



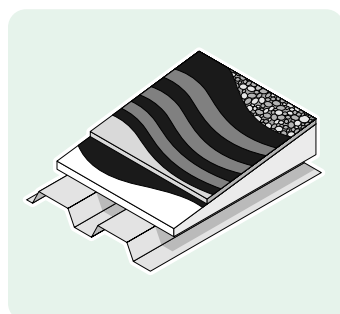
# PlastiSpan™ Insulation

## Roof and Deck Insulation: Selection, Application and Specification

This brochure provides design notes, application instructions and specifications applicable to PlastiSpan building insulation for roofing applications. The required installation method varies depending on the membrane to be applied above the

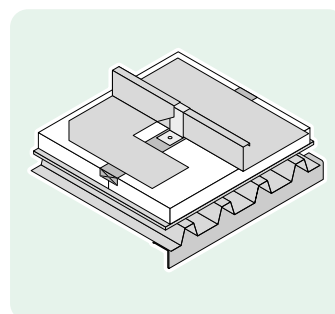
insulation. The selection chart below indicates additional brochures, which should be reviewed for complete information on the use of PlastiSpan insulation for roofing applications.

### Sloped Insulation



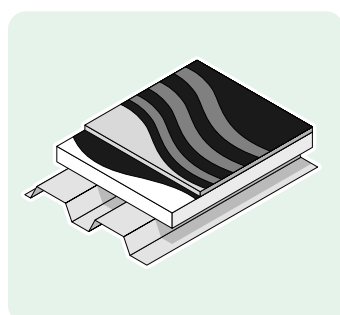
- Provides the positive slope to drain while maintaining the structural and economic advantages of a flat roof deck system.

### Standing Seam



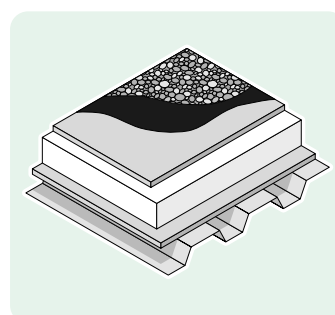
- Variety of profiles and colours.
- Install at any temperature
- Easily installed over thermal barriers on steel decks.

### Built-Up Roofing



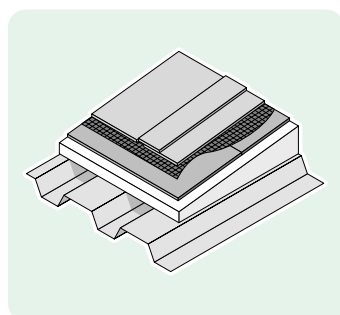
- Economical for high thermal resistance.
- Fibreboard provides an excellent and familiar surface for the application of built-up roofing.
- Easily installed over thermal barriers on steel deck.

### Fire-Rated Assemblies



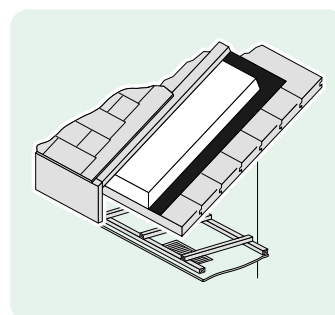
- Thermal barriers on steel decks tested to demonstrate compliance with Building Code.
- Steel deck with suspended ceiling can provide 1-hour fire rating.

### Single Ply Roofing



- PlastiSpan insulation adapts to requirements of single ply membrane.
- Economical for high thermal resistance.
- Easily installed over thermal barriers on steel decks.

### Cathedral Ceilings



- Ideal where exposed timber deck is chosen inside building finish and slope is sufficient to allow the use of shingles, shakes or tiles.

## Design Notes

PlastiSpan insulation board is a rigid expanded polystyrene (EPS) product. The closed cell structure of PlastiSpan insulation does not contain CFC's, HCFC's or HFC's, which assures long lasting thermal insulation properties. It is chemically inert to a wide range of chemicals; it has no food value and it will not sustain insects, parasites, animals or plant life.

PlastiSpan EPS roof insulation is incorporated into a roofing system in order to reduce the energy loss through the roof. The thickness of the insulation required will depend to some extent on the comfort factor required in the building. The main criteria for thickness will be a cost/benefit analysis designed to balance the capital cost of the insulation against the saving in energy costs over the life of the building and to meet minimum thermal resistance required in the Building Code. Building Codes require minimum thermal resistance for various types of construction in

different geographical areas. (See applicable Building code and the current Supplement to the National Building Code).

