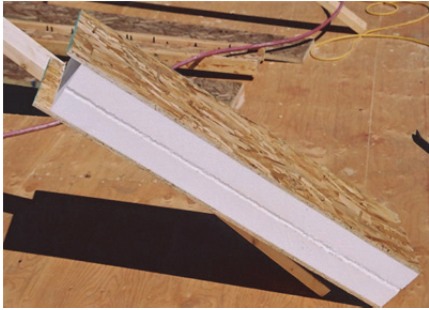


Product Information Bulletin

Insulspan® SIP System - BCBC 2018 Energy Efficiency Requirements

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The **Insulspan® SIP (Structural Insulating Panel) System** is an energy efficient building system that consists of a core of **PlastiSpan®** expanded polystyrene (EPS) insulation with SIP-grade oriented strand board (OSB) structurally laminated to the interior and exterior faces of the EPS insulation core.

The BC Energy Step Code is a provincial standard enacted in April 2017 to provide an incremental approach to achieving more energy-efficient buildings that go beyond the requirements of the base BC Building Code.

A variety of support documents that provide additional information regarding the BC Energy Step Code are available at <https://www2.gov.bc.ca/gov/content/industry/construction-industry/building-codes-standards/energy-efficiency/energy-step-code/resources>.

The BC Energy Step Code groups energy-efficiency requirements into a series of "steps." To achieve Step 1, builders need to use a whole-building energy model to calculate the energy use of the building and conduct an airtightness test (see **BC Energy Step Code – A Best Practices Guide for Local Governments**). In addition, the energy efficiency of building assemblies needs to meet minimum prescriptive RSI_{eff}/R_{eff} requirements per Table 1 below as per British Columbia Building Code 2018 (BCBC 2018), Tables 9.36.2.6.-A and 9.36.2.6.-B.

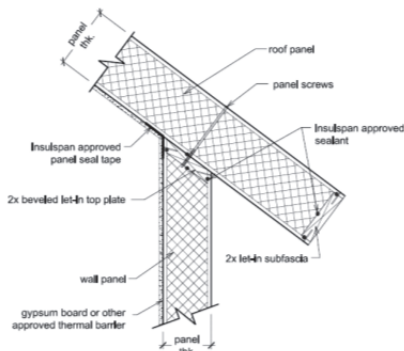
Table 1 – BCBC 2018 Minimum RSI_{eff}/R_{eff} for Above-Ground Opaque Building Assemblies

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
Wall Assemblies - Where a Heat Recovery Ventilator (HRV) is not Installed						
$RSI_{eff} - m^2 \cdot ^\circ C/W$	2.78	3.08	3.08	3.08	3.85	3.85
$R_{eff} - ft^2 \cdot hr \cdot ^\circ F/BTU$	15.8	17.5	17.5	17.5	21.9	21.9
Wall Assemblies - Where a Heat Recovery Ventilator (HRV) is Installed						
$RSI_{eff} - m^2 \cdot ^\circ C/W$	2.78	2.97	2.97	2.97	3.08	3.08
$R_{eff} - ft^2 \cdot hr \cdot ^\circ F/BTU$	15.8	16.9	16.9	16.9	17.5	17.5
Cathedral Ceilings and Flat Roofs - With or Without Heat Recovery Ventilator (HRV) Installed						
$RSI_{eff} - m^2 \cdot ^\circ C/W$	4.67	4.67	4.67	5.02	5.02	5.02
$R_{eff} - ft^2 \cdot hr \cdot ^\circ F/BTU$	26.5	26.5	26.5	28.5	28.5	28.5

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This bulletin provides examples of *Insulspan SIP System* wall and roof assemblies meeting **effective thermal resistance (RSI_{eff}/R_{eff})** per Table 1 calculated as per BCBC 2018, Subsection 9.36.2.

Insulspan SIP System wall and roof assemblies are constructed with wood framing at 1,220 mm (48") on center versus typical wood frame assemblies which are typically constructed with wood framing at 406 mm (16") to 610 mm (24") on center. **Effective thermal resistance (RSI_{eff}/R_{eff})** is calculated using the formula below as per BCBC 2018, Appendix Note A-9.36.2.4.(1) which includes the effect of thermal bridging due to wood framing members.

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

Where:

- $RSI_F (R_F)$ = Thermal resistance of framing members
- $RSI_C (R_C)$ = Thermal resistance of insulation component

Insulspan SIP System Wall Assemblies:

Table 2 provides RSI_{eff}/R_{eff} calculations for 6 1/2" and 8 1/4" *Insulspan SIP System* wall assemblies manufactured using *PlastiSpan* insulation core material meeting CAN/ULC-S701, Type 1 to meet BCBC 2018 energy efficiency requirements for climate zones as indicated.

