

ROCKWOOL Board Insulation Attachment Guide

How to Use this Guide

This ROCKWOOL Board Insulation Attachment Guide provides recommendations for attaching ROCKWOOL semi-rigid and rigid board insulation products for most common applications, when used as part of a cladding attachment system or as plain board installation. This guide is intended to assist design professionals when designing the attachment systems used with ROCKWOOL stone wool insulation boards. These recommendations are for information purposes only as the exact requirements may vary based on the project specific design and exposure considerations

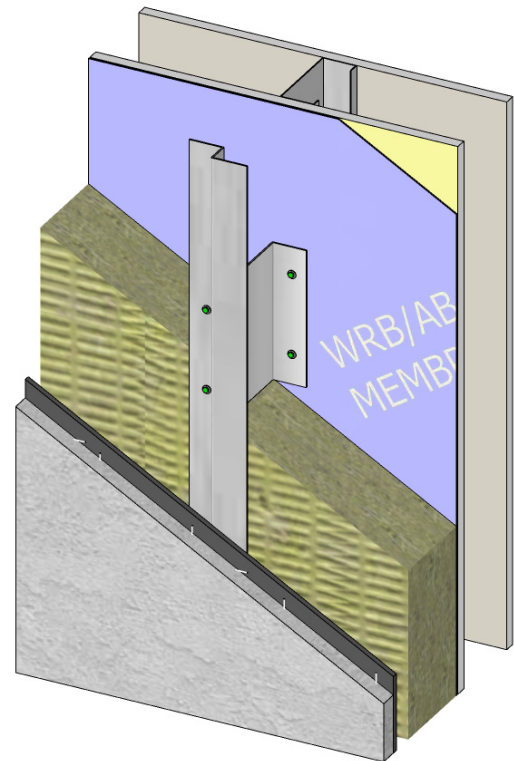
The effective thermal performance of wall assemblies using ROCKWOOL board insulation products will be impacted by the attachment method used and the installation. When ROCKWOOL boards are attached to a substrate, the attachment method must be able to hold the boards flush with the substrate in a continuous fashion for the intended service life of the insulation. ROCKWOOL recommends designers obtain validation from the attachment product manufacturers to ensure the proposed solutions meet the installer's and client's needs.

Installing continuous insulation is an effective way to achieve higher thermal performance in wall assemblies, and the use of continuous exterior insulation is common in commercial and residential construction due to more stringent building performance and energy code thermal performance requirements.

ROCKWOOL board insulation products can be installed over various substrates in various applications. ROCKWOOL semi-rigid and rigid board insulation is most commonly installed as a component of a cladding attachment system, where in some systems, the insulation aids in the structural support for the cladding (i.e., strapping with long screws). For this reason, the installation of ROCKWOOL boards will vary depending on the application and type of cladding attachment system.

This guide addresses the permanent attachment of ROCKWOOL insulation boards which are not part of a cladding attachment system. However, a summary of when ROCKWOOL insulation boards is used with or as part of cladding attachment systems is provided for the following systems:

- ▶ Continuous Insulation with Strapping
- ▶ Continuous Insulation with Clips/Girts/Rails
- ▶ Continuous Insulation with Masonry Ties

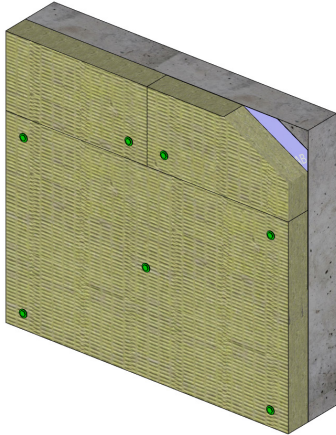


The methods for attaching ROCKWOOL boards in conjunction with cladding attachment systems have also been covered in various ROCKWOOL guides, which are referenced at the end of this guide.

