

Product Information Bulletin

NBC 2010 - PlastiSpan[®] Insulation for Interior Basement Applications

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A Canada Mortgage and Housing Corporation (CMHC)/Canadian Home Builders Association (CHBA) report concluded that use of insulation partway down the interior of a basement wall, as is typical for many residential applications, actually increases heat loss to the adjacent soil because the upper zone insulation is appreciably short-circuited by the heat loss from below.

PlastiSpan[®] insulation is a rigid closed cell, expanded polystyrene (EPS) insulation. It is an ideal solution to provide full-height interior basement wall insulation. Table 1 below provides material properties for PlastiSpan insulation material.

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

Material Property ¹	ASTM Test Method	Units	PlastiSpan Insulation
Thermal Resistance <i>Minimum per 25 mm (inch)</i>	C518	m ² ·°C/W (ft ² ·h·°F/BTU)	0.65 (3.75)
Compressive Resistance <i>Minimum @ 10% Deformation</i>	D1621	kPa (psi)	70 (10)
Flexural Strength <i>Minimum</i>	C203	kPa (psi)	170 (25)
Water Vapour Permeance² <i>Maximum</i>	E96	ng/(Pa·s·m ²) (Perms)	300 (5.0)
Water Absorption³ <i>Maximum</i>	D2842	% By volume	6.0
Dimensional Stability <i>Maximum</i>	D2126	% Linear Change	1.5
Limiting Oxygen Index <i>Minimum</i>	D2863	%	24

This bulletin highlights some of the typical details that should be considered when using **PlastiSpan** insulation for this application.

1. **PlastiSpan** 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 12424-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 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.

NBC 2010 – Energy Efficiency Requirements

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 m² and used for major occupancies classified as residential occupancies. Energy efficiency requirements in NBC 2010, Subsection 9.36.2. are based upon minimum **effective thermal resistance (RSI_{eff}/R_{eff})** of building assemblies which includes the effect of thermal bridging due to repetitive structural members such as wood framing members in wall or roof assemblies calculated using the following formula.

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

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.

Table 2 - 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

Table 3 provides annual HDD for some building locations across Canada per NBC 2010, Division B, Appendix C

Table 3 – Annual HDD

Province	Building Location	HDD (Celsius Degree Days)	Province	Building Location	HDD (Celsius Degree Days)
British Columbia	Victoria	2,650	Quebec	Montréal	4,200
	Vancouver	2,950		Trois-Rivières	4,900
	Kelowna	3,400		Québec	5,080
	Whistler	4,180		Gaspé	5,500
	Dawson Creek	5,900		Baie-Comeau	6,020
Alberta	Lethbridge	4,650		Schefferville	8,550
	Calgary	5,000		New Brunswick	Campbellton
	Edmonton	5,400	Edmunston		5,400
	Fort McMurray	6,550	Fredericton		4,650
Saskatchewan	Moose Jaw	5,270	Nova Scotia	Digby	4,020
	Regina	5,600		Truro	4,650
	Saskatoon	5,700		Halifax	4,200
	Prince Albert	6,100	PEI	Charlottetown	4,600
	Uranium City	7,500	Newfoundland	St. John's	4,800
Manitoba	Winnipeg	5,670		Labrador City	7,900
	Flin Flon	6,440	NWT	Inuvik	10,050
	Thompson	7,600	Nunavut	Alert	13,200
	Churchill	8,950	Yukon	Dawson	8,400

Table 4 provides the RSI_{eff} (R_{eff}) for a basement wall assembly using **PlastiSpan** insulation to provide a continuous insulation layer over the interior of the basement wall to meet minimum requirements for NBC 2010 Climate Zone 4.

Table 4 – PlastiSpan Insulation Interior Basement Example – NBC 2010 Climate Zone 4

System Description	RSI_F	RSI_C	Continuous Materials
203 mm (8") Basement wall	----	----	0.08
102 mm (2.5") PlastiSpan Insulation	----	----	1.65
Wood Strapping @ 600 mm (24")	0.54	----	----
13 mm (1/2") Gypsum wall board	----	----	0.08
Inside Air Film	----	----	0.12
Total	0.54	NA	1.93
% Area of Each Component	13%	NA	100%
RSI_{eff} (R_{eff})	RSI-2.00 (R11.4)		

Table 5 provides the RSI_{eff} (R_{eff}) for a basement wall assembly using **PlastiSpan** insulation board to provide a continuous insulation layer over the interior of the basement wall to meet minimum requirements for NBC 2010, Table 9.36.2.8.A. for Climate Zones 5 to 6 & Table 9.36.2.8.B. for Climate Zones 5 to 8.

Table 5 – PlastiSpan Insulation Interior Basement Example – NBC 2010 Climate Zones 5 to 8

System Description	RSI_F	RSI_C	Continuous Materials
203 mm (8") Basement wall	----	----	0.08
102 mm (4") PlastiSpan Insulation	----	----	2.64
Wood Stud @ 600 mm (24")	0.54	----	----
13 mm (1/2") Gypsum wall board	----	----	0.08
Inside Air Film	----	----	0.12
Total	0.54	NA	2.92
% Area of Each Component	13%	NA	100%
RSI_{eff} (R_{eff})	RSI-2.99 (R17.0)		