



Fire Ratings Explained: Part 2

Equivalent Thickness. Testing every possible wall combination is not feasible. The equivalent thickness method accurately predicts fire resistance.

Part 1 of this guide describes ASTM E-119 testing, which is one way that building components such as walls, partitions and floor/ceiling assemblies qualify for fire ratings. When an assembly passes such a test, which usually is conducted at an independent testing lab such as Underwriters Laboratories, Inc., that specific combination of products assembled exactly as tested receives a UL Classification number that can be used to designate it in project specifications.

Masonry systems typically are not tested in this way and do not carry UL Classification numbers. Instead, building codes and industry practice allow the calculation of fire ratings for masonry, based on long experience with its fire-resistant properties and its performance in many earlier fire tests. Calculated masonry fire ratings make it practical for designers to rely on masonry's proven fire-resistant properties while taking full advantage of its variety and versatility. All of masonry's usual constituent materials—cement, water, sand and other aggregates, clay and shale, stone, etc.—are noncombustible, but masonry units and mortar are locally produced from locally available materials. Testing every useful combination would be impossible, and a designation earned by any particular tested system would have only limited application.

Fire resistance ratings for brick and concrete masonry are determined in accordance with Code Requirements for Determining Fire Resistance of Concrete and Masonry Construction Assemblies, (ACI 216.1-07 / TMS-0216-07), a standard developed by the American Concrete Institute and The Masonry Society. This standard is included by reference in the International Building Code.

Calculations are based on the known fire-resistance properties of masonry assemblies built from solid masonry units of various types and thicknesses. Hollow units are rated based on their "equivalent thickness," that is, the solid thickness that would be obtained if the volume of material the unit contains were recast without core holes. The standard provides tables with the equivalent thickness needed to achieve specific fire ratings with specific types of masonry materials. It includes information on the effects of full and partial grouting, of loose-fill insulation in hollow units, and of different facing materials. It also provides and explains the formulas you can use to calculate fire ratings for assemblies not specifically covered in the tables.

The equivalent thickness method is a simple, time-tested, industry-sanctioned and building code approved way to provide essential fire protection using masonry.