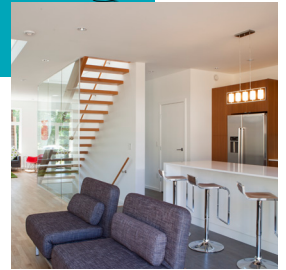


ROCKWOOL Comfortboard™ 80

Exterior non-structural insulated sheathing board used as continuous insulation in high-performance wall systems and more applications.



ROCKWOOL™ Exterior Wall Solutions

ROCKWOOL Pushes the Building Envelope Forward

As the building industry seeks new and innovative ways to save energy and create quieter and safer homes, ROCKWOOL leads the way with a multitude of exterior and interior insulation products designed to improve the performance of the building's envelope.

ROCKWOOL Comfortboard™ 80 is a rigid stone wool insulation board used as a non-structural sheathing product in residential and commercial construction. It is designed to provide increased thermal performance to the building envelope. This board is non-combustible, vapor permeable, water repellent and sound absorbent. It has also received ICC-ES validated product acceptance in accordance to IRC and IBC for the following uses:

- Non-structural thermal insulation in non-fire-resistive rated dwellings
- Exterior perimeter insulation around foundation
- Under flat concrete slab
- A component of residential wood-framed cathedral ceilings
- In areas where probability of termite infestation is 'very heavy'



ESR-3773

ASTM C612 Type IVB
Flame Spread & Smoke Developed Index = 0/0

Other ROCKWOOL stone wool insulation products:

- ROCKWOOL Comfortboard™ 110 Rigid Insulation Board
- ROCKWOOL Comfortbatt® Thermal Insulation
- ROCKWOOL Safe'n'Sound® Soundproofing insulation
- ROCKWOOL Roxul Safe™ 45 Fire Separation Board



ROCKWOOL Comfortboard™ 80 and 110 can be used in both residential and commercial construction.

- 1 Comfortboard™ 80 on exterior wall (outside)
- 2 Comfortbatt® R14/15 on a 2 x 4 wall
- 3 Comfortbatt® R22/23 on a 2 x 6 wall
- 4 Comfortbatt® R28/R30 in a cathedral ceiling

- 5 Comfortbatt® R28/30 + Comfortbatt® R14/R15 parallel on the attic
- 6 Multi-unit partition wall with 3.5" Comfortbatt® on both sides and ROCKWOOL ROXUL SAFE™ 45 as fire separation board

- 7 Basement Wall – Comfortboard™ 80 (1.5") against the concrete wall (moisture barrier behind the Comfortboard™ 80) with wood studs in front and Comfortbatt® R14/15 in the studs (basement system)

- 8 Safe'n'Sound® on interior partition and basement ceiling
- 9 Comfortboard™ 80 on exterior foundation wall below grade

Superior Building Envelope Performances

As society demands more energy efficient buildings, codes and builders are responding by increasing the R-value of the building enclosure, in particular, the above-grade wall. Given that the cavity of the standard 2 x 6 wood frame wall used in low-rise housing is already filled with insulation, the clear path forward to higher R-values is to add layers of exterior insulation.

ROCKWOOL Comfortboard™ 80 is a rigid stone wool insulation board fastened to the outside face of the exterior studs used in residential construction and designed to provide increased thermal performance to the building envelope. The stone wool-based insulation is made from basalt rock & slag, it features up to 40% recycled content. The product delivers thermal and fire-resistant properties that other types of insulations can't match.

As building codes adjust to increased effective R-value requirements, the need for insulated sheathing will increase accordingly, and Comfortboard™ 80 leads the way as the exterior insulation of choice for residential applications.

Today, building codes are moving to mandate "effective R-values" vs. nominal – and insulated exterior wall sheathing will play a major role to help builders achieve this requirement. ROCKWOOL Comfortboard™ 80 is the better sheathing insulation.



