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How do I meet the new requirement for membrane protection in the *MUBEC Residential Building Code section R501.3*?

***MUBEC Residential Building Code section R501.3* States:**

R501.3 Fire protection of floors. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a ½ inch gypsum wallboard membrane, 5/8 inch wood structural panel membrane, or equivalent on the underside of the floor framing member.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.

2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.

3. Portions of floor assemblies can be unprotected when complying with the following:

3.1 The aggregate area of the unprotected portions shall not exceed 80 square feet per story

3.2 Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.

4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.

The genesis for this requirement was five separate code change proposals introduced in 2009 to revise IRC. The IRC Code Development Committee disapproved all the proposals and requested that the interested parties to work together to develop a public comment. In October 2010, the ICC membership approved the above text, jointly developed by the International Association of Fire Fighters, International Association of Fire Chiefs-Life Safety Section, the National Association of Home Builders, and the American Wood Council (AWC).

Questions Frequently Asked Are:

- Do I have to specially fire block the perimeter of the opening between the permitted 80 ft^2 unprotected area and the balance protected area, and
- Do I have to treat the joints in the gypsum wallboard with tape and compound?

Recent testing with an 80 ft^2 unprotected area has shown that if a fire occurred under a protected area, fire blocking would provide a minimal level of performance of the membrane system. This affirms the proponents' intent that the perimeter between the 80 ft^2 unprotected area and the protected area needs to be fire blocked and no special treatment beyond the specified fire blocking is necessary to achieve the desired performance.

Furthermore, gypsum wallboard joints are not required to be finished with tape and joint compound. A somewhat analogous requirement in the code is that for a thermal barrier over foam plastic insulation. Such barriers are also not required to be finished with tape and joint compound. Likewise joints between wood structural panels are not required to be finished with wood filler and sanded.

Summary:

- No treatment of the "open edge" at the perimeter of the permitted 80 ft^2 unprotected area beyond fire blocking is required.
- Finishing the membrane protection joints of gypsum wallboards or wood structural panels is not required.

Q: What was AWC's intent when Clause R501.3, Exception 4 was developed?

4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.

A: As one of the original proponents of this language, AWC has insight into the intent and discussions leading to development of the wording in this exception.

To be considered equivalent to 2x10 sawn lumber or SCL, the framing members should support a load corresponding to 50% of the full bending design of the framing members, while being subjected to an ASTM E 119 time/temperature heating regime. All components utilized in the manufacture of the framing members (fasteners, plates, hardware, etc) should be utilized during testing. The test end criteria should be structural member failure.

AWC believes that the most straightforward and accurate means of determining the required minimum fire resistance time would be to estimate that time using the calculation methodology specified in NDS Chapter 16 for unprotected solid-sawn 2x10 floor joists assuming: a 3-sided exposure, a nominal char rate of 1.5 inches/hr, a bending strength to ASD ratio of 2.85, and supporting a load corresponding to 50% of full bending design.