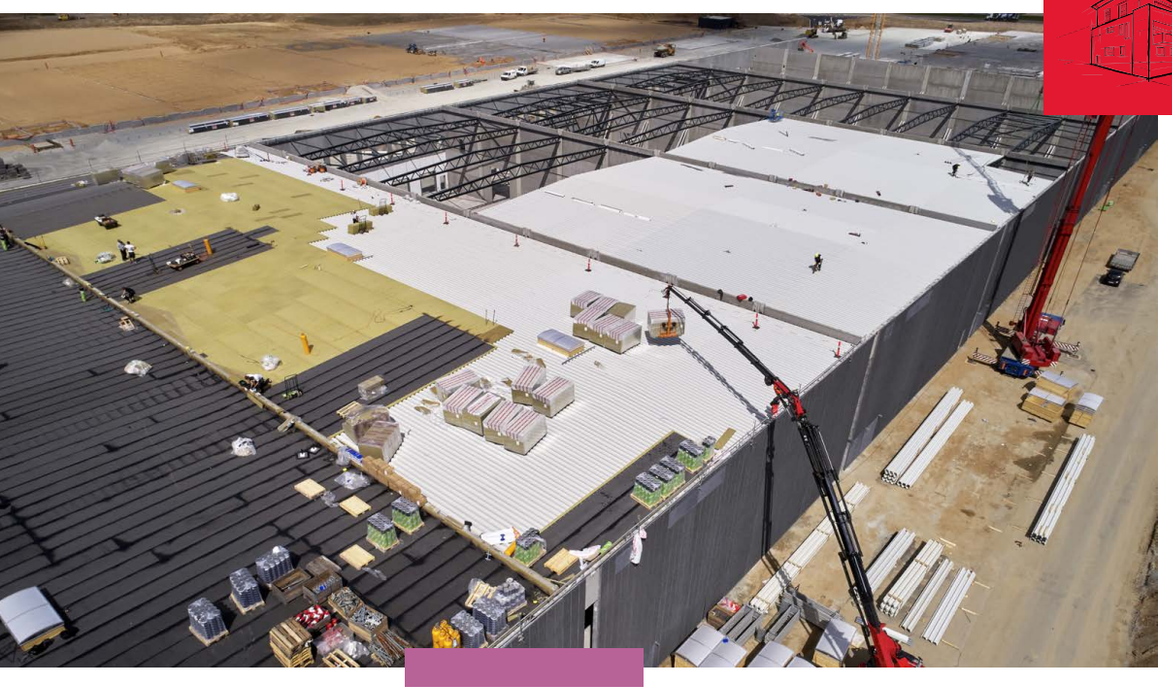
Technical Data Sheet
Flat Roof Insulation
1st November 2023



ROCKWOOL Hardrock & Roofrock

High compression strength insulation for flat roofs

ROCKWOOL Roofrock and Hardrock are stone wool insulation board compatible with a wide range of adhered and mechanically fixed waterproofing systems.

The high mechanical strength of this product can better guarantee the bearing capacity of the roofing system. Its excellent performance in fire resistance, insulation, acoustics and durability can enhance the overall performance of the system in terms of fire protection, thermal insulation and sound absorption & noise reduction, and also ensure the durability of the system.

The product is available in a wide range of sizes to suit most exterior application requirements in Australia and New Zealand.



ROCKWOOL Roofrock and Hardrock are stone wool insulation board that, in addition to thermal comfort, provides acoustic and fire resistance properties.

ROCKWOOL stone wool insulation, like the basalt rock it is made from, is non-combustible by nature with no chemical flame retardants. It is capable of withstanding temperatures exceeding 1,000°C.

For more information at www.rockwool.com/anz

ROCKWOOL Hardrock & Roofrock

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10 Additional Roof Loads

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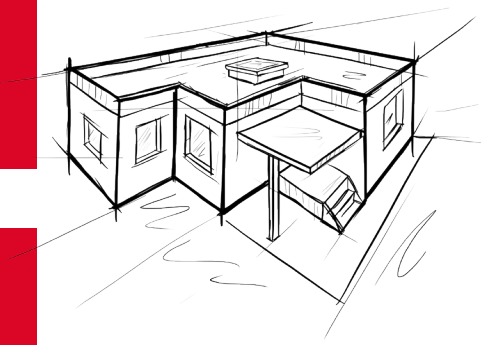




Photo courtesy of Tetra Pak

Project
Tetra Pak Factory, Binh Duong, Vietnam

Completed: 2018
Owner: Tetra Pak

For more information at www.rockwool.com/anz

ROCKWOOL Hardrock & Roofrock

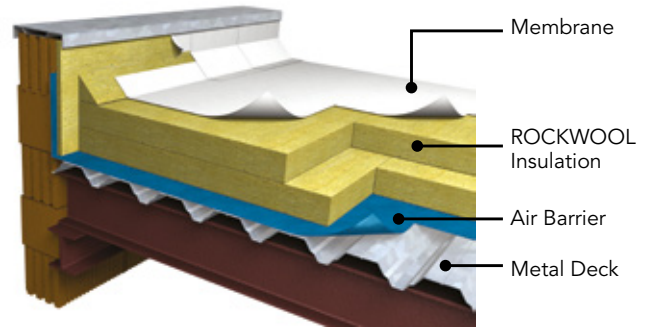
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Flat Roof Insulation
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Introduction