PlastiSpan insulation board is available as CAN/ULC-S701, Type 1, 2 or 3. The choice of the appropriate type of PlastiSpan insulation board will depend upon the characteristics required by the roofing system. PlastiSpan Type 1 insulation will generally provide the required insulation level most economically. Where additional compressive strength is required, PlastiSpan type 2 or 3 insulation board may be required.

The top surface of the insulation must be protected from melting in built up roofing applications, in torch on membrane applications and in some single ply membrane applications where solvent and adhesive attack is possible. Do not install PVC membranes in direct contact with PlastiSpan insulation. In these cases, a protection board of fibreboard or particleboard is generally used.

## General Application Instructions

The insulation application may vary based upon the membrane used or the material and equipment used to apply the system. Application clauses specific to the types of membrane are listed in the applicable PlastiSpan Roof & Deck Insulation brochure; however, the following sections provide general application instructions for PlastiSpan insulation when used with various roof components:

### Decks

Ensure that decks are clean, dry and free from oil, grease, rust, frost, snow and other foreign matter. Clean flutes of steel deck as necessary. Prime concrete deck that is to receive direct application of asphalt with asphalt base primer. Keep primer back 50 mm (2") from joints of precast deck.

### Thermal Barrier to Steel Deck

Apply fire retardant adhesive to deck ridges with a dispenser at a rate recommended by adhesive manufacturer. Lay thermal barrier onto adhesive while still tacky.

OR

Mechanically fasten thermal barrier to steel deck using non-corroding self-tapping fasteners in accordance with fastener manufacturer's instructions.

### Vapour Barrier to Various Decks

Apply proprietary vapour barrier in accordance with vapour barrier manufacturer's instructions for the type of deck.

### Attachment of Vapour Barrier to Thermal Barrier

Apply proprietary vapour barrier in accordance with vapour barrier manufacturer's instructions to steel deck.

### Attachment of Air Barrier to Steel or Timber Deck

If an air barrier is not otherwise provided for, apply approved air barrier material to deck.

### Insulation

Butt boards in moderate contact and stagger joints. Ensure that joints occur over solid bearing (e.g. not over flutes of steel deck). Lay sloped insulation as detailed on approved drawings.

### Insulation to Steel Deck, Vapour Barrier, or to Thermal Barrier

Apply fire retardant adhesive over deck ridges, vapour barrier, thermal barrier, using a brush or long handled paint roller.

Allow open time for solvents to evaporate, then lay insulation onto adhesive while it is still tacky.

### Insulation Mechanically Fastened to Wood, Steel, or Concrete Deck

Choose number of layers based on thickness of insulation required. Use protection board if required based upon membrane type and/or protection required for the insulation from solvents, adhesives, torches or other.

Stagger joints of insulation with joints in thermal barrier (if thermal barrier is used). Lay first layer of insulation board across

flutes in steel deck so that butt joints occur over solid bearing. If second layer is required, stagger joints with joints in second layer with those in first layer.

### Single Insulation Layer Direct to Metal Deck

Fastener spacing will be as per the specific roof design and/or fastener manufacturer requirements.

Note: Roof systems including thermal barriers, double layer insulation and protection board can be assembled and mechanically fastened as a single layer.

### Single Insulation Layer with Protection Board

Stagger joints of insulation and protection board. Fastener spacing will be as per the specific roof design and/or fastener manufacturer requirements. Protection board can be fastened to nailer or Z-bar.

### Double Insulation Layer

Lay first layer or first row of insulation across steel deck. Lay nailer (or Z-bar) against insulation or into routed groove in insulation. Lay insulation and nailers (or Z-bars) across roof and fasten to deck.

Lay second layer or Lay first row of second layer of insulation across the roof perpendicular to first layer. Lay nailer (or Z-bar) against insulation or into routed groove in insulation. Lay insulation and nailers (or Z-bars) across roof and fasten to deck or to first layer nailer (or Z-bar) at each intersection. Protection board can be fastened along with second layer of insulation; OR fastened to nailer or Z-bar.