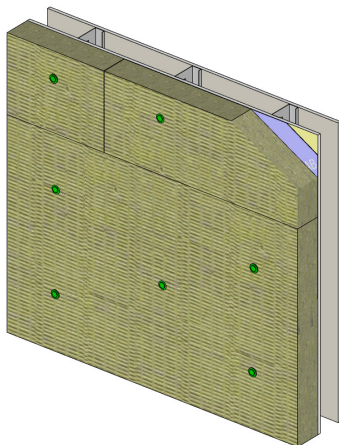
Unlike with insulation board products, ROCKWOOL batt insulation does not require an attachment system as it is designed to be friction-fitted between framing. The attachment design and securement of ROCKWOOL insulation boards for roofing applications is not covered by this guide.

Attachment Method for Plain Board Insulation

Plain board insulation refers to the permanent attachment of ROCKWOOL board insulation where the attachment system is not part of a cladding attachment system. Examples of uses in construction are interior insulation on the underside of a parkade slab, exterior insulation on the underside of soffits, interior insulation at below grade walls, and interior wall insulation at unfinished spaces (mechanical space, crawlspace, etc).



ROCKWOOL board supported by 5 fasteners with washers over a solid surface (concrete) - fasteners are highlighted and oversized



ROCKWOOL board supported by 5 fasteners with washers over wood or metal studs - fasteners are highlighted and oversized, fasteners into wood or metal studs must hit studs

Mechanical Fasteners

For the permanent attachment of ROCKWOOL board insulation, ROCKWOOL recommends the boards be mechanically attached using mechanical fasteners with minimum 2" diameter washers.

Impaling Pins

Mechanically attached impaling pins are an acceptable attachment method for plain board insulation.

Adhesive backed impaling pins can also be considered for the permanent attachment of ROCKWOOL board insulation. In this case, ROCKWOOL recommends seeking validation from the attachment and/or adhesive manufacturer to determine if the impaling pins can adequately support the insulation and that the adhesive is compatible with the substrate upon which it will be adhered.

Adhesive Directly Applied to ROCKWOOL Boards

ROCKWOOL does not recommend the use of adhesives directly applied to ROCKWOOL board insulation for permanent attachment. However, a construction grade adhesive can be used for the temporary attachment of ROCKWOOL boards, before fastening connections are installed for permanent attachment. Construction grade adhesives must be compatible with ROCKWOOL stone wool boards and the intended substrate so that the adhesive does not damage the substrate or negatively effect its performance.

Number and Selection of Fasteners or Impaling Pins

When supporting ROCKWOOL semi-rigid and rigid insulation boards using only mechanical fasteners or impaling pins, ROCKWOOL recommends a minimum of 5 attachments per board.

Fasteners or impaling pins should be:

- ▶ Chosen in accordance with the substrate type,
- ▶ Capable of withstanding applied pull-out and shear-loads,
- ▶ Numerous enough and of large enough cross-section to prevent tear-through of the insulation under expected conditions, and
- ▶ Sufficiently durable to withstand the environment to which they will be exposed.

Fastener Depth

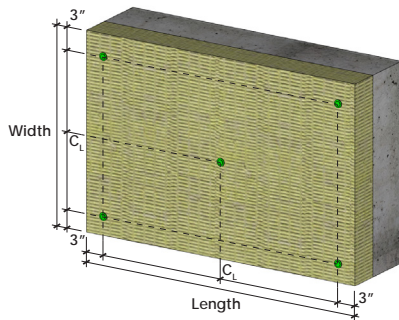
Embedded fastener depth will vary based on substrate. As a general rule, embed a minimum of 1.5" deep in wood studs and concrete. Extend at least 3 full threads past the flange of steel studs. Anti-unwinding fasteners (or alternative precautions) should be used for metal frame construction. The embedment should be validated with the fastener manufacturer.

Fastening Patterns

The dimension of the insulation boards dictates the minimum number of attachments required and their fastening pattern. This section provides examples for insulation boards up to 96" in length installed over a solid wall and a wood/metal stud wall.

