Energy Code Requirements:
Ontario

STEELWAY BUILDING SYSTEMS

Introduction
With the introduction of updated energy codes and standards, such as the Canadian National Code for Buildings (NECB), provincial jurisdictions are enacting more stringent requirements on the thermal transmittance of building envelopes. Steelway Building Systems offers roof and wall assemblies that can be used as part of the solution required to determine over-all building compliance to the energy codes. It should be noted that the Owner/Builder/Engineer of Record that applies for the Building Permit is responsible for ensuring compliance to the energy codes. The thermal assemblies that follow only form part of this compliance. Other factors like the trade-off paths used, complete building energy modelling, HVAC equipment efficiency, building openings and other wall assemblies not supplied by Steelway, can affect the final compliance level achieved. This assessment must be done by a professional knowledgeable in the field of Building Energy Science and is not the responsibility of Steelway Building Systems.

Effective Thermal Transmittance
The tables below outline the minimum effective transmittance values (Usi) required by the SB-10 codes. To determine heating zone for various locations in Ontario, refer to Table 1.2 in the OBC 2012 for the Degree Days Below 18 C.

Example: Timmins, Ontario has 5940 Degree Days below 18 C. This falls under a Zone 7 (5000 to 6999) using the SB-10 Code.

SB-10 2012 Effective U values (si) (Ontario)
Overall Thermal Transmittance of Above-ground Opaque Building Assemblies

Above-ground Opaque Metal Building Assembly	Heating Degree-Days of Building Location in Celsius Degree-Days				
	Zone 4	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 6999	Zone 8 ≥6999
	Maximum Overall Thermal Transmittance Usi in W/(m²•K)				
Walls	n/a	0.300	0.300	0.300	n/a
Roofs	n/a	0.200	0.180	0.160	n/a

SB-10 2016 Effective U values (si) (Ontario)
Overall Thermal Transmittance of Above-ground Opaque Building Assemblies

Above-ground Opaque Metal Building Assembly	Heating Degree-Days of Building Location in Celsius Degree-Days				
	Zone 4	Zone 5 (A,B,C) HDD18<4000	Zone 6 (A,B) 4000≤HDD18<5000	Zone 7 HDD18≥5000	Zone 8
	Maximum Overall Thermal Transmittance Usi in W/(m²•K)				
Walls	n/a	0.256	0.256	0.225	n/a
Roofs	n/a	0.189	0.158	0.148	n/a

Effective Date: January 2017

Conversions
1/U = R (R or RSI); R = 0.176 RSI; RSI = 5.68 R

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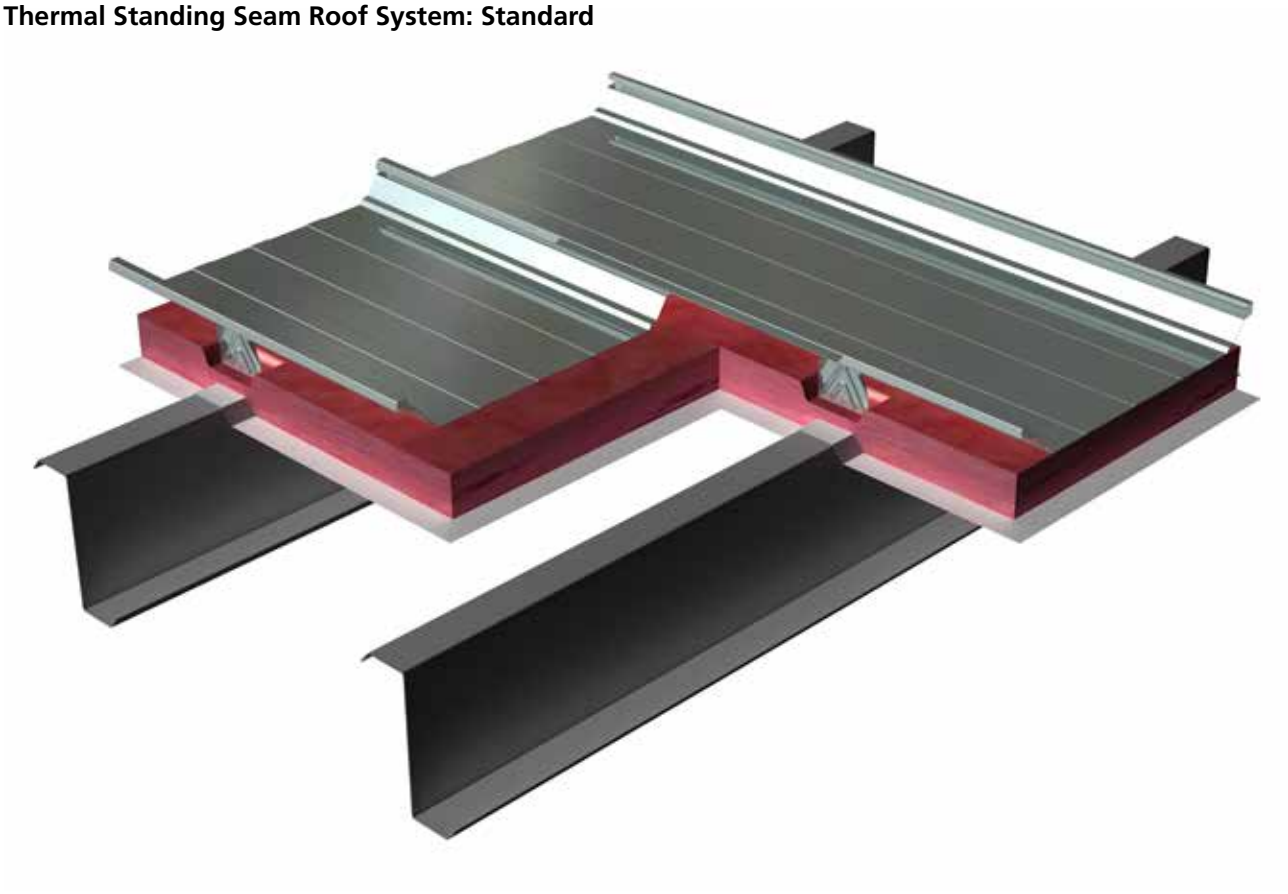
Thermal Standing Seam Roof System: Standard



