Fire Rated Roof Assemblies

Plasti-Fab PlastiSpan insulation board may be used as the insulation component in roof assemblies for either non-combustible or combustible construction. Part 3 of the National Building Code (NBC) of Canada defines requirements for the use of foam plastic insulation, such as PlastiSpan insulation, in both types of construction. To comply with these requirements, a thermal barrier may be required under PlastiSpan insulation in some cases.

National Building Code
Article 3.1.14.2. of the NBC outlines requirements for metal roof deck assemblies which form part of a building required to be of non-combustible construction and support combustible insulation materials used in metal roof deck assemblies. If the building is unsprinklered, Part 3 of the NBC requires that the roof assembly meet the conditions of acceptance of CAN/ULC-S126-M.

PlastiSpan insulation has been tested to demonstrate compliance with this requirement and is listed as an insulation component in Roof Deck Constructions C7, C12A, and C12B as described in the Underwriters’ Laboratories of Canada (ULC) List of Materials and Equipment, Volume II.

Part 3 of the NBC also allows PlastiSpan insulation to be used in metal roof deck assemblies as part of a building required to be of non-combustible construction if one of the two conditions below are satisfied:

1. A thermal barrier consisting of not less than 12.7 mm thick gypsum board is located beneath the insulation board.
2. The building is sprinklered and monitored throughout according to building code requirements.

Underwriters’ Laboratories of Canada
Underwriters’ Laboratories of Canada tests roof assemblies based upon the type of fire exposure. Components used in roof assemblies are assessed using CAN/ULC-S101-M for fire exposure originating within a building and using CAN/ULC-S107-M for external fire exposure with specific tested roof assemblies listed in the ULC List of Materials and Equipment, Volume III.

Underwriters’ Laboratories of Canada test a full scale wall or roof system for fire originating inside a building. The severity of the exposure is classed in terms of 1 hour, 1-1/2 hour, or 2 hour fire resistance rating. The test standards demonstrate that the constructions listed will not contribute materially to flame spread on the underside when subjected to a controlled standardized fire exposure.

ULC Design No’s. R210 and R222 demonstrate construction which includes PlastiSpan insulation, carries a ULC certificate, and will meet requirements for a 1 hour fire resistance rated roof. Should a 2 hour fire rated roof assembly be required it will normally be achieved using the appropriate thickness of concrete or gypsum decks.

Roof assemblies containing PlastiSpan insulation board are tested for external fire exposure using CAN/ULC-S107-M. The roof assemblies in combination with specific roof coverings are given a rating Class A, B or C based upon severity of the fire exposure. PlastiSpan insulation board has been listed in combination with a wide range of roof coverings.

Factory Mutual Research Corporation
For building owners who have insurance underwritten by Factory Mutual, Plasti-Fab insulation is listed under a number of constructions for Class 1 fire exposure as well as 1-60 and 1-90 wind uplift requirements. The listings are valid for the roof assemblies constructed as detailed in the Factory Mutual Approval Guide.
Summary of Constructions Required for Fire Rated Construction

This list is meant as a short form summary of the constructions described. These listings are revised periodically, therefore, please check the exact listing in the appropriate reference for the construction required by the authorities.

Underwriters’ Laboratories of Canada (ULC)
List of Equipment and Materials

UCL Construction C7
1. Supports: Structural steel or other materials acceptable to authorities having jurisdiction
2. Steel Deck: 0.76 mm thick, or heavier, not perforated, not less than 38 mm deep and not less than 152 mm wide sections welded to supports in accordance with deck manufacturer’s recommendations
3. Underlayment: a) minimum 11 mm thick wood fibreboard at a minimum area density of 2.5 kg/m²; b) minimum 12.7 mm thick gypsum wallboard. Attach underlayment to the steel deck using one of the following methods:
- Mechanically fastened using 40 mm long self-drilling, self-tapping screws through 75 x 75 mm steel stud plates, maximum one screw and plate combination per 51 m² of roof area, or
- Fully adhered using type 3 asphalt applied in continuous beads to the top flutes of the steel roof deck at a minimum rate of 6.7 kg/10 m², or
- Adhered applied at a rate of 1.65 kg/m²; use adhesive listed by ULC under Roof Deck Construction Materials, Guide No. 360 R13.
5. Steep Asphalt: Type 3 asphalt for attaching Insulation of no lower than the underlayments noted above or optional sheathing membrane, mopped at a rate of 8.6 kg/10 m² (maximun).
6. Insulation: PlastiSpan or PlastiSpan HD insulation board at minimum thickness of 25 mm.
7. Deep Asphalt: Type 3 asphalt for attaching Insulation to one of the underlayments noted above or optional sheathing membrane, mopped at a rate of 8.6 kg/10 m² (maximun).
8. Cover Board: Minimum 12.7 mm thick wood fibreboard with a minimum area density of 3.4 kg/m².
9. Roof Covering: Authorities having jurisdiction should be consulted as to the class of roof covering, which will be acceptable in each location.