## Specifications

### Part 1 – General

#### 1.01 Related Documents

- A. Drawing and general provisions of contract, including general and supplementary conditions and Division-1 Specification Sections, apply to this Section.

#### 1.02 Submittals

- A. Manufacturer's product literature, including specified physical properties.
- B. Installation instructions.
- C. Confirmation that product complies with specification requirements and is compatible with the roofing membrane and adhesives.
- D. Manufacturer's Thermal Performance Warranty where required.

#### 1.03 Quality Assurance

- A. Where required, provide proof of compliance with quality requirements in the form of an Evaluation Listing or Report in the Canadian Construction Materials Centre (CCMC) Registry of Product Evaluations or third party certification of product quality by an accredited body.

#### 1.04 Product Handling

- A. Protect insulation from physical damage.
- B. Comply with manufacturer's recommendations for handling, storage and protection.
- C. Handle boards carefully so corners are not broken off or boards otherwise damaged.

#### 1.05 Warranty

- A. Where required, provide written warranty that the long term thermal resistance of the roof insulation will not vary from its published thermal resistance based upon installation in accordance with manufacturer's recommendations.
- B. Warranty period is 20 years after date insulation is purchased.

#### 1.06 Job Conditions

- A. Apply insulation under the same conditions as specified for the application of roof membrane.
- B. Application of roof membrane shall follow immediately after the application of roof insulation.

### Part 2 – Products

#### 2.01 Roof Insulation Material

- A. Material Properties:
  - 1. Rigid closed-cell expanded polystyrene thermal insulation board complying with the minimum requirements of CAN/ULC-S701, Type 1<sup>1</sup>, 2<sup>2</sup>, or 3<sup>3</sup>
    - <sup>1</sup> Use type 1 where roof system will be subject to normal superimposed loads such as ballasted single-ply roofing subject to pedestrian traffic – thermal resistance of RSI 0.65 per 25 mm (R-3.75 per inch) of thickness.
    - <sup>2</sup> Use type 2 insulation where roof system will be subject to heavier than normal superimposed loads – thermal resistance of RSI 0.70 per 25 mm (R-4.04 per inch) of thickness.
    - <sup>3</sup> Use type 3 insulation where roof system will be subject to significantly heavier than normal superimposed loads – thermal resistance of RSI 0.74 per 25 mm (R-4.27 per inch) of thickness
  - B. Acceptable Manufacturer's Product: PlastiSpan roof insulation.
  - C. Acceptable Thermal Barrier Boards: Material complying with the requirements contained in the National Building Code of Canada (eg. 13 mm (1/2") thick gypsum board), provincial building codes, or approved ULC roof system.

### Part 3 – Execution

#### 3.01 Preparation

- A. Sweep areas to receive roof insulation clean prior to commencing roof insulation work.

#### 3.02 Installation

- <sup>1</sup> Use one of the following paragraphs A's if a fire rated roof system is required (see PlastiSpan Fire-Rated Roofing Systems roofing brochure for more detailed information). The first Paragraph A is intended for use with roof assemblies requiring an Underwriters' Laboratory of Canada (ULC) fire resistance for a specific length of time as per CAN/ULC-S101-M (fire exposure originating within the structure). The second paragraph A can be used for roof assemblies requiring a ULC Class A fire exposure rating as per CAN/ULC-S107-M (fire exposure from an external source). Use the third paragraph A for Factory Mutual (FM) Class 1-60 or 1-90 rated roof assemblies.
    - A. Apply insulation boards to comply with ULC Design Numbers R210 or R220 as per ULC List of Equipment and Materials and with insulation manufacturer's installation requirements.  
OR
    - A. Install appropriate thermal barrier directly to metal deck followed by insulation boards at right angles to the run of the deck. Butt boards snugly together. Apply membrane in accordance with manufacturer's requirements to conform to appropriate ULC Class A fire rated roof assembly.  
OR
    - A. Install appropriate thermal barrier directly to metal deck followed by insulation boards at right angles to the run of the deck. Butt boards snugly together. Apply roof membrane in accordance with selected roof assembly as listed in the FM Approval Guide for Building Materials.
    - B. Apply roof insulation in accordance with approved shop drawings.
  - <sup>2</sup> Insert paragraph C when insulation boards are to be applied in multiple layers.
  - C. Install roof insulation in two layers, with joints of top layer staggered in both directions with joints of the layer below.
- #### 3.03 Clean-Up
- A. Remove and dispose of excess insulation, wrappings and other waste materials.

