

Quality Assurance of Masonry Mortars

Volume 1, Issue 2

June 2009

Occasionally the question arises when testing is done at the job site how to use the various ASTM standards, namely ASTM C270 and ASTM C 780.

ASTM C 270 is the *Standard Specification for Mortar for Unit Masonry* and is to be used to evaluate masonry mortars in a laboratory environment. ASTM C 780 is the *Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry*.

In 2005 , a new ASTM Standard was accepted to provide guidance and clarification to designers, specifiers, inspectors, testing agencies, producers and users in specifying and evaluating masonry mortar. The designation of this document is ASTM C 1586 *Standard Guidance for Quality Assurance of Mortars*.

Unless requested on a special basis, all TCC Materials[®] Spec Mix[®] mortar blends are designed and tested to meet the property specifications of ASTM C270 for the type of mortar specified. The Property Specification of C 270 requires the evaluation of a mortar with a consistency or flow of $110 \pm 5\%$. According to ASTM, this flow rate was chosen to approximate the water content of mortar after it is placed in the masonry assemblage with absorbent masonry units. The amount of water required in the mortar produced at the construction site is normally **greater** than the amount specified for lab evaluations.

Due to the higher amount of water necessary for actual masonry construction, mortar produced and sampled in the field will typically have lower compressive strength than that produced in the lab per ASTM C 270 (ASTM C 1586).

Paragraph 5.5.3 of ASTM C1586 states," Measurement of construction site masonry mortar compressive strength using Test Method C780, Annex A7, is not the appropriate test method to determine the compliance of the mortar with the compressive strength requirements of Specification C270." The paragraph continues to explain, "construction site mortar strengths are generally not equal.... Due to the difference between water contents of field and laboratory produced mortars. Furthermore, mortar compressive strengths can vary from day to day depending on the amounts of mix water required, the curing conditions at the

construction site, the weather conditions, masonry unit and sand moisture contents, and other variables."

The ASTM1586 Standard goes on to say, "Measuring mortar compressive strength of field sampled mortar has no relevance unless preconstruction testing is performed in the laboratory using similar mixing equipment, mortar materials, and the same specimen geometry. Even when this is done, the field compressive strength data can only be compared to the preconstruction mortar strength data in general, due to other factors ,such as weather, temperature of mortar, and the absorption properties of the specific masonry units being used.

Properties of mortars measured by Test Method C 780 are not required nor expected to meet the Property Requirements of Table 2 in Specification C270 (C 780, Annex A7).

Use Test Method C 780 to evaluate masonry mortar prepared at the construction site for the following properties:

- Mortar Aggregate Ratio (Annex A4)
- Mortar Water Content (Annex A5)

By choosing the correct Quality Testing measurements and understanding the variables which influence field testing of mortars, a reduction of controversy and eliminating job delays can occur.

