

Primed Structural Steel Guidelines For Spray-Applied Fireproofing

Primed/Painted structural steel is a very important project condition that cannot be over-looked when installing Spray-Applied Fireproofing, also known as Spray-Applied Fire Resistive Materials (SFRMs).

As the world's leading manufacturer of passive fire protection products, we recommend that structural steel members to receive SFRM remain unprimed/unpainted in order to ensure proper adhesion to the substrate.

Most fire testing by UL and/or SFRM manufacturers have been conducted on unprimed steel and therefore, unprimed/unpainted steel is the preferred substrate condition for commercial construction.

UL does allow the application of SFRM to primed/painted wide flange steel members (beams and columns) and pipe and tube steel columns provided the guidelines that are listed in the 2014 UL Fire Resistance Directory - Volume 1 (see attached excerpt) are followed in their entirety.

Prior to 1989, UL had little or no fire test data demonstrating the performance of SFRMs when applied to painted or primed members. Since then, a limited number of tests with paints and primers were conducted with different manufacturers' SFRMs. This resulted in a database of tested steel sizes. The largest beam tested had a flange width of 12 inches and a web depth of 16 inches¹. Likewise, the largest column tested had a flange width of 16 inches and a web depth of 16 inches¹. The largest pipe outer diameter and tube width had a dimension of 12 inches. Therefore, any members exceeding these dimensions require a mechanical break be installed such as metal lath or steel studs with discs prior to the installation of the fire protection material. If metal strip lath is utilized, no less than 25% of the width of the oversized flange, web element or face of tube or pipe shall be covered by the metal lath. The strips of metal lath shall be minimum 1.7 lbs. per sq. yard and minimum of 3½ inches wide. If

steel studs with discs are used, the studs shall be welded to the oversized element in rows such that the maximum clear span is in accordance with either the 12 inch or 16 inch requirements previously mentioned. The spacing of the studs in each row shall not exceed 24 inches and a minimum of one stud per 256 sq. inch shall be provided.

Even if the steel member is "oversized" and requires one of the preceding mechanical breaks, acceptable bond strength values still must be achieved. These bond tests are conducted in accordance with ASTM E736, "Standard Test Method for Cohesion/Adhesion of Sprayed Fire Resistive Materials Applied to Structural Members". A minimum average bond strength of 80% and a minimum individual bond strength of 50% must be maintained when compared to the bond strength of the fire-resistive coating applied to clean uncoated steel. Bond tests can be conducted within a laboratory environment or within the field on existing structures. In some cases, achieving these acceptable bond strength values may require the use of a bonding adhesive. In these cases, the SFRM manufacturer should be contacted for specific details.

When bond strengths are not within the aforementioned specifications, or the primer is unknown and cannot be field tested, mechanical bond may be obtained by completely wrapping the structural member with expanded metal lath (minimum 1.7 lbs. per sq. yard) following the contour of the steel member.

The direct application of SFRMs to primed/painted bar joists is acceptable, provided the SFRM thickness is in accordance with the appropriate design. The use of metal lath or non-metallic fiber mesh is optional and is only used to help aid in the application.

For specific information pertaining to Primed/Painted Decking, refer to Isolutions - Primed / Painted Decking.

The above mentioned information has been provided as a summary of the requirements necessary for the proper installation of SFRMs to various primed/painted structural steel members.

¹ Web depths are measured from inside of top flange to inside of bottom flange

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