



OWENS CORNING® ENCLOSURE SOLUTIONS

ABOVE GRADE STEEL STUD WALL ASSEMBLIES

**ENCLOSURE SOLUTIONS THAT MEET ENERGY
CODE REQUIREMENTS TO REDUCE MATERIAL COSTS,
INCREASE LABOUR SAVINGS, AND ENHANCE
ACOUSTICAL PERFORMANCE**



The NEW Owens Corning® Thermafiber® RainBarrier® High Compressive continuous insulation series allows the attachment of metal cladding through the insulation with long screws, increasing the effectiveness of the exterior insulation. This requires less thickness to comply to overall RSI effective or U-Value for the assembly.

Thermafiber® RainBarrier® ci High Compressive 80
(RSI 0.74 per 25.4 mm)
For lightweight cladding attachment

Thermafiber® RainBarrier® ci High Compressive Plus 110
(RSI 0.73 per 25.4 mm)
For medium weight cladding attachment

Thermafiber® RainBarrier® ci High Compressive Max
(RSI 0.71 per 25.4 mm)
For heavyweight cladding attachment

Alternatively, use Owens Corning® Thermafiber® RainBarrier® 45 or HD for wall assemblies with standard Z-girts or thermally isolated clips used for metal cladding attachment.

Thermafiber® RainBarrier® 45
(RSI 0.74 per 25.4 mm)

Thermafiber® RainBarrier® HD
(RSI 0.74 per 25.4 mm)

Adding EcoTouch® PINK® FIBERGLAS® thermal batt insulation in the steel stud cavity can significantly reduce the required thickness of exterior continuous insulation.



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ENERGY EFFICIENCY REQUIREMENTS FOR COMMERCIAL BUILDINGS IN CANADA

2017 National Energy Code of Canada for Buildings

Above-Ground Opaque Building Assembly	Heating Degree-Days of Building Location, in Celsius Degree-Days							
			Zone 4 < 3,000	Zone 5 3,000 to 3,999	Zone 6 4,000 to 4,999	Zone 7A 5,000 to 5,999	Zone 7B 6,000 to 6,999	Zone 8 ≥ 7,000
	Maximum Overall Thermal Transmittance, in W/(m² - K)							
Walls	Max. U-Value	0.315	0.278	0.247	0.210	0.210	0.183	
	Min. R Effective	3.17	3.60	4.05	4.76	4.76	5.46	

ASHRAE 90.1; 2016/2019

Walls Above Grade (Steel-Framed)	
Zone	Maximum Assembly U (RSI)
	Non Residential
4	0.365
5	0.315
6	0.277
7	0.277
8	0.212

ENERGY EFFICIENCY REQUIREMENTS FOR COMMERCIAL BUILDINGS IN CANADA

Quebec Construction Code, Chapter I.1- Energy Efficiency of Buildings, and National Energy Code of Canada for Buildings 2015 (amended)

In effect June 27, 2020 with an 18 month transition period ending December 27, 2021

Above-Ground Opaque Building Assembly	Heating Degree-Days of Building Location, in Celsius Degree-Days							
			Zone 4 < 3,000	Zone 5 3,000 to 3,999	Zone 6 4,000 to 4,999	Zone 7A 5,000 to 5,999	Zone 7B 6,000 to 6,999	Zone 8 ≥ 7,000
	Maximum Overall Thermal Transmittance, in W/(m² - K)							
Walls	Max. U-Value	0.278	0.278	0.278	0.278	0.247	0.247	
	Min. R Effective	3.60	3.60	3.60	3.60	4.05	4.05	

THERMAL TRANSMITTANCE

The term overall thermal transmittance represents the reciprocal of effective thermal resistance (Effective R-Value).

$$U = \frac{1}{R_{eff}}$$



SOLUTION 1: DIRECT ATTACHMENT OF CLADDING THROUGH EXTERIOR INSULATION WITH LONG SCREWS AND NO INSULATION IN STEEL STUD CAVITY

Owens Corning® Thermafiber® RainBarrier® ci High Compressive Insulation Series

Thermafiber® RainBarrier® ci High Compressive 80 (RSI 0.74 per 25.4 mm)

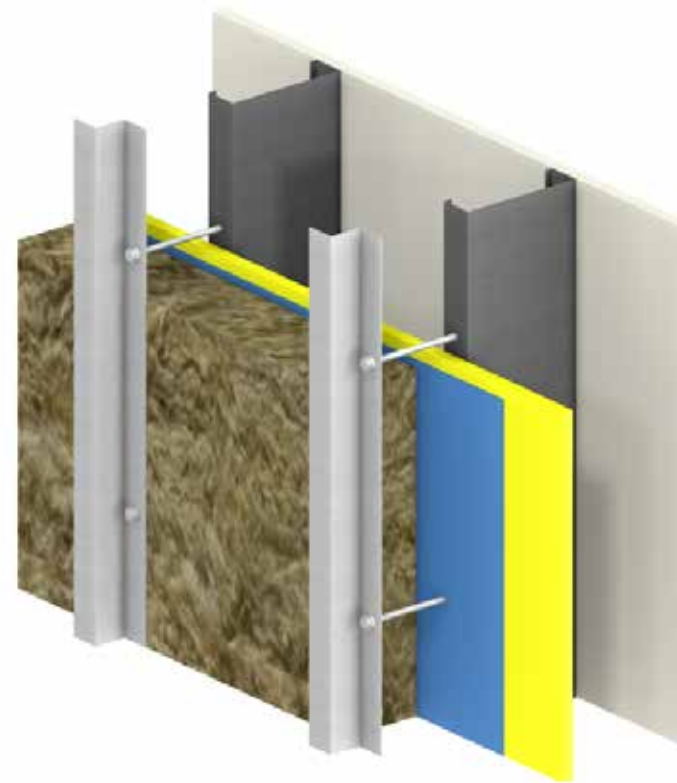
For lightweight cladding attachment

Thermafiber® RainBarrier® ci High Compressive Plus 110 (RSI 0.73 per 25.4 mm)

For medium weight cladding attachment

Thermafiber® RainBarrier® ci High Compressive Max (RSI 0.71 per 25.4 mm)

For heavyweight cladding attachment



SOLUTION 1: DIRECT ATTACHMENT OF CLADDING THROUGH EXTERIOR INSULATION WITH LONG SCREWS AND NO INSULATION IN STEEL STUD CAVITY

Owens Corning® Products	Exterior Insulation		Assembly Performance		% Effectiveness	Compliant Zones		
	Thickness (mm)	Nominal RSI	RSI Effective	U-Value	Exterior Insulation	NECB 2017	ASHRAE 90.1	Quebec
Thermafiber® RainBarrier® ci High Compression Insulation Series <small>Minimum RSI 0.71 per 25.4 mm required*</small>	102	2.82	3.140	0.320	90%	Non Compliant	4	Non Compliant
	114	3.17	3.448	0.290		4	4,5	Non Compliant
	127	3.52	3.760	0.266		4,5	4,5,6,7	4,5,6
	140	3.87	4.072	0.246		4,5,6	4,5,6,7	ALL
	152	4.23	4.384	0.228		4,5,6	4,5,6,7	ALL
	165	4.58	4.695	0.213		4,5,6	4,5,6,7	ALL
	178	4.93	5.007	0.200		4,5,6,7A,7B	ALL	ALL
	191	5.28	5.320	0.188		4,5,6,7A,7B	ALL	ALL
	203	5.64	5.630	0.178		ALL	ALL	ALL
Thermafiber® RainBarrier® ci High Compression Insulation Series <small>Minimum RSI 0.74 per 25.4 mm required*</small>	102	2.96	3.260	0.310	90%	4	4,5	Non Compliant
	114	3.33	3.584	0.279		4	4,5	Non Compliant
	127	3.70	3.910	0.256		4,5	4,5,6,7	4,5,6
	140	4.07	4.236	0.236		4,5,6	4,5,6,7	ALL
	152	4.44	4.561	0.219		4,5,6	4,5,6,7	ALL
	165	4.81	4.887	0.205		4,5,6,7A,7B	ALL	ALL
	178	5.18	5.213	0.192		4,5,6,7A,7B	ALL	ALL
	191	5.55	5.539	0.181		ALL	ALL	ALL