As an exterior insulation, ROCKWOOL Comfortboard™ 80 is fastened to the exterior OSB/plywood sheathing or structural stud wall and is designed to provide increased thermal performance to the building envelope

Matt Risinger Takes Thermal Performance To A New Level

Custom Home in Austin, Texas That Goes Beyond Code

ROCKWOOL Leads The Way

The house was framed using LVL 2x6 studs – a plywood stud that's typically only used in the headers and beams. This provided double the strength of traditional 2x6 framing. The prevalence of wood in the structure meant that there was an even greater need to control moisture. Matt and his team used a vapor-open yet airtight peel & stick house wrap and ROCKWOOL's continuous insulation product Comfortboard™ 80 on the exterior.

While Austin would fall into Zone 2 on the climate map, the methods used in this build would be sufficient up to Climate Zone 5. And, despite being over 170 miles from the Gulf Coast, this home was built to withstand a coastal environment; including extreme weather events like hurricanes and tropical storms, as well as the heightened humidity levels that come with building in the hot/humid Southern US.

Comfortboard™ is a vapor-open insulating solution; this ensures the house will dry to the outside. The team used 2" Comfortboard™ 80 to achieve an R6 rating. This application is well beyond current building codes, but any fluctuations in temperature – such as a cold snap – or changes in humidity would not affect the structure's moisture control.

Self-motivated builders seek to raise their own standards; an approach that makes good business sense. This presents a significant benefit to potential clients and enhances the demand for quality-built homes.

Using the Home Energy Rating System index – the industry standard for measuring a home's efficiency – this house achieved a score of 48; roughly 50% more efficient than the standard code-built home.

"The exterior insulation will lead to a lifetime of energy savings, better durability for the structure - since we don't have to risk any negative impacts inside the house caused by condensation - and we're providing the added benefit of fire resistance."

Matt Risinger



What Makes ROCKWOOL™ the Insulation of choice for many Architects & Builders?

Factors That Contribute to Superior Thermal Performance

With informed consumers and the building industry pushing for innovative solutions that are truly energy efficient, ROCKWOOL raises the bar in developing wall systems with excellent long-term thermal performance. This is the result of two inherent properties in insulation systems – lack of thermal loss due to dimensional changes, and product that is not produced with blowing agents, which can off-gas and result in lower long-term thermal performance.

As well, the use of ROCKWOOL Comfortboard™ 80 in conjunction with Comfortbatt® in the wall cavity contributes to a higher effective R-value wall system, increasing the performance of the residential building envelope.

Fast Outward Drying

Vapor-permeable insulation like ROCKWOOL Comfortboard™ 80 has the added benefit of allowing fast outward drying during cold weather. This dries the wood-frame cavity very quickly, even if the framing is wet from construction or becomes wet because of incidental water leaks.

Decreased Thermal Bridging

ROCKWOOL Comfortboard™ 80 insulation helps reduce thermal bridging through wood studs, leading to a better performing thermal wall. In a typical single-family building, wood studs make up 25% of the wall surface, so it's important to ensure the use of exterior insulation to complete the building envelope.

Dimensional Stability

The dimensional stability of an insulation material is necessary for the faultless function of the wall system. Dimensional changes in materials vary according to their physical properties.

Thermal expansion co-efficients express the rate at which materials shrink or expand when cooled or heated. Made from stone wool, ROCKWOOL Comfortboard™ 80 insulation has a smaller thermal expansion coefficient than insulation materials such as foam plastics. Poor dimensional stability can cause shrinking, expansion, and buckling of a system's insulation. These actions can lead to thermal bridging, waterproofing breaches, and unpredictable insulation performance.