Purlins at 5'-0", RTL-24 roof, faced insulation draped over purlins

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Effective Assembly U-Value W/(m^2K) (BTU/(hr•FT^2•°F)	Effective Assembly R-Value m^2K/W (hr•FT^2•°F/BTU)
RSI	R			
3.59	20	152 (6)	0.357 (0.063)	2.80 (R-15.9)
5.38	30	229 (9)**	0.289 (0.051)	3.46 (R-19.6)

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Minimum R5 (RSI 0.88) thermal block.
3. ** RTL-24 high clip (6") required.
4. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

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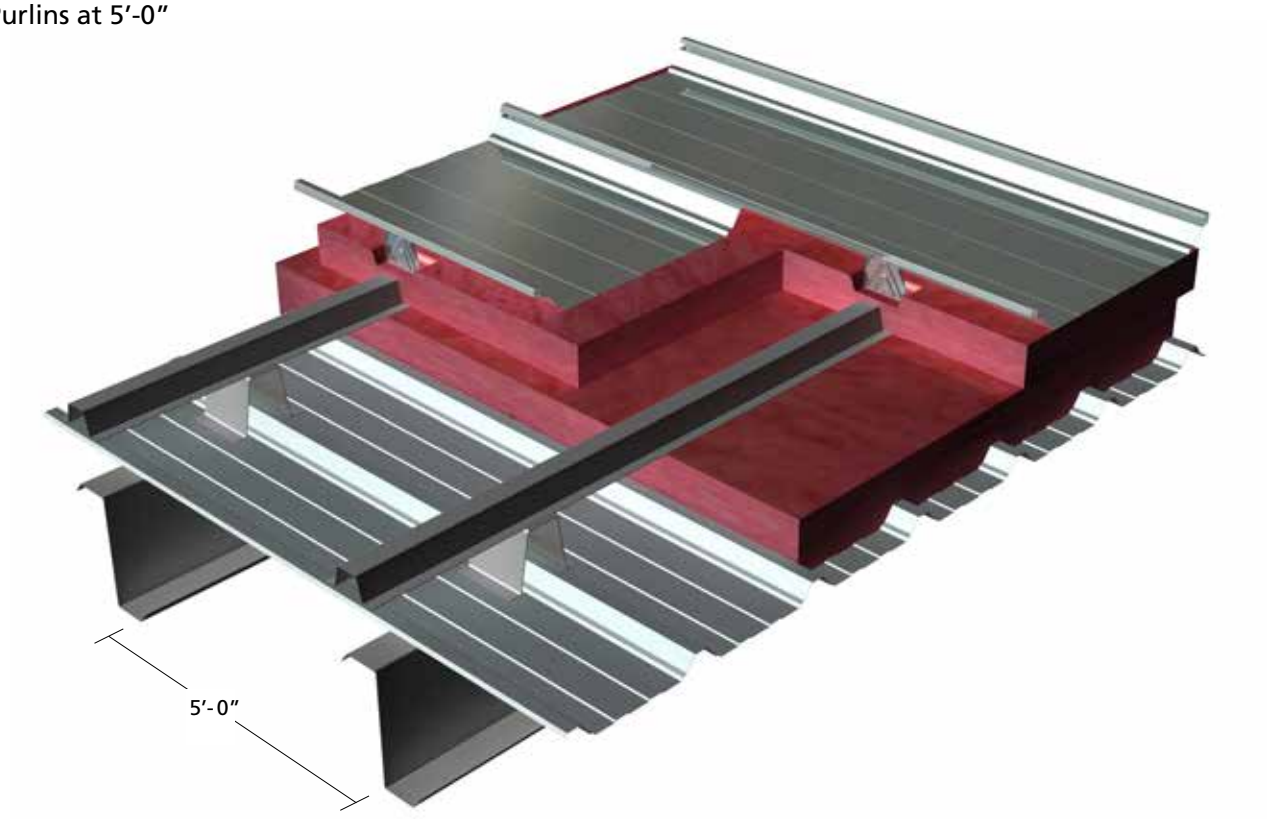
Thermal Standing Seam Roof System: Hat and Chair Stand-off
Purlins at 5’-0”

