

RSI EFFECTIVE

The prescriptive compliance packages within SB-12 Chapter 3 list the thermal value requirements for walls as: 1) minimum nominal RSI, 2) maximum U-value, and 3) minimum effective RSI. It is not necessary to meet all three, assemblies are only required to meet one of the thermal values (see SB-12 3.1.1.1.(13)).

Effective RSI and U-value account for the thermal bridging effect of structural members and better represent the resistance of an assembly to heat loss. For example, wood studs (RSI 1.19) lose more heat than batt insulation (RSI 3.87 for R22 batt). Increasing the stud spacing of a wall can lower the heat loss (a wider stud spacing means more insulation and less heat loss through wood studs, therefore a higher effective RSI). Varying the stud spacing would not have an impact on the nominal RSI value of the wall, which lists only the RSI value of the insulation (RSI 3.87 for R22 batt). Builders may use many different assembly combinations to achieve the total effective RSI or U-value.

If a builder wishes to use nominal thermal resistance for Code compliance, packages A2 through A6 require continuous insulation (ci). The continuous insulation decreases the heat loss through thermal bridges. The insulation is installed across the structural members.

SB-12 defines effective RSI value as the effective thermal resistance, which is the inverse of the overall thermal transmittance of a building assembly, in (m²•K)/W.

Overall thermal transmittance (U-value) is defined as the rate, in W/(m²•K), at which heat is transferred through all components of a building envelope assembly that is subject to temperature differences and includes interior and exterior air films that are in contact with the assembly, but does not include exterior air films where the assembly is in contact with soil.

THERMAL BRIDGES

The effective RSI accounts for the thermal bridging effect of closely spaced, repetitive structural members (studs and joists) and of other structural members (lintels, sills, and plates) that interrupts the thermal resistance of the cavity insulation. For example, an RSI 3.34 (R19) cavity insulation has an effective R-value of RSI 2.81 (R15.94) in a 2x6 at 16" oc installation.

A thermal bridge is a component within an envelope assembly that short circuits the insulation and allows more heat loss than the surrounding insulation.

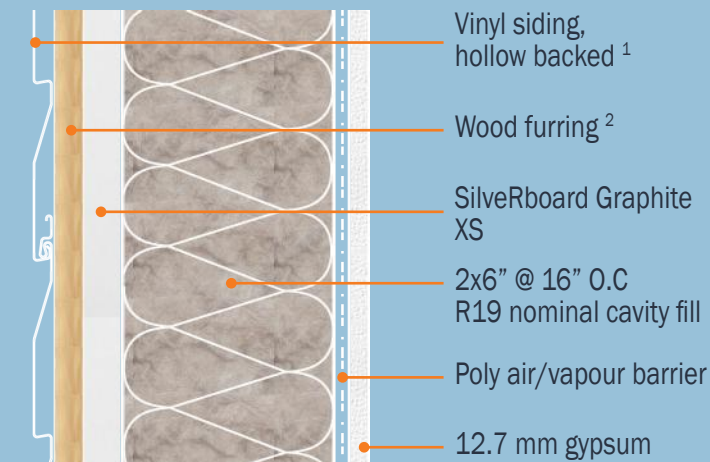
VINYL WALL ASSEMBLIES WITH SILVERBOARD GRAPHITE XS FOR OBC ZONE 1 ≥ 92% AFUE SPACE HEATING EQUIPMENT

SilveRboard Graphite XS allows builders to easily meet the Package A1 requirements by using 38x140mm (2x6") studs and RSI 3.34 (R19) batt insulation without requiring advanced framing, see calculation table to the right. Builders have the option to comply with OBC requirements both with and without the installation of furring.

SilveRboard Graphite XS also allows builders to easily meet the Package A2 and A5 requirements using the nominal thermal resistance option. Check out the chart at the bottom of this brochure.

38x140mm @ 406mm O.C. (2x6" @ 16" O.C.) with RSI 3.34 (R19) nominal cavity fill

Component	Package A1		Package A2 and A5	
	No Furring	Furring	No Furring	Furring
	RSI (metric R-Value)		RSI (metric R-Value)	
Air film (exterior)	0.03	0.03	0.03	0.03
Vinyl Siding, hollow backed ¹	0.11	0.00	0.11	0.00
Wood Furring ²	-	0.00	-	0.00
SilveRboard Graphite XS	0.39	0.49	0.89	1.38
Framing and insulation	2.36	2.36	2.36	2.36
12.7mm (1/2") gypsum	0.08	0.08	0.08	0.08
Air film (interior)	0.12	0.12	0.12	0.12
Total Effective RSI	3.09	3.08	3.59	3.97
OBC required total effective RSI	3.00	3.00	3.58	3.58
Thickness of SilveRboard Graphite XS (mm)	12.70	15.88	28.58	44.45
Thickness of SilveRboard Graphite XS (inch)	1/2"	5/8"	1-1/8"	1-3/4"



1. Siding is exterior of vented air space, therefore excluded from calculation.
2. Vented air space created by furring for rain screen: not a closed air space therefore excluded as an air cavity.
Please consult local jurisdictions for compliant wall assemblies.