Material Type	Expansion Co-Efficient 10-6 m/m°C	Actual Expansion at Temperature Difference 50° on a 10 Meter Board (mm)
Plywod (Dry)	3.5	2
Stone Wool	5.5	3
Concrete	12	6
Steel	12	6
Expanded Polystyrene	70	35
Extruded Polystyrene	80	40
Polyurethane	100	50
Polyisocyanurate	120	60

Some foam products may be considered vapor retarders when in excess of 2 inches. This can substantially affect the drying potential of the wall cavity and restrict the wall system from drying out, increasing the chance of mold and mildew growth. A 2" layer of XPS has an approximate perm rating of 0.55, which is classified as semi-impermeable. In comparison, Comfortboard™ 80 has a perm rating of 30 and is classified as vapor-permeable.



ROCKWOOL™ Stone Wool Outperforms Plastic Foams and Fiberglass

More "Breathability" than Plastic Foams

Comfortboard™ 80 is moisture resistant, yet vapor-permeable insulation (30 perms) and will allow transient vapors to pass through without restriction. This unique vapor-permeable quality of insulation allows for an increased potential for drying "breathability" without trapping moisture in the wall assembly. The stone wool insulation does not wick water, which means that any bulk water that contacts the outer surface will drain and not be absorbed into the body of the insulation.

Better Acoustics

As building trends move towards higher density communities, it's time to start thinking about improving acoustics on exterior walls – planes, trains and automobiles all contribute to noisier living space and with a ROCKWOOL stone wool wall system, that noise can be significantly reduced. Compared to other types of insulation, the stone wool wall systems provides increased density and effectively reduces airflow and, essentially, sound transmission.



Results:

Stone wool on the outside of the studs will at a maximum increase water content from 0.01 to 0.12 and Comfortbatt® between the studs from 0.01 to 0.10. XPS as an increase from .23 to .77 and fiberglass between the studs from .41 to 1.87. Ten air changes/ hour were included in the calculation.

Acoustical Performance

AS™ C423 CO-EFFICIENTS AT FREQUENCIES

Thickness	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
1.5"	0.21	0.64	0.92	1.00	0.95	1.01	0.90
2.0"	0.43	0.78	0.90	0.97	0.97	1.00	0.90
3.0"	0.75	0.82	0.89	0.94	1.00	1.00	0.90

Wall with XPS [Water Content (kg/m3)]

Layer/Material	Start of Calc.	End of Calc.	Min.	Max.
Brick (Old)	3.34	9.34	1.76	51.08
Air Layer 25 mm	1.88	7.72	0.89	10.16
1" Extruded Polystyrene Insulation (XPS)	0.31	0.58	0.23	0.77
Spun Bonded Polyolefine Membrane (SBP)	0.00	0.00	0.00	0.00
Oriented Strand Board	83.25	78.66	71.09	89.53
Fiberglass	1.86	0.88	0.41	1.87
Vapor Retarder (0.1 perm)	0.00	0.00	0.00	0.00
Interior Gypsum Board	8.65	4.43	2.75	8.65

Wall with ROCKWOOL Comfortboard™ 80 [Water Content (kg/m3)]

Layer/Material	Start of Calc.	End of Calc.	Min.	Max.
Brick (Old)	3.34	9.36	1.94	51.50
Air Layer 25 mm	1.88	8.15	0.97	9.71
1.5" ROCKWOOL Comfortboard™ 80	0.02	0.04	0.01	0.12
Spun Bonded Polyolefine Membrane (SBP)	0.00	0.00	0.00	0.01
Oriented Strand Board	83.25	90.99	49.79	95.28
ROCKWOOL Comfortbatt®	0.07	0.05	0.01	0.10
Vapor Retarder (0.1 perm)	0.00	0.00	0.00	0.00
Interior Gypsum Board	8.65	4.44	2.75	8.65

