Product Information Bulletin

320

NBC 2010 - PlastiSpan HD Insulation for Exterior Basement Walls

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NBC 2010 - PlastiSpan® HD Insulation for Exterior Basement Walls

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[1]
Thermal Resistance *Minimum RSI per 25 mm (R per inch)*	C518	$m^2 \cdot {}^oC/W$ $(ft^2 \cdot h \cdot {}^oF/BTU)$	0.70 (4.04)
Compressive Resistance *Minimum @ 10% Deformation*	D1621	kPa (psi)	110 (16)
Flexural Strength *Minimum*	C203	kPa (psi)	240 (35)
Water Vapour Permeance[2] *Maximum*	E96	$ng/(Pa \cdot s \cdot m^2)$ (Perms)	200 (3.5)
Water Absorption[3] *Maximum*	D2842	% By volume	4.0
Dimensional Stability *Maximum, 7 Days @ 70 ± 2°C (158 ± 4°F)*	D2126	% Linear Change	1.5
Limiting Oxygen Index *Minimum*	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^2 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.

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

1. ***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.
2. WVP values quoted are maximum values for 25-mm thick samples with natural skins intact. Lower values will result for thicker materials.
3. 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**
Table 9.36.2.8.A. – Buildings Without a Heat-Recovery Ventilator						
RSI$_{eff}$ - m^2•°C/W	1.99	2.98	2.98	3.46	3.46	3.97
R_{eff} - ft^2•hr•°F/BTU	11.3	16.9	16.9	19.6	19.6	22.5
Table 9.36.2.8.B. – Buildings With a Heat-Recovery Ventilator						
RSI$_{eff}$ - m^2•°C/W	1.99	2.98	2.98	2.98	2.98	2.98
R_{eff} - ft^2•hr•°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") ***PlastiSpan HD*** 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
Total	**0.54**	**NA**	**2.06**
% Area of Each Component	**13%**	**NA**	**100%**
Total RSI$_{eff}$ (R_{eff})	**RSI-2.13 (R12.1)**		
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") ***PlastiSpan HD*** 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
Total	**0.54**	**NA**	**2.95**
% Area of Each Component	**13%**	**NA**	**100%**
Total RSI$_{eff}$ (R_{eff})	**RSI-3.02 (R17.1)**		