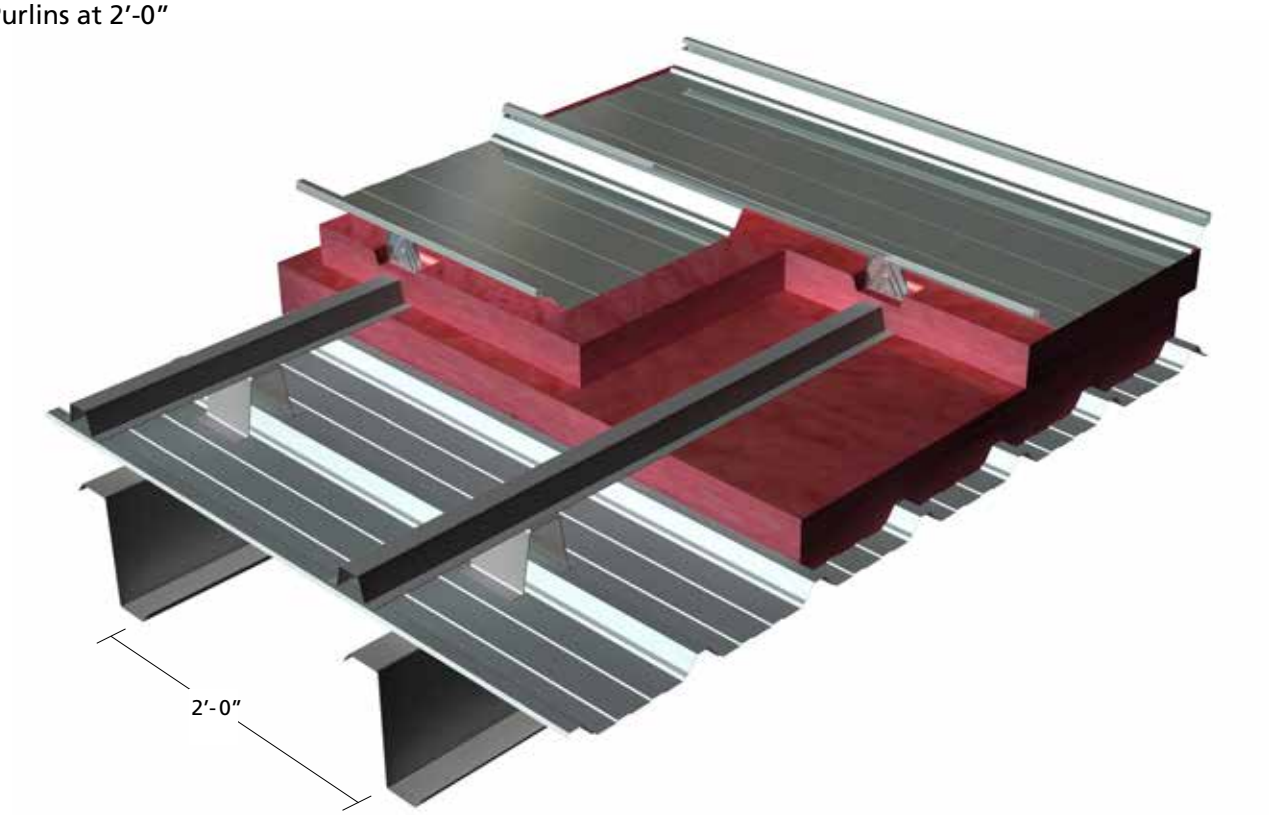


Purlins at 5’-0” with chairs spacing of 48” o/c, RTL-24 roof

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Chair Height mm (in)	Hat Height mm (in)	Effective Assembly U-Value W/(m²K) (BTU/(hr•FT²•°F)	Effective Assembly R-Value m²K/W (hr•FT²•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R							
6.16 (4.22 + 1.94)	35 (24 + 11)	254 (10)	178 (7)	50.8 (2)	0.202 (0.036)	4.95 (R-28.1)	5	None
6.76 (4.82 + 1.94)	38 (27 + 11)	279 (11)	203 (8)	50.8 (2)	0.183 (0.032)	5.45 (R-31.0)	5	5
7.40 (5.46 + 1.94)	42 (31 + 11)	305 (12)	229 (9)	50.8 (2)	0.170 (0.030)	5.87 (R-33.4)	6	5
8.63 (6.69 + 1.94)	49 (38 + 11)	356 (14)	279 (11)	50.8 (2)	0.154 (0.027)	6.51 (R-36.9)	7	6
9.86 (7.92 + 1.94)	56 (45 + 11)	406 (16)	330 (13)	50.8 (2)	0.142 (0.025)	7.04 (R-40)	7	7

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Minimum R5 (RSI 0.88) thermal block.
3. Standard 2” hat section height. 3” insulation R11 (RSI 1.94) over top of hat sections.
4. Effective U values for purlin spacing between modelled values may be extrapolated.
5. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

Thermal Standing Seam Roof System: Hat and Chair Stand-off
Purlins at 2'-0"



Purlins at 2'-0" with chairs spacing of 48" o/c, RTL-24 roof

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Chair Height mm (in)	Hat Height mm (in)	Effective Assembly U-Value W/(m²K) (BTU/(hr•FT²•°F)	Effective Assembly R-Value m²K/W (hr•FT²•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R							
6.16 (4.22 + 1.94)	35 (24 + 11)	254 (10)	178 (7)	50.8 (2)	0.243 (0.043)	4.12 (R-23.4)	None	None
7.40 (5.46 + 1.94)	42 (31 + 11)	305 (12)	229 (9)	50.8 (2)	0.211 (0.037)	4.73 (R-26.9)	None	None
8.63 (6.69 + 1.94)	49 (38 + 11)	356 (14)	279 (11)	50.8 (2)	0.205 (0.036)	4.87 (R-27.7)	None	None
9.86 (7.92 + 1.94)	56 (45 + 11)	406 (16)	330 (13)	50.8 (2)	0.197 (0.035)	5.07 (R-28.8)	5	None

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Minimum R5 (RSI 0.88) thermal block.
3. Standard 2" hat section height. 3" insulation R11 (RSI 1.94) over top of hat sections.
4. Effective U values for purlin spacing between modelled values may be extrapolated.
5. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

