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Product Information Bulletin

2014 ABC - 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 surface 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·s·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

2014 ABC – Energy Efficiency Requirements

2014 Alberta Building Code (2014 ABC), 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.

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

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 2014 ABC, 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 6	Zone 7A	Zone 7B	Zone 8
Heating Degree-Days (HDD) Celsius Degree-Days	**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	2.98	3.46	3.46	3.97
R_{eff} - ft^2•hr•°F/BTU	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	2.98	2.98	2.98	2.98
R_{eff} - ft^2•hr•°F/BTU	16.9	16.9	16.9	16.9

Table 3 provides annual heating degree days for some building locations in Climate Zones 6 to 8 as per 2014 ABC, Division B, Appendix C.

Table 3 - Annual HDD (Celsius Degree Days) for Building Locations

Zone 6		Zone 7A		Zone 7B		Zone 8	
Location	**HDD**	**Location**	**HDD**	**Location**	**HDD**	**Location**	**HDD**
Lethbridge	4500	Calgary	5000	Athabasca	6000	Fort Chipewayan	7170
Medicine Hat	4540	Edmonton	5120	Peace River	6050	Rainbow Lake	7200
Brooks	4880	Banff	5500	Lac la Biche	6100	Embarras Portage	7100
High River	4900	Grande Prairie	5790	Fort McMurray	6250		
Okotoks	4920	Slave Lake	5850	Lake Louise	6500		

Table 4 provides an example of a continuous exterior ***PlastiSpan HD*** insulation option for a basement wall assembly that meets minimum ***RSI$_{eff}$ (R_{eff})*** per 2014 ABC, for Zone 6 with or without HRV as well as Zone 7A to 8 with HRV.

Table 4 – PlastiSpan HD Insulation - Exterior Basement Insulation System Examples

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)**		