

Product Information Bulletin

	•
BULLETIN NO.	337
ISSUED:	July 19, 2017
REPLACES:	April 7, 2017

PlastiSpan® Insulation for Insulating Sheathing - 2012 BCBC

Page 1 of 4

PlastiSpan® insulation board is a moulded expanded polystyrene (EPS) insulation that meets or exceeds CAN/ULC-S701, **Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering**. PlastiSpan insulating sheathing applied over the exterior of wood framed walls provide continuous insulation eliminating thermal bridges at wood stud locations.

Table 1 - PlastiSpan Insulation Material Properties

·	Material Property ASTM Test Units		CAN/ULC-S701 ²
Material Property	Method ¹	Units	Type 1
Thermal Resistance	C518	m ² •°C/W	0.65
Minimum per 25 mm (inch)	C316	(ft²•h•°F/BTU)	(3.75)
Compressive Resistance	D1621	kPa	70
Minimum @ 10% Deformation	D1021	(psi)	(10)
Flexural Strength	C203	kPa	170
Minimum	C203	(psi)	(25)
Water Vapour Permeance ³	E96	ng/(Pa•s•m²)	300
Maximum		(Perms)	(5.0)
Water Absorption⁴ <i>Maximum</i>	D2842	% By volume	6.0
Dimensional Stability Maximum, 7 Days @ $70 \pm 2 ^{\circ}\!$	D2126	% Linear Change	1.5
Limiting Oxygen Index Minimum	D2863	%	24

This bulletin addresses use of *PlastiSpan* insulation as an exterior insulating sheathing applied to above grade walls in compliance with the 2012 British Columbia Building Code (2012 BCBC).

^{1.} The test methods used to determine material properties in the above table provide a means of comparing different types of cellular plastic thermal insulation. They are intended for use in specifications, product evaluations and quality control. They do not predict end-use product performance.

PlastiSpan insulation properties are third party certified under a quality listing program administered by Intertek and are listed by the Canadian Construction Materials Centre (CCMC) under evaluation listing numbers 12424-L (Type 1).
 WVP values quoted are maximum values for 25-mm thick samples with natural skins intact. Lower values will result for thicker materials.

^{4.} The water absorption laboratory test method involves complete submersion under a head of water for 96 hours. The water absorption values above are applicable to specific end-use design requirements only to the extent that the end-use conditions are similar to test method requirements.



PlastiSpan Insulation Used as Insulating Sheathing Material - 2012 BCBC

Product Information Bulletin 337

Page 2 of 4

1. Air Barrier System Requirements

Article 9.25.3.1. requires wall, ceiling and floor assemblies separating conditioned space from unconditioned space or from the ground to be constructed so as to include an air barrier system that will provide a continuous barrier to air leakage. *PlastiSpan* insulation may be used as one component in an air barrier system; however, air barrier system design must consider requirements for sealing of all penetrations of the air barrier system, such as those created by the installation of doors, windows, electrical wiring, electrical boxes, piping or ductwork

2. Vapour Barrier System Requirements

Article 9.25.4.1. requires all thermally insulated wall, ceiling and floor assemblies to be constructed with a vapour barrier sufficient to prevent condensation. Dependent upon thickness, *PlastiSpan* insulation can have a vapour permeance less than 60 ng/(Pa•s•m²) as per Sentence 9.25.4.2.(1); however, *PlastiSpan* insulating sheathing is not intended to provide the principal protection against vapour diffusion in an above grade wall application. See requirements related to low air- and vapour-permeance materials below.

3. Position and Properties of *PlastiSpan* Insulating Sheathing

Subsection 9.25.5.1. addresses low air- and vapour-permeance materials and implications for moisture accumulation. Because *PlastiSpan* insulating sheathing may have an air leakage characteristic less than 0.1 L/(s•m²) at 75 Pa and a vapour permeance characteristic less than 60 ng/(Pa•s•m²), the provisions of Article 9.25.5 should be considered.