ROCKWOOL roofing boards provide a one stop solution to roofing insulation requirements. They are suitable for new and re-roofing applications on metal deck or concrete deck. ROCKWOOL insulation is approved by Factory Mutual (FM Approval) for Class 1 roof construction in membrane roofing systems and has proven track records in various international projects. The roofing boards have been developed to offer three types of roofing performances to address the challenges in membrane and metal roofing design for roof designers.

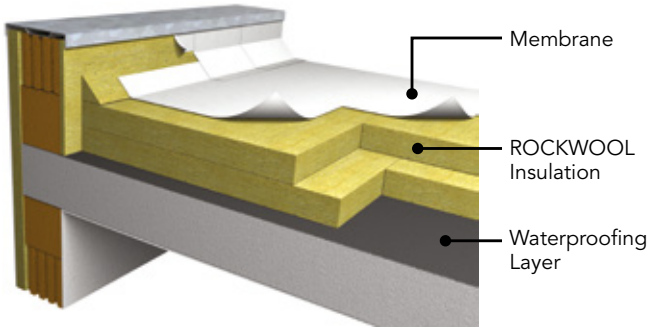
System Description

ROCKWOOL flat roof insulation solutions are specially designed for membrane and metal roof systems.



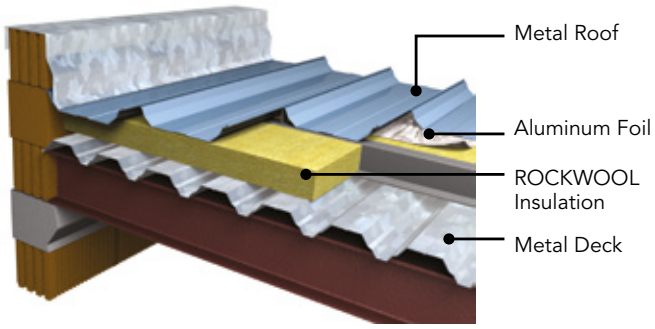
Steel Deck Roof System

ROCKWOOL roofing boards provides an unrivalled fire performance that combines with the excellent mechanical strength to meet all requirements and regulation needs. The superior properties of ROCKWOOL stone wool insulation enhances the overall performance of the membrane roof system in fire, thermal and acoustics, thus producing a durable and energy efficient roofing system. ROCKWOOL roofing boards with mechanically fixed single-ply roofing membrane system on metal deck is ideal for commercial and industrial buildings.



Concrete Deck Roof System

With the high thermal mass of the concrete roof deck, concrete roof have to be adequately protected during summer and winter periods. ROCKWOOL roofing boards provides excellent thermal properties to keep the interior temperature stable and comfortable. Furthermore, ROCKWOOL roofing boards is dimensionally stable and will not be affected by the variation of temperatures over time.



Twin Skin Metal Deck Roof System

The superior sound absorption characteristics of ROCKWOOL roofing boards provides an effective damping of sound resonance within twin skin metal deck. Combined with the added mass of the insulation, ROCKWOOL roofing boards with twin skin metal deck roof system provides an effective acoustic solution for a wide range of applications. ROCKWOOL roofing boards with twin skin metal deck roof system is ideal for educational institutions, airports, convention centres and other buildings where acoustic performance is an important criteria in building performance.

ROCKWOOL Hardrock & Roofrock

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General Insulation Benefit

ROCKWOOL roofing boards offer unrivaled combination of benefits for flat roof constructions.

a. Mechanical Strength

- ROCKWOOL roofing boards offer high resistance to compression and point loading in order to facilitate periodic maintenance of roof.
- The roofing boards effectively maintain a flat surface to allow rain water draining on the roof surface.

b. Fire

- ROCKWOOL roofing boards are non-combustible and can withstand at least 1000°C without melting according to ASTM E749.
- The roofing boards can effectively impede spread of fire and provide the critical extra minutes for occupants to escape.
- ROCKWOOL insulation also provides the highest Euro Fire Classification, A1 rating according to EN 13501-1, as a non-combustible product.
- ROCKWOOL boards do not produce any burning droplets, promote flashover or release excessive smoke during a fire.

c. Dimentional Stability

- ROCKWOOL roofing boards are made from stone, therefore the thermal coefficient of expansion of the boards is virtually zero.
- The boards do not shrink, warp or deform over time, hence providing the most stable substrate without causing undesirable stress on the roofing membrane.
- The dimensional stability of ROCKWOOL roofing boards eliminates the need for additional mechanical fasteners to prevent differential thermal expansion.

