

## Product Information Bulletin

### NBC 2010 - PlastiSpan® HD Insulation for Exterior Basement Walls

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**PlastiSpan® HD** insulation is a rigid closed cell, expanded polystyrene (EPS) insulation. Continuous **PlastiSpan HD** insulation used on the exterior of a basement wall provides a fully insulated warm wall and reduces the likelihood of condensation forming on the interior of the concrete wall.

**Table 1 – PlastiSpan HD Insulation – CAN/ULC-S701, Type 2 Material Properties**

Material Property	ASTM Test Method	Units	Values <sup>1</sup>
<b>Thermal Resistance</b> <i>Minimum RSI per 25 mm (R per inch)</i>	C518	m <sup>2</sup> •°C/W (ft <sup>2</sup> •h•°F/BTU)	0.70 (4.04)
<b>Compressive Resistance</b> <i>Minimum @ 10% Deformation</i>	D1621	kPa (psi)	110 (16)
<b>Flexural Strength</b> <i>Minimum</i>	C203	kPa (psi)	240 (35)
<b>Water Vapour Permeance<sup>2</sup></b> <i>Maximum</i>	E96	ng/(Pa•s•m <sup>2</sup> ) (Perms)	200 (3.5)
<b>Water Absorption<sup>3</sup></b> <i>Maximum</i>	D2842	% By volume	4.0
<b>Dimensional Stability</b> <i>Maximum, 7 Days @ 70 ± 2°C (158 ± 4°F)</i>	D2126	% Linear Change	1.5
<b>Limiting Oxygen Index</b> <i>Minimum</i>	D2863	%	24

#### NBC 2010 – Energy Efficiency Requirements

National Building Code of Canada 2010 (NBC 2010), Section 9.36 provides energy efficiency requirements for buildings 3 storeys or less in building height, having a building area not exceeding 600 m<sup>2</sup> and used for major occupancies classified as residential occupancies. **Effective thermal resistance RSI<sub>eff</sub> (R<sub>eff</sub>)** 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.

$$RSI_{eff} (R_{eff}) = \frac{100\%}{RSI_F (R_F)} + \frac{\% \text{ Area Cavity}}{RSI_C (R_C)} + RSI(R) \text{ Continuous Material Layers}$$

- PlastiSpan HD** insulation properties are third party certified to CAN/ULC-S701, **Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering**, under a certification program administered by Intertek and are listed by the Canadian Construction Materials Centre (CCMC) under evaluation listing number 12425-L.
- WVP values quoted are maximum values for 25-mm thick samples with natural skins intact. Lower values will result for thicker materials.
- The water absorption laboratory test method involves complete submersion under a head of water for 96 hours. The water absorption value above is applicable to specific end-use design requirements only to the extent that the end-use conditions are similar to test method requirements.

Table 2 provides  $RSI_{eff}$  ( $R_{eff}$ ) for basement walls per NBC 2010, Tables 9.36.2.8.A and 9.36.2.8.B together with annual heating degree days (HDD) for some building locations in Climate Zones 4 to 8 as per NBC 2010, Division B, Appendix C.

