



Gary Porter, Engineering & Technical Services for the Masonry Advisory Council is called upon with questions about construction concerns and for masonry advice from a variety of Architects, Engineers, Contractors, Developers and Distributor sources. He is dedicated to ongoing education of masonry and shares helpful tips from his professional experience that may be beneficial to you.

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Fire Resistance of Masonry Units

Every year it seems like we get a call or several calls regarding how to determine fire resistance of a masonry wall.

One of the biggest advantages of using masonry for building is that it does not burn! Brick are made of clay which does not burn. Locations safe for burning combustible items such as fireplaces are typically made with brick because they will not burn. Concrete block do not burn. In today's buildings there are many items that are highly combustible, so having a little or a lot of masonry creates safety within a structure especially in a stairwell, elevator, corridor or other walls designated for separation. These locations are the primary means of exiting a building in a fire. These areas need to provide maximum safety!

The fire resistance rating is a duration of time not exceeding 4 hours that the masonry unit can safely confine fire to an area or maintain the units' structural integrity.

There are various methods used to determine the fire resistance rating provided by a masonry unit, a combination of different layers or wythes of masonry units or for a combination of different materials used to form a wall assembly.

The most popular is the equivalent thickness method. This method is an equation designed to calculate the thickness of the masonry unit minus the void space and additionally considers the aggregate type used to make the unit. The combination of these values used in this equation determines its equivalent thickness.

Thru a table (included) the fire rating can be determined by the equivalent thickness of the unit and establishes a fire resistance rating. A typical 8" concrete masonry unit provides at least 2 hours of fire rating with some 8" units manufactured with thicker webs able to provide 3 or 4 hours of fire rating.

Table 1—Fire Resistance Rating Period of Concrete Masonry Assemblies (refs. 1, 2, 3)

Aggregate type in the concrete masonry unit ^C	Minimum required equivalent thickness, in. (mm), for fire resistance rating, hours ^{A, B}														
	4	3 ³ / ₄	3 ¹ / ₂	3 ¹ / ₄	3	2 ³ / ₄	2 ¹ / ₂	2 ¹ / ₄	2	1 ³ / ₄	1 ¹ / ₂	1 ¹ / ₄	1	3 ⁴ / ₄	1 ² / ₂
Calcareous or siliceous gravel	6.2	6.0	5.8	5.5	5.3	5.0	4.8	4.5	4.2	3.9	3.6	3.2	2.8	2.4	2.0
Limestone, cinders or unexpanded slag	5.9	5.7	5.5	5.2	5.0	4.8	4.5	4.3	4.0	3.7	3.4	3.1	2.7	2.3	1.9
Expanded clay, shale or slate	5.1	4.9	4.8	4.6	4.4	4.2	4.0	3.8	3.6	3.4	3.3	2.9	2.6	2.2	1.8
Expanded slag or pumice	4.7	4.5	4.4	4.2	4.0	3.8	3.6	3.4	3.2	3.0	2.7	2.5	2.1	1.9	1.5

^A Fire resistance rating between the hourly fire resistance rating periods listed may be determined by linear interpolation based on the equivalent thickness value of the concrete masonry unit. The requirements of ASTM C55, ASTM C73, ASTM C90 or ASTM C744 (refs. 13, 14, 6, 15) shall apply. Include equivalent thickness of finishes where applicable: see section "Effects of Finishes on Fire Resistance Ratings."

^B Where combustible members are framed into the wall, the thickness of solid material between the end of each member and opposite wall face, or between members set in from opposite sides, must be at least 93% of thickness shown.

^C Minimum required equivalent thickness corresponding to the hourly fire resistance rating for units made with a combination of aggregates shall be determined by linear interpolation based on the percent by volume of each aggregate used in the manufacture.

Fire Resistance of Masonry Units (cont.)



One of the telling factors of a structure fire is that the masonry is usually still standing, still keeping its' structural integrity. The elevator shaft, the stairwells, they are still in place! Most other building materials have disintegrated, crumbled, fallen apart and failed.

Apartment fire remains in Raleigh, NC with first floor, flexicore, concrete block stairways and elevator shaft still standing.

There is additional information on fire ratings for brick at the website for Brick Institute Association, BIA at www.gobrick.com. Look for read and research and then technical notes, Tek Note #16 - Fire Resistance of Brick Masonry.

There is additional information on fire ratings for concrete masonry at the website for National Concrete Masonry Association NCMA at www.ncma.org. Look for concrete masonry then technical notes, view solutions for Tek Note 07-01C - Fire Resistance Ratings of Concrete Masonry Assemblies.



The Masonry Advisory Council is a non-profit organization that markets and promotes the benefits of building with masonry. Our vast network of industry professionals are available through MAC as a source of education, technical support, promotion, and market outreach.

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