

## Sprayed Fire Resistive Material (SFRM) and Primed or Painted Structural Steel and Unclassified Decks

Painted/primed structural steel and decking often trigger requirements for bond testing and the use of metal lath. There are three critical issues with painted steel substrates:

- A. Ambient bond - the ability of fireproofing to remain in place during normal use for the design life of the structure.
- B. Performance of the paint or primer during exposure to fire.
- C. Sensitivity of the paint to alkali exposure associated with Portland cement based products.

Requirements to ensure compatibility of the paint with the fireproofing are dependent on the substrate in question and are detailed below.

### ***Painted Decking***

***Fireproofing can only be applied directly to painted floor and roof decking if the specific decking, with the specific paint, has been fire-tested and is then specifically listed in the design in the UL Fire Resistance Directory.*** Painted decking must be supplied by the decking manufacturer to the jobsite with the paint pre-applied during the manufacturing process. There are no paints or decking approvals which allow the application of paint on the jobsite. Galvanized decking is the default in all designs in the UL Fire Resistance Directory. Where painted decking is allowed, the design lists the specific deck type and then uses the designation "Types XX , XXX etc. ptd/ptd or phos/ptd may be used" (the ptd/ptd and phos/ptd refer to the coatings on the top and bottom of the deck). Note that unclassified decking that has been painted is not listed and therefore fireproofing cannot be directly applied to painted, unclassified deck. Bond testing to listed painted decking is not required but recommended prior to, or immediately after, beginning of the application to painted decking.

When painted decking is not specifically listed, the only approved method of attaining the fire resistance rating is the use of metal lath mechanically fastened to the underside of the deck. The lath must be mechanically fastened in accordance with the requirements of the applicable UL fire test design. Since all unlisted painted deck surfaces require 100% lath coverage, no bond testing is required.

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## Painted Steel Joists

In dry interior-use conditions, fireproofing can be applied directly to primed/painted joists without use of metal lath. No bond testing is required.

## Painted Structural Steel

Spray Applied Fire Resistive Materials are almost always fire tested on unprimed/unpainted structural steel. The presence of any unknown substance on the steel, such as unlisted paints/primers, may affect both the ambient and high temperature bond of fireproofing and its ability to remain in place during the design life of the building and during a fire. The front of the UL Fire Resistance Directory (Section II.9. Coating Materials) details the requirements related to the ambient bond and lath requirements when primers or paint is present on structural steel. Important facts to understand when bidding fireproofing over painted steel are:

- a. Ambient bond testing is required on all fireproofing applied over painted structural steel shapes. The pass criteria is that the average bond of the fireproofing to the painted surface, in accordance with ASTM E736, must be equal or greater than 80% of the value obtained (with the same fireproofing applied under the same conditions) applied to a bare steel surface, but not less than the minimum bond required in the specification. A bonding agent may be used to attain this "pass" value.
- b. Where the paint/primer is unknown or unavailable, or when timeframes do not allow for testing prior to job start, the applicator may either lath the entire substrate or choose to start using a bonding agent with testing conducted on an initial area as soon as the first area of fireproofing has set and dried. Generally, the application of a small test area (½" fireproofing coating applied over an area with and without a bonding agent, allowed to set and then fan dried) can be used to predict whether a bond problem may need to be addressed. UL compliance requires that standard bond testing must be done to confirm any preliminary results.
- c. All paints/primers should be bond tested in their end use (wet/dry) condition. It is critical when primers are submitted for bond evaluation that the end use condition be known and advised.
- d. Some paints/primers, particularly alkyds or modified alkyds, are sensitive to exposure to alkali and need special attention when Portland cement based fireproofing is to be applied. This is critical in both wet and dry use conditions.
- e. In addition to bond testing, metal lath (or steel studs with disks) is required over painted steel beam surfaces when beam flange widths are greater than 12 inches and/or when the beam web depth exceeds 16 inches. Lath is required on columns when the column flanges or web depth exceed 16 inches. Lath is required on painted tube and pipe steel when the pipe diameter or any face of the tube exceeds 12 inches.
  - i. Lath must be a minimum 1.7 pounds per square yard
  - ii. Attachment must be a maximum of 12 inches on center on each longitudinal edge of the strip and a maximum of 12 inches on center within the field of the lath (if applicable). Certain field conditions may require a tighter spacing to adequately support the lath.
  - iii. Lath must cover a minimum of 25% of the surface of the flange/web.
  - iv. Lath strips must have a minimum width of 3 ½ inches.

v. The clear span between the lath strips and the distance between the lath strip and a change in direction of the steel must not exceed the 12 and 16 inch span limitations detailed above for beams, columns and tube and pipe steel sections.

As SFRM manufacturers do not control the paint / primer formulations or their application, it is important to conduct on-site bond testing to confirm bond test values obtained for tested primers and paints. Also, many paints and primers have minimum and/or maximum overcoat time restrictions that may affect the ability of SFRMs to bond to them.