

Product Information Bulletin

2014 ABC - Plasti-Fab EPS Product Solutions

Alberta Building Code 2014 (ABC 2014), 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 m² and used for major occupancies classified as residential occupancies. This bulletin summarizes Plasti-Fab® expanded polystyrene (EPS) product solutions for building assemblies complying with ABC 2014, 9.36.2.

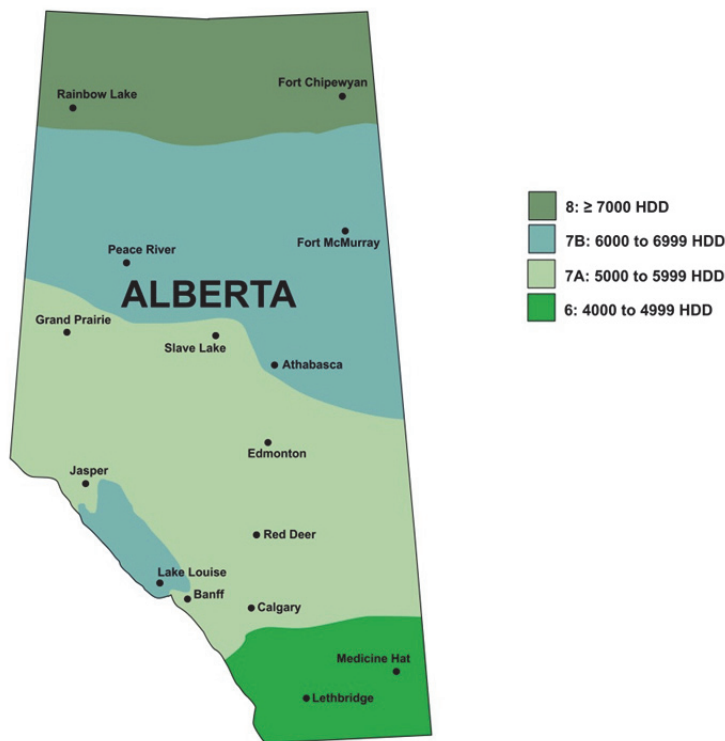


Figure 1 - ABC 2014 Climate Zone Map

Table 1 – ABC 2014, Division B, Appendix C, Heating Degree Days (HDD) 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 Chipewyan	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		

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.

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

Table 2 provides minimum RSI_{eff} (R_{eff}) from ABC 2014 for above grade wall applications.

Table 2 – ABC 2014 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}
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 examples of Plasti-Fab EPS product solutions that can be used to meet the above ABC 2014 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	ABC 2014 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 Sheathing²				
Option A – without HRV Base wall - 2 x 4 wood studs @ 406 mm (16") on center with RSI-2.29 (R-13) cavity insulation	6 to 7A	3.08 (17.5)	1.90 (10.8)	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	6 to 7A	2.97 (16.9)	1.90 (10.8)	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	6 to 8	3.85 (21.9)	NA	4.14 (23.5)
Option F: With or Without HRV Insulspan [®] SIP System (6 ½" SIP) – see Insulspan SIP System PIB 221 for RSI_{eff}/R_{eff} calculated per note 4	6 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 221 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•m². 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 ABC 2014, 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 the ABC 2014 for below-grade wall applications.

Table 4 – ABC 2014 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}
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 the above 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	ABC 2014 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 Insulation²				
Option A – Without HRV Base wall – 2 x 3 wood studs @ 610 mm (24") on center	6	2.98 (16.9)	0.35 (2.0)	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	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	6 to 8	2.98 (16.9)	0.35 (2.0)	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	6 to 8	2.98 (16.9)	1.99 (11.3)	0.99 (5.6)
Wall Option 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	6 to 8	3.97 (22.5)	NA	4.00 (22.7)

1. Base wall RSI_{eff} (R_{eff}) calculations 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 insulation thickness based upon RSI/R-values for Plasti-Fab EPS insulation 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 ABC 2014 for floors in contact with the ground.

**Table 7 – ABC 2014, Tables 9.36.2.8.A. & 9.36.2.8.B.
 RSI_{eff} (R_{eff}) for Floors in Contact with the Ground**

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
	Minimum $RSI_{eff} - m^2 \cdot ^\circ C/W$ ($R_{eff} - ft^2 \cdot hr \cdot ^\circ F/ BTU$)			
Unheated Floors above frost Line	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)	1.96 (11.1)
Heated Floors	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 the above 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	2014 ABC Climate Zone	Minimum RSI_{eff} (R_{eff}) ¹	Plasti-Fab EPS Insulation Min. RSI (R) ^{2,3}
Options with Plasti-Fab EPS Insulation			
Option A – Unheated Slab Above Frost Line⁴ Plasti-Fab EPS insulation between 2 x 3 wood nailers @ 610 mm (24") on center above slab	6 to 8	1.96 (11.1)	1.83 (10.4)
Option B – Unheated Slab Above Frost Line⁵ Plasti-Fab EPS insulation below slab	6 to 8	1.96 (11.1)	1.76 (10.0)
Option C – Heated Slab⁶ Plasti-Fab continuous EPS insulation below slab	6	2.32 (13.2)	2.12 (12.0)
Option D – Heated Slab⁶ Plasti-Fab continuous EPS insulation below slab	7A to 8	2.84 (16.1)	2.64 (15.0)

- RSI_{eff} (R_{eff}) calculations include:
 - 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.
 - Contribution from continuous Plasti-Fab EPS insulation below slab plus other continuous elements in assembly – i.e., concrete floor slab and inside air film.
- Alberta Building Code Variance 14-BCV-019 clarifies that it does not remove insulation requirements for heated floors as per Article 9.36.2.8. of the ABC 2014, however, a variance was issued to allow, as an alternative, the following under-slab insulation for hydronic or radiant heating:
 - A minimum RSI 0.88 (R-5) under slab insulation is in compliance when installed for a heated floor in contact with the ground where the floor is fully below frost line.
 - A minimum RSI 1.32 (R 7.5) under slab insulation is in compliance when installed for a heated floor in contact with the ground where the floor is above the frost line.
- Determine insulation thickness based upon RSI/R-values for Plasti-Fab EPS insulation options in Table 6. **Radon Guard** insulation may also be used under slab insulation. In addition to providing required thermal resistance, **Radon Guard** insulation is used as a component in a Radon mitigation system – for additional information see Plasti-Fab Product Information Bulletin 294.
- Unheated slabs above the frost line shall be insulated 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
- 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.
- 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.