

Concrete Masonry Fire Rating – Florida

Please Note: This technical Note is developed to clarify the Fire Rating of Concrete Masonry Units with specific reference to the State of Florida.

Background

First, an explanation of the “Code Approved” method of achieving a fire rating for concrete masonry construction.

1. All model building codes accept the “Calculated Method” for determining the fire rating of concrete masonry.
2. The fire rating of the concrete masonry unit in accordance with the “Calculated Method” is based on two things.
 - a. The type of aggregate used in it’s manufacture.
 - b. The “equivalent thickness” of the manufactured unit.
3. The normal method of illustrating compliance with the “Calculated Method” is achieved by physical testing of the C/M unit in accordance with ASTM C-140 by a testing laboratory. All major producers of C/M units in the United States have had independent laboratories do the required testing to ascertain the “Equivalent Thickness” and knowing the type of aggregate used in the manufacture, they can, and do issue letters showing compliance with the various

required fire ratings. The laboratory also tests for compliance to ASTM C-90.

Secondly, we address Underwriters Laboratory or UL Label.

1. Just a note on UL Ratings. UL is one of many private laboratories. Many years ago, UL was probably the dominant lab in regard to fire tests. However, with the advent of testing by many other labs the “calculated method”, which takes into account a much larger data-base, has become the accepted method and, in fact, it is the standard incorporated in all model codes today.
2. With the acceptance of the Calculated Method, the UL reference is seldom specified and rarely adhered to. Architects normally from the East sometimes specify it.

Thirdly, we address Florida.

1. As a matter of record there are few if any block plants in the State of Florida which maintain the UL label. This is due to its high cost and lack of need or benefit.
2. The data from Underwriters Laboratories and the basic data of UL 618 is incorporated in the more voluminous data from which Table 721.3.2 was developed and all this data was based on the standard ASTM E 199 fire test.

Summation

1. The “calculated Method” is the standard in the Florida Building code and is found in Table 721.3.2.

**TABLE 721.3.2
MINIMUM EQUIVALENT THICKNESS (inches) OF BEARING OR NONBEARING CONCRETE MASONRY WALLS^{a,b,c,d}**

TYPE OF AGGREGATE	FIRE-RESISTANCE RATING (hours)															
	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	
Pumice or expanded slag	1.5	1.9	2.1	2.5	2.7	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.5	4.7	
Expanded shale, clay or slate	1.8	2.2	2.6	2.9	3.3	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1	
Limestone, cinders or unexpanded slag	1.9	2.3	2.7	3.1	3.4	3.7	4.0	4.3	4.5	4.8	5.0	5.2	5.5	5.7	5.9	
Calcareous or siliceous gravel	2.0	2.4	2.8	3.2	3.6	3.9	4.2	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.2	

For SI: 1 inch = 25.4 mm.

- a. Values between those shown in the table can be determined by direct interpolation.
- b. Where combustible members are framed into the wall, the thickness of solid material between the end of each member and the opposite face of the wall, or between members set in from opposite sides, shall not be less than 93 percent of the thickness shown in the table.
- c. Requirements of ASTM C 55, ASTM C 73 or ASTM C 90 shall apply.
- d. Minimum required equivalent thickness corresponding to the hourly fire-resistance rating for units with a combination of aggregate shall be determined by linear interpolation based on the percent by volume of each aggregate used in manufacture.

2. It should be noted that most common aggregate in Florida is “LIMESTONE”.

3. Table 721.3.2 shows that with limestone aggregate the following equivalent thickness is required:
 - a. 1 Hour – 2.7
 - b. 2 Hour – 4.0
 - c. 4 Hour – 5.0
 - d. 4 Hour – 5.9

4. The CMU producer will issue a letter showing compliance with the above requirements depending on the specific fire rating required for the project.

5. Review: For fire rating two items are needed:
 - a. Type of aggregate
 - b. Equivalent thickness