Modeled values; all other values are extrapolated or interpolated

*Values in the tables also apply to any Thermafiber® product with higher thermal resistance than what is modeled. Modeled value from Morrison Hershfield Thermal Analysis of Owens Corning Wall Enclosure Systems (Report Number 201970600)

Assembly:

Exterior Insulated Steel-Frame Wall with Continuous Insulation and Stainless Steel Fasteners at 300 mm (12") o.c. Vertical Spacing

- 18 ga. vertical Z-girt at 406 mm (16") o.c. horizontal spacing
- #12 stainless steel fasteners at 406 mm (16") o.c. horizontal spacing and 305 mm (12") o.c. vertical spacing
- Thermafiber® RainBarrier® ci High Compressive mineral wool insulation series
- 16 mm (5/8") gypsum sheathing and air/vapour/weather barrier membrane
- 152 mm (6") x 41 mm (1 5/8") steel studs at 406 mm (16") o.c. spacing with empty cavity
- 16 mm (5/8") gypsum board



SOLUTION 2: SPLIT INSULATED WALL SYSTEM

DIRECT ATTACHMENT OF CLADDING THROUGH EXTERIOR INSULATION WITH LONG SCREWS AND ECOTOUCH® PINK® FIBERGLAS® BATT INSULATION IN STEEL STUD CAVITY; R20 (RSI 3.52)

Benefits of adding insulation in the stud cavity: significant reduction in required thickness of exterior insulation resulting in material and labour savings, and enhanced acoustical performance

Owens Corning® Thermafiber® RainBarrier® ci High Compressive Insulation Series

Thermafiber® RainBarrier® ci High Compressive 80 (RSI 0.74 per 25.4 mm)

For lightweight cladding attachment

Thermafiber® RainBarrier® ci High Compressive Plus 110 (RSI 0.73 per 25.4 mm)

For medium weight cladding attachment; not modeled†

Thermafiber® RainBarrier® ci High Compressive Max (RSI 0.71 per 25.4 mm)

For heavyweight cladding attachment

EcoTouch® PINK® FIBERGLAS® Batt Insulation for Steel Studs; R20 (RSI 3.52)

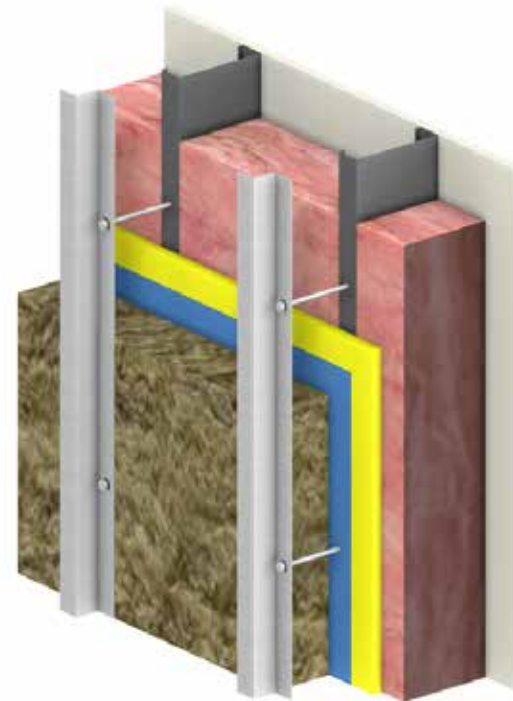
Assembly:

Split Insulated Steel-Frame Wall with Continuous Insulation and Stainless Steel Fasteners

at 406 mm (16") o.c. Vertical Spacing

- 18 ga. vertical Z-girt at 406 mm (16") o.c. horizontal spacing
- #12 stainless steel fasteners at 406 mm (16") o.c. horizontal spacing and 406 mm (16") o.c. vertical spacing
- Thermafiber® RainBarrier® ci High Compressive mineral wool insulation series
- 16 mm (5/8") gypsum sheathing and air/weather barrier membrane
- 152 mm (6") x 41 mm (1 5/8") steel studs at 406 mm (16") o.c. spacing with EcoTouch® PINK® FIBERGLAS® batt insulation in cavity; R20 (RSI 3.52)
- Vapour barrier†
- 16 mm (5/8") gypsum board

†The exterior air/weather barrier membrane can also perform the function of the vapour barrier in the assembly with sufficient insulation on the exterior side of the steel studs. In this case the vapour barrier behind the interior gypsum board is not required.



SOLUTION 2: SPLIT INSULATED WALL SYSTEM

DIRECT ATTACHMENT OF CLADDING THROUGH EXTERIOR INSULATION WITH LONG SCREWS AND ECOTOUCH® PINK® FIBERGLAS® BATT INSULATION IN STEEL STUD CAVITY; R20 (RSI 3.52)

Owens Corning® Products	Exterior Insulation		Assembly Performance		% Effectiveness	Compliant Zones		
	Thickness (mm)	Nominal RSI	RSI Effective	U-Value	Exterior Insulation	NECB 2017	ASHRAE 90.1	Quebec
Thermafiber® RainBarrier® ci High Compression Insulation Series <small>Minimum RSI 0.71 per 25.4 mm required†</small>	25	0.70	2.820	0.350	78%	Non Compliant	4	Non Compliant
	38	1.06	3.144	0.318		Non Compliant	4	Non Compliant
	51	1.41	3.480	0.290	81%	4	4,5	Non Compliant
	64	1.76	3.795	0.263		4,5	4,5,6,7	4,5,6
	76	2.11	4.130	0.240	84%	4,5,6	4,5,6,7	ALL
	89	2.47	4.447	0.225		4,5,6	4,5,6,7	ALL
	102	2.82	4.770	0.210	85%	4,5,6,7A,7B	ALL	ALL
	114	3.17	5.099	0.196		4,5,6,7A,7B	ALL	ALL
	127	3.52	5.424	0.184		ALL	ALL	ALL
Thermafiber® RainBarrier® ci High Compression Insulation Series <small>Minimum RSI 0.74 per 25.4 mm required†</small>	25	0.74	2.850	0.350	77%	Non Compliant	4	Non Compliant
	38	1.11	3.197	0.313		4	4,5	Non Compliant
	51	1.48	3.540	0.280	81%	4	4,5	Non Compliant
	64	1.85	3.879	0.258		4,5	4,5,6,7	4,5,6
	76	2.22	4.220	0.240	84%	4,5,6	4,5,6,7	ALL
	89	2.59	4.561	0.219		4,5,6	4,5,6,7	ALL
	102	2.96	4.890	0.200	85%	4,5,6,7A,7B	ALL	ALL
	114	3.33	5.242	0.191		4,5,6,7A,7B	ALL	ALL
	127	3.70	5.583	0.179		ALL	ALL	ALL

Modeled values; all other values are extrapolated or interpolated

†Values in the tables also apply to any Thermafiber® product with higher thermal resistance than what is modeled. Modeled value from Morrison Hershfield Thermal Analysis of Owens Corning Wall Enclosure Systems (Report Number 201970600). System values include EcoTouch® PINK® FIBERGLAS® batt insulation in steel stud cavity; R20 (RSI 3.52)



SOLUTION 3: EXTERIOR INSULATION WITH CONTINUOUS HORIZONTAL Z-GIRTS AND NO INSULATION IN STEEL STUD CAVITY.

