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Technical Bulletin

Code Compliance of Intumescent Fireproofing

Some intumescent fireproofing manufacturers are promoting the use of small scale testing of floor assemblies, roof assemblies, beams and columns to meet the fire protection requirements for commercial buildings. Due to limited knowledge of the fire protection building code requirements, some design firms have accepted these tests and even specified these small scale tests for their projects.

The purpose of this document is to bring awareness of the criteria necessary for compliance with the IBC code, test protocols set forth in the ASTM E119 / UL 263 full scale fire test standards, and to define what fire test certification is required for submittals, proposals, and specifications pertaining to fire protection.

Small scale testing is misleading because these tests are not performed to the full ASTM E119 / UL 263 fire test standards. These substandard tests are only run to the ASTM E119 time / temperature fire curve and do not meet the mandatory requirements set forth by the International Building Code (IBC) or test procedures that are clearly laid out in the ASTM E119 and UL 263 fire test standards.

The IBC requirements are detailed in Chapter 7, Section 703 "Fire Resistance Ratings and Fire Test". Section 703.2 of the code states "The fire resistance rating of building elements, components, or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263..."

SECTION 703

FIRE-RESISTANCE RATINGS AND FIRE TESTS

703.1 Scope. Materials prescribed herein for *fire resistance* shall conform to the requirements of this chapter.

703.2 Fire-resistance ratings. The *fire-resistance rating* of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E 119 or UL 263 or in accordance with Section 703.3. Where materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the building element, component or assembly, sufficient data shall be made available to the *building official* to show that the required *fire-resistance rating* is not reduced. Materials and methods of construction used to protect joints and penetrations in fire-resistance-rated building elements, components or assemblies shall not reduce the required *fire-resistance rating*.

Mandatory requirements only met with full scale ASTM E119 / UL 263 fire testing and not met by these small scale tests:

1. Minimum beam span of 12' for a beam only test either restrained or Unrestrained (ASTM E119 section 8.7.2.1 and 8.8.2.1)
2. Minimum section size of a representative floor assembly or roof assembly test must be 180 ft² with neither dimension less than 12'
3. Loading required for proper testing of restrained beam classification
4. Restrained vs unrestrained beam classification
5. Columns tested under ASTM E119 or UL 263 require a minimum column length of an 9' section with no load applied



TESTS OF FLOORS AND ROOFS

28. Size and Characteristics of Specimen

28.1 The area exposed to fire shall be not less than 180 ft²(16 m²) with neither dimension less than 12 ft (3.7 m). Structural members, if a part of the construction under test, shall lie within the combustion chamber and have a side clearance of not less than 8 in. (203 mm) from its walls.

28.2 Specimens for which a restrained rating is desired shall be so restrained during the test exposure.

36. Loading

36.1 Throughout the fire endurance test, apply a superimposed load to the specimen to simulate a maximum load condition. This load shall be the maximum load condition allowed under nationally recognized structural design criteria unless limited design criteria are specified and a corresponding reduced load is applied.

TESTS OF COLUMNS

19. Size of Specimen

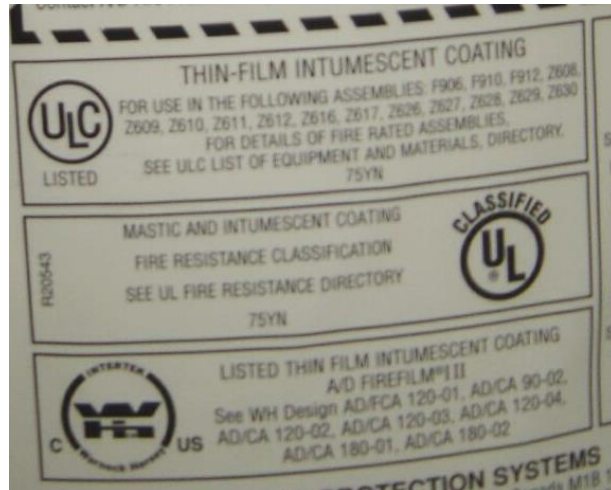
19.1 The length of the column exposed to fire shall be not less than 9 ft (2.7 m). Apply the contemplated details of connections and their protection, if any, according to the methods of field practice. The column shall be vertical during the fire exposure.

Large scale testing has been proven to be to be more onerous due to the greater exposed surface area of the test article to the fire environment, increased data points (temperature measurements), and proper loading. Large scale test articles equate to the actual physical dynamics of real world construction. This is why the code requires full scale testing. Subscale tests that are not compliant should be rejected.

Summary

To meet industry standards, it is mandatory to run full scale testing at a recognized, accredited fire test laboratory such as Underwriter's Laboratories or Intertek. As part of this full scale test program, the accredited fire test laboratory provides follow-up service which includes QA/QC, plant audits, manufacturing inspection, and assurance that the material supplied to the market is the same as was tested. Failing to have a formal follow-up service allows non-compliant materials to be sold in the marketplace.