UCL Construction C12A
1. Supports: Structural steel or other materials acceptable to authorities having jurisdiction
2. Steel Deck: 0.76 mm thick, or heavier, not perforated, not less than 38 mm deep and not less than 152 mm wide sections welded to supports in accordance with deck manufacturer’s recommendations
3. Underlayment: a) minimum 11 mm (7/16”) thick wood fibreboard with a minimum area density of 2.5 kg/m² loosely laid on the steel deck, or b) minimum 12.7 mm thick gypsum wallboard loosely laid on the steel deck.
5. Insulation: PlastiSpan or PlastiSpan HD insulation board at minimum thickness of 25 mm.

UCL Construction C12B
1. Supports: Structural steel or other materials acceptable to authorities having jurisdiction
2. Steel Deck: 0.76 mm thick, or heavier, not perforated, not less than 38 mm deep and not less than 152 mm wide sections welded to supports in accordance with deck manufacturer’s recommendations
3. Underlayment: a) minimum 11 mm (7/16”) thick wood fibreboard with a minimum area density of 2.5 kg/m² loosely laid on the steel deck, or b) Minimum 12.7 mm thick gypsum wallboard loosely laid on the steel deck.
5. Insulation: PlastiSpan or PlastiSpan HD insulation board at minimum thickness of 25 mm.
6. Cover Board: Minimum 12.7 mm thick wood fibreboard with a minimum area density of 3.4 kg/m².
7. Roof Covering: Authorities having jurisdiction should be consulted as to the class of roof covering, which will be acceptable in each location.

Factory Mutual (FM) Approval Guide – Building Materials: FM Approved Assemblies

FM Class 1-60 or 1-90 Assembly
1. Supporting Structure: Concrete deck
2. Thermal Barrier: No. 360 R13 attached with asphalt to cool to 107°C after allowing the asphalt to cool to 107°C.
3. Roof Covering: 3 Ply Organic Felt BUR Cover

FM Class 1-90 Assembly
1. Supporting Structure: Concrete deck
2. Thermal Barrier: Min 19 mm thick listed perlite board secured to the deck with fasteners applied at 0.25 m² max contributory area per fastener or for min. 16 mm thick .Fiberboard or 13 mm thick Dens Deck secured to the deck with fasteners applied at 0.25 m² max contributory area per fastener
3. Attachment: Hot Asphalt applied to cool to 107°C and allowed to cool to 121°C (225 to 250°F) before placing insulation.
4. Insulation: 25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
5. Cover Board: Min. 13 mm thick listed high density fibreboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.

FM Class 1-60 Assembly
1. Supporting Structure: Concrete deck
2. Thermal Barrier: Min 19 mm thick listed perlite board secured to the deck with fasteners applied at 0.25 m² max contributory area per fastener or for min. 16 mm thick Fiberboard or 13 mm thick Dens Deck secured to the deck with fasteners applied at 0.25 m² max contributory area per fastener
3. Attachment: Two plies of 7 kg felt adhered with hot asphalt and allowed to cool to 107°C before placing insulation.
4. Insulation: 25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
5. Cover Boards: Min. 13 mm thick listed perlite board or high density fibreboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.

FM Class 1-90 Assembly
1. Supporting Structure: Concrete deck
2. Attachment: Asphalt applied to the deck and allowed to cool to 107°C before placing insulation.
3. Insulation: 25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
4. Cover Boards: Min. 13 mm thick listed high density fibreboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.

FM Class 1-60 Assembly
1. Supporting Structure: Concrete deck
2. Attachment: Asphalt applied to the deck and allowed to cool to 107°C before placing insulation.
3. Insulation: 25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
4. Jigging Plates: Min. 13 mm thick listed high density fibreboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.

FM Class 1-90 Assembly
1. Supporting Structure: Concrete deck
2. Attachment: Asphalt applied to the deck and allowed to cool to 107°C before placing insulation.
3. Insulation: 25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
4. Jigging Plates: Min. 13 mm thick listed high density fibreboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.

ECP-Certified Insulation

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