Owens Corning® Products
Thermafiber® RainBarrier® 45/HD
 (RSI 0.74 per 25.4 mm; not modeled)



Assembly:

Exterior Insulated Steel-Frame Wall with Continuous Horizontal Z-Girts

- 18 ga. horizontal Z-girt at 610 mm (24") o.c. vertical spacing
- Thermafiber® RainBarrier® 45/HD mineral wool insulation
- 16 mm (5/8") gypsum sheathing and air/vapour/weather barrier membrane
- 152 mm (6") x 41 mm (1 5/8") steel studs at 406 mm (16") o.c. spacing with empty cavity
- 16 mm (5/8") gypsum board

SOLUTION 3: EXTERIOR INSULATION WITH CONTINUOUS HORIZONTAL Z-GIRTS AND NO INSULATION IN STEEL STUD CAVITY.

Owens Corning® Products	Exterior Insulation		Assembly Performance		% Effectiveness	Compliant Zones		
	Thickness (mm)	Nominal RSI	RSI Effective	U-Value	Exterior Insulation	NECB 2017	ASHRAE 90.1	Quebec
Thermafiber® RainBarrier® 45/HD <small>Minimum RSI 0.71 per 25.4 mm required*</small>	152	4.23	2.640	0.380	49%	Non Compliant	Non Compliant	Non Compliant
	191	5.28	3.151	0.317		Non Compliant	4	Non Compliant
	203	5.64	3.301	0.303		4	4,5	Non Compliant
	216	5.99	3.450	0.290		4	4,5	Non Compliant
	229	6.34	3.599	0.278		4,5	4,5	4,5,6
	241	6.69	3.748	0.267		4,5	4,5,6,7	4,5,6
	254	7.04	3.897	0.257		4,5	4,5,6,7	4,5,6
	267	7.40	4.047	0.247		4,5,6	4,5,6,7	ALL
	279	7.75	4.196	0.238		4,5,6	4,5,6,7	ALL
	292	8.10	4.345	0.230		4,5,6	4,5,6,7	ALL
	305	8.45	4.494	0.223		4,5,6	4,5,6,7	ALL
	318	8.81	4.643	0.215		4,5,6	4,5,6,7	ALL
	330	9.16	4.793	0.209		4,5,6,7A,7B	ALL	ALL
	343	9.51	4.942	0.202		4,5,6,7A,7B	ALL	ALL
394	10.92	5.539	0.181		ALL	ALL	ALL	

Modeled values; all other values are extrapolated or interpolated

*Values in the tables also apply to any Thermafiber® product with higher thermal resistance than what is modeled.
 Modeled value from Morrison Hershfield Thermal Analysis of Owens Corning Wall Enclosure Systems (Report Number 201970600)



SOLUTION 4: SPLIT INSULATED WALL SYSTEM

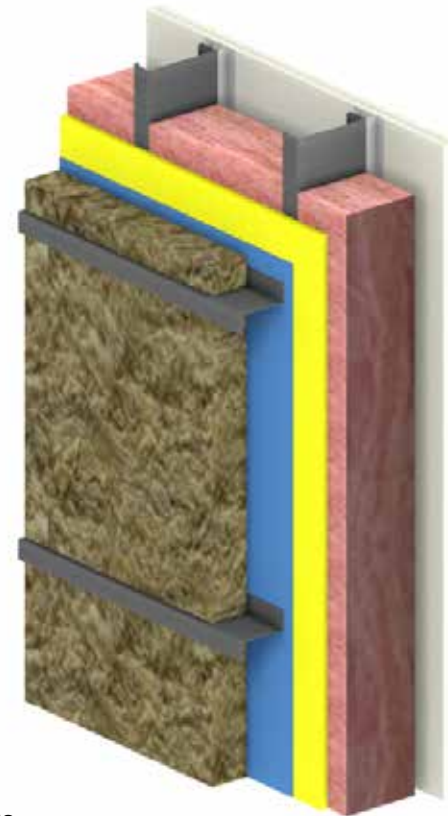
EXTERIOR INSULATION WITH CONTINUOUS HORIZONTAL Z-GIRTS AND ECOTOUCH® PINK® FIBERGLAS® BATT INSULATION IN STEEL STUD CAVITY; R20 (RSI 3.52)

Benefits of adding insulation in the stud cavity: significant reduction in required thickness of exterior insulation resulting in material and labour savings, and enhanced acoustical performance

Owens Corning® Products

Thermafiber® RainBarrier® 45/HD
(RSI 0.74 per 25.4 mm)

EcoTouch® PINK® FIBERGLAS® Batt Insulation
for Steel Studs; R20 (RSI 3.52)



Assembly:

Split Insulated Steel-Frame Wall with Continuous Horizontal Z-Girts

- 18 ga. horizontal Z-girt at 610 mm (24") o.c. vertical spacing
- Thermafiber® RainBarrier® 45/HD mineral wool insulation
- 16 mm (5/8") gypsum sheathing and air/weather barrier membrane
- 152 mm (6") x 41 mm (1 5/8") steel studs at 406 mm (16") o.c. spacing with EcoTouch® PINK® FIBERGLAS® batt insulation in cavity; R20 (RSI 3.52)
- Vapour barrier†
- 16 mm (5/8") gypsum board

†The exterior air/weather barrier membrane can also perform the function of the vapour barrier in the assembly with sufficient insulation on the exterior side of the steel studs. In this case the vapour barrier behind the interior gypsum board is not required.

SOLUTION 4: SPLIT INSULATED WALL SYSTEM

EXTERIOR INSULATION WITH CONTINUOUS HORIZONTAL Z-GIRTS AND ECOTOUCH® PINK® FIBERGLAS® BATT INSULATION IN STEEL STUD CAVITY; R20 (RSI 3.52)

Owens Corning® Products	Exterior Insulation		Assembly Performance		% Effectiveness	Compliant Zones		
	Thickness (mm)	Nominal RSI	RSI Effective	U-Value	Exterior Insulation	NECB 2017	ASHRAE 90.1	Quebec
Thermafiber® RainBarrier® 45/HD <small>Minimum RSI 0.71 per 25.4 mm required*</small>	25	0.74	2.830	0.350	75%	Non Compliant	4	Non Compliant
	38	1.11	3.097	0.323		Non Compliant	4	Non Compliant
	51	1.48	3.280	0.300	64%	4	4,5	Non Compliant
	64	1.85	3.461	0.289		4	4,5	Non Compliant
	76	2.22	3.740	0.270	62%	4,5	4,5,6,7	4,5,6
	89	2.59	3.825	0.261		4,5	4,5,6,7	4,5,6
	102	2.96	4.060	0.250	57%	4,5	4,5,6,7	4,5,6
	114	3.33	4.189	0.239		4,5,6	4,5,6,7	ALL
	127	3.70	4.380	0.230		4,5,6	4,5,6,7	ALL
	140	4.07	4.552	0.220		4,5,6	4,5,6,7	ALL
	152	4.44	4.660	0.210		4,5,6	4,5,6,7	ALL
	165	4.81	4.916	0.203		4,5,6,7A,7B	ALL	ALL
	178	5.18	5.098	0.196		4,5,6,7A,7B	ALL	ALL
	191	5.55	5.280	0.189		4,5,6,7A,7B	ALL	ALL
	203	5.92	5.462	0.183		ALL	ALL	ALL