Minimum 5 attachments required for solid and framed walls with the following board sizes

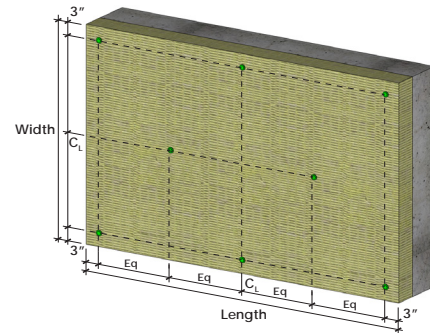
Thickness	Width	Length
1" to 6"	16"	48"
1" to 6"	24"	48"
3" to 5"	32"	48"



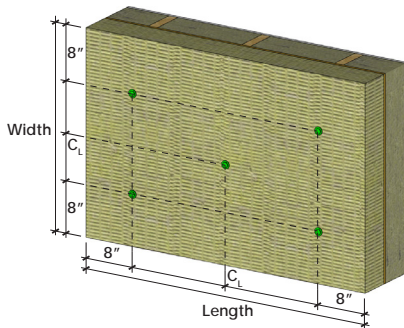
Fastening pattern over a solid surface with 5 attachments (32" x 48" ROCKWOOL insulation board over a concrete wall shown)

Minimum 8 attachments required for solid and framed walls with the following board sizes

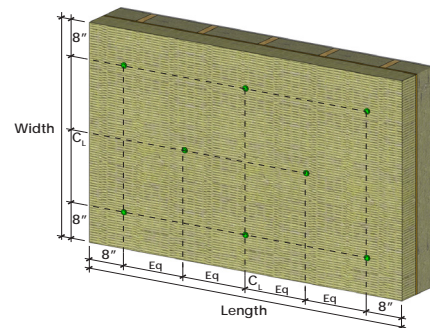
Thickness	Width	Length
1" to 3"	48"	72"
1" to 3"	48"	96"



Fastening pattern over a solid surface with 8 attachments (48" x 72" ROCKWOOL insulation board over a concrete wall shown)



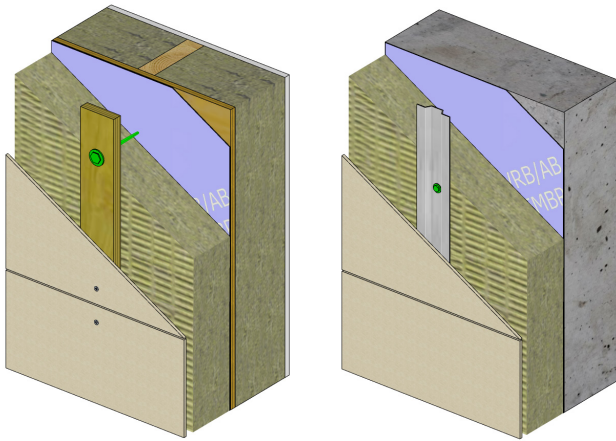
Fastening pattern over a framed wall with 5 attachments (32" x 48" ROCKWOOL insulation board over a wood stud wall shown)



Fastening pattern over a framed wall with 8 attachments (48" x 72" ROCKWOOL insulation board over a wood stud wall shown)

Attachment Method for Continuous Insulation with Strapping

This cladding attachment system uses strapping, such as treated wood furring strips or metal hat channels, on the front face of exterior rigid board insulation. The strapping is fastened with long screws through the insulation and into the backup wall. The cladding is then attached and supported with separate fasteners into the strapping.



Wood and steel strapping assemblies with ROCKWOOL insulation (note that fasteners are oversized and highlighted in green for clarity)

For more information on this cladding attachment system, please refer to our technical bulletin [Performance of Strapping Attachment on Walls with Long Screws Through ROCKWOOL Rigid Insulation](#).