**PlastiSpan Insulation Properties**

MATERIAL PROPERTIES	TEST METHOD	METRIC (SI) UNITS	CAN/ULC-S701			IMPERIAL UNITS	CAN/ULC-S701		
			TYPE 1	TYPE 2	TYPE 3		TYPE 1	TYPE 2	TYPE 3
<b>Thermal Resistance</b> <sup>1</sup> Minimum	ASTM C 518	$\frac{m^2 \cdot ^\circ C}{W}$	0.65	0.70	0.74	$\frac{ft^2 \cdot hr \cdot ^\circ F}{BTU}$	3.75	4.04	4.27
<b>Compressive Resistance</b> Minimum @ 10% Deformation	ASTM D 1621	kPa	70	110	140	psi	10	16	20
<b>Flexural Strength</b> Minimum	ASTM C 203 Procedure B	kPa	170	240	300	psi	25	35	44
<b>Water Vapour Permeance</b> <sup>2</sup> Maximum	ASTM E 96	$\frac{ng}{Pa \cdot s \cdot m^2}$	300	200	130	perms	5.2	3.5	2.3
<b>Dimensional Stability</b> Maximum	ASTM D 2126 7 days @ 70 ± 2° C	% linear change	1.5	1.5	1.5	% linear change	1.5	1.5	1.5
<b>Water Absorption</b> Maximum	ASTM D 2842	% by volume	6.0	4.0	2.0	% by volume	6.0	4.0	2.0
<b>Limiting Oxygen Index</b> <sup>3</sup> Minimum	ASTM D 2863	%	24	24	24	%	24	24	24

NOTES: 1. Thermal resistance measured at mean temperature of 24°C (75°F) for 25 mm (1 inch) thick material.  
 2. Values quoted are maximum for 25 mm (1 inch) thick material. Lower values will result for thicker materials.  
 3. PlastiSpan insulation board has a maximum Flame Spread Rating of 290 and a Smoke Developed Rating greater than 500 for minimum thickness of 25 mm classified in accordance with CAN/ULC-S102.2M.

**For more information on Plasti-Fab EPS Product Solutions, consult the following brochures:**

**Roof & Deck Insulation**

- Roof & Deck Insulation:  
Selection, Application & Specification
- Built Up Roofing
- Cathedral Ceilings
- Fire Rated Roof Assemblies
- Single Ply Roofing
- Sloped Roof Insulation
- Standing Seam Roofing

**Building Insulation**

**WALL INSULATION**

- Wall Insulation:  
Selection, Application & Specification
- Commercial / Industrial Applications
- Exterior Insulation Finish Systems
- Exterior Insulation Sheathing  
New or Retrofit Construction
- Interior Systems
- PlastiSpan M Insulation
- Precast Concrete Wall Panels
- Rain Screen (Cavity) Walls

**FLOOR INSULATION**

- Floor Insulation:  
Selection, Application & Specification
- Floor Insulation Systems
- Insulation for Radiant Floor Heating Systems
- Split Floor Slabs

**FOUNDATION INSULATION**

- Foundation Insulation:  
Selection, Application & Specification
- Exterior and Interior Foundation Walls
- Exterior Perimeter Foundation  
Insulation Systems
- Frost Protected Shallow Foundation
- GeoDrain Foundation Insulation Board

**ICE RINKS**

- Ice Rink Slab Insulation

**Concrete Formwork**

- Advantage ICF System
- Enermizer ICF System

**Mechanical Insulation**

- Cold Storage Applications
- Pipe and Vessel Insulation
- Utilities Insulation

**Roof & Wall Panels**

- PlastiSpan SIP System

**Buoyancy Systems**

- Buoyancy Systems:  
Selection, Application & Specification
- Floating Dock or Marina
- Floating Rafts

**Geotechnical Engineered Applications**

- Geotechnical Engineered Applications:  
Selection, Application & Specification
- GeoSpan Compressible Fill Material
- GeoSpec Lightweight Fill Material  
for Landscape Applications
- GeoSpec Lightweight Fill Material  
for Road Embankments
- GeoVoid Compressible Fill Material



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