Modeled values; all other values are extrapolated or interpolated

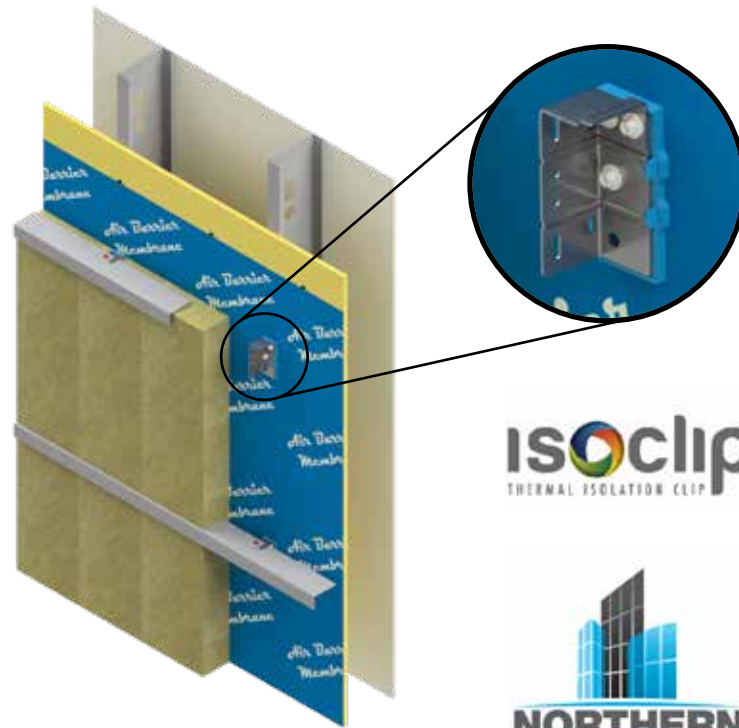
*Values in the tables also apply to any Thermafiber® product with higher thermal resistance than what is modeled. Modeled value from Morrison Hershfield Thermal Analysis of Owens Corning Wall Enclosure Systems (Report Number 201970600) System values include EcoTouch® PINK® FIBERGLAS® batt insulation in steel stud cavity; R20 (RSI 3.52)

SOLUTION 5: EXTERIOR INSULATION WITH THERMALLY ISOLATED CLIPS AND NO INSULATION IN STEEL STUD CAVITY

Benefits of adding insulation in the stud cavity: significant reduction in required thickness of exterior insulation resulting in material and labour savings, and enhanced acoustical performance

*ISO Clip Thermally Isolated Clip shown in illustration

Owens Corning® Products
Thermafiber® RainBarrier® 45/HD
 (RSI 0.74 per 25.4 mm)



Split Insulated Steel Stud Assembly

- 18 ga. horizontal L-Angle at 610 mm (24") o.c. vertical spacing
- 51 mm (2") ISO Clip System
- Thermafiber® RainBarrier® 45/HD mineral wool insulation
- 13 mm (1/2") gypsum sheathing and air/vapour/weather barrier membrane
- 152 mm (6") x 41 mm (1 5/8") steel studs at 406 mm (16") o.c. spacing with empty cavity
- 13 mm (1/2") gypsum board

SOLUTION 5: EXTERIOR INSULATION WITH THERMALLY ISOLATED CLIPS AND NO INSULATION IN STEEL STUD CAVITY

Stud Spacing (mm)	Horizontal Clip Spacing (mm)	Exterior Insulation			610 mm Vertical Clip Spacing			914 mm Vertical Clip Spacing			1219 mm Vertical Clip Spacing			1524 mm Vertical Clip Spacing		
					Assembly Performance		% Effective	Assembly Performance		% Effective	Assembly Performance		% Effective	Assembly Performance		% Effective
		Owens Corning® Products	Thickness (mm)	Nominal RSI	RSI Effective	USI	Exterior Insulation	RSI Effective	USI	Exterior Insulation	RSI Effective	USI	Exterior Insulation	RSI Effective	USI	Exterior Insulation
406 mm	406 mm	Thermafiber® RainBarrier® 45/HD RSI 0.74 per 25.4 mm	51	1.48	1.830	0.546	86%	1.896	0.527	91%	1.930	0.518	93%	1.951	0.513	95%
			64	1.85	2.092	0.478	83%	2.190	0.457	89%	2.241	0.446	91%	2.273	0.440	93%
			76	2.22	2.319	0.431	80%	2.461	0.406	86%	2.530	0.395	89%	2.577	0.388	91%
			89	2.59	2.552	0.392	77%	2.740	0.365	85%	2.821	0.355	88%	2.881	0.347	90%
610 mm	610 mm		51	1.48	1.882	0.531	90%	1.935	0.517	93%	1.961	0.510	95%	1.977	0.506	96%
			64	1.85	2.160	0.463	87%	2.241	0.446	91%	2.282	0.438	93%	2.307	0.434	95%
			76	2.22	2.409	0.415	84%	2.521	0.397	89%	2.585	0.387	92%	2.621	0.382	93%
			89	2.59	2.655	0.377	81%	2.802	0.357	87%	2.884	0.347	90%	2.933	0.341	92%
406 mm	813 mm		51	1.48	1.904	0.525	91%	1.951	0.513	95%	1.971	0.507	96%	1.985	0.504	97%
			64	1.85	2.193	0.456	89%	2.262	0.442	93%	2.298	0.435	94%	2.319	0.431	96%
			76	2.22	2.451	0.408	86%	2.550	0.392	90%	2.604	0.384	93%	2.637	0.379	94%
			89	2.59	2.704	0.370	83%	2.837	0.353	88%	2.910	0.344	91%	2.955	0.338	93%

Modeled value from Morrison Hershfield 2in. ISO Clip Thermal Analysis for Owens Corning Design Guide (Report Number 210121700)



SOLUTION 6: SPLIT INSULATED WALL SYSTEM: EXTERIOR INSULATION WITH THERMALLY ISOLATED CLIPS (ISO CLIP SHOWN) WITH ECOTOUCH® PINK® FIBERGLAS® BATT INSULATION IN STEEL STUD CAVITY R20 (RSI 3.52)

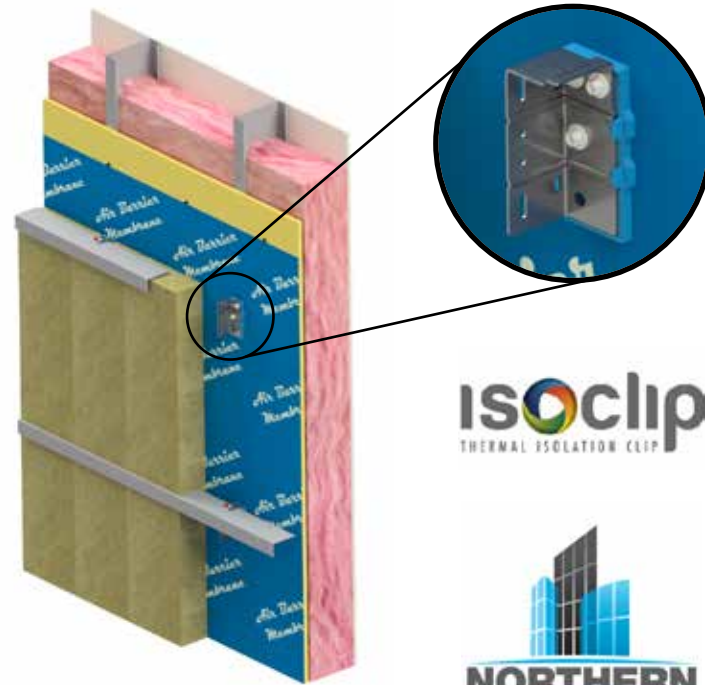
Benefits of adding insulation in the stud cavity: significant reduction in required thickness of exterior insulation resulting in material and labour savings, and enhanced acoustical performance

*ISO Clip Thermally Isolated Clip shown in illustration

Owens Corning® Products

Thermafiber® RainBarrier® 45/HD
(RSI 0.74 per 25.4 mm)

EcoTouch® PINK® FIBERGLAS® Batt Insulation
for Steel Studs; R20 (RSI 3.52)



Split Insulated Steel Stud Assembly

- 18 ga. horizontal L-Angle at 610 mm (24") o.c. vertical spacing
- 51 mm (2") ISO Clip System
- Thermafiber® RainBarrier® 45/HD mineral wool insulation
- 13 mm (1/2") gypsum sheathing and air/weather barrier membrane
- 152 mm (6") x 41 mm (1 5/8") steel studs at 406 mm (16") o.c. spacing with EcoTouch® PINK® FIBERGLAS® batt insulation in cavity; R20 (RSI 3.52)
- Vapour barrier†
- 13 mm (1/2") gypsum board

†The exterior air/weather barrier membrane can also perform the function of the vapour barrier in the assembly with sufficient insulation on the exterior side of the steel studs. In this case the vapour barrier behind the interior gypsum board is not required.