Rigid continuous insulation boards, such as Comfortboard® 80 or Comfortboard® 110, are recommended for insulation supported cladding systems, as these products can typically provide the necessary compressive resistance for systems with lightweight and medium weight cladding.

Strapping

ROCKWOOL recommends installing strapping vertically to provide better drainage. For cladding types requiring horizontal strapping, perforated metal channels installed horizontally will allow for ventilation and drainage. If perforated channels cannot be used, ROCKWOOL recommends installing a first layer of vertical strapping to allow for drainage and ventilation, followed by a second layer of horizontal strapping to attach the cladding system.

Installation Tips

- ▶ To facilitate construction, fasteners (or a construction grade adhesive) can be used to hold the insulation in place prior to installation of the strapping. These temporary attachments need only be sufficient to hold the boards in place during construction, though consideration should be given to the expected weather conditions (i.e., wind) during construction to ensure this support is sufficient. Note that if fasteners are used, while they are not intended to provide the long-term attachment system for the insulation, these fasteners should typically not be removed and instead should remain in place to avoid creating a discontinuity in the sheathing membrane.
- ▶ Consider installing a starter row of board insulation at the base of the wall and installing strapping over the starter row extending vertically up the wall. Subsequent rows of board insulation can then be slid behind the strapping moving up the wall and will be supported by the board below.
- ▶ Double-thread screws for strapping attachment can be used with softer, less dense insulation to maintain strapping in position where insulation does not need to provide necessary compressive resistance for the system

Design Tables

Based on the testing work completed and engineering calculations, the following design tables are provided with respect to supporting the dead load of cladding systems installed using long screws through ROCKWOOL exterior stone wool insulation. The design tables assume ROCKWOOL Comfortboard® 80 exterior stone wool insulation with minimum compression strength of 439 psf (21 kPa) at 10% per ASTM C165 testing. Embedment refers to the embedment of the fastener into the stud, excluding the tapered tip of the fastener and the sheathing thickness. Values provided pertain to wall assemblies on low- to mid-rise buildings up to six storeys, built using typical wood and steel stud framing techniques. The higher wind loads expected on larger buildings requires specific structural design.

Long Screw Cladding Attachment Design Table with Comfortboard® 80

Fastening Patterns

Exterior Insulation Thickness	Maximum Vertical Screw Spacing	Minimum Screw Diameter	Minimum Screw Embedment	Minimum Strapping Size
16" o.c. Wood-Frame Wall Assemblies				

Light Weight Cladding < 5 lbs/ft²

up to 3"	24"	#10	1-1/2"	3/4" x 2-1/2"
>3" to 6"	16"			
>6" to 9"	16"	#12	1-1/2"	3/4" x 2-1/2"
>9" to 12"	8"			

Medium Weight Cladding 5 lbs/ft² to < 10 lbs/ft²

up to 3"	16"	#12	1-1/2"	3/4" x 3"
>3" to 6"	12"			
>6" to 9"	12"	#14	1-1/2"	3/4" x 3"
>9" to 12"	8"			

Heavy Weight Cladding 10 lbs/ft² to < 15 lbs/ft²

up to 3"	16"	#14	1-1/2"	3/4" x 3-1/2"
>3" to 6"	12"			
>6" to 9"	12"	5/16"	1-1/2"	3/4" x 3-1/2"
>9" to 12"	10"			

24" o.c. Wood-Frame Wall Assemblies

Light Weight Cladding < 5 lbs/ft²

up to 3"	16"	#10	1-1/2"	3/4" x 2-1/2"
>3" to 6"	12"			
>6" to 9"	12"	#12	1-1/2"	3/4" x 2-1/2"
>9" to 12"	6"			

Medium Weight Cladding 5 lbs/ft² to < 10 lbs/ft²

up to 3"	12"	#12	1-1/2"	3/4" x 3"
>3" to 6"	8"			
>6" to 9"	8"	#14	1-1/2"	3/4" x 3"
>9" to 12"	6"			

