TEK NOTE

June 2005

Factory Preblended Mortar Specification

Mortar is an important component of a masonry wall system. It serves many functions: bonds units together; seals joints against air and moisture penetration; accommodates small movements within a wall and slight differences between unit sizes; bonds to joint reinforcement, ties, and anchors; and provides compressive and shear strength. Mortar also affects the appearance of a masonry wall.

The American Society for Testing and Materials (ASTM) maintains national standards for mortars and materials commonly used in mortars. The standard specification for masonry mortar is ASTM C-270, which contains two **alternative** specifications: the proportion specification and the property specification. **Mortar can be specified by only one of these two methods, not both.**

Under the proportion specification, the specified type of mortar is produced using volumetric proportions of cementitious materials and aggregate as set forth in Table 1 of ASTM C-270. The aggregate must meet certain gradation limits. No physical requirements are placed on the mortar with this method. The property specification requires pretesting of mortar mix designs in the laboratory to establish compliance with Table 2 of standard C-270. The specified mortar type must meet the required physical properties for compressive strength, water retention, and air content. An aggregate ratio range must also be followed. Once the laboratory establishes proportions for mortar based upon successful tests these controlled proportions are then used for the construction project.

Factory preblended (premixed) cement-lime mortar is produced from a process of dry-batching the mortar ingredients. The cementitious materials and dried sand are accurately weighed and blended at a plant. This process avoids the need to adjust the mix for moisture content of the sand and ensures consistent proportions of mortar materials. Only water and mixing are required at the project site.

Preblended mortar typically complies with ASTM C-270 under the **property specification**. Mortars have been formulated to produce the desired properties for specific project requirements. Because the sand is dried in preblended mortar, the proportion specification doesn't directly apply since it is based upon sand volume measured in a "damp, loose condition."

In the field, damp sand usually has a moisture content between 4 and 8 percent. This surface moisture will increase the volume of sand up to 30 percent over dry sand. This is known as moisture bulking. Therefore, if preblended mortar was produced to meet the proportion specification of standard C-270 it would have too much sand (by weight) and the resultant mortar would not be workable for the mason. A workable mortar is desired as it spreads easily on the masonry unit; adheres to vertical surfaces during unit handling, placement, and bedding; increases bond strength; and provides a full, watertight joint when tooled. Mortar of good workability will increase mason productivity. **For the reasons above, it is recommended that preblended mortar be specified to meet the property specification alternate of ASTM C-270.**

Project submittals for mortar shall include certification that all mortar materials meet their individual ASTM specifications. A letter of certification shall be required verifying the lab-tested properties meet the mortar type (usually Type S) requirements under ASTM C-270. Submittal of the laboratory test report can also be requested.

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