxides nor 2 percent for carbon black.

C. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4-inch (6.5 mm), use aggregate graded with 100 percent passing the No. 16 (1.18 mm) sieve.
   1. Colored-Mortar Aggregates: Natural-colored sand or ground marble, granite, or other sound stone, as required to match Architect's sample.

D. Aggregate for Grout: ASTM C404 with 100 percent passing the 3/8" (9.5mm) sieve.

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

F. Admixtures: NOT permitted unless approved by the Structural Engineer of Record, prior to construction.
   1. Calcium Chloride is NOT permitted in mortar. Admixtures and other chemicals containing Thiocyanates, Calcium Chloride or more than 0.1 percent chloride ions are NOT permitted.

G. Water: Potable

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine conditions with installer present, for compliance with requirements for installation tolerances and other specific conditions, and miscellaneous conditions affecting performance of unit masonry.

B. Examine rough-in and built-in construction to verify actual locations of piping and other penetrations prior to installation.

3.2 INSTALLATION

A. Maintain an ambient temperature of the materials in contact with the mortar, of NOT less than 40 degrees F, unless otherwise required by TMS 402/602. Maintain this temperature limitation at every area and elevation of weather enclosures, when used.

B. Lay solid brick-sized masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. DO NOT slush head joints.

C. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings, piers, columns, and pilasters, and where adjacent to cells or cavities which are to be reinforced or filled with grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

D. In existing construction, maintain joint widths shown, to match existing coursing, except for minor variations required to maintain bond alignment. If not shown, lay walls to match existing or 3/8" joints.

E. Cut joints flush for masonry walls that are to be concealed or to be covered by other materials, unless otherwise indicated.

F. Remove masonry units disturbed after lying; clean and reset in fresh mortar. DO NOT pound corners or jambs to shift adjacent stretcher units that have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

G. Grouting: DO NOT place grout until the entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

H. Refer to Section 04 22 00 for maximum allowable grouting heights.

3.3 MIXING OF MORTAR

A. Machine mix in an approved type of mixer in which quantity can be accurately and uniformly controlled. Only small batches of mortar may be mixed at one time. Mixing time is not less than five (5) minutes and not less than three (3) minutes after water has been added. If hydrated lime is used, use dry-mixed method (optional) of first consistently mixing hydrated lime into putty.

B. Dry Blended in Silos: Mixing shall be done using a continuous, self-cleaning mixer mounted at the apex of the silo. The water flow valve shall be set to provide desired workability.

C. Keep all mixers and equipment clean. Do not deposit mortar on the ground.

3.4 WORKMANSHIP

A. Mortar having stood for more than one hour shall not be used or re-tempered.

B. Lay no masonry when danger of freezing conditions exists before mortar sets.

END OF SECTION