

# Product Information Bulletin

## NBC 2015 - Saskatchewan Plasti-Fab EPS Product Solution

National Building Code of Canada 2015 (NBC 2015), Section 9.36., **Energy Efficiency**, came into force in Saskatchewan for any building permit issued on or after January 1, 2019. NBC 2015, Section 9.36. provides energy efficiency requirements for buildings 3 storeys or less in building height, having a building area not exceeding 600 m<sup>2</sup> 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 NBC 2015, Section 9.36.2. for Saskatchewan building locations.

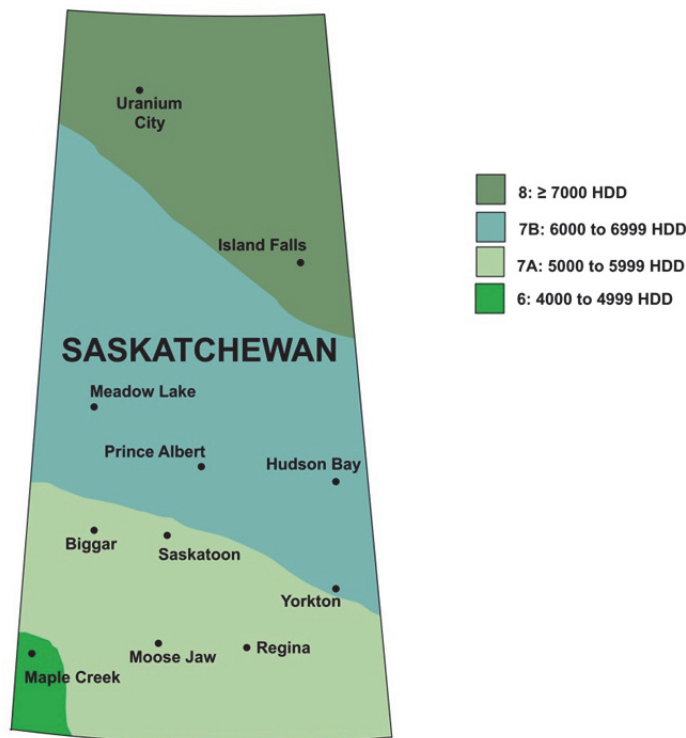


Figure 1: Saskatchewan Climate Zone Map

Table 1 – NBC 2015, Division B, Appendix C, Heating Degree Days (HDD) for Building Locations

Zone 7a		Zone 7b		Zone 8	
Location	HDD	Location	HDD	Location	HDD
Moose Jaw	5270	Yorkton	6000	Island Falls	7100
Regina	5600	Prince Albert	6100	Uranium City	7500
Saskatoon	5700	Hudson Bay	6280		
Biggar	5720	Nipawin	6300		

**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 NBC 2015 for above grade wall applications applicable to Saskatchewan Climate Zone locations per Table 1.

**Table 2 – NBC 2015  $RSI_{eff}$  ( $R_{eff}$ ) for Above Grade Walls**

Climate Zone	Table 9.36.2.6.-A – Without HRV		Table 9.36.2.6.-B – With HRV	
	$RSI_{eff}$	$R_{eff}$	$RSI_{eff}$	$R_{eff}$
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 NBC 2015 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	NBC 2015 Climate Zone	Minimum $RSI_{eff}$ ( $R_{eff}$ )	Base Wall $RSI_{eff}$ ( $R_{eff}$ ) <sup>1</sup>	RSI (R) Plasti-Fab Solution
<b>Wall Options with Plasti-Fab Continuous EPS Insulating Sheathing<sup>2</sup></b>				
<b>Option A – without HRV</b> Base wall - 2 x 4 wood studs @ 406 mm (16") on center with RSI-2.29 (R-13) cavity insulation	7a	3.08 (17.5)	1.90 (10.8)	1.18 (6.7)
	7b to 8	3.85 (21.9)		1.95 (11.1)
<b>Option B – With HRV</b> Base wall as per Option A	7a	2.97 (16.9)	1.90 (10.8)	1.07 (6.1)
	7b to 8	3.08 (17.5)		1.18 (6.7)
<b>Option C – Without HRV</b> 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) <sup>3</sup>
<b>Wall Options with Plasti-Fab EPS Building Systems</b>				
<b>Option E: With or Without HRV</b> Advantage ICF System <sup>®</sup> wall – see Advantage ICF System PIB 222 for $RSI_{eff}/R_{eff}$ calculated per note 4	7a to 8	3.85 (21.9)	NA	4.14 (23.5)
<b>Option F: With or Without HRV</b> Insulspan <sup>®</sup> SIP System (6 1/2" SIP) – see Insulspan SIP System PIB 209 for $RSI_{eff}/R_{eff}$ calculated per note 4	7a to 8	3.08 (17.5)	NA	3.42 (19.4)
<b>Option G: Without HRV</b> Insulspan <sup>®</sup> SIP System (8 1/4" SIP) – see Insulspan SIP System PIB 209 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**, **DuroFoam Plus** and **DuroSpan GPS** insulations are manufactured with a laminated film on each face and have a vapour permeance characteristic less than 30 ng/Pa•s•m<sup>2</sup>. When applied as exterior insulating sheathing in Climate Zone 8, the minimum RSI (R) for these insulation options would be RSI-1.28 (R-7.3) to meet the minimum ratio of outboard to inboard insulation per NBC 2015, 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 NBC 2015 for below-grade wall applications.