Heavy Weight Cladding 10 lbs/ft² to < 15 lbs/ft²

up to 3"	16"	#14	1-1/2"	3/4" x 3-1/2"
>3" to 6"	12"			
>6" to 9"	12"	5/16"	1-1/2"	3/4" x 3-1/2"
>9" to 12"	6"			

16" o.c. Steel Stud Wall Assemblies

Light Weight Cladding < 5 lbs/ft²

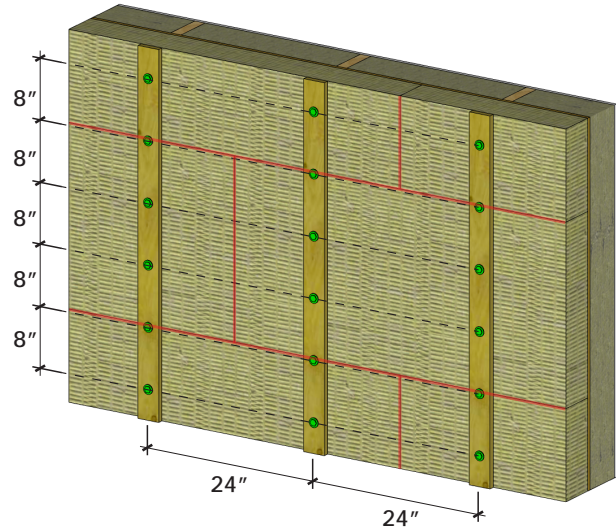
up to 3"	16"	#12	through stud flange	7/8" x 1-1/4" 20ga hat track
>3" to 6"	12"			
>6" to 9"	10"			

Medium Weight Cladding 5 lbs/ft² to < 10 lbs/ft²

up to 3"	12"	#12	through stud flange	7/8" x 1-1/4" 20ga hat track
>3" to 6"	10"			
>6" to 9"	8"			

Heavy Weight Cladding 10 lbs/ft² to < 15 lbs/ft²

up to 3"	12"	#14	through stud flange	7/8" x 1-1/4" 20ga hat track
>3" to 6"	8"			
>6" to 9"	6"			



Strapping fastening pattern for a 24" o.c. wood-frame wall assembly with 5" of ROCKWOOL Comfortboard® 80 exterior insulation and medium weight cladding 5 lb/ft² to < 10 lb/ft² (note that fasteners are oversized and highlighted in green for clarity)

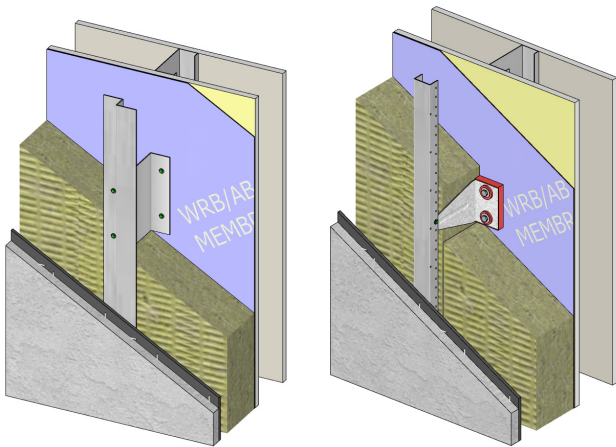
Strapping fastening patterns for ROCKWOOL rigid board insulation should be specified based on the backup assembly and project specific loads (weight of cladding).

Long screw fasteners must penetrate framing members like studs and this effects the potential horizontal spacing of the fasteners and strapping.

For additional guidance on the installation and information on the performance of ROCKWOOL rigid board insulation with strapping, please refer to [Comfortboard® 80 Installation Guide](#) and [Performance of Strapping Attachment on Walls with Long Screws Through ROCKWOOL Rigid Insulation](#).