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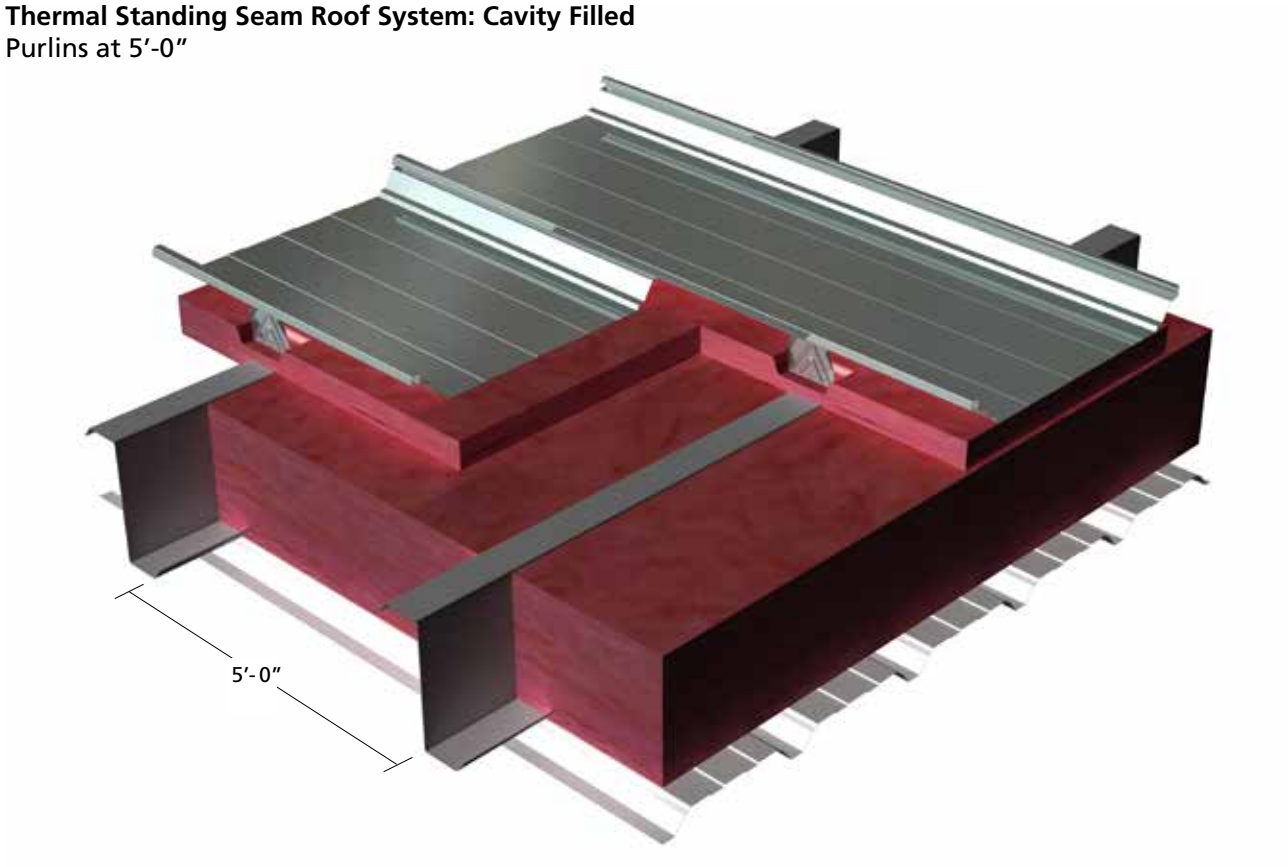
Thermal Standing Seam Roof System: Cavity Filled
Purlins at 5’-0”



Purlins at 5’-0”, RTL-24 roof with liner

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Purlin Height mm (in)	Effective Assembly U-Value W/(m²K) (BTU/(hr•FT²•°F)	Effective Assembly R-Value m²K/W (hr•FT²•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R						
6.34 (4.40 + 1.94)	36 (25 + 11)	279 (11)	203 (8)	0.228 (0.040)	4.38 (R-24.9)	None	None
7.74 (5.80 + 1.94)	44 (33 + 11)	330 (13)	254 (10)	0.203 (0.036)	4.92 (R-27.9)	None	None
8.63 (6.69 + 1.94)	49 (38 + 11)	381 (15)	305 (12)	0.183 (0.032)	5.46 (R-31.0)	5	5
*9.59 (6.69 + 2.90)	*52 (38 + 16.5)	*432 (17)	305 (12)	0.158 (0.028)	6.34 (R-36.0)	7	6

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Minimum R5 (RSI 0.88) thermal block.
3. Standard 3” Batt insulation R11 (RSI 1.94) over top of purlin sections.
4. Steel liner or Simple Saver underside of purlins.
5. Effective U values for purlin spacing between modelled values may be extrapolated.
6. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.
7. *RTL 6” High Clip used.

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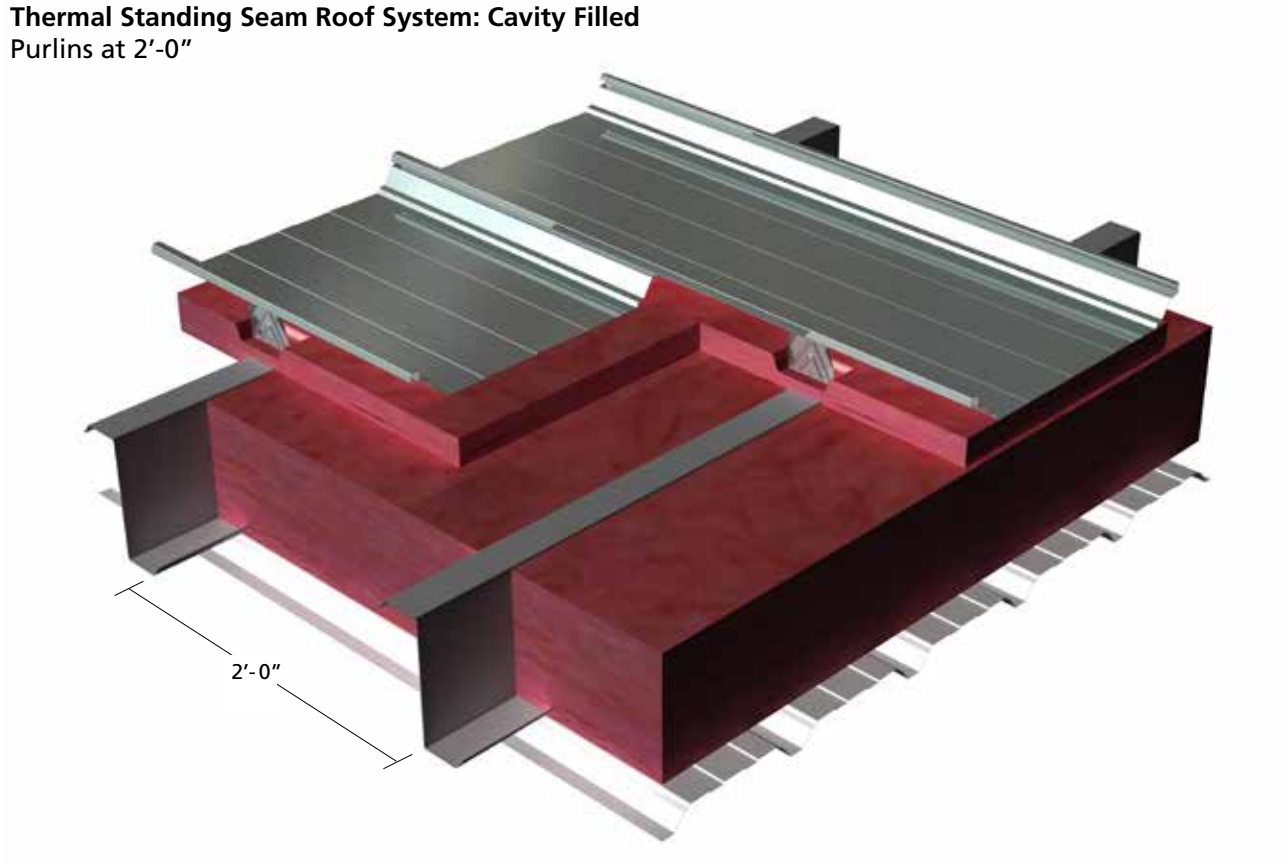
Thermal Standing Seam Roof System: Cavity Filled
Purlins at 2'-0"