SOLUTION 6: SPLIT INSULATED WALL SYSTEM: EXTERIOR INSULATION WITH THERMALLY ISOLATED CLIPS (ISO CLIP SHOWN) WITH ECOTOUCH® PINK® FIBERGLAS® BATT INSULATION IN STEEL STUD CAVITY R20 (RSI 3.52)

Stud Spacing (mm)	Horizontal Clip Spacing (mm)	Exterior Insulation			610 mm Vertical Clip Spacing			914 mm Vertical Clip Spacing			1219 mm Vertical Clip Spacing			1524 mm Vertical Clip Spacing		
					Assembly Performance		% Effective	Assembly Performance		% Effective	Assembly Performance		% Effective	Assembly Performance		% Effective
		Owens Corning® Products	Thickness (mm)	Nominal RSI	RSI Effective	USI	Exterior Insulation	RSI Effective	USI	Exterior Insulation	RSI Effective	USI	Exterior Insulation	RSI Effective	USI	Exterior Insulation
406 mm	406 mm	Thermafiber® RainBarrier® 45/HD RSI 0.74 per 25.4 mm	51	1.48	3.376	0.296	90%	3.459	0.289	95%	3.495	0.286	98%	3.534	0.283	100%
			64	1.85	3.631	0.275	85%	3.751	0.267	92%	3.805	0.263	95%	3.857	0.259	98%
			76	2.22	3.850	0.260	81%	4.017	0.249	89%	4.107	0.243	93%	4.160	0.240	95%
			89	2.59	4.080	0.245	78%	4.281	0.234	86%	4.397	0.227	91%	4.465	0.224	93%
610 mm	610 mm		51	1.48	3.846	0.260	95%	3.912	0.256	100%	3.953	0.253	103%	3.974	0.252	104%
			64	1.85	4.121	0.243	91%	4.218	0.237	96%	4.276	0.234	99%	4.308	0.232	101%
			76	2.22	4.345	0.230	86%	4.496	0.222	93%	4.579	0.218	97%	4.622	0.216	98%
			89	2.59	4.589	0.218	83%	4.777	0.209	90%	4.878	0.205	94%	4.936	0.203	97%
406 mm	813 mm		51	1.48	3.506	0.285	98%	3.538	0.283	100%	3.561	0.281	102%	3.572	0.280	103%
			64	1.85	3.795	0.264	94%	3.850	0.260	97%	3.890	0.257	99%	3.911	0.256	101%
			76	2.22	4.029	0.248	89%	4.139	0.242	94%	4.199	0.238	97%	4.231	0.236	98%
			89	2.59	4.283	0.233	86%	4.428	0.226	92%	4.506	0.222	95%	4.550	0.220	96%

Modeled value from Morrison Hershfield 2in. ISO Clip Thermal Analysis for Owens Corning Design Guide (Report Number 210121700)
System values include EcoTouch® PINK® FIBERGLAS® batt insulation in steel stud cavity; R20 (RSI 3.52)

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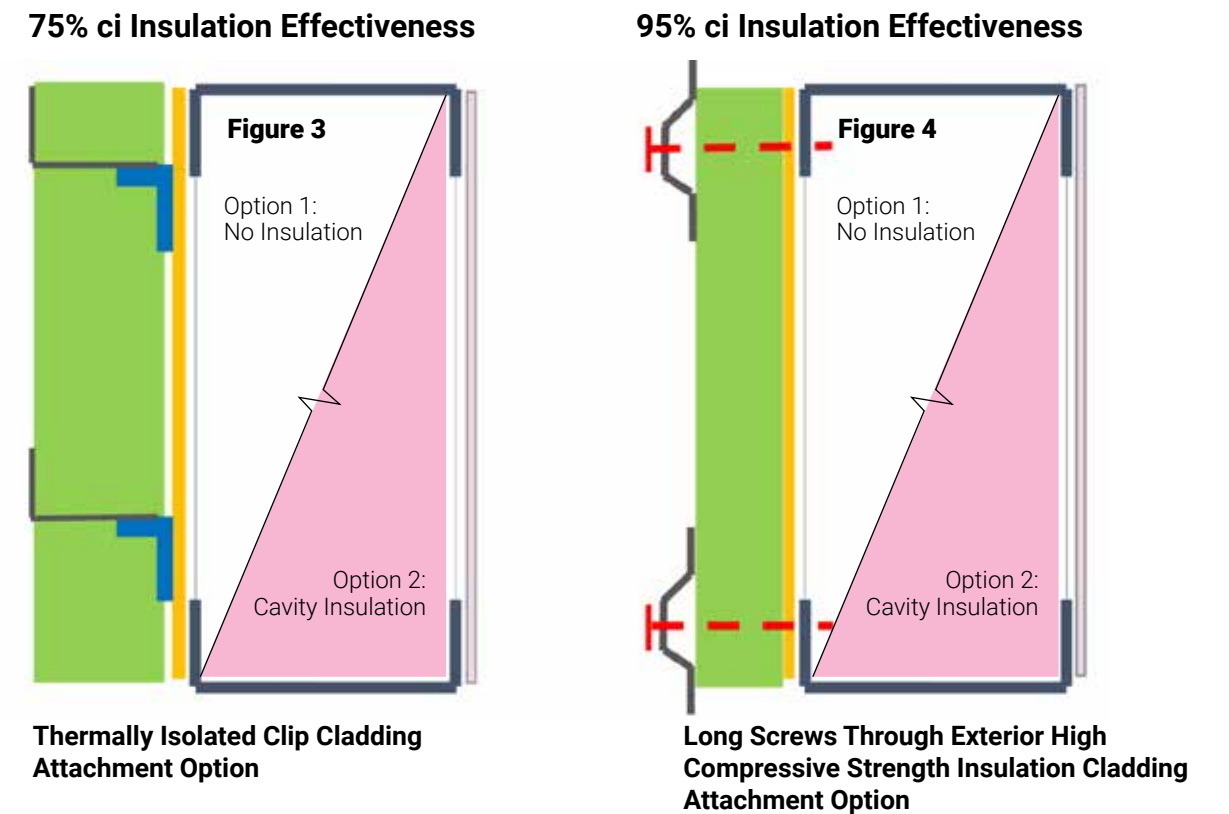
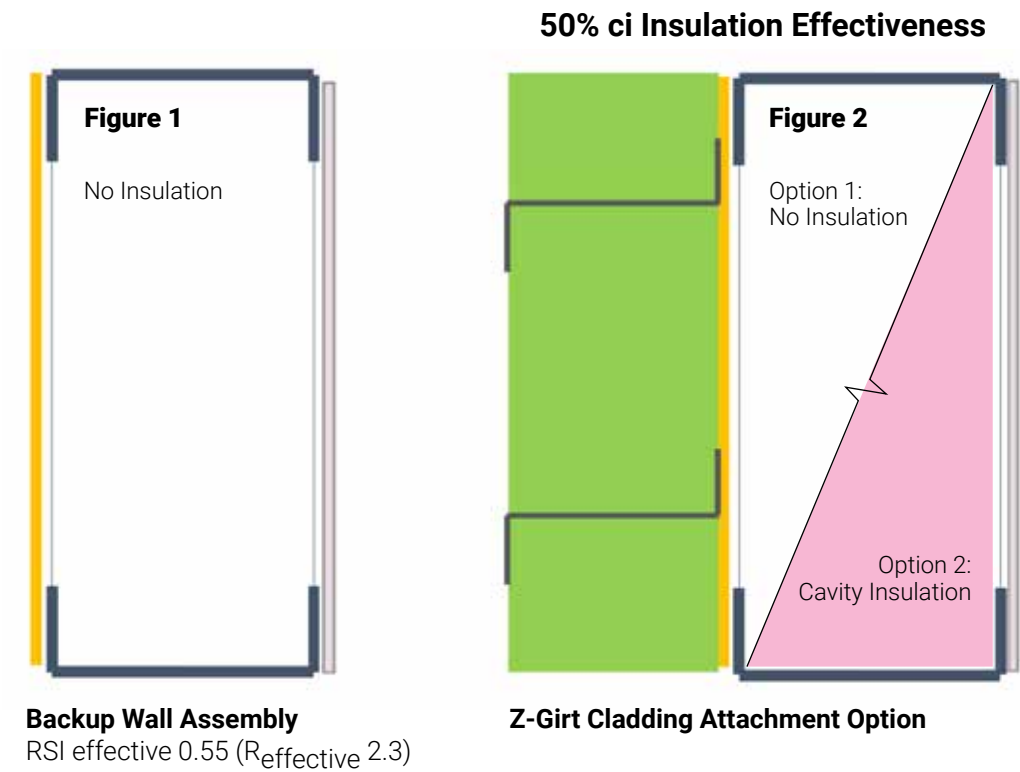
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TARGET NEW ENERGY CODE RSI EFFECTIVE 3.6/4.05