As stated in the Underwriter's Laboratories (UL) Fire Resistance Directory, Volume 1, 2016 Introduction, page v, "Only those products bearing the appropriate UL mark and company's name, trade name, trademark, or other authorized identification should be considered as being covered by UL's Listing, Classification, Certification and Follow-Up Service. The UL mark provides evidence of listing or labeling, which may be required by installation codes or standards."



As stated in the Intertek online Fire Resistance Directory, "Intertek's Warnock Hersey Mark has long been a marquee mark in building product industry and in 2013, Intertek introduced the next evolution of the Warnock Hersey mark. The new mark combined the storied ETL Mark with the traditional Warnock Hersey (WH) Mark. Combining two marks into one leveraged the fire-safety strength of the WH Mark with the electrical-safety strength of the ETL Mark allowing for easy recognition by Authorities Having Jurisdiction (AHJs) across North America. The new WH-ETL Mark provides customers whose products traditionally bore the WH Mark a solution that moves with the direction of their industry. If you have any questions about the new mark, be sure to check out our WH-ETL FAQ page.

The Warnock Hersey Mark can be found on more than 6,500 products ranging from fire doors, hardware, hearth, plumbing, and construction and fire resistive products. Utilizing the Warnock Hersey Mark on a product reflects a commitment to product safety, performance, and quality to inspectors, builders and end users. The mark also signifies that the product's manufacturing site(s) undergo periodic follow-up inspections to ensure ongoing compliance of the originally certified product.

This is a serious life safety and asset protection issue. We strongly recommend that all architects, engineers, and owners must stay informed and are diligent in specifying reputable manufacturers that follow the proper testing protocol set forth by industry standards.

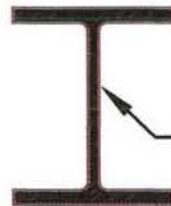


ST-2 2 HOUR FIRE ASSEMBLY - 8" WF24 OR LARGER
STEEL SECTION

Typical Assembly - 8WF24 or larger, used horizontally as a beam



TO ACHIEVE 2 HOUR FIRE RATING:
PREPARATION OF STEEL MEMBER: CLEAN AND APPLY ALKYD PRIMER @ 2.5 MIL.
APPLY 60 MIL THICKNESS (DRY) OF ForceField® FireGuard® E-84 TO ALL EXPOSED SIDES OF STEEL BEAM.



60 MIL THICKNESS (DRY) OF FFG E-84 INTUMESCENT COATING

SCALE: N.T.S.

| | |
|-----------------------------|---|
| FIRE TEST ENDURANCE RATING: | 2 HOUR |
| STANDARD TESTED TO: | ASTM E-119-11a Structural Steel Section; NFPA 251; UL 263; ULC S-101-07 with No Load Capacity, No Restraint, Small Scale Test |
| FIRE TESTED LABORATORY: | GUARDIAN FIRE TESTING LABORATORIES, INC. 480 HINMAN AVE. BUFFALO, NY 14216 |
| REPORT NO: | GL 115611 |
| PRODUCT: | ForceField® FireGuard® E-84 INTUMESCENT COATING (FFG E-84) |
| MANUFACTURER: | SHIELD INDUSTRIES, INC. 131 SMOKEHILL LANE WOODSTOCK, GA 30188 |

GUARDIAN 4/7/14
A. Joseph Pearson



Laura Ann Hinton 4/1/2014

* SEE MANUFACTURER APPLICATION INSTRUCTIONS AND SPECIFICATIONS FOR SURFACE PREPARATION AND APPLICATION PROCESS



Shield Industries, Inc.

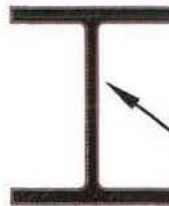
ST-3

1 HOUR FIRE ASSEMBLY - 8" WF24 OR LARGER STEEL SECTION

Typical Assembly – 8WF24 or larger, used vertically as a column



TO ACHIEVE 1 HOUR FIRE RATING:
PREPARATION OF STEEL MEMBER: CLEAN AND APPLY ALKYD PRIMER @ 2.5 MIL.
APPLY 35 MIL THICKNESS (DRY) OF ForceField® FireGuard® E-84 TO ALL EXPOSED SIDES OF STEEL COLUMN.



35 MIL THICKNESS (DRY) OF FFG E-84 INTUMESCENT COATING

SCALE: N.T.S.

| | |
|-----------------------------|---|
| FIRE TEST ENDURANCE RATING: | 1 HOUR |
| STANDARD TESTED TO: | ASTM E-119 Structural Steel Section; NFPA 251; UL 263; ULC S-101-07 with No Load Capacity, No Restraint, Small Scale Test |
| FIRE TESTED LABORATORY: | GUARDIAN FIRE TESTING LABORATORIES, INC. 480 HINMAN AVE. BUFFALO, NY 14216 |
| REPORT NO: | GL 115611, GL 88311 |
| PRODUCT: | ForceField® FireGuard® E-84 INTUMESCENT COATING (FFG E-84) |
| MANUFACTURER: | SHIELD INDUSTRIES, INC. 131 SMOKEHILL LANE WOODSTOCK, GA 30188 |

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