Product Information Bulletin

BULLETIN NO. 330
ISSUED: May 5, 2017
REPLACES: December 20, 2016

2012 BCBC - Plasti-Fab EPS Product Solutions

2012 British Columbia Building Code (2012 BCBC), Section 9.36, **Energy Efficiency**, 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. This bulletin summarizes Plasti-Fab® expanded polystyrene (EPS) product solutions for use in building assemblies complying with 2012 BCBC, Section 9.36.2.

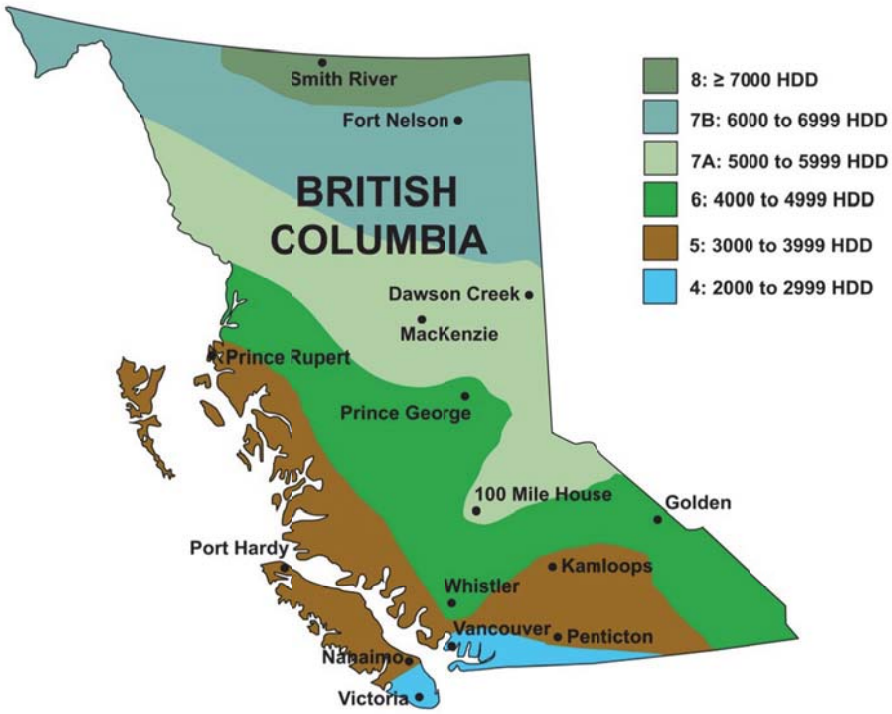

Figure 1: 2012 BCBC Climate Zones Map

Table 1 – 2012 BCBC, Division B, Appendix C, Heating Degree Days (HDD) for Building Locations

Zone 4		Zone 5		Zone 6		Zone 7a		Zone 7b	
Location	HDD	Location	HDD	Location	HDD	Location	HDD	Location	HDD
Victoria	2650	Nanaimo	3000	Whistler	4180	100 Mile House	5030	Beaton River	6300
Chilliwack	2780	Penticton	3350	Cranbrook	4400	Mackenzie	5550	Dease Lake	6730
Abbotsford	2860	Kamloops	3450	Prince George	4720	Fort St. John	5750	Fort Nelson	6710
Vancouver	2950	Prince Rupert	3900	Golden	4750	Glacier	5800		

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Printed in Canada

Effective thermal resistance (RSI_{eff}/R_{eff}) of building assemblies calculated using the formula below includes the effect of thermal bridging due to repetitive structural members such as wood framing members in walls.

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

Table 2 provides minimum RSI_{eff} (R_{eff}) from 2012 BCBC for above grade wall applications.

Table 2 – 2012 BCBC RSI_{eff} (R_{eff}) for Above Grade Walls

Climate Zone	Table 9.36.2.6.A. – Without HRV		Table 9.36.2.6.B. – With HRV	
	RSI_{eff}	R_{eff}	RSI_{eff}	R_{eff}
4	2.78	15.8	2.78	15.8
5	3.08	17.5	2.97	16.9
6	3.08	17.5	2.97	16.9
7a	3.08	17.5	2.97	16.9
7b	3.85	21.9	3.08	17.5
8	3.85	21.9	3.08	17.5

Table 3 provides Plasti-Fab EPS product solutions that can be used to meet 2012 BCBC minimum RSI_{eff} (R_{eff}) requirements for above grade wall applications.