**Table 4 – NBC 2015  $RSI_{eff}$  ( $R_{eff}$ ) of Below-Grade Foundation Walls**

Climate Zone	Table 9.36.2.8.-A – Without HRV		Table 9.36.2.8.-B – With HRV	
	$RSI_{eff}$	$R_{eff}$	$RSI_{eff}$	$R_{eff}$
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 examples of Plasti-Fab EPS product solutions that can be used to meet NBC 2015 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	NBC 2015 Climate Zone	Minimum $RSI_{eff}$ ( $R_{eff}$ )	Base Wall $RSI_{eff}$ ( $R_{eff}$ ) <sup>1</sup>	$RSI$ (R) Plasti-Fab Solution
<b>Wall Options with Plasti-Fab Continuous EPS Interior or Exterior Insulation<sup>2</sup></b>				
<b>Option A – Without HRV</b> Base wall – 2 x 3 wood studs @ 610 mm (24") on center	7a to 7b	3.46 (19.6)	0.35 (2.0)	3.11 (17.6)
	8	3.97 (22.5)		3.62 (20.5)
<b>Option B – Without HRV</b> Base wall – 2 x 4 wood studs @ 610 mm (24") on center with RSI-2.11 (R-12) cavity insulation	7a to 7b	3.46 (19.6)	1.99 (11.3)	1.47 (8.3)
	8	3.97 (22.5)		1.98 (11.2)
<b>Option C – Without HRV</b> 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)
<b>Option D – With HRV</b> Base wall – 2 x 3 wood studs @ 610 mm (24") on center	7a to 8	2.98 (16.9)	0.35 (2.0)	2.63 (14.9)
<b>Option E: With HRV</b> Base wall – 2 x 4 wood studs @ 610 mm (24") on center with RSI-2.11 (R-12) cavity insulation	7a to 8	2.98 (16.9)	1.99 (11.3)	0.99 (5.6)
<b>Wall Options with Plasti-Fab Building System</b>				
<b>Option F: With or Without HRV</b> Advantage ICF System <sup>®</sup> wall – see Advantage ICF System PIB 222 for $RSI_{eff}/R_{eff}$ calculated per note 3	7a to 8	3.97 (22.5)	NA	4.00 (22.7)

1. Base wall  $RSI_{eff}$  ( $R_{eff}$ ) calculations include the 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
<b>PlastiSpan<sup>®</sup></b> or <b>DuroFoam<sup>®</sup></b> insulation	$RSI$ -0.65 per 25 mm (R-3.75 per inch)
<b>PlastiSpan HD</b> or <b>DuroFoam Plus</b> insulation	$RSI$ -0.70 per 25 mm (R-4.04 per inch)
<b>DuroSpan<sup>®</sup> GPS</b> insulation	$RSI$ -0.82 per 25 mm (R-4.7 per inch)
<b>EnerSpan<sup>®</sup></b> insulation	$RSI$ -0.82 per 25 mm (R-4.7 per inch)

Table 7 provides minimum  $RSI_{eff}$  ( $R_{eff}$ ) from NBC 2015 for floors in contact with the ground.

**Table 7 – NBC 2015  $RSI_{eff}$  ( $R_{eff}$ ) for Floors in Contact with the Ground**

Climate Zones	Zone 7a	Zone 7b	Zone 8
Heating Degree-Days (HDD) Celsius Degree-Days	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)
Heated Floors	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 NBC 2015 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	NBC 2015 Climate Zone	Minimum $RSI_{eff}$ ( $R_{eff}$ ) <sup>1</sup>	Plasti-Fab EPS Insulation Min. RSI (R) <sup>2</sup>
<b>Options with Plasti-Fab EPS Insulation</b>			
<b>Option A – Unheated Slab Above Frost Line<sup>3</sup></b> Plasti-Fab EPS insulation between 2 x 3 wood nailers @ 610 mm (24") on center above slab	7a to 8	1.96 (11.1)	1.83 (10.4)
<b>Option B – Unheated Slab Above Frost Line<sup>4</sup></b> Plasti-Fab EPS insulation below slab	7a to 8	1.96 (11.1)	1.76 (10.0)
<b>Option C – Heated Slab<sup>5</sup></b> Plasti-Fab continuous EPS insulation below slab	7a to 8	2.84 (16.1)	2.12 (12.0)

- $RSI_{eff}$  ( $R_{eff}$ ) 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.
- Determine Plasti-Fab EPS insulation thickness based upon RSI/R-values for Plasti-Fab EPS options in Table 9.
- 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.

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

Plasti-Fab EPS Insulation Option	RSI (R) Unit of Thickness
<b>PlastiSpan</b> <sup>®</sup> or <b>DuroFoam</b> <sup>®</sup> insulation	RSI-0.65 per 25 mm (R-3.75 per inch)
<b>PlastiSpan HD</b> or <b>DuroFoam Plus</b> insulation	RSI-0.70 per 25 mm (R-4.04 per inch)
<b>DuroSpan</b> <sup>®</sup> <b>GPS</b> insulation	RSI-0.82 per 25 mm (R-4.7 per inch)
<b>EnerSpan</b> <sup>®</sup> insulation	RSI-0.82 per 25 mm (R-4.7 per inch)
<b>Radon Guard</b> <sup>®</sup> insulation <sup>1</sup>	RSI-0.70 per 25 mm (R-4.04 per inch)

- 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.