38 MM (1-5/8") STEEL STUDS SPACED 410 MM (16") CC WITH 13 MM (1/2") EXTERIOR GYPSUM SHEATHING AND 13 MM (1/2") INTERIOR GYPSUM BOARD (R-4.2/INCH USED FOR EXTERIOR CI)

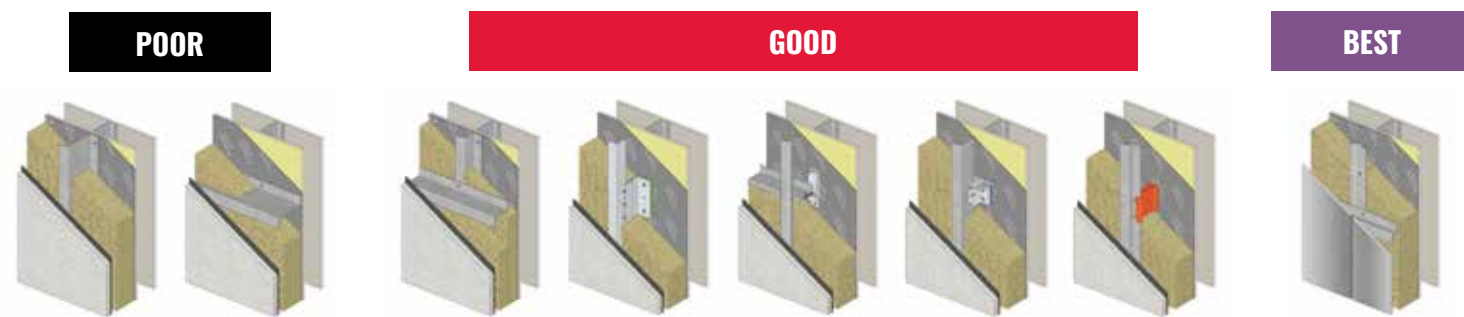
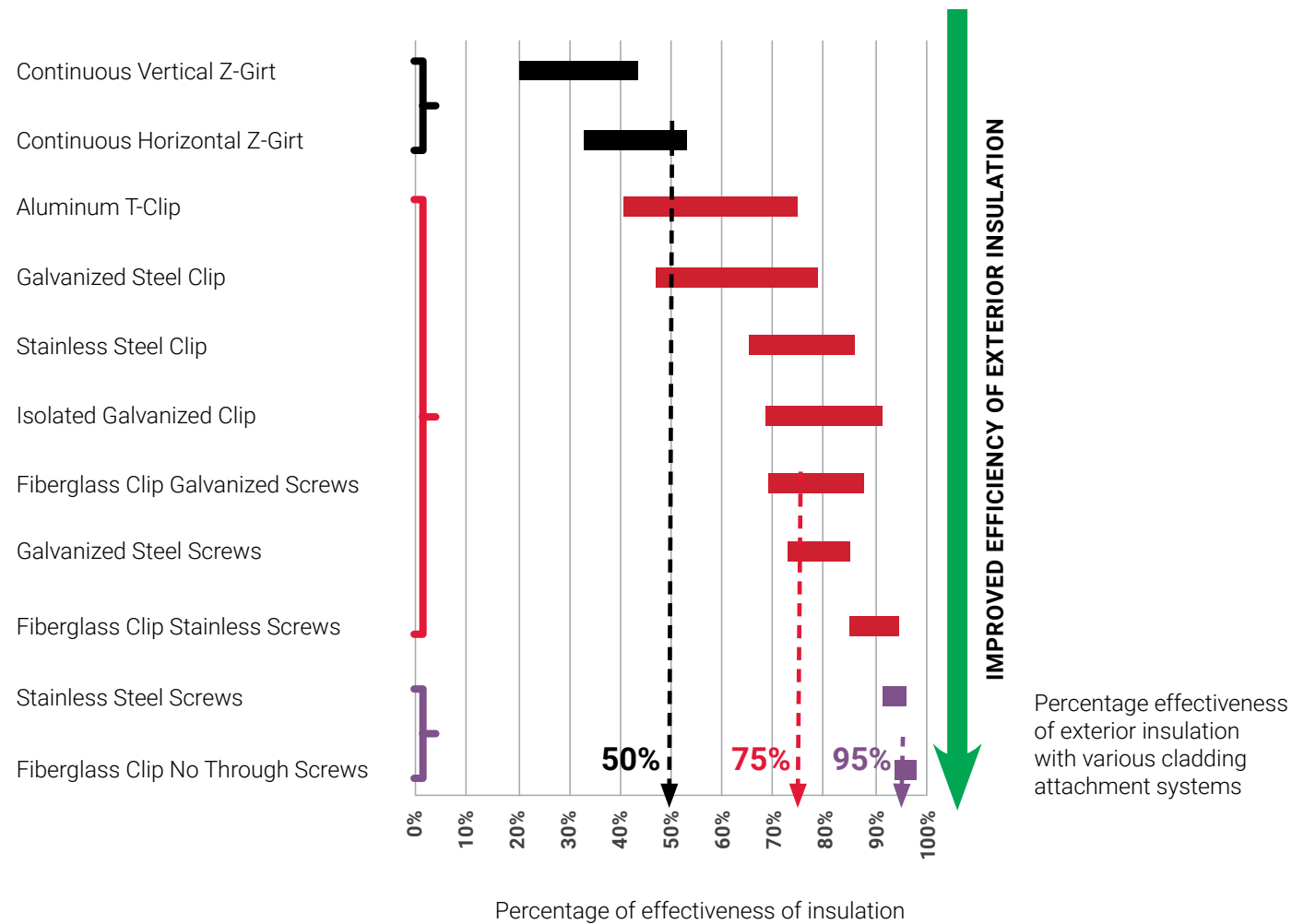


EFFECTIVE RESISTANCE CALCULATIONS OF WALL ASSEMBLIES

Figure 9

Thermal Comparison of Systems

To summarize the thermal performance of the various cladding attachment strategies presented, the range of thermal effectiveness of the exterior insulation is shown below. These percentages can be multiplied by the R-value of the exterior insulation and added to the back-up wall R-value to determine an approximate overall effective R-value for the wall assembly.