ROCKWOOL™ Stone Wool: Fire-Resistant, Non-Combustible Insulation

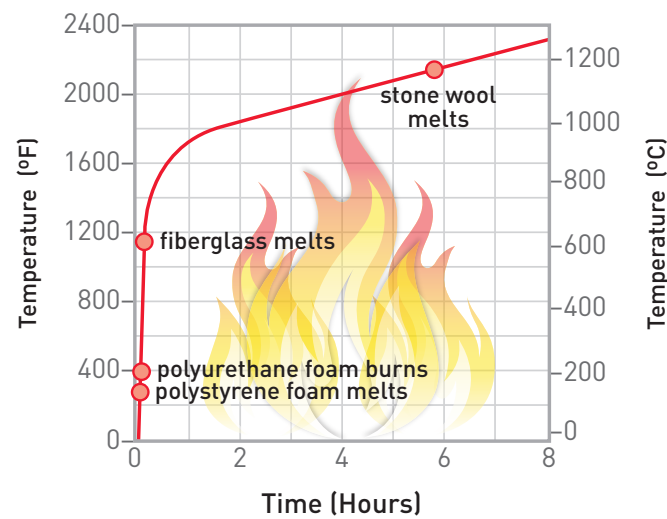
A key feature of ROCKWOOL™ insulation is fire resistance. Comfortboard™ 80 is classified as “non-combustible” as determined by ASTM E136 and CAN4-S114. It will not develop toxic smoke or promote flame spread, even when directly exposed to fire, as most other insulation materials do. By comparison, combustible extruded polystyrene (XPS) foam results, when tested to ASTM E84, typically achieve smoke developed up to 175 and can contribute to the spread of fire. The risk of fire spread during construction or after occupancy is considerably reduced when non-combustible ROCKWOOL Comfortboard™ 80 is used.

Fire Safety: Stone Wool Versus Foam

Actual fires like the Shanghai fire (2010) or the Grenfell Tower fire in London (2017), serve to raise fire safety issues not only when a building is in operation but when it is also under construction (new construction or renovation).

In the case of the Shanghai fire, foam insulation was ignited accidentally during construction and quickly spread through the building exterior. Because of these safety concerns, ROCKWOOL firmly believes in the added value that passive fire resistance provides for buildings.

Temperature Development in a Standard Fire (ASTM E119)

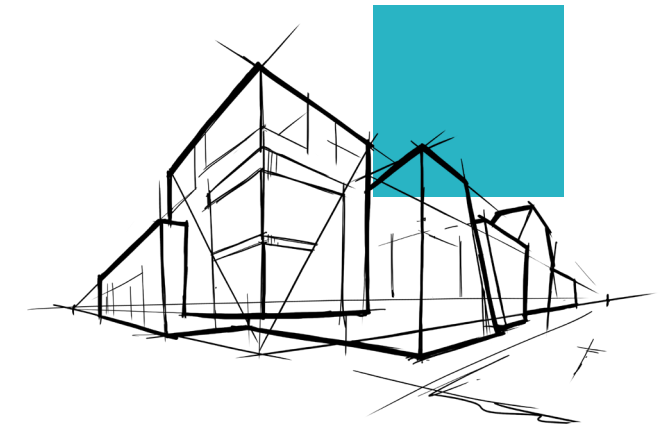


The severity of the Shanghai fire was partially a result of the use of urethane foam insulation, which aided in the spread of flame and smoke.

Fire Performance

Specification	Test	Result
ASTM E 136	Behavior of Materials at 750 °C (1382°F)	Non-Combustible
CAN/ULC S114	Test for Non-Combustibility	Non-Combustible
ASTM E 84(UL 723)	Surface Burning Characteristics	Flame Spread = 5 Smoke Developed = 10
CAN/ULC S102	Surface Burning Characteristics	Flame Spread = 5 Smoke Developed = 10