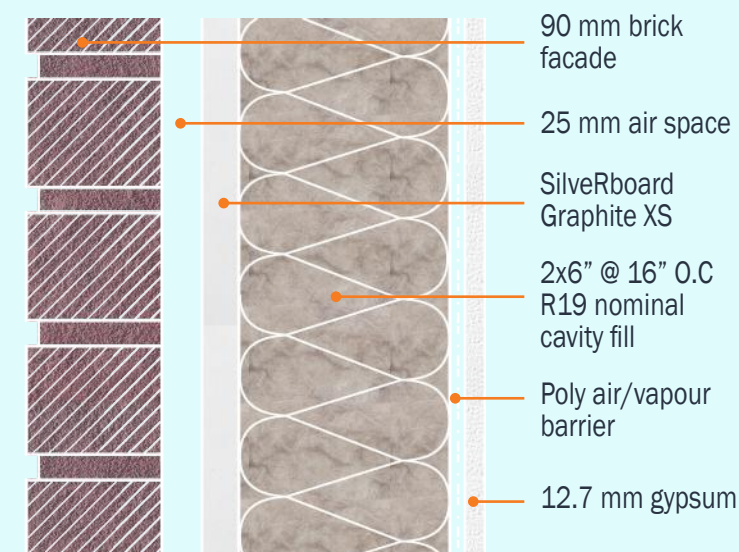
BRICK WALL ASSEMBLIES WITH SILVERBOARD GRAPHITE XS FOR OBC ZONE 1 ≥ 92% AFUE SPACE HEATING EQUIPMENT

SilveRboard Graphite XS allows builders to easily meet the Package A1 requirements by using 38x140mm (2x6") studs and RSI 3.34 (R19) batt insulation without requiring advanced framing, see calculation table to the right. Builders have the option to comply with OBC requirements both with and without the installation of OSB sheathing.

SilveRboard Graphite XS also allows builders to easily meet the Package A2 and A5 requirements, see calculation table to the right. Builders have the option to comply with OBC requirements both with and without the installation of OSB sheathing. SilveRboard Graphite XS also allows builders to easily meet the Package A2 and A5 requirements using the nominal thermal resistance option. Check out the chart below.

38x140mm @ 406mm O.C. (2x6" @ 16" O.C.) with RSI 3.34 (R19) nominal cavity fill

Component	Package A1		Package A2 and A5	
	No OSB	With OSB	No OSB	With OSB
	RSI (metric R-Value)		RSI (metric R-Value)	
Air film (exterior)	0.03	0.03	0.03	0.03
Brick Cladding	0.07	0.07	0.07	0.07
25 mm air space	0.18	0.18	0.18	0.18
11.11 mm (7/16") OSB	-	0.11	-	0.11
SilveRboard Graphite XS	0.39	0.39	0.89	0.69
38x140 mm at 16" O.C.	2.36	2.36	2.36	2.36
12.7mm (1/2") gypsum	0.08	0.08	0.08	0.08
Air film (interior)	0.12	0.12	0.12	0.12
Total Effective RSI	3.23	3.34	3.73	3.64
OBC required total effective RSI	3.00	3.00	3.58	3.58
Thickness of SilveRboard Graphite XS (mm)	12.70	12.70	28.58	22.23
Thickness of SilveRboard Graphite XS (inch)	1/2"	1/2"	1-1/8"	7/8"



Please consult local jurisdictions for compliant wall assemblies.

DON'T WANT TO USE EFFECTIVE RSI OR U-VALUE?

Comply with nominal RSI using the chart below. This chart shows which SilveRboard Graphite XS product that builders can use to meet the continuous insulation (ci) requirements for the Zone 1 packages:

Package	ci requirement	SilveRboard Graphite XS Product
A2	RSI 0.88 (R5)	SBGX110008P - RSI 0.89 (R5) (1-1/8")
A3	RSI 1.32 (R7.5)	SBGX162508P - RSI 1.38 (R7.8) (1-3/4")
A4	RSI 0.88 (R5)	SBGX110008P - RSI 0.89 (R5) (1-1/8")
A5	RSI 0.88 (R5)	SBGX110008P - RSI 0.89 (R5) (1-1/8")
A6	RSI 0.88 (R5)	SBGX110008P - RSI 0.89 (R5) (1-1/8")

AMVIC HAS A GREAT SOLUTION.