EXAMPLE CALCULATION FOR A 152 MM (6") X 38 MM (1-5/8") STEEL STUD SPACED 410 MM O.C. (16" C.C.) WALL ASSEMBLY WITH 13 MM (1/2") EXTERIOR GYPSUM BOARD SHEATHING AND 13 MM (1/2") INTERIOR GYPSUM BOARD

WITH AND WITHOUT INSULATION IN THE STEEL STUD CAVITY WITH 3 CLADDING ATTACHMENT TYPES

Insulation in Steel Stud Cavity (RSI)	A	B	C	D	Estimated Wall Assembly RSI Effective A+(C*D)	Thickness of Exterior Continuous Insulation Required to Achieve:	
	Backup Wall Assembly RSI effective (R _o) (Figure 8)	Cladding Attachment Type (Figure 9)	Percent Effectiveness of Exterior Insulation (Figure 9)	Nominal Thermal Resistance of Exterior Continuous Insulation (RSI) (75 mm Thermafiber® RainBarrier® 45, RSI 0.74/25.4 mm)		RSI Effective 3.60	RSI Effective 4.05
None (Air)	0.55	Continuous Horizontal Z-girt	50%	2.22	1.66	178 mm	214 mm
EcoTouch® PINK® FIBERGLAS® Batts RSI 3.52	2.05	Continuous Horizontal Z-girt	50%	2.22	3.16	76 mm	140 mm
None (Air)	0.55	Isolated Galvanized Clip	75%	2.22	2.215	127 mm	165 mm
EcoTouch® PINK® FIBERGLAS® Batts RSI 3.52	2.05	Isolated Galvanized Clip	75%	2.22	3.715	51 mm	102 mm
None (Air)	0.55	Stainless Steel Screws	95%	2.22	2.659	102 mm	127 mm
EcoTouch® PINK® FIBERGLAS® Batts RSI 3.52	2.05	Stainless Steel Screws	95%	2.22	4.159	38 mm	76 mm

See page 21-22 for modeling report

HOW TO ESTIMATE THE EFFECTIVE THERMAL RESISTANCE STEEL STUD WALL ASSEMBLIES WITH THREE DIFFERENT METAL CLADDING ATTACHMENT TYPES

BACKUP WALL ASSEMBLIES: 3-5/8" X 1-5/8" STEEL STUD WALL ASSEMBLY WITH 1/2" EXTERIOR GYPSUM BOARD SHEATHING AND 1/2" INTERIOR GYPSUM BOARD

Figure 5

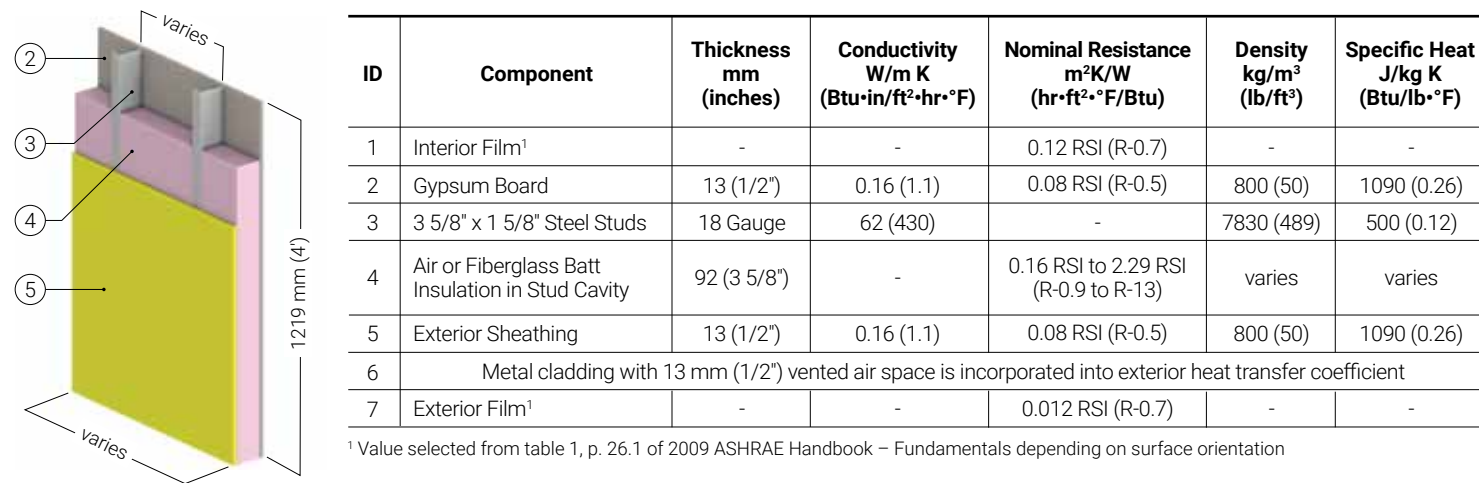
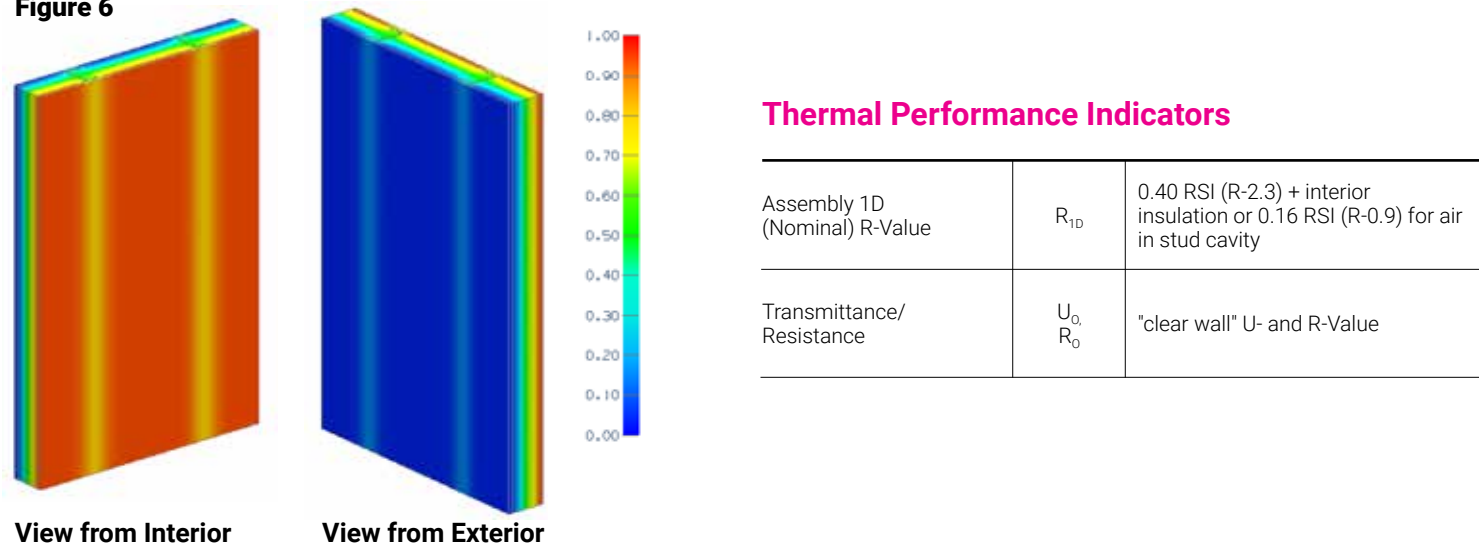