Purlins at 2'-0", RTL-24 roof with liner

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Purlin Height mm (in)	Effective Assembly U-Value W/(m²K) (BTU/(hr•FT²•°F)	Effective Assembly R-Value m²K/W (hr•FT²•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R						
6.34 (4.40 + 1.94)	36 (25 + 11)	279 (11)	203 (8)	0.328 (0.058)	3.04 (R-17.3)	None	None
7.74 (5.80 + 1.94)	44 (33 + 11)	330 (13)	254 (10)	0.306 (0.054)	3.27 (R-18.6)	None	None
8.63 (6.69 + 1.94)	49 (38 + 11)	381 (15)	305 (12)	0.286 (0.050)	3.49 (R-19.8)	None	None
*9.59 (6.69 + 2.90)	*52 (38 + 16.5)	*432 (17)	305 (12)	0.239 (0.042)	4.18 (R-23.7)	None	None

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Minimum R5 (RSI 0.88) thermal block.
3. Standard 3" Batt insulation R11 (RSI 1.94) over top of purlin sections.
4. Steel liner or Simple Saver underside of purlins.
5. Effective U values for purlin spacing between modelled values may be extrapolated.
6. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.
7. *RTL 6" High Clip used.

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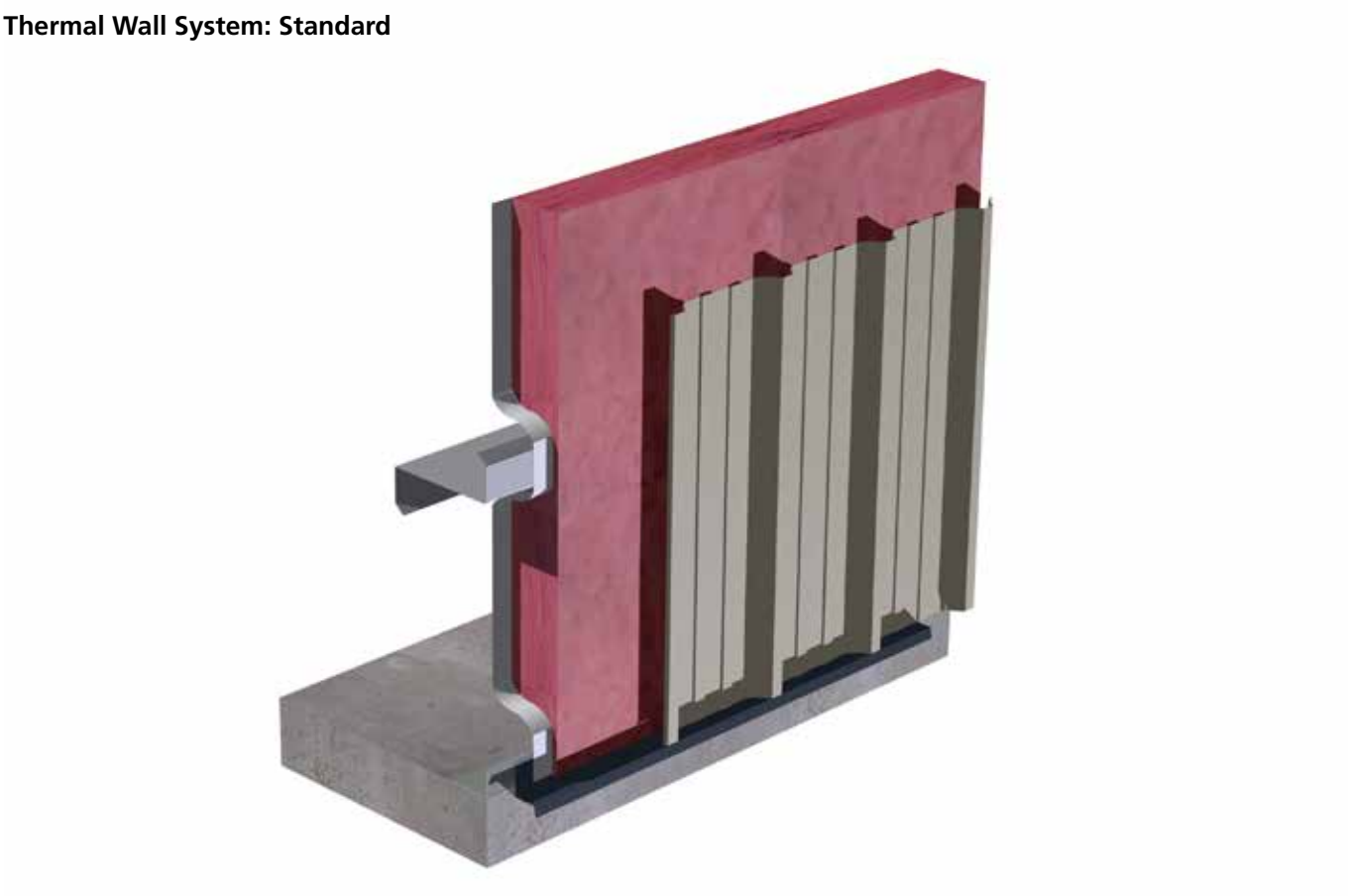
Thermal Wall System: Standard