Article 9.25.5.2 permits the use of insulating sheathing meeting the above criteria on the exterior of an insulated frame wall based upon the *ratio of outboard to inboard thermal resistance* for specific heating degree-day (HDD) ranges. Wall assemblies with ratio of outboard to inboard thermal resistance values greater than those given in Table 9.25.5.2 (see Table 2) ensure that the inner surface of the insulating sheathing is likely to be warm enough for most of the heating season such that no significant accumulation of moisture will occur. As well, the vapour barrier function has to be provided by a separate building element installed on the warm side of the assembly. For additional information on assumptions used in developing Table 9.25.5.2., refer to 2012 BCBC Appendix note A-9.25.5.2.

Table 2 - Minimum Ratio of Total Thermal Resistance Outboard to Thermal Resistance Inboard

Heating Degree-Days	Ratio	Heating Degree-Days	Ratio
up to 4999	0.20	9000 to 9999	0.55
5000 to 5999	0.30	10000 to 10999	0.60
6000 to 6999	0.35	11000 to 11999	0.65
7000 to 7999	0.40	12000 or higher	0.75
8000 to 8999	0.50		

4. Insulating Sheathing in lieu of Sheathing Membrane

Subclause 9.27.3.4.(2)(b)(i) states that a separate sheathing membrane is not required over insulating sheathing where the joints between boards are sealed. Therefore, when the joints between *PlastiSpan* insulation boards are sealed, a separate sheathing membrane is not required. Refer to PIB 205 for additional information on installation requirements.

5. Thermal Resistance of Wall Assemblies with PlastiSpan Insulation

2012 British Columbia Building Code (2012 BCBC), Section 9.36 provides energy efficiency requirements for buildings 3 storeys or less in building height, having a building area not exceeding 600 m² and used for major occupancies classified as residential occupancies.

Effective thermal resistance RSI_{eff} (R_{eff}) of building assemblies is calculated using the following formula which includes the thermal bridging effect due to repetitive structural members such as wood framing members in walls.



PlastiSpan Insulation Used as Insulating Sheathing Material - 2012 BCBC
Product Information Bulletin 337

Page 3 of 4

$$\frac{100\%}{\text{RSI}_{\text{eff}}(R_{\text{eff}})} = \frac{\frac{100\%}{\text{With Framing}}}{\text{RSI}_{\text{F}}(R_{\text{F}})} + \frac{\frac{\% \text{ Area Cavity}}{\text{RSI}_{\text{C}}(R_{\text{C}})}}{\text{RSI}_{\text{C}}(R_{\text{C}})} + \frac{\text{RSI}(R) \text{ Continuous Material Layers}}{\text{RSI}_{\text{C}}(R_{\text{C}})}$$

Table 3 provides minimum RSI_{eff}/R_{eff} requirements per 2012 BCBC Tables 9.36.2.6.A. and 9.36.2.6.B. for above grade walls in buildings as noted.

Table 3 - Minimum RSI_{eff}/R_{eff} of Above-ground Opaque Wall Assemblies

2012 BCBC Climate Zones	Zone 4	Zone 5	Zone 6	Zone 7A	Zone 7B	Zone 8
Heating Degree-Days (HDD) Celsius Degree-Days	< 3,000	3,000 to 3,999	4,000 to 4,999	5,000 to 5,999	6,000 to 6,999	≥ 7,000
Table 9.36.2.6.A Buildings Where a Heat Recovery Ventilator (HRV) is not Installed						
RSI _{eff} – m ² •°C/W	2.78	3.08	3.08	3.08	3.85	3.85
R _{eff} – ft ² •hr•°F/BTU	15.8	17.5	17.5	17.5	21.9	21.9
Table 9.36.2.6.B Buildings Where a Heat Recovery Ventilator (HRV) is Installed						
RSI _{eff} − m ² •°C/W	2.78	2.97	2.97	2.97	3.08	3.08
R _{eff} – ft ² •hr•°F/BTU	15.8	16.9	16.9	16.9	17.5	17.5

Table 4 provides annual heating degree days for some building locations in Climate Zones 4 to 7B as per 2012 BCBC, Division B, Appendix C.