Table 3 - Plasti-Fab EPS Product Solutions for Above Grade Walls

Plasti-Fab Wall Option Description	2012 BCBC Climate Zone	Minimum RSI_{eff} (R_{eff})	Base Wall RSI_{eff} (R_{eff})[1]	RSI (R) Plasti-Fab Solution
Wall Options with Plasti-Fab Continuous EPS Insulating Sheathing[2]				
Option A – without HRV Base wall - 2 x 4 wood studs @ 406 mm (16") on center with RSI-2.29 (R-13) cavity insulation	4	2.78 (15.8)	1.90 (10.8)	0.88 (5.0)
	5 to 7a	3.08 (17.5)		1.18 (6.7)
	7b to 8	3.85 (21.9)		1.95 (11.1)
Option B – With HRV Base wall as per Option A	4	2.78 (15.8)	1.90 (10.8)	0.88 (5.0)
	5 to 7a	2.97 (16.9)		1.07 (6.1)
	7b to 8	3.08 (17.5)		1.18 (6.7)
Option C – Without HRV Base wall - 2 x 6 wood studs @ 406 mm (16") on center with RSI-3.34 (R-19) cavity insulation	7b to 8	3.85 (21.9)	2.68 (15.2)	1.17 (6.7)[3]
Wall Options with Plasti-Fab Building Systems				
Option E: With or Without HRV Advantage ICF System® wall – see Advantage ICF System PIB 222 for RSI_{eff}/R_{eff} calculated per note 4	4 to 8	3.85 (21.9)	NA	4.14 (23.5)
Option F: Without HRV Insulspan® SIP System (6 ½" SIP) – see Insulspan SIP System PIB 217 for RSI_{eff}/R_{eff} calculated per note 4	4 to 8	3.08 (17.5)	NA	3.42 (19.4)
Option G: Without HRV Insulspan SIP System (8 ¼" SIP) – see Insulspan SIP System PIB 217 for RSI_{eff}/R_{eff} calculated per note 4	7b to 8	3.85 (21.9)	NA	4.32 (24.5)

1. Base wall RSI_{eff} (R_{eff}) calculations include the contribution from wood studs with cavity insulation plus continuous elements other than Plasti-Fab EPS insulation – i.e., outside air film, cladding, gypsum board and inside air film.
2. Determine Plasti-Fab EPS insulation thickness based upon RSI/R-values for Plasti-Fab EPS options in Table 6.
3. DuroFoam and DuroFoam Plus insulations are manufactured with a laminated film on each face and have a vapour permeance characteristic less than 60 ng/Pa•s•m^2. When applied as exterior insulating sheathing, the minimum RSI (R) for these insulation options in Climate Zone 8 would be RSI-1.28 (R-7.3) to meet the minimum ratio of outboard to inboard insulation per 2012 BCBC, Article 9.25.5.2.
4. RSI(R) in table 3 is RSI_{eff}/R_{eff} for wall systems built with Plasti-Fab building system noted.

Table 4 provides minimum RSI_{eff} (R_{eff}) from 2012 BCBC for below-grade wall applications.

Table 4 – 2012 BCBC RSI_{eff} (R_{eff}) for Below-Grade Foundation Walls

Climate Zone	Table 9.36.2.8.A. – Without HRV		Table 9.36.2.8.B. – With HRV	
	RSI_{eff}	R_{eff}	RSI_{eff}	R_{eff}
4	1.99	11.3	1.99	11.3
5	2.98	16.9	2.98	16.9
6	2.98	16.9	2.98	16.9
7a	3.46	19.6	2.98	16.9
7b	3.46	19.6	2.98	16.9
8	3.97	22.5	2.98	16.9

Table 5 provides Plasti-Fab EPS product solutions that can be used to meet 2012 BCBC minimum RSI_{eff} (R_{eff}) requirements for below-grade wall applications.

Table 5 - Plasti-Fab EPS Product Solutions for Below-Grade Foundation Walls

Plasti-Fab Wall Option Description	2012 BCBC Climate Zone	Minimum RSI_{eff} (R_{eff})	Base Wall RSI_{eff} (R_{eff})[1]	RSI (R) Plasti-Fab Solution
Wall Options with Plasti-Fab Continuous EPS Interior or Exterior Insulation[2]				
Option A – Without HRV Base wall – 2 x 3 wood studs @ 610 mm (24") on center	4	1.99 (11.3)	0.35 (2.0)	1.64 (9.3)
	5 to 6	2.98 (16.9)		2.63 (14.9)
	7a to 7b	3.46 (19.6)		3.11 (17.6)
	8	3.97 (22.5)		3.62 (20.5)
Option B – Without HRV Base wall – 2 x 4 wood studs @ 610 mm (24") on center with RSI-2.11 (R-12) cavity insulation	5 to 6	2.98 (16.9)	1.99 (11.3)	0.99 (5.6)
	7a to 7b	3.46 (19.6)		1.47 (8.3)
	8	3.97 (22.5)		1.98 (11.2)
Option C – Without HRV Base wall – 2 x 6 wood studs @ 610 mm (24") on center with RSI-3.34 (R-19) cavity insulation	7a to 7b	3.46 (19.6)	2.97 (16.9)	0.49 (2.7)
	8	3.97 (22.5)		1.00 (5.6)
Option D – With HRV Base wall – 2 x 3 wood studs @ 610 mm (24") on center	4	1.99 (11.3)	0.35 (2.0)	1.64 (9.3)
	5 to 8	2.98 (16.9)		2.63 (14.9)
Option E: With HRV Base wall – 2 x 4 wood studs @ 610 mm (24") on center with RSI-2.11 (R-12) cavity insulation	5 to 8	2.98 (16.9)	1.99 (11.3)	0.99 (5.6)
Wall Options with Plasti-Fab Building System				
Option F: With or Without HRV Advantage ICF System® wall – see Advantage ICF System PIB 222 for RSI_{eff}/R_{eff} calculated per note 3	4 to 8	3.97 (22.5)	NA	4.00 (22.7)