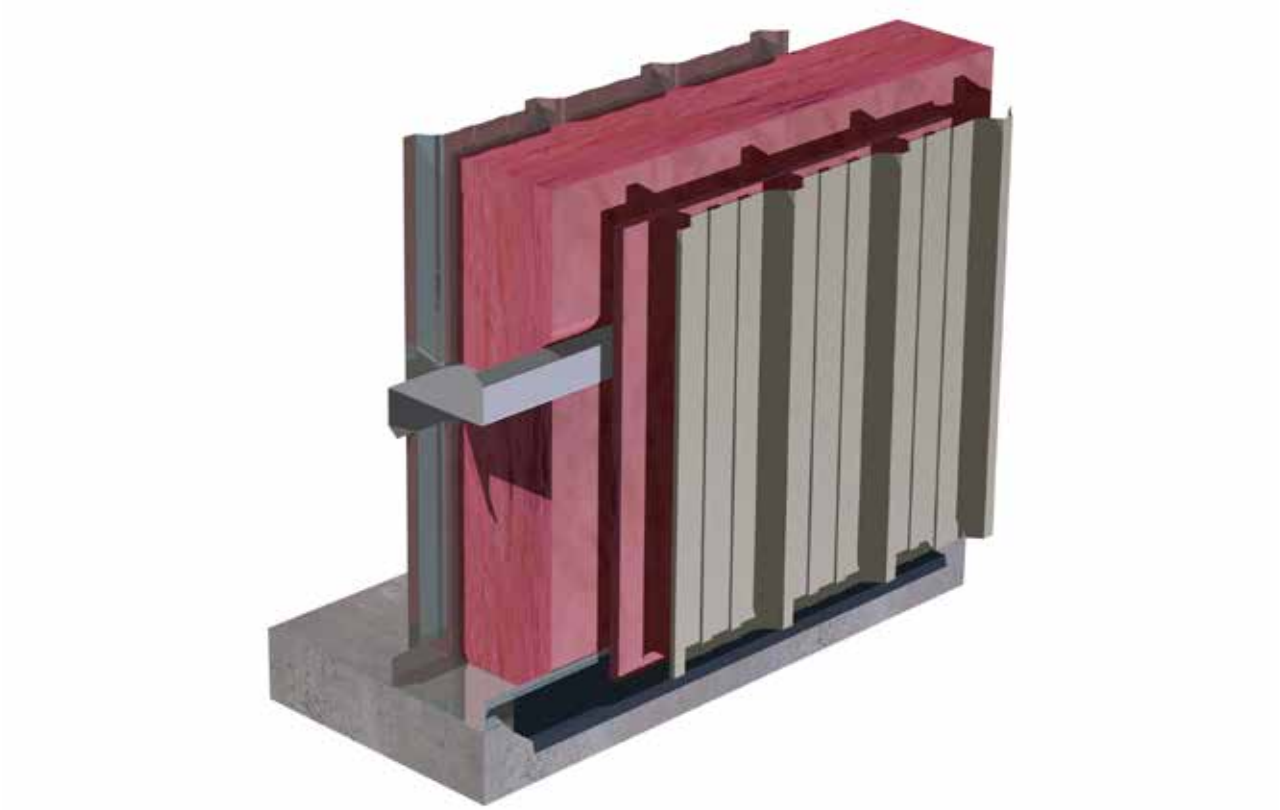


Girts at 5'-0" minimum, StormSeal panel with faced insulation draped outside wall girts

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Effective Assembly U-Value W/(m^2K) (BTU/(hr•FT^2•°F)	Effective Assembly R-Value m^2K/W (hr•FT^2•°F/BTU)
RSI	R			
3.35	19	152 (6)	0.480 (0.085)	2.08 (R-11.8)