**Table 2 – Minimum  $RSI_{eff}$  ( $R_{eff}$ ) and HDD for Building Locations**

Minimum $RSI_{eff}$ ( $R_{eff}$ ) – Basement Walls Below or In Contact with Ground								
NBC 2010 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		
<b>Table 9.36.2.8.A. – Buildings Without a Heat-Recovery Ventilator</b>								
$RSI_{eff}$ - $m^2 \cdot ^\circ C/W$	1.99	2.98	2.98	3.46	3.46	3.97		
$R_{eff}$ - $ft^2 \cdot hr \cdot ^\circ F/BTU$	11.3	16.9	16.9	19.6	19.6	22.5		
<b>Table 9.36.2.8.B. – Buildings With a Heat-Recovery Ventilator</b>								
$RSI_{eff}$ - $m^2 \cdot ^\circ C/W$	1.99	2.98	2.98	2.98	2.98	2.98		
$R_{eff}$ - $ft^2 \cdot hr \cdot ^\circ F/BTU$	11.3	16.9	16.9	16.9	16.9	16.9		
Location	HDD	Zone	Location	HDD	Zone	Location	HDD	Zone
Victoria, BC	2,650	4	Lethbridge, AB	4,650	6	Saskatoon, SK	5,700	7a
Chilliwack, BC	2,780	4	Prince George, BC	4,720	6	Glacier, BC	5,800	7a
Abbotsford, BC	2,860	4	Golden, BC	4,750	6	Dawson Creek, BC	5,900	7a
Vancouver, BC	2,950	4	Trois-Rivières, QC	4,900	6	Baie-Comeau, QC	6,020	7b
Duncan, BC	2,980	4	Calgary, AB	5,000	7a	Prince Albert, SK	6,100	7b
Hope, BC	3,000	5	100 Mile House, BC	5,030	7a	Flin Flon, MB	6,440	7b
Nanaimo, BC	3,000	5	Smithers, BC	5,040	7a	Fort McMurray, AB	6,550	7b
Burnaby, BC	3,100	5	Québec, QC	5,080	7a	Uranium City, SK	7,500	8
Kelowna, BC	3,400	5	Moose Jaw, SK	5,270	7a	Thompson, MB	7,600	8
Kamloops, BC	3,450	5	Edmonton, AB	5,400	7a	Dawson, Yukon	8,400	8
Terrace, BC	4,150	6	Gaspé, QC	5,500	7a	Schefferville, QC	8,550	8
Whistler, BC	4,180	6	Mackenzie, BC	5,550	7a	Churchill, MB	8,950	8
Montréal, QC	4,200	6	Regina, SK	5,600	7a	Inuvik, NWT	10,050	8
Cranbrook, BC	4,400	6	Winnipeg, MB	5,670	7a	Alert, Nunavut	13,200	8

Table 3 provides examples of continuous exterior *PlastiSpan HD* insulation for basement wall assemblies to meet minimum  $RSI_{eff}$  ( $R_{eff}$ ) per NBC 2010, Tables 9.36.2.8.A. and 9.36.2.8.B.

**Table 3 – PlastiSpan HD Insulation - Exterior Basement Insulation System Examples**

Meets Tables 9.36.2.8.A. and 9.36.2.8.B. for Climate Zone 4			
System Description	$RSI_F$	$RSI_C$	Continuous Materials
64 mm (2.5") <i>PlastiSpan HD</i> Insulation	----	----	1.78
203 mm (8") Basement Wall	----	----	0.08
Wood Strapping @ 610 mm (24")	0.54	----	----
13 mm (1/2") Gypsum Wall Board	----	----	0.08
Inside Air Film	----	----	0.12
<b>Total</b>	<b>0.54</b>	<b>NA</b>	<b>2.06</b>
<b>% Area of Each Component</b>	<b>13%</b>	<b>NA</b>	<b>100%</b>
<b>Total <math>RSI_{eff}</math> (<math>R_{eff}</math>)</b>		<b>RSI-2.13 (R12.1)</b>	
Meets Table 9.36.2.8.A. for Climate Zones 5 to 6 & Table 9.36.2.8.B. for Climate Zones 5 to 8			
System Description	$RSI_F$	$RSI_C$	Continuous Materials
95 mm (3.75") <i>PlastiSpan HD</i> Insulation	----	----	2.67
203 mm (8") Basement Wall	----	----	0.08
Wood Strapping @ 610 mm (24")	0.54	----	----
13 mm (1/2") Gypsum Wall Board	----	----	0.08
Inside Air Film	----	----	0.12
<b>Total</b>	<b>0.54</b>	<b>NA</b>	<b>2.95</b>
<b>% Area of Each Component</b>	<b>13%</b>	<b>NA</b>	<b>100%</b>
<b>Total <math>RSI_{eff}</math> (<math>R_{eff}</math>)</b>		<b>RSI-3.02 (R17.1)</b>	