

Code References: CMU Testing Responsibility

2016 California Building Code, 2013 TMS 602/ACI 530.1/ASCE 6

Concrete masonry construction includes concrete masonry units (CMU), mortar, grout, and reinforcement. Quality Assurance for masonry includes building code mandated submittals, special inspections, and material tests, though requirements for each of the component materials in concrete masonry are not the same.

Submittals for mortar and grout, for example, must include test reports when those materials are specified to the property specification of their respective standards. CMU are excluded from that requirement. Often, however, that code distinction is not known and manufacturers are expected to provide a test report. This is contrary to the intent and requirements of the California Building Code (CBC) and TMS 602/ACI 530.1/ASCE 6 as referenced by the CBC.

As the code excerpts below indicate, CMU tests are solely within the process of verification of the specified compressive strength of masonry (f'_m), which is accomplished by the unit strength method or prism test method ("or", not both) [TMS 602/ACI 530.1/ASCE 6 Section 1.4 B]. The testing and inspection program is solely the responsibility of the project owner through the design professional in general responsible charge and their designees.

CBC REFERENCED MATERIAL AND TESTING STANDARDS

ASTM C90-16 Standard Specification for Loadbearing Concrete Masonry Units

Section 8. Sampling and Testing

8.1 The purchaser or authorized representative shall be accorded proper facilities to inspect and sample the units at the place of manufacture from the lots ready for delivery.

Note: 6 - The purchaser is the public body or authority, association, corporation, partnership, or individual entering into a contract or agreement to purchase or install, or both, concrete masonry units.

Note: 13 - ...if the results of the tests show that the units conform to the specification requirements, the cost is typically borne by the purchaser.

ASTM C140-16 Standard Test Methods for Sampling and Testing Concrete Masonry Units

Section 5. Sampling

5.1.1 For purposes of testing, full-sized units shall be selected by the purchaser or authorized representative.

BUILDING CODES

TMS 602/ACI 530.1/ASCE 6 Specification for Masonry Structures [2013 edition; referenced by 2016 CBC]

Article 1.5 - Submittals

1.5 B. Submit the following:

1. Mix designs and test results
 - a. ...mortar mix...
 - i. proportion specification – submit mix design
 - ii. property specification (minimum strength requirement) – submit mix design and test report
 - b. ...grout mix...
 - i. proportion specification – submit mix design
 - ii. property specification (minimum strength requirement) – submit mix design and test report

[CMU is NOT listed for submittals of mix designs or test results]

Code References: CMU Testing Responsibility

2016 California Building Code, 2013 TMS 602/ACI 530.1/ASCE 6

2. Material certificates – Material certificates for the following, certifying that each material is in compliance.
 - a. Reinforcement
 - b. Anchors, ties...
 - c. Masonry units
 - d. Mortar...
 - e. Self-consolidating grout

Article 1.6 – Quality Assurance

1.6 A. Testing Agency's services and duties

1. Sample and test in accordance with Table 3, 4, or 5 as specified for the project.
5. Unless otherwise required, the Owner will retain the Testing Agency.

Commentary 1.6 – Quality Assurance

Quality assurance consists of the actions taken by an owner or owner's representative, including establishing the quality assurance requirements, to provide assurance that materials and workmanship are in accordance with the contract documents. Quality assurance includes quality control measures as well as testing and inspection to verify compliance.

CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE [2016]

Chapter 4 Administrative Regulations for the Division of the State Architect-Structural Safety (DSA-SS)

Article 1 Essential Services Buildings

Section 4-213. Tests.

(b) **Test sampling.** Test samples or specimens of material for testing may be taken by the architect or registered engineer, the architect's or engineer's representative, the project inspector or a representative of the testing agency. In no case shall the contractor, his employee or a vendor select the samples or specimens.

Section 4-217. Duties of the architect and registered engineers.

(d) **Testing program.** The architect or registered engineer in general responsible charge shall establish the extent of the testing of materials consistent with the needs of the particular project and shall issue specific instructions to the testing agency.

Article 2 State Buildings

Section 4-239. Tests.

In addition to the requirements of Section 4-213, Article 1 of these regulations, the following provisions shall apply:

- (a) **Performance of tests.** The owner, with the recommendation of the architect or registered engineer shall select a qualified testing laboratory to conduct the tests. Sampling, preparation of samples and tests shall be in accordance with the standards as provided in the approved plans and specifications and in the applicable building regulations. Where a sample has failed to pass the required tests, the architect or registered engineer, subject to the approval of the enforcement agency, may permit retest of the sampled material.
- (b) **Payments.** The owner shall pay for all tests.