Attachment Method for Continuous Insulation with Clips, Girts, and Rails

When using cladding systems that are supported by clips, girts, and rails, semi-rigid continuous insulation boards, such as ROCKWOOL Cavityrock®, are recommended, as this type of insulation can pressure-fit between the supporting members. In this arrangement, the insulation does not provide structural support for the cladding.



Assemblies with ROCKWOOL insulation in a system using clips, girts and rails for cladding attachment

Insulation Fasteners and Impaling Pins

While rigid insulation installed tight against clips, girts, or rails are supported by the hardware to some degree, with these types of system, only the insulation fasteners and impaling pins provide permanent support for the insulation.

The number of fasteners required is based on the recommendation from the previous sections, *Attachment Method for Plain Board Insulation*. However, the number of fasteners can be optimized if the cladding system already provides support. This should be determined and approved by a qualified design professional.

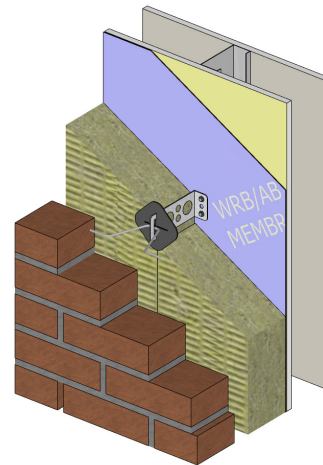
Recommendations from the manufacturer of the cladding attachment system should always be followed when using proprietary cladding attachment systems.

For additional guidance on the installation of ROCKWOOL semi-rigid insulation with clips, girts, and rails, refer to the [Cavityrock® Builders Guide](#).

Attachment Method for Continuous Insulation with Masonry Anchors & Ties

Wedges or clips installed over masonry anchors and ties can be used to secure ROCKWOOL semi-rigid or rigid stone wool boards to the backup wall. ROCKWOOL board insulation should conform around the ties and the backup wall.

If the masonry anchors or ties do not include an insulation retention system, the insulation boards should be attached using the designs indicated for plain board insulation.



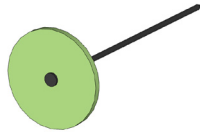
Assemblies with ROCKWOOL insulation in a system using masonry anchors and ties

The exact type and spacing of masonry anchors or ties should be determined based on the project specific requirements and by the anchor or tie manufacturer.

Insulation Attachment Examples

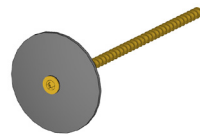
Plastic Cap Nails

Recommended for temporarily securing insulation and/or fastening insulation to wood and wood-based substrates.



Fasteners and Washers

Recommended for use with all types of ROCKWOOL stone wool insulation boards. Fastener should be the appropriate type for the substrate.



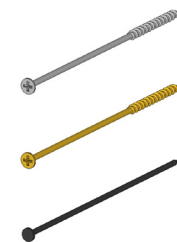
Metal Fasteners (for strapping)

Recommended for use with metal frame construction. May require anti-unwinding fasteners (or other precautions).



Wood Screws, Concrete Screws, Concrete Nails (for strapping)

Select appropriate fasteners for the intended supporting material and suitable for outdoor use when used on the exterior.



Dual Thread Fasteners (for strapping)

Recommended for use with softer, less dense insulation to maintain strapping in position and reduce the risk of compression deflection.



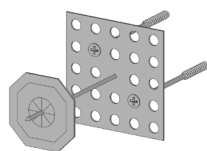
Insulation Fasteners

Recommended for fastening insulation to concrete, masonry block and through sheathing and studs.



Impaling Pins

Mechanically attached or bonded to the structure. Recommended for use with all types of ROCKWOOL stone wool boards.