SilveRboard Graphite XS allows builders to meet wall assembly requirements for Section 9.36, with any cladding options and without requiring advanced framing. SilveRboard Graphite XS is a combination of graphite embedded EPS beads surrounded by air pockets, laminated on both sides with perforated reflective polystyrene film. Ninety-Eight percent of the EPS in SilveRboard Graphite XS is air, we call this insulation "Engineered Air". This highly effective combination provides one of the most energy efficient high R value, environmentally friendly, and cost effective insulation products available today, while giving the board jobsite toughness. For more information on SilveRboard Graphite XS, check out the SilveRboard Graphite XS Brochure.

NOTES:

Effective RSI and U-values should be calculated following good practice. This includes the use of the Isothermal Planes (Series-Parallel) method as described in 2009 ASHRAE Handbook—Fundamentals. More information, including tables that provide effective thermal resistance values, can be found on the NRCAN website: <http://www.nrcan.gc.ca/energy/efficiency/housing/new-homes/energy-star/14176>.

Please consult local Building Officials prior to construction.

Table 3.1.1.2.A (SI)
ZONE 1 - Compliance Packages for Space Heating Equipment with AFUE ≥ 92%
 Forming Part of Sentence 3.1.1.2.(1)

Component	Thermal Values	Compliance Package		
		A 1	A 2	A 5
Ceiling with Attic Space	Min. Nominal RSI	10.56	10.56	8.80
	Max. U	0.096	0.096	0.115
	Min. Effective RSI	10.43	10.43	8.67
Ceiling Without Attic Space	Min. Nominal RSI	5.46	5.46	5.46
	Max. U	0.205	0.205	0.205
	Min. Effective RSI	4.87	4.87	4.87
Exposed Floor	Min. Nominal RSI	5.46	5.46	6.16
	Max. U	0.190	0.190	0.177
	Min. Effective RSI	5.25	5.25	5.64
Walls Above Grade	Min. Nominal RSI	3.87	3.34 + 0.88 ci	3.34 + 0.88 ci
	Max. U	0.333	0.280	0.280
	Min. Effective RSI	3.00	3.58	3.58
Basement Walls ⁽⁶⁾	Min. Nominal RSI	3.52 ci	2.11 + 1.76 ci	2.11 + 0.88 ci
	Max. U	0.269	0.272	0.355
	Min. Effective RSI	3.72	3.67	2.81
Below Grade Slab Entire Surface > 600 mm Below Grade	Min. Nominal RSI	-	-	-
	Max. U	-	-	-
	Min. Effective RSI	-	-	-
Heated Slab or Slab ≤ 600 mm Below Grade	Min. Nominal RSI	1.76	1.76	1.76
	Max. U	0.510	0.510	0.510
	Min. Effective RSI	1.96	1.96	1.96
Edge of Below Grade Slab ≤ 600 mm Below Grade	Min. Nominal RSI	1.76	1.76	1.76
Windows and Sliding Glass Doors	Max. U	1.6	1.6	1.6
	Energy Rating	25	25	25
Skylights	Max. U	2.5	2.5	2.5
Space Heating Equipment	Min. AFUE	96%	96%	94%
HRV	Min. SRE	75%	75%	70%
Domestic Water Heater	Min. EF	0.8	0.7	0.8

Notes to Table 3.1.1.2.A (SI):

(6) In the case of basement wall assemblies, where RSI 3.52 ci is required RSI 2.11 + 1.76 ci is permitted to be used or vice versa; or where RSI 2.11 + 0.88 ci is required, RSI 2.64 ci is permitted to be used or vice versa.



SB-12

ONTARIO BUILDING CODE

The SB-12 Chapter 3 requirements have increased the energy efficiency levels for new, low-rise homes by 15%. The minimum efficiency requirements for envelopes and mechanical systems have increased.

SB-12 Chapter 3 continues to divide the province into two climate zones: Zone 1 for locations with less than 5000 heating degree days, and Zone 2 for locations with 5000 or more heating degree days. This brochure focuses on Zone 1.

SB-12 Chapter 3 continues to offer a prescriptive compliance option that includes builder option packages, shown in the chart to the right.

Amvic's SilveRboard Graphite XS allows builders to cost effectively meet the requirements of Chapter 3 of Supplementary Standard SB-12 of the Ontario Building Code.



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SB-12 ONTARIO BUILDING CODE

ENERGY EFFICIENCY REQUIREMENTS FOR ONTARIO

ZONE 1