1. Base wall RSI_{eff} (R_{eff}) calculation include contribution from framed portion of wall plus continuous elements other than Plasti-Fab EPS insulation – i.e. concrete foundation wall, gypsum board and inside air film.
2. Determine Plasti-Fab EPS insulation thickness based upon RSI/R-values for Plasti-Fab EPS options in Table 6.
3. RSI(R) in table 5 is RSI_{eff}/R_{eff} for wall system built with Advantage ICF System.

Table 6 – RSI (R-value) Plasti-Fab Continuous EPS Insulation Options

Plasti-Fab Continuous EPS Insulation Option	RSI (R) Unit of Thickness
PlastiSpan® or DuroFoam® insulation	RSI-0.65 per 25 mm (R-3.75 per inch)
PlastiSpan HD or DuroFoam Plus insulation	RSI-0.70 per 25 mm (R-4.04 per inch)
EnerSpan® insulation	RSI-0.82 per 25 mm (R-4.7 per inch)

Table 7 provides minimum RSI_{eff} (R_{eff}) from 2012 BCBC for floors in contact with the ground.

Table 7 – 2012 BCBC RSI_{eff} (R_{eff}) for Floors in Contact with the Ground

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
	Minimum RSI_{eff} - m^2•°C/W (R_{eff} - ft^2•hr•°F/BTU)					
Unheated Floors above frost Line	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)
Heated Floors	2.32 (13.2)	2.32 (13.2)	2.32 (13.2)	2.84 (16.1)	2.84 (16.1)	2.84 (16.1)

Table 8 provides Plasti-Fab EPS product solutions that can be used to meet 2012 BCBC minimum RSI_{eff} (R_{eff}) requirements for floor slab applications.

Table 8 - Plasti-Fab EPS Product Solutions for Floors in Contact with the Ground

Plasti-Fab Option Description	2012 BCBC Climate Zone	Minimum RSI_{eff} (R_{eff})[1]	Plasti-Fab EPS Insulation Min. RSI (R)[2]
Options with Plasti-Fab EPS Insulation			
Option A – Unheated Slab Above Frost Line[3] Plasti-Fab EPS insulation between 2 x 3 wood nailers @ 610 mm (24") on center above slab	4 to 8	1.96 (11.1)	1.83 (10.4)
Option B – Unheated Slab Above Frost Line[4] Plasti-Fab EPS insulation below slab	4 to 8	1.96 (11.1)	1.76 (10.0)
Option C – Heated Slab[5] Plasti-Fab continuous EPS insulation below slab	4 to 6	2.32 (13.2)	2.12 (12.0)
Option D – Heated Slab[5] Plasti-Fab continuous EPS insulation below slab	7a to 8	2.84 (16.1)	2.64 (15.0)

1. RSI_{eff} (R_{eff}) calculations include:
   a. Contribution from wood nailers with Plasti-Fab EPS insulation for above slab option plus continuous elements in assembly – i.e., concrete floor slab, floor sheathing and inside air film.
   b. Contribution from continuous Plasti-Fab EPS insulation below slab plus other continuous elements in assembly – i.e., concrete floor slab and inside air film.
2. Determine Plasti-Fab EPS insulation thickness based upon RSI/R-values for Plasti-Fab EPS options in Table 9.
3. Unheated slabs above the frost line shall be insulate within the wooden sleepers below the floor for a distance not less than 1.2 m (4 ft) horizontally from the perimeter of the slab
4. Unheated slabs above the frost line shall be insulated beneath the slab for a distance not less than 1.2 m (4 ft) horizontally from the perimeter of the slab with a thermal break along the edge of the slab.
5. Floors-on-ground with embedded heating ducts, cables or pipes (heated slabs) shall be insulated to the effective thermal resistance under their full bottom surface including the edges.

Table 9 – RSI (R-value) Plasti-Fab EPS Insulation Options

Plasti-Fab EPS Insulation Option	RSI (R) Unit of Thickness
PlastiSpan® or DuroFoam® insulation	RSI-0.65 per 25 mm (R-3.75 per inch)
PlastiSpan HD or DuroFoam Plus insulation	RSI-0.70 per 25 mm (R-4.04 per inch)
EnerSpan® insulation	RSI-0.82 per 25 mm (R-4.7 per inch)
Radon Guard™ insulation[1]	RSI-0.70 per 25 mm (R-4.04 per inch)

1. Note Radon Guard insulation applicable for below slab insulation options. In addition to providing required thermal insulation, Radon Guard insulation is used as a component in a Radon mitigation system – for additional information see Plasti-Fab Product Information Bulletin 294.