Table 2 – RSI_{eff}/R_{eff} for Insulspan SIP System Wall Assemblies

Insulspan SIP Wall Assembly	Zones 4 to 7A without HRV Zones 4 to 8 With HRV			Zones 4 to 8 with or without HRV		
	6 1/2" Insulspan SIP			8 1/4" Insulspan SIP		
	RSI_F	RSI_C	Continuous Materials	RSI_F	RSI_C	Continuous Materials
Outside Air Film	----	----	0.03	----	----	0.03
Cladding	----	----	0.11	----	----	0.11
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
PlastiSpan Type 1 Insulation	----	3.71	----	----	4.87	----
Wood Stud @ 1220 mm (48") o.c.	1.19	----	----	1.56	----	----
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
Gypsum Wall Board, 13 mm (1/2")	----	----	0.08	----	----	0.08
Inside Air Film	----	----	0.12	----	----	0.12
RSI Sub-totals	1.19	3.71	0.56	1.56	4.87	0.56
% Area of Each Component	14%	86%	100%	14%	86%	100%
Effective Thermal Resistance	RSI_{eff}	RSI-3.42			RSI-4.32	
	R_{eff}	R-19.4			R-24.5	

Table 3 provides RSI_{eff}/R_{eff} calculations for 6 1/2" and 8 1/4" **Insulspan SIP System** wall assemblies manufactured using **PlastiSpan HD** insulation core material meeting CAN/ULC-S701, Type 2 to meet BCBC 2018 energy efficiency requirements for climate zones as indicated.

Table 3 – RSI_{eff}/R_{eff} for Insulspan SIP System Wall Assemblies

Insulspan SIP Wall Assembly	Zones 4 to 7A without HRV Zones 4 to 8 With HRV			Zones 4 to 8 with or without HRV		
	6 1/2" Insulspan SIP			8 1/4" Insulspan SIP		
	RSI_F	RSI_C	Continuous Materials	RSI_F	RSI_C	Continuous Materials
Outside Air Film	----	----	0.03	----	----	0.03
Cladding	----	----	0.11	----	----	0.11
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
PlastiSpan HD Type 2 Insulation	----	4.00	----	----	5.25	----
Wood Stud @ 1220 mm (48") o.c.	1.19	----	----	1.56	----	----
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
Gypsum Wall Board, 13 mm (1/2")	----	----	0.08	----	----	0.08
Inside Air Film	----	----	0.12	----	----	0.12
RSI Sub-totals	1.19	4.00	0.56	1.56	4.87	0.56
% Area of Each Component	14%	86%	100%	14%	86%	100%
Effective Thermal Resistance	RSI_{eff}	RSI-3.56			RSI-4.50	
	R_{eff}	R-20.2			R-25.6	

Insulspan SIP System Roof Assemblies:

Table 4 provides RSI_{eff}/R_{eff} calculations for 10 1/4" and 12 1/4" **Insulspan SIP System** roof assemblies manufactured using **PlastiSpan** insulation core material meeting CAN/ULC-S701, Type 1 to meet BCBC 2018 energy efficiency requirements for all climate zones.

Table 4 – RSI_{eff}/R_{eff} for Insulspan SIP System Roof Assemblies

	10 1/4" Insulspan SIP			12 1/4" Insulspan SIP		
	RSI_F	RSI_C	Continuous Materials	RSI_F	RSI_C	Continuous Materials
Outside Air Film	----	----	0.03	----	----	0.03
Asphalt Shingles	----	----	0.08	----	----	0.08
Roof Sheathing Membrane	----	----	0.03	----	----	0.03
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
PlastiSpan Type 1 Insulation	----	6.19	----	----	7.51	----
Wood Stud @ 1220 mm (48") o.c.	2.00	----	----	2.43	----	----
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
Gypsum Wall Board, 13 mm (1/2")	----	----	0.08	----	----	0.08
Inside Air Film	----	----	0.12	----	----	0.12
RSI Sub-totals	2.00	6.19	0.56	2.43	7.51	0.56
% Area of Each Component	9%	91%	100%	9%	91%	100%
Effective Thermal Resistance	RSI_{eff}	RSI-5.76			RSI-6.88	
	R_{eff}	R-32.7			R-39.1	

Table 5 provides RSI_{eff}/R_{eff} calculations for 10 ¼" and 12 ¼" **Insulspan SIP System** roof assemblies manufactured using **PlastiSpan HD** insulation core material meeting CAN/ULC-S701, Type 2 to meet BCBC 2018 energy efficiency requirements for all climate zones.

Table 5 – RSI_{eff}/R_{eff} Calculation for Insulspan SIP System Roof Assemblies

Insulspan SIP Roof Assembly	10 ¼" Insulspan SIP			12 ¼" Insulspan SIP		
	RSI_F	RSI_C	Continuous Materials	RSI_F	RSI_C	Continuous Materials
Outside Air Film	----	----	0.03	----	----	0.03
Asphalt Shingles	----	----	0.08	----	----	0.08
Roof Sheathing Membrane	----	----	0.03	----	----	0.03
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
PlastiSpan HD Type 2 Insulation	----	6.67	----	----	8.09	----
Wood Stud @ 1220 mm (48") o.c.	2.00	----	----	2.43	----	----
7/16" Oriented Strand Board	----	----	0.11	----	----	0.11
Gypsum Wall Board, 13 mm (1/2")	----	----	0.08	----	----	0.08
Inside Air Film	----	----	0.12	----	----	0.12
RSI Sub-totals	2.00	6.67	0.56	2.43	8.09	0.56
% Area of Each Component	9%	91%	100%	9%	91%	100%
Effective Thermal Resistance	RSI_{eff}	RSI-6.07			RSI-7.25	
	R_{eff}	R-34.4			R-41.2	