ROCKWOOL™ Stone Wool: Meeting the Demands for Higher R-Values of Tomorrow



Building Envelope Performance Matrix

				Thermal Batt Insulation									
				Comfortbatt®		Comfortbatt®		Comfortbatt®		Comfortbatt®			
Continuous Insulation				16" On Center		24" On Center		16" On Center		24" On Center			
				3.5"		3.5"		5.5"		5.5"			
				Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.		
				R14	R15	R14	R15	R22	R23	R22	R23		
A	Comfortboard™ 80	1.25"	R 5.0	19.00	20.00	19.00	20.00	27.00	28.00	27.00	28.00	NOMINAL R-VALUE	
				15.96	16.66	16.36	17.06	21.14	21.84	21.77	22.42	EFFECTIVE R-VALUE	
B	Comfortboard™ 80	1.5"	R 6.0	20.00	21.00	20.00	21.00	28.00	29.00	28.00	29.00	NOMINAL R-VALUE	
				16.96	17.66	17.36	18.06	22.14	22.84	22.77	23.42	EFFECTIVE R-VALUE	
C	Comfortboard™ 80	2.0"	R 8.0	22.00	23.00	22.00	23.00	30.00	31.00	30.00	31.00	NOMINAL R-VALUE	
				18.96	19.66	19.36	20.06	24.14	24.84	24.77	25.42	EFFECTIVE R-VALUE	
D	Comfortboard™ 80	3.0"	R 12.0	26.00	27.00	26.00	27.00	34.00	35.00	34.00	35.00	NOMINAL R-VALUE	
				22.96	23.66	23.36	24.06	28.14	28.84	28.77	29.42	EFFECTIVE R-VALUE	
E	NONE			14.00	15.00	14.00	15.00	22.00	23.00	22.00	23.00	NOMINAL R-VALUE	
				10.96	11.66	11.36	12.06	16.14	16.84	16.77	17.42	EFFECTIVE R-VALUE	

Bridging The Gap Between Stated R-Value Vs Effective R-Value

A material's R-value is the measure of its resistance to heat flow. The higher the R-value, the more the material insulates. Stated R-value tests measure only thermal resistance, not taking into account factors such as:

- Air infiltration due to leakage through gaps
- Permeability of system components
- Convection flows within the wall system
- Thermal mass of components
- Thermal bridging across the building envelope

While the stated or nominal R-value of an insulation product is important, excluding factors such as those listed will alter the effective R-value of the wall system.

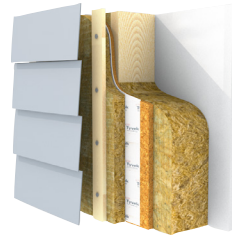
In real-world performance, the installation of ROCKWOOL Comfortboard™ 80 as the sheathing and Comfortbatt® as the wall cavity insulation results in a building envelope that is less susceptible to air infiltration, slumping, and internal convection, especially when compared to fiberglass, plastic foams and other insulation products.

ROCKWOOL™ Wall Assemblies: Applications and Installation

Wall Applications (Outside Wall to Interior Wall)

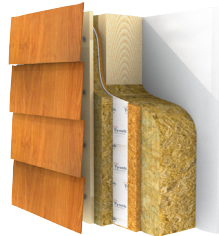
Vinyl Wall Components

- 1 Vinyl Siding
- 2 Fasteners
- 3 1 x 3 Furring Strips
- 4 1.25" (R5) to 3" (R12) of Insulating ROCKWOOL Comfortboard™ 80 Sheathing
- 5 Exterior Air/Moisture Barrier Membrane
- 6 Structural Sheathing
- 7 (2 x 6) Stud Wall @ 24" o.c.
- 8 ROCKWOOL Comfortbatt® R22/R23 Stud Cavity
- 9 Vapor Control Layer
- 10 Gypsum Wall Board



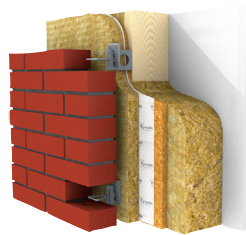
Wood Fiber Wall Components

- 1 Wood Lay Siding
- 2 Fasteners
- 3 1 x 3 Furring Strips,
- 4 1.25" (R5) to 3" (R12) of Insulating ROCKWOOL Comfortboard™ 80 Sheathing
- 5 Exterior Air/Moisture Barrier Membrane
- 6 Structural Sheathing
- 7 (2 x 6) Stud Wall @ 24" o.c.
- 8 ROCKWOOL Comfortbatt® R22/R23 Stud Cavity
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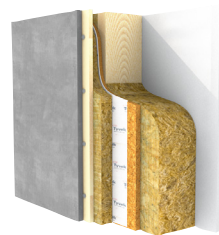
Brick Wall Components

