



Masonry in Hawaii

Technical Bulletin 10.

How do you meet the strength requirements of a single-wythe masonry wall system? Can the same concrete masonry units used to certify f'm 1500 psi under the Unit Strength Method, also qualify for f'm 2000 psi under the prism test method?

ACI 530.1-02 states the following in determining compressive strengths for cmu units:

1.4A. *Compressive strength requirements* - Compressive strength of masonry in each masonry wythe and grouted collar joint shall equal or exceed the specified f'm.

1.4B. *Compressive strength determination* – Alternatives for determination of the compressive strength. Determine the compressive strength for each wythe by the **unit strength method** or by the **prism test method** as specified.

Unit Strength Method.

To achieve your desired design strength using the unit strength method you will need the following cmu strengths specified with the type M or S mortar:

| f'm | CMU Compressive Strength |
|----------|--------------------------|
| 1500 psi | 1900 psi |
| 2000 psi | 2800 psi |
| 2500 psi | 3750 psi |

What this table is stating is that the for a cmu designed with an f'm of 1500 psi, the average strength of the block must average equal to or exceed 1900 psi and for 2000 psi f'm, the average strength must average 2800 psi or higher. Using this method, a special higher strength block must be produced by the manufacturer to qualify for the strength requirement of f'm 2000 psi. The grout has to conform to ASTM C 476 and its compressive strength equals or exceed the f'm desired compressive strength but not less than 2000 psi.

Prism Test Method.

This method replicates the actual masonry system itself. The test is made with two to three cmu units that are mortared together and then grouted with the grout used in the actual assembly (ASTM C 1314). Three sets of the prism are tested and the average compressive strength of the prism needs to exceed the desired f'm (1500 psi, 2000 psi, 2500 psi) strength requirement. The cmu produced on Oahu, Maui and the Big Island of Hawaii have been currently exceeding the 2000 psi f'm strength when tested with the 2500 psi or 3000 psi grout and type M mortar.



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By using the prism test method for testing cmu, the engineer can use the standard blocks produced to achieve the f'_m 2000 psi. If he were to specify the unit strength method, the engineer would need to have a special high strength block be manufactured instead of the standard blocks.