Attachment Challenges + Recommendations

- ▶ ROCKWOOL recommends mechanically fastening board insulation for permanent attachment
- ▶ Fasteners should be selected based on installed condition and intended supporting material
- ▶ When using adhesive, select appropriate adhesive (i.e., adhesive backed impaling pins, construction adhesive directly applied to ROCKWOOL board insulation) for the intended substrate
- ▶ When using adhesive, consider condition of the substrate (i.e., dusty, wet, surface temperature)
- ▶ When using adhesive, follow manufacturer's installation (i.e., appropriate application pressure)
- ▶ The use of adhesive directly applied to ROCKWOOL board insulation should only be limited to temporary attachment
- ▶ Adhesive backed impaling can be used for permanent attachment with validation from the impaling pin or adhesive manufacturers
- ▶ Thermal cycling/wetting prior to the installation of insulation
- ▶ Consider static, wind, and seismic loads
- ▶ Ensure that final attachment systems are validated by a qualified design professional
- ▶ Failing to include a safety factor may result in failure of mechanical attachments

Additional Resources

Cladding Attachment Solutions Guide

www.rockwool.com/siteassets/o2-rockwool/documentation/technical-guides/commercial/cavityrock-and-comfortboard-cladding-attachment-solutions-technical-guide.pdf

Performance of Strapping Attachment on Walls with Long Screws Through ROCKWOOL Rigid Insulation

www.rockwool.com/siteassets/o2-rockwool/documentation/research/research-report/rockwool-test-results-design-tables-strapping-attachments.pdf

Structural Testing of Screws through Thick Exterior Insulation Report

www.rockwool.com/siteassets/o2-rockwool/documentation/research/research-report/rockwool-test-results-design-tables-strapping-attachments.pdf

Comfortboard® 80 Installation Guide

www.rockwool.com/siteassets/o2-rockwool/documentation/technical-guides/residential/comfortboard80-installationguide.pdf

Cavityrock® Builders Guide

www.rockwool.com/siteassets/o2-rockwool/documentation/technical-guides/commercial/cavityrock_builders_guide_techguide_en.pdf

Cavityrock® Black Accessories Bulletin

www.rockwool.com/siteassets/o2-rockwool/documentation/technical-bulletins/commercial/cavityrock-black-accessories-technical-bulletin.pdf

Technical Inquiries

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When penetrating or adhering to a water-resistive barrier (WRB), ROCKWOOL recommends referring to the attachment and membrane manufacturers to secure additional direction on installation method and material compatibility.

Fastening connections should be designed to withstand all the combined applied loads, including but not limited to dead-load and wind-load. Where applicable, consideration should be given to seismic-load, and live-load (not covered in this guide).

As ROCKWOOL does not supply fasteners or adhesives, it is the responsibility of the manufacturers of the fastenings or adhesives to comment on the performance of their products when managing the loads of ROCKWOOL insulation materials and other assembly components. ROCKWOOL makes no representations or warranties, express or implied, with respect to its recommendations for attaching the semi-rigid and rigid board products with fastenings and all warranties are disclaimed.

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Summary Table

The following table summarizes the different applicable attachment methods for common ROCKWOOL board insulation products based on their density, thickness and overall insulation board size.

Product Name	Density (lb/ft ³)	Board Thicknesses	Board Size	Applicable Attachment Methods			# of Required Attachments for Plain Board Insulation		
				Cladding with Strapping	Cladding with Clips/Girts	Cladding with Masonry Ties	5 Attachments Minimum	6 Attachments Minimum	8 Attachments Minimum
Cavityrock Monolithic Density	4.3	1" to 2"	16" x 48"		X	X	X		
			24" x 48"		X	X	X		
Cavityrock Dual Density	6.2 (Outer Layer, 5/8" thick) 3.8 (Inner Layer, remaining board thickness)	2.5" to 8"	16" x 48"		X	X	X		
			24" x 48"		X	X	X		
Comfortboard® 80	8.0	1" to 6"	24" x 48"	X	X	X	X		
			36" x 48"	X	X	X		X	
			48" x 72"	X	X	X			X
			48" x 96"	X	X	X			X
Comfortboard® 110	11.0	1" to 6"	24" x 48"	X	X	X	X		
			48" x 72"	X	X	X			X