

Plasti-Fab Design Manual

Fire Rated Assemblies



Better building ideas from PFB ™



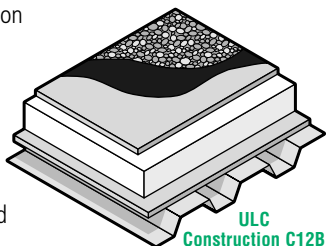
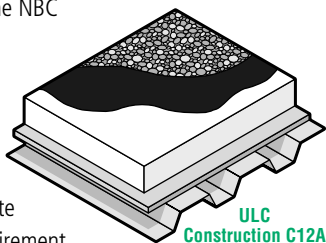
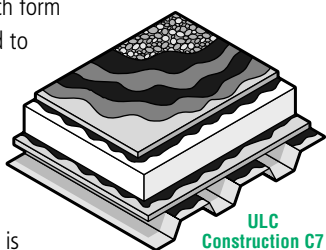
PlastiSpan™ Insulation

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 foamed 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:

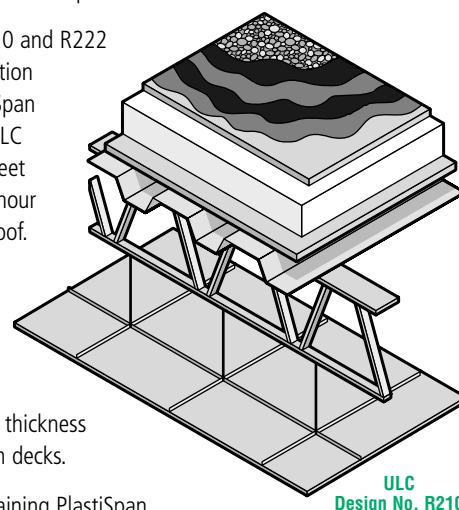
1. A thermal barrier consisting of not less than 12.7 mm thick gypsum board is located beneath the insulation board.
2. The building is sprinklered and monitored throughout according to building code requirements.

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

ULC Construction C7

- Supports
Structural steel or other materials acceptable to authorities having jurisdiction
- 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
- Underlayment
 - minimum 11 mm thick wood fibreboard with a minimum area density of 2.5 kg/m²; or
 - 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 stamped steel plates; maximum one screw and plate combination per 0.3 m² of roof area, or
 - Fully adhered using type 3 asphalt applied in continuous beads to the top flute of the steel roof deck at a maximum rate of 6.7 kg/10 m²; or
 - Adhesive applied at a rate of 1.65 L/10 m²; use adhesive listed by ULC under Roof Deck Construction Materials, Guide No. 360 R13.
- Vapour Barrier (optional)
 - Sheathing membrane listed by ULC under Roof Deck Construction Materials, Guide No. 360 R13 loosely laid on underlayment or
 - Sheathing membrane listed by ULC under Roof Deck Construction Materials, Guide No. 360 R13 attached with adhesive applied at a rate of 1.65 L/10 m²; use adhesive listed by ULC under Roof Deck Construction Materials, Guide No. 360 R13.
- Steep 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 (maximum)
- Insulation
PlastiSpan or PlastiSpan HD insulation board at minimum thickness of 25 mm.
- Steep Asphalt
Type 3 asphalt for attaching 12.7 mm thick wood fibreboard cover board to insulation back-mopped to wood fibreboard at a maximum rate of 9.0 kg/10 m².
- Cover Board
Minimum 12.7 mm thick wood fibreboard with a minimum area density of 3.4 kg/m².
- Roof Covering
Authorities having jurisdiction should be consulted as to the class of roof covering, which will be acceptable in each location.

ULC Construction C12A

- Supports
Structural steel or other materials acceptable to authorities having jurisdiction
- 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.
- Underlayment
 - 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
 - minimum 12.7-mm thick gypsum wallboard loosely laid on the steel deck
- Vapour Barrier (optional)
Sheathing membrane listed by ULC under Roof Deck Construction Materials, Guide No. 360 R13 loosely laid on underlayment
- Insulation
PlastiSpan or PlastiSpan HD insulation board at minimum thickness of 25 mm.
- Roof Covering
Loose laid and ballasted EPDM listed under Guide No. 360 018 that has been evaluated over PlastiSpan insulation board.

ULC Construction C12B

- Supports
Structural steel or other materials acceptable to authorities having jurisdiction
- 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.
- Underlayment
 - 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
 - Minimum 12.7 mm thick gypsum wallboard loosely laid on the steel deck
- Vapour Barrier (optional)
Sheathing membrane listed by ULC under Roof Deck Construction Materials, Guide No. 360 R13 loosely laid on underlayment
- Insulation
PlastiSpan or PlastiSpan HD insulation board at minimum thickness of 25 mm.
- Cover Board
Minimum 12.7 mm thick wood fibreboard with a minimum area density of 3.4 kg/m²
- Roof Covering
Mechanically fastened single ply EPDM or PVC roof covering listed under Guide No. 360 018 that has been evaluated over wood fibreboard covering PlastiSpan insulation board. The wood fibreboard thickness density shall be the higher of that specified per item 6 above or that specified under the specific roof covering listing under Guide No. 360 018. Fastening rate not to exceed 1 fastener per 0.37 m².

