

Bond Strength Testing Of Spray-Applied Fireproofing

The International Building Code's (IBC) influence on Spray-Applied Fireproofing products is directly attributed to its Section 403, "High-Rise Buildings". In this section, which includes Table 403.2.4 shown on the back page, the IBC sets forth minimum bond strength requirements that are predicated on building height. In short, the higher the structure, the higher the minimum bond strength requirements are for the Spray-Applied Fireproofing product being installed.

In-field bond strength (cohesion/adhesion) testing of Spray-Applied Fireproofing is used to measure the bonding characteristics of in-place product to the steel substrate to which it was applied. Testing is performed in accordance with ASTM E736, "Standard Test Method for Cohesion/Adhesion of Sprayed Fire Resistive Materials Applied to Structural Members" and the IBC's Section 1705.13.1. In addition to other apparatuses, a plastic cap with a diameter of 3 ¼ inches (83mm) is routinely used to conduct this testing with significantly greater pounds of force placed upon the spring/pull scale to reach the higher bond strength requirements.

As higher bond strengths are now being measured more frequently, significantly greater pounds of force are being reached as each test is performed; safety becomes even more of a concern when the cap reaches its failure point. To minimize this concern, Isolatek International and other industry partners endorse the use of a metal cap that is 2 inches (51 mm) in diameter, as prescribed in ASTM E736.

The industry's position is that by transitioning to a metal cap that is 2 inches in diameter, the following enhancements, both in testing and safety, to the test protocol and the qualified individual performing in-field tests, are realized.

- Safer means of testing as less pounds of force are required to be pulled to reach the higher, minimum bond strength requirements
- More reliable and consistent results as the smaller, metal cap resists warping, distorting, and separation from the plural component adhesive as greater force is generated during the test
- Accommodates the capacity range (lbs. of pull) of most spring scales used for bond strength testing

The abbreviated table on the back page provides resulting bond strength values in lbs./ft.² based on the force pulled (lbs.) as recorded on the spring scale when utilizing a 2 inch (51 mm) diameter metal cap.

The highlighted bond strength values are outlined in IBC Section 403 – "High-Rise Buildings" and the American Institute of Architects (AIA) MasterSpec[®] Section 078100 "APPLIED FIREPROOFING" as minimum performance requirements.

Bond Strength Test Kits are available for purchase from Isolatek International as shown in the attached document. For questions regarding the information within this Isolutions, please contact our Technical Service Group at 800.631.9600, extension 269.

Table 403.2.4

MINIMUM BOND STRENGTH

Height of Building ^a	SFRM Minimum Bond Strength
Up to 420 ft.	430 psf
Greater than 420 ft.	1,000 psf

For SI: 1 foot - 304.8 mm, 1 pound per square foot (psf) - 0.0479 kW/M².

a. Above the lowest level of fire department vehicle access.

❖ See the commentary to Section 403.2.4

403.2.4 Sprayed fire-resistant materials (SFRM). The bond strength of the SFRM installed throughout the building shall be in accordance with Table 403.2.4.

❖ For Buildings other than high-rise buildings, the minimum bond strength required for spray fire-resistant materials (SFRM) required by the code is 150 psf.

Lbs. Pulled and Bond Strength

Pull (lbs.)	Bond Strength (lbs./ft. ²)
1	45.8
2	91.7
3	137.5
3.28	150
4	183.4
5	229.3
6	275.1
7	321.0
8	366.8
9	412.7
9.38	430
10	458.6
11	504.4
12	550.3
13	596.1
14	642.0
15	687.9
16	733.7
17	779.6
18	825.4
19	871.3
20	917.2
21	963.0
21.81	1,000
22	1,008.9

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