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

Thermal Wall System: Cavity Filled - Narrow Rib Out

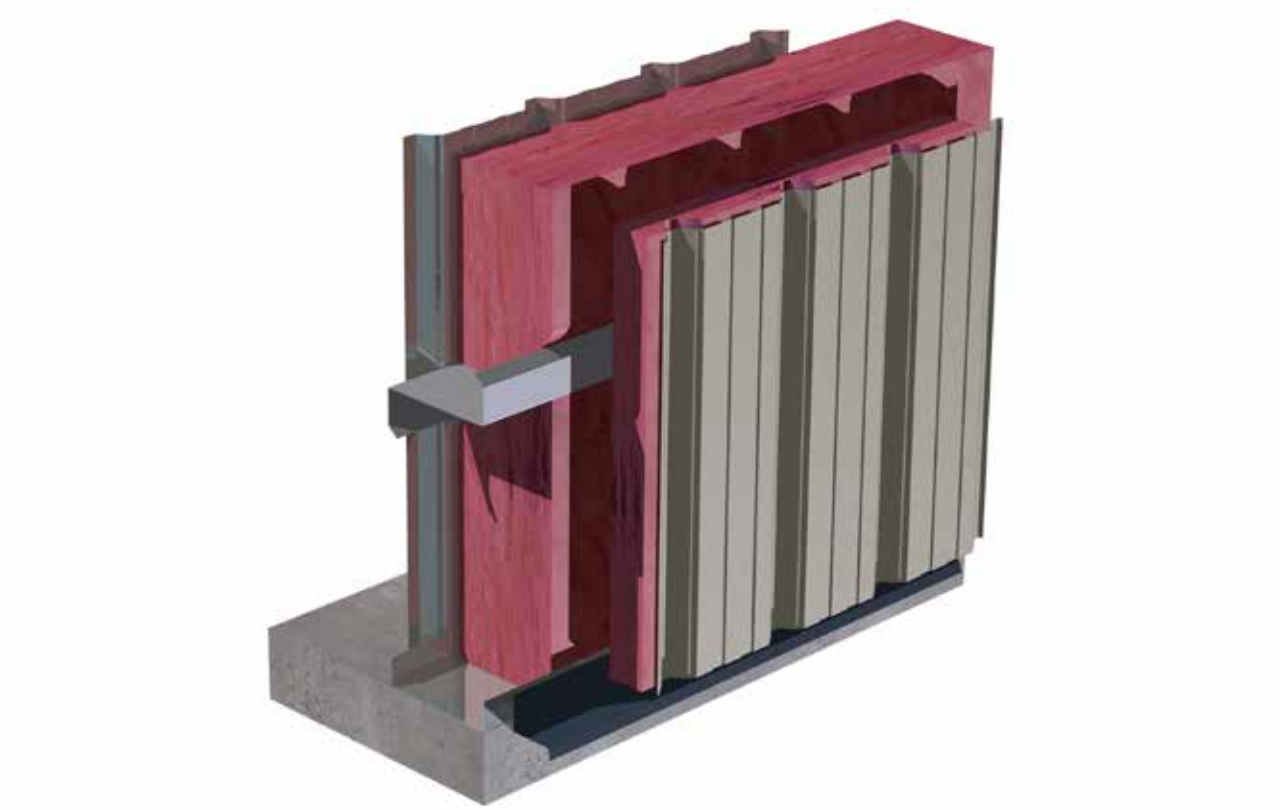


Girts at 5'-0" (minimum spacing), StormSeal exterior panels with interior liner

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Girt Depth mm (in)	Effective Assembly U-Value W/(m^2K) (BTU/(hr•FT^2•°F)	Effective Assembly R-Value m^2K/W (hr•FT^2•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R						
6.33 (4.40 + 1.93)	36 (25 + 11)	279 (11)	203 (8)	0.312 (0.055)	3.21 (R-18.2)	None	None
7.73 (5.80 + 1.93)	44 (33 + 11)	330 (13)	254 (10)	0.273 (0.048)	3.66 (R-20.8)	7	None
8.62 (6.69 + 1.93)	49 (38 + 11)	381 (15)	305 (12)	0.245 (0.043)	4.09 (R-23.2)	7	6

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Standard 3" Batt insulation R11 (RSI 1.94) over top of girt sections.
3. Steel liner inside of girts.
4. 5 mph exterior windspeed used in model.
5. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

Thermal Wall System: Cavity Filled - Wide Rib Out

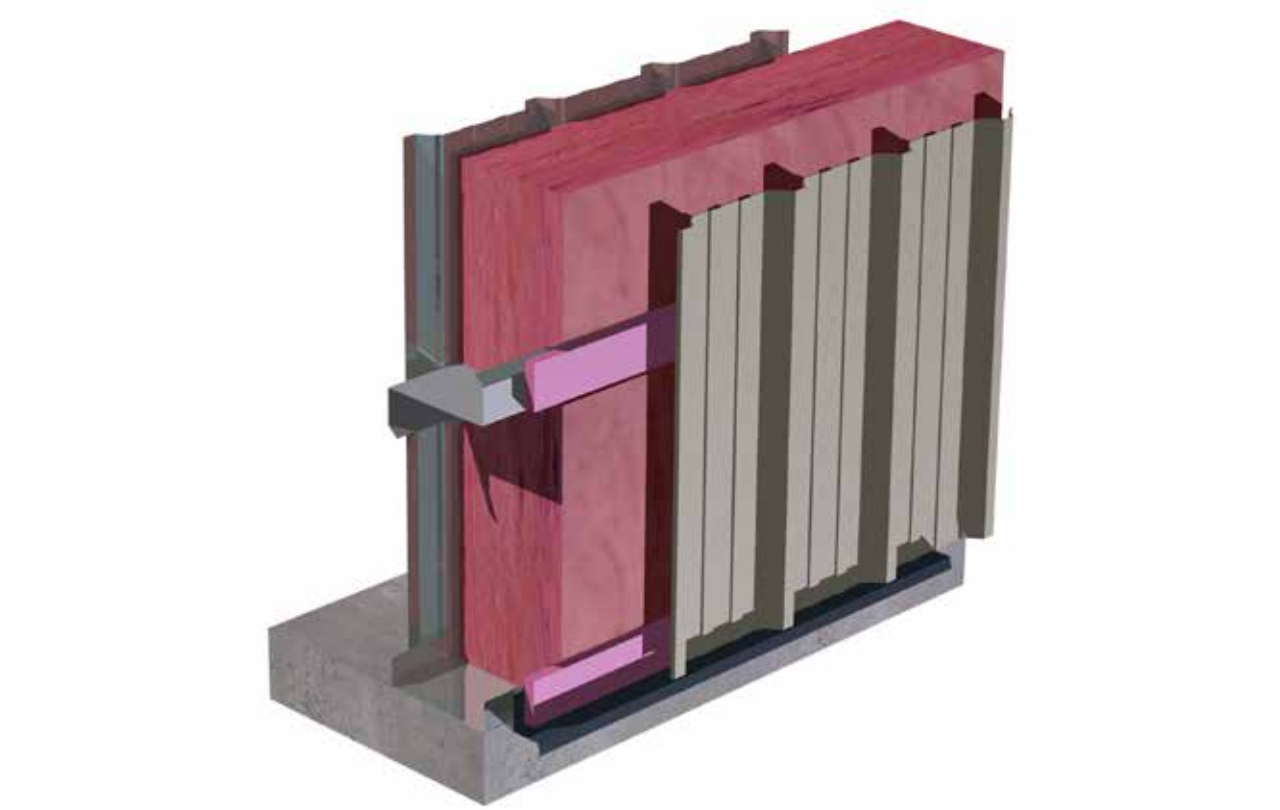


Girts at 5'-0" (minimum spacing), StormSeal exterior panels (wide rib out) with interior liner

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Girt Depth mm (in)	Effective Assembly U-Value W/(m²K) (BTU/(hr•FT²•°F)	Effective Assembly R-Value m²K/W (hr•FT²•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R						
6.33 (4.40 + 1.93)	36 (25 + 11)	279 (11)	203 (8)	0.255 (0.045)	3.93 (R-22.3)	7	6

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Standard 3" Batt insulation R11 (RSI 1.94) over top of girt sections.
3. Steel liner inside of girts.
4. 5 mph exterior windspeed used in model.
5. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