Figure 6



Nominal (1D) vs. Assembly Performance Indicators

Stud Spacing	Stud Cavity Insulation	R _{1D} m ² K/W (ft ² ·hr·°F/Btu)	R _o m ² K/W (ft ² ·hr·°F/Btu)	U _o W/m ² K (Btu/ft ² ·hr·°F)
410 mm (16") o.c.	Air	0.56 (R-3.2)	0.55 (R-3.1)	1.82 (0.321)
	2.11 RSI (R-12) Batt	2.51 (R-14.3)	1.61 (R-9.2)	0.62 (0.109)
	2.29 RSI (R-13) Batt	2.69 (R-15.3)	1.68 (R-9.5)	0.60 (0.105)
610 mm (24") o.c.	Air	0.56 (R-3.2)	R-3.1 (0.55)	1.81 (0.318)
	2.11 RSI (R-12) Batt	2.51 (R-14.3)	1.83 (R-10.4)	0.55 (0.096)
	2.29 RSI (R-13) Batt	2.69 (R-15.3)	1.92 (R-10.9)	0.52 (0.092)

HOW TO ESTIMATE THE EFFECTIVE THERMAL RESISTANCE STEEL STUD WALL ASSEMBLIES WITH THREE DIFFERENT METAL CLADDING ATTACHMENT TYPES

BACKUP WALL ASSEMBLIES: 6" X 1-5/8" STEEL STUD WALL ASSEMBLY WITH 1/2" EXTERIOR GYPSUM BOARD SHEATHING AND 1/2" INTERIOR GYPSUM BOARD

Figure 7

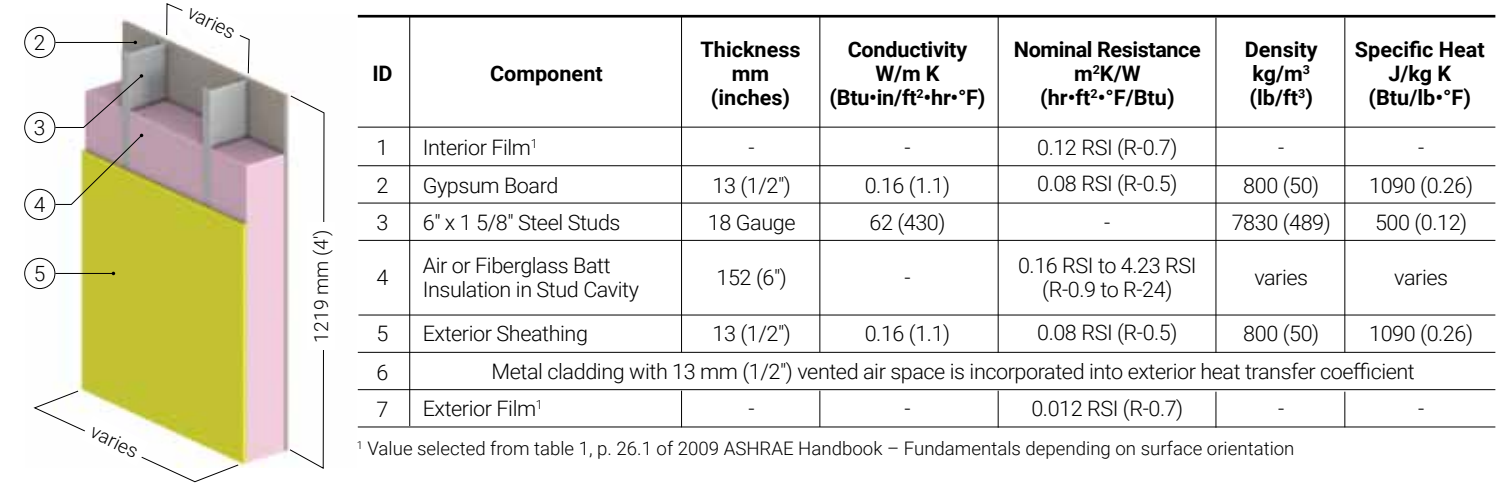
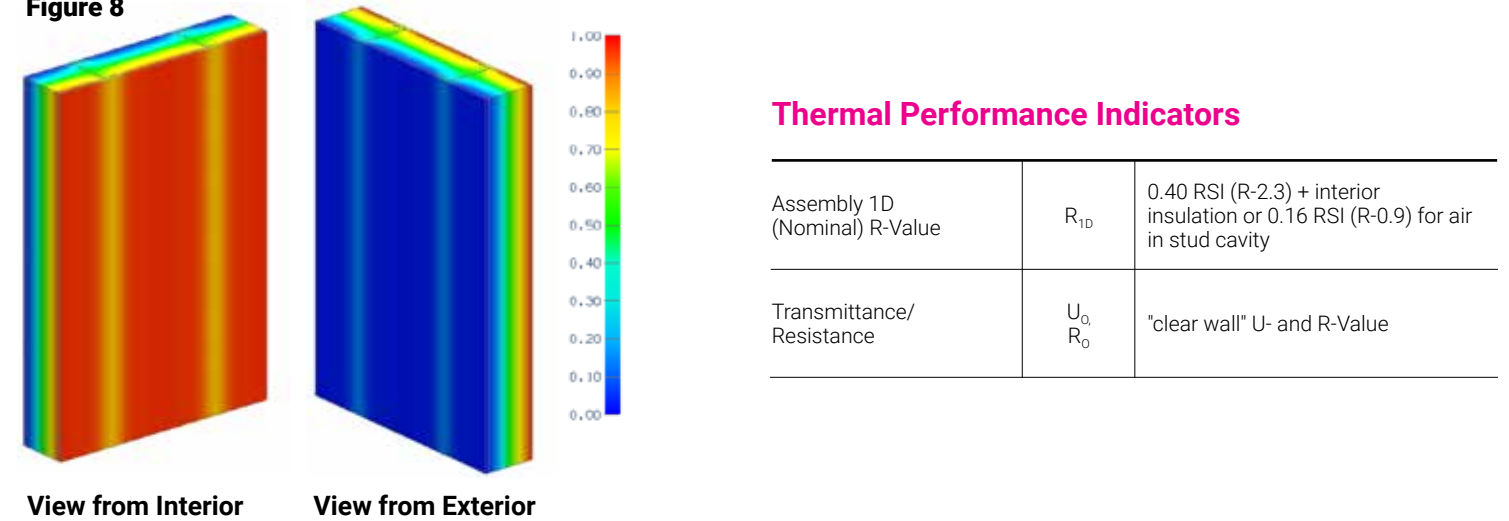


Figure 8



Nominal (1D) vs. Assembly Performance Indicators

Stud Spacing	Stud Cavity Insulation	R _{1D} m ² K/W (ft ² ·hr·°F/Btu)	R _o m ² K/W (ft ² ·hr·°F/Btu)	U _o W/m ² K (Btu/ft ² ·hr·°F)
410 mm (16") o.c.	Air	0.56 (R-3.2)	0.55 (R-3.1)	1.82 (0.320)
	3.35 RSI (R-19) Batt	3.75 (R-21.3)	2.01 (R-11.4)	0.50 (0.088)
	3.52 RSI (R-20) Batt	3.92 (R-22.3)	2.05 (R-11.6)	0.49 (0.086)
	3.87 RSI (R-22) Batt	4.27 (R-24.3)	2.14 (R-12.1)	0.47 (0.082)
	4.22 RSI (R-24) Batt	4.63 (R-26.3)	2.22 (R-12.6)	0.45 (0.079)
610 mm (24") o.c.	Air	0.56 (R-3.2)	0.56 (R-3.1)	1.80 (0.318)
	3.35 RSI (R-19) Batt	3.75 (R-21.3)	2.37 (R-13.5)	0.42 (0.074)
	3.52 RSI (R-20) Batt	3.92 (R-22.3)	2.44 (R-13.8)	0.41 (0.072)
	3.87 RSI (R-22) Batt	4.27 (R-24.3)	2.56 (R-14.5)	0.39 (0.069)
	4.22 RSI (R-24) Batt	4.63 (R-26.3)	2.68 (R-15.2)	0.37 (0.066)



To learn more about Owens Corning® Thermafiber® RainBarrier® Exterior Insulation, visit www.owenscorning.ca.



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