ULC Design No. R210 (Built Up Roofing) and No. R222 (Single Ply Membranes)

- Roof Covering
Class A Built Up Roofing or Listed Single Ply Membranes
- Protection Board
Wood Fibreboard 12.7 mm or 25.4 mm based upon listing
- Attachment
 - Hot Asphalt - mop and flop, or
 - Mechanically fastened through insulation
- Insulation
PlastiSpan 25 mm minimum. No maximum.
- Attachment
Hot Asphalt
- Vapour Barrier
Listed vapour barriers and adhesives (optional)
- Thermal Barrier
15.9 mm Gypsum Board
- Attachment
Adhesives under ULC Guide No. 40 U18.1-1/2
- Steel Deck
0.61 mm thick galvanized steel deck minimum 25 mm deep by 635 mm wide, fluted steel deck with flutes approx. 100-mm o/c.
- Steel Joists
Nominally 250-mm depth weighing 9 kg/m with minimum size as per the National Building Code of Canada, spaced 1220 mm o/c and welded to end supports.
- Bridging
Rigid top and bottom
- Cold Rolled Channel
1.6 mm thick, 38 mm deep with 14 mm flanges placed on lower chords of joists and secured with 1.2 mm galvanized steel wire
- Hanger Wire
Galvanized tie wire hanger wire 2.5 mm twist tied to lower chord of joist or cold rolled channels,
- Acoustical Material
CGC INTERIORS, A Division of CGC Inc. or Armstrong World Industries as per ULC Guide No. 40 U18.1

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

FM Class 1-60 or 1-90 Assembly

- Supporting Structure:
Steel roof deck.
- Thermal Barrier:
Class 1-90: Min 19 mm thick listed perlite board secured to the deck with fasteners applied at 0.25 m² max contributory area per fastener or 16 mm thick Fiberbond secured to the deck with fasteners with metal plates only applied at 0.37 m² max contributory area per fastener or 16 mm thick Dens Deck secured to the deck with fasteners applied at 0.19 m² per fastener.
Class 1-60: 16 mm thick Dens Deck secured to the deck with fasteners applied at 0.37 m² max contributory area per fastener.
- Attachment
Two plies of 7 kg felt adhered with hot asphalt and allowed to cool to 107°C before placing insulation.
- Insulation:
25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
- Cover Board:
Min. 13 mm thick listed perlite board or high density fiberboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.
- Roof Covering:
3 Ply Organic Felt BUR Cover

FM Class 1-90 Assembly

- Supporting Structure:
Concrete deck
- Attachment:
Asphalt applied to the deck and allowed to cool to 107°C before placing insulation.
- Insulation:
25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
- Cover Board:
Min. 13 mm thick listed high density wood fiberboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.
- Roof Covering:
3 Ply Organic Felt BUR Cover

FM Class 1-60 Assembly

- Supporting Structure:
Steel roof deck
- Thermal Barrier:
Min 25 mm thick listed perlite board or min 0.5 in. (13 mm) thick Dens Deck is loose laid on the deck.
- Insulation:
25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation is laid over thermal barrier and secured with fasteners applied at 4.0 ft² (0.37 m²) max contributory area per fastener.
- Cover Board:
Min. 13 mm thick listed high density fiberboard or 25 mm thick regular fiberboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.
- Roof Covering:
Listed Single Ply Roof Cover

FM Class 1-90 Assembly

- Supporting Structure:
Steel roof deck
- 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 16 mm thick Fiberbond or 13 mm thick Dens Deck secured to the deck with fasteners applied at 0.37 m² max contributory area per fastener secured to the deck with fasteners applied at 0.19 m² per fastener.
- Attachment:
Hot asphalt applied at 1 kg/m² and allowed to cool to 107 to 121°C (225 to 250°F) before placing insulation.
- Insulation:
25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
- Cover Board:
Min. 13 mm thick listed high density fiberboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.
- Roof Covering:
3 Ply Organic Felt BUR

FM Class 1-60 Assembly

- Supporting Structure:
Steel roof deck
- 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 16 mm thick Fiberbond or 13 mm thick Dens Deck secured to the deck with fasteners applied at 0.37 m² max contributory area per fastener secured to the deck with fasteners applied at 0.19 m² per fastener.
- Insulation:
25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
- Cover Board:
Min. 13 mm thick listed high density fiberboard
- Attachment:
All components are loose laid and fastened through the top layer. Fasteners are applied for min. 19 mm thick perlite board at 0.25 m² max. contributory area per fastener or for min. 16 mm thick Fiberbond or min. 13 mm thick Dens Deck at max. 0.37 m² contributory area per fastener.
- Roof Covering:
3 Ply Organic Felt BUR or Listed Single Ply.

FM Class 1-90 Assembly

- Supporting Structure:
Concrete roof deck
- Attachment:
Asphalt applied to the deck and allowed to cool to 107°C before placing insulation.
- Insulation:
25 to 203 mm thick PlastiSpan or PlastiSpan HD insulation.
- Cover Board:
Min. 13 mm thick listed high density fiberboard backmopped with hot asphalt and flopped onto the insulation after allowing the asphalt to cool to 107°C.
- Roof Covering:
3 Ply Organic Felt BUR or Listed Single Ply.

ECP-Certified
Insulation



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