Thermal Wall System: Cavity Filled - 1" Thermal Blocks

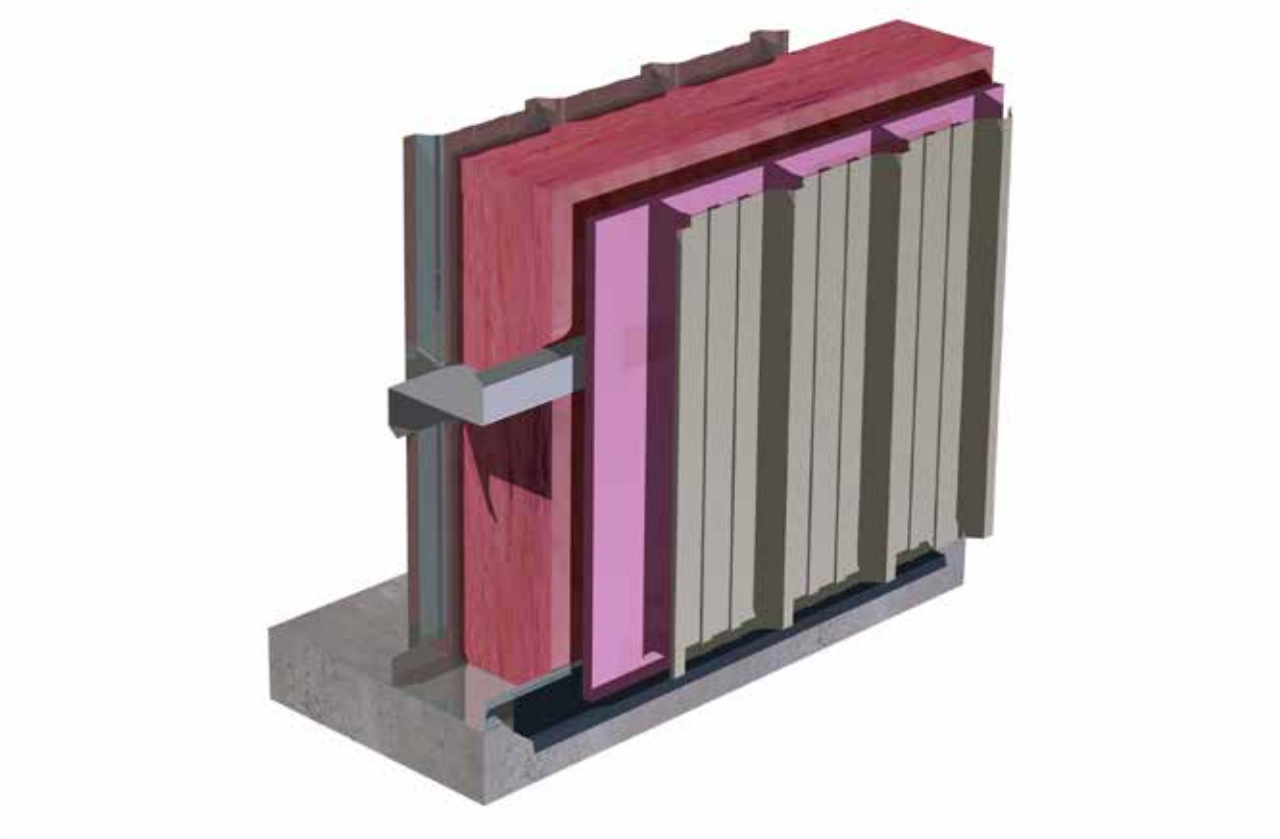


Girts at 5'-0" (minimum spacing), StormSeal exterior panels with interior liner

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Girt Depth mm (in)	Effective Assembly U-Value W/(m²K) (BTU/(hr•FT²•°F)	Effective Assembly R-Value m²K/W (hr•FT²•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R						
5.28	30	229 (9)	203 (8)	0.244 (0.043)	4.11 (R-23.3)	7	6
5.80	35.5	279 (11)	254 (10)	0.215 (0.038)	4.65 (R-26.4)	7	7

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Minimum R5 (RSI 0.88) thermal block.
3. Steel liner inside of girts.
4. 5 mph exterior windspeed used in model.
5. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

Thermal Wall System: Cavity Filled - 1" Rigid Board



Girts at 5'-0" (minimum spacing), StormSeal exterior panels with interior liner

Rated Value of Insulation (nominal)		Overall Insulation Thickness mm (in)	Girt Depth mm (in)	Effective Assembly U-Value W/(m^2K) (BTU/(hr•FT^2•°F)	Effective Assembly R-Value m^2K/W (hr•FT^2•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R						
6.16 (4.40 + 1.76)	R5 + 25	203 (8)	203 (8)	0.232 (0.041)	4.32 (R-24.5)	7	6

Notes:
1. Standard Batt insulation with average R3.4 (RSI 0.60) per inch.
2. Minimum R5 (RSI 0.88) ridge board insulation.
3. Steel liner inside of girts.
4. 5 mph exterior windspeed used in model.
5. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.

Thermal Wall System: Thermal Notched Zee Stand-off

Girts at 5'-0", StormSeal exterior panels with LinerSeal

Rated Value of Insulation (nominal)		Notched Thermal Zee Depth mm (in)	Effective Assembly U-Value W/(m²K) (BTU/(hr•FT²•°F)	Effective Assembly R-Value m²K/W (hr•FT²•°F/BTU)	Highest Zone Meet with SB-10 2012	Highest Zone Meet with SB-10 2016
RSI	R					
4.44	25	152 (6.0)	0.267 (0.047)	3.75 (R-21.3)	7	None
5.55	32	191 (7.5)	0.225 (0.040)	4.44 (R-25.2)	7	7
6.29	36	216 (8.5)	0.206 (0.036)	4.85 (R-27.6)	7	7

Notes:
1. Mineral wool insulation with average R4.2 (RSI 0.74) per inch.
2. 5 mph exterior windspeed used in model.
3. 3D Thermal modelling conducted by Morrison Hershfield using steel building components manufactured by Steelway Building Systems. Software validated as part of ASHRAE Research Project 1365-RP.