Table 4 - Annual HDD (Celsius Degree Days) for Building Locations

Climate Zone	Locations	HDD
4	Victoria	2650
	Chilliwack	2780
	Abbotsford	2860
	Vancouver	2950
	Nanaimo	3000
5	Penticton	3350
5	Kamloops	3450
	Prince Rupert	3900
	Whistler	4180
6	Cranbrook	4400
б	Prince George	4720
	Golden	4750
	Smithers	5040
7A	Mackenzie	5550
/ A	Fort St. John	5750
	Glacier	5800
	Beaton River	6300
7B	Dease Lake	6730
	Fort Nelson	6710





PlastiSpan Insulation Used as Insulating Sheathing Material - 2012 BCBC Product Information Bulletin 337 Page 4 of 4

Tables 5 provides $RSI_{\it eff}/R_{\it eff}$ calculations for a wall assemblies using PlastiSpan continuous insulating sheathing to meet requirements per 2012 BCBC, Table 9.36.2.6.A. for buildings in Climate Zones 4 to 7A and Table 9.36.2.6.B. for buildings in Climate Zones 7B to 8.

Table 5 - RSI_{0ff}/R_{off} of Typical Wall Assembly with PlastiSpan (Type 1) Insulating Sheathing

Table 3 - Noteff Neff of Typical Wall Assembly With Fla					
Wall Construction				Continuous	
		RSI _F	RSI _C	Layers	
Outside Air Film				0.03	
Vinyl Cladding				0.11	
2" (50.8 mm) PlastiSpan Insulation				1.32	
Stud Cavity Insulation			2.29		
2 x 4 Wood Stud @ 16" (406 mm) o.c.		0.76			
6 mil polyethylene vapour barrier					
1/2" (12.7 mm) Gypsum Wall Board				0.08	
Inside Air Film				0.12	
RSI Sub-Totals		0.76	2.29	1.66	
% Area of Each Component		23%	77%	100%	
	RSI-3.22 (R-18.3)				
Ratio of Outboa	ard to Inboard	d Insulation Cal	culation		
Outboard Insulation Components	RSI	Inboard Insulation Components		s RSI	
Outside air film	0.03	Stud cavity insulation		2.29	
Vinyl cladding	0.11	Gypsum board		0.08	
2" (51 mm) PlastiSpan Insulation 1.32		Inside air film		0.12	
Total Outboard RSI	1.46	Total Inboard RSI		2.49	
Ratio of Outboard to Inboard RSI		1.46/2.49		0.59	

Tables 6 provides RSI_{eff}/R_{eff} calculations for a wall assemblies using *PlastiSpan* continuous insulating sheathing to meet requirements per 2012 BCBC, Table 9.36.2.6.B. for buildings in Climate Zones 4 to 7A.

Table 6 - RSI_{eff}/R_{eff} of Typical Wall Assembly with PlastiSpan Insulating Sheathing

Wall Construction		· · · · · · · · · · · · · · · · · · ·		Continuous	
		RSI _F	RSI _c	Layers	
Outside Air Film				0.03	
Vinyl Cladding				0.11	
1-5/8" (41.3 mm) PlastiSpan Insulation)			1.07	
Stud Cavity Insulation			2.29		
2 x 4 Wood Stud @ 16" (406 mm) o.c.		0.76			
6 mil polyethylene vapour barrier					
1/2" (12.7 mm) Gypsum Wall Board				0.08	
Inside Air Film				0.12	
RSI Sub-Totals		0.76	2.29	1.41	
% Area of Each Component		23%	77%	100%	
RSI _{eff} (R _{eff})		RSI-2.97 (R-16.9)			
Ratio of Outboard to Inboard Insulation Calculation					
Outboard Insulation Components	RSI	Inboard Insulation Components		s RSI	
Outside air film	0.03	Stud cavity insulation		2.29	
Vinyl cladding	0.11	0.11 Gypsum board		0.08	
1-5/8" (41.3 mm) PlastiSpan Insulation 1.07		Inside air film		0.12	
Total Outboard RSI 1.21		Total Inboard RSI		2.49	
Ratio of Outboard to Inboard RSI		1.21/2.49		0.49	