- 1 Brick
- 2 Air Space
- 3 Metal Brick Ties
- 4 1.25" (R5) to 3" (R12) of Insulating ROCKWOOL Comfortboard™ 80 Sheathing
- 5 Exterior Air/Moisture Barrier Membrane
- 6 Structural Sheathing
- 7 (2x6) Stud Wall @ 24" o.c.
- 8 ROCKWOOL Comfortbatt® R22/R23 Stud Cavity
- 9 Vapor Control Layer
- 10 Gypsum Wall Board



Cement Board Wall Components

- 1 Cement Board
- 2 Fasteners
- 3 1 x 3 Furring Strips
- 4 1.25" (R5) to 3" (R12) of Insulating ROCKWOOL Comfortboard™ 80 Sheathing
- 5 Exterior Air/Moisture Barrier Membrane
- 6 Structural Sheathing
- 7 (2 x 6) Stud Wall @ 24" o.c.
- 8 ROCKWOOL Comfortbatt® R22/R23 Stud Cavity
- 9 Vapor Control Layer
- 10 Gypsum Wall Board



Installation Recommendations

ROCKWOOL Comfortboard™ 80 high-performance residential wall system boards should be installed on the exterior wood stud frame in combination with Comfortbatt® insulation within the wood stud cavity.

How to Attach the Insulation Boards

Comfortboard™ 80 should be attached to wood studs using roofing nails (or wood screws) with heads/washers with a minimum diameter of 1" (25 mm) at spacing no more than 12" on center along the perimeter of the board and along the studs. When properly installed, the product's rigid, yet flexible edges allow for a tightly butted edge where boards meet on the wall, further increasing the building's thermal performance.

Vinyl and Wood Siding

Available Sizes				
Thickness	1.25"	1.5"	2.0"	3.0"
R-value	R5	R6	R8	R12

Standard board sizes available 2' x 4' and 3' x 4'. Check with dealer for non-standard board sizes.

- Minimum 1" x 3" furring strip be placed vertically with screw attachment of 16" o.c. for 16" on wood studs and 12" o.c. for 24" on center wood studs.
- #8 or #10 screws recommended.
- Each screw must have a minimum embedment of 1" into the wood stud or substrate.
- Brick
- Metal ties or anchors required for nailing into the framing through the insulation boards (to building code requirements).
- 1" (25 mm) space between the masonry and insulation required.
- Air/Moisture Barrier
- Air/moisture barrier is required as per building code and necessary for effective air tightness.
- Air/moisture barrier should be applied on the inner side of the insulation board and should be continuous.

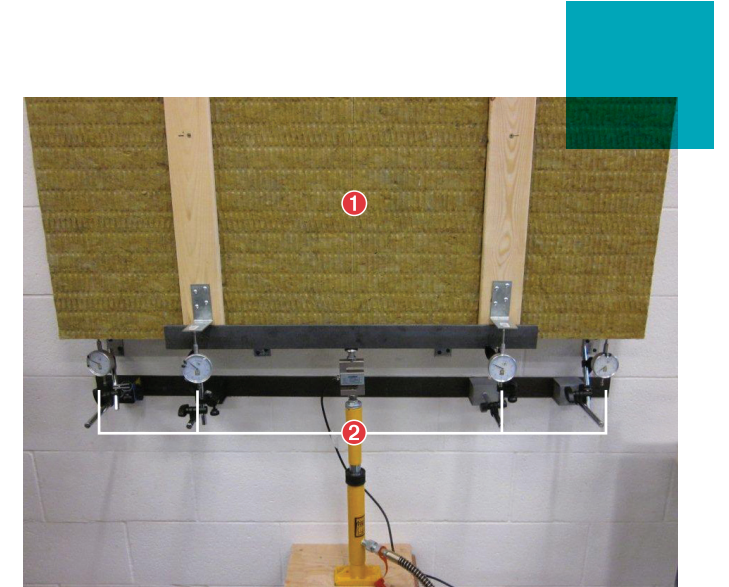
ROCKWOOL Comfortboard™ 80: Superior Cladding Load Performance

