# CONTRACTOR'S ALERT – 2019.7

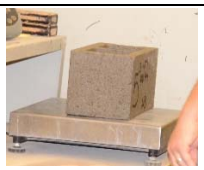
## TESTING CONCRETE MASONRY UNITS

As with any ASTM Standard, the requirements are frequently updated reflecting changes incorporating new technology and quality control. ASTM C140, *Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units* is no exception. In order to correctly apply testing frequency, it is essential to understand the definition of term 'lot' in ASTM C140:

> 3.2 *Definitions of Terms Specific to This Standard:*
> 3.2.1 *lot, n*—any number of concrete masonry units or related units, designated by the producer, of any configuration or dimension manufactured by the producer using the same materials, concrete mix design, manufacturing process, and curing method.

A 'lot' may include all sizes and shapes made from the same materials, concrete mix design, manufacturing process, and curing method. There is no reason to test all the various sizes, shapes, and colors for a particular mix design. A test for each lot is only required on a yearly or bi-yearly basis, and may be accepted as compliance testing for a project. For projects that may require job-specific testing, only one set of tests needs to be performed. For instance, if a project has 8-inch and 12-inch concrete masonry units from the same 'lot', only one set of tests needs to be performed (typically the smaller 8-inch units).

Concrete Masonry Unit tests are not needed for each specific project. Acceptable frequency of testing is contained in ASTM C90, Standard Specification for Loadbearing Concrete Masonry Units and summarized in the following table:

| **Acceptable Test Result Criteria for Units of Same Lot (ASTM C90-16a, Sections 8.2, 8.3)** | | | | |
|---|---|---|---|---|
| **Type of Test/Frequency Required** | | | | |
| Compression Strength | Absorption | Density | Dimension Tolerances | Linear Drying Shrinkage |
| Within 12 Months | Within 12 Months | Within 12 Months | Within 12 Months | Within 24 Months |
|  |  |  |  |  |

Photos courtesy of National Concrete Masonry Association

Compressive Strength tests can be performed rather quickly provided the units have properly cured. Preparation consists of capping the units and allowing the capping material to set, which is not more than a few hours. In order to achieve correct test results, capping of the masonry units must be level within the tolerances set forth in ASTM C1552 and the average thickness of the cap must not exceed 1/8 inch.

Checking dimensional tolerances can also be immediate since the units can be measured with no special unit preparation.

Testing for absorption takes a little longer since the masonry units must be submerged for 24 to 28 hours, then dried for at least 24 hours, then measured at 2-hour increments until a consistent unit weight is achieved. Using the measured weights recorded, the absorption and unit density can be calculated.

Linear shrinkage tests are very time consuming and may impact a project schedule. A linear shrinkage test can take as long as 30 days to complete (time frame is dependent on how quickly the concrete masonry units being tested stabilize). It is not required to perform linear shrinkage tests for every project requiring project-specific testing. The concrete masonry producer will supply a linear shrinkage test performed within the past 24 months to satisfy the requirement of ASTM C90. For projects within the jurisdiction of DSA, linear shrinkage tests performed within the past 24 months are acceptable and no project-specific linear shrinkage testing is required.

Some of the above tests are quite involved and not all testing laboratories are qualified to properly perform testing on concrete masonry units. Consequently, material producers maintain both their own internal quality control program supplemented by regular testing of qualified independent testing laboratories. The ASTM material and testing requirements reflect an appropriate frequency of testing for the areas of testing. The requirements for testing masonry units have been thoroughly reviewed by an accredited committee and recognized by the design community for the minimum standard of quality through appropriate testing.

***Note:*** Prior to bid, check for test requirements. Project-specific tests may impact the schedule. It is not unreasonable to clarify testing requirements and when test results conforming to the ASTM requirements are available, the designer may accept the test results to verify material compliance.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