Exterior Insulation Deflection Test Results

World-renowned Building Science Corporation (BSC) performed load and deflection testing of Comfortboard™ 80 under various fastener embedded situations with the results shown below.

Under common cladding loads, all the insulations tested showed very little deflection (<0.01" [0.25 mm]) up to 12 pounds per square foot (psf) at the loads imposed by lap siding (of wood, vinyl, or fiber cement).

The testing also showed no significant difference at various fastener embedment (in framing, in OSB or combination) at loads less than 20 psf. The tests assumed studs at 24" o.c. and fasteners at a maximum of 16" vertical spacing through 1 x 3 furring strips to simulate worst-case scenario.



- 1 ROCKWOOL Comfortboard™ 80 attached to wall frame.
- 2 Hydraulic ram with load cell and deflection gauges measuring strapping movement.

The purpose of the study was to quantify the relationship between cladding gravity loads and deflection under cladding weights up to 30 pounds PSF. Results: All insulations showed minimal load deflection.

Exterior Insulation Load and Deflection Performance

Summary of Deflection Results at 1000 lbs					Est Deflection (inches) in Service for Typical Cladding Loads	
Test Series	Test Description	1st Loading [inches]	2nd Loading [inches]	3rd Loading [inches]	Vinyl Siding [1 PSF]	Fiber Cement Siding [4 PSF]
1	1 ¼" Comfortboard™ 80, #8 3" screws, all embedded in framing	.034	.018	0.19	< 0.01	< 0.01
2	1 ¼" Comfortboard™ 80, #8 3" screws, none embedded in framing	.050	.026	.026	< 0.01	< 0.01
3	1 ¼" Comfortboard™ 80, #8 3" screws, embedded in top & bottom plate	0.90	0.36	.032	< 0.01	< 0.01
4	1 ¼" Comfortboard™ 80, #10 3" screws, all embedded in framing	.030	.016	.016	< 0.01	< 0.01
5	1 ¼" Comfortboard™ 80, 16d 3.5" nails, all embedded in framing	.043	.026	.027	< 0.01	< 0.01
6	3" Comfortboard™ 80, #10 5" screws, all embedded in framing	.047	.023	.023	< 0.01	< 0.01

At the ROCKWOOL Group, we are committed to enriching the lives of everyone who comes into contact with our solutions. Our expertise is perfectly suited to tackle many of today's biggest sustainability and development challenges, from energy consumption and noise pollution to fire resilience, water scarcity and flooding. Our range of products reflects the diversity of the world's needs, while supporting our stakeholders in reducing their own carbon footprint.

Stone wool is a versatile material and forms the basis of all our businesses. With more than 11,000 employees in 39 countries, we are the world leader in stone wool solutions, from building insulation to acoustic ceilings, external cladding systems to horticultural solutions, engineered fibres for industrial use to insulation for the process industry and marine and offshore.

AFB®, AFB evo™, CAVITYROCK®, Comfortbatt®, CONROCK®, CURTAINROCK®, ROCKBOARD®, TOPROCK®, MONOBOARD®, ROCKWOOL MULTIFIX™, Comfortboard™, FABROCK™, ROCKWOOL ROXUL SAFE™ and ROCKWOOL PLUS™ are trademarks of ROCKWOOL. SAFE'n'SOUND® is a registered trademark used under licence.



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