d. Acoustic

- The open fibre structure of ROCKWOOL insulation provides excellent sound absorbing properties.
- ROCKWOOL roofing boards are proven as the ideal acoustics insulation material to provide excellent sound insulation and reduced impact noise for flat roof constructions.
- When laid on perforated metal deck lining, the roofing boards are able to control room reverberation and enhance acoustic quality.

e. Thermal Performance

- ROCKWOOL roofing boards are dimensionally stable and ensure constant thermal resistance value. The roofing boards do not contain CFC's or HCFC' insulant that could diffuse from the board over time and reduce its R-value.
- The excellent thermal properties of the roofing boards assist the reduction of condensation built-up by the roofing system.
- ROCKWOOL roofing boards are compatible with all types of roofing membrane. No separation layer is required between the roof membrane and insulation to provide for an optimum design.

Compliance with the Australia NCC

These range of ROCKWOOL products when properly specified and installed, demonstrate compliance with the following requirements:

Thermal

Complies with AS/NZS 4859.1 and meets the requirements of NCC through adherence to NCC 2022 Volume 1 Section J4D3 (1), NCC 2019 Volume 1 Section J1.2(a), NCC 2019 Volume 2 Section 3.12.1.1(a) and state-prescribed variations.

Fire Hazard Properties

Adheres to NCC 2019 Volume 1 Specification C1.10 Clause 7 and NCC 2022 Specification 7 Clause S7C7 for insulation materials. When tested to AS1530.3, these products conforms to the "Spread of Flame" and "Smoke Developed" requirements outlined in NCC 2022 Specification 7 Clause S7C7 and NCC 2019 Volume 1 Specification C1.10 Clause 7.

Non-Combustibility

Complies with the non-combustibility standards of NCC 2022 Volume 1 C2D2 and NCC 2019 Volume 1 C1.9(a) or satisfies the testing criteria outlined in AS 1530.1.

Facings

ROCKWOOL Hardrock series is available as plain products and additionally with options of foil facing or glass tissue on one side or two-sided.

Packaging and Storage

ROCKWOOL Hardrock is shrink-wrapped in polyethylene sheets for ease of handling, transportation and storage. Products should be stored in doors or under waterproof covering.

Health & Safety

ROCKWOOL stone wool products are manufactured from FBS-1 stone wool. FBS-1 stone wool is safe to use and the fibre component of these products is listed by Safe Work Australia as Man-made Vitreous Fibre (stone wool) of low bio persistence as specified under Note Q in the Australian Hazardous Substances Information System and in the Australian Approved Criteria.

For more information at www.rockwool.com/anz

ROCKWOOL Hardrock & Roofrock

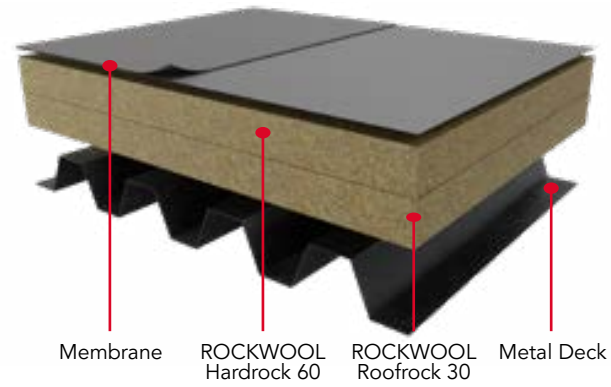
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Solutions for Flat Roof Insulation

To provide flexibility in design, cost and usage of membrane roofing system, ROCKWOOL roofing boards offer three different types of roofing insulation system to allow owners, designers and installers to achieve the desired performances of an ideal roof.

Flatroof Lite

The Flatroof Lite insulation solution offers a cost effective solution for built up bitumen membrane roof system. It satisfies the basic requirement for thermal, acoustic and fire performances. The system introduces Hardrock and Roofrock series of products to allow roof designers to achieve the required mechanical performances of the membrane roof system using the combination of both products. In Flatroof Lite roof insulation system, Roofrock 30 roofing board with the compression resistance of 30kPa is introduced as the bottom layer of the system. With the superior mechanical strength of Hardrock 60 roofing board, the insulation board is employed at the top layer to provide the stability for the overall system. Flatroof Lite is FM approved using the combination of Hardrock and Roofrock 30 insulation.



Performance of Flat Roof Lite Solution	
Insulation thickness	100mm
Insulation layer / thickness	HardRock 60 (Top) / 50mm RoofRock (Bottom) / 50mm
Thermal Resistance (R-Value, m^2K/W)	2.74
Compression Strength (Ơ10) kPa at 10% deformation in accordance to EN826	>30kPa
Point Load (Ơp) N at 5mm deformation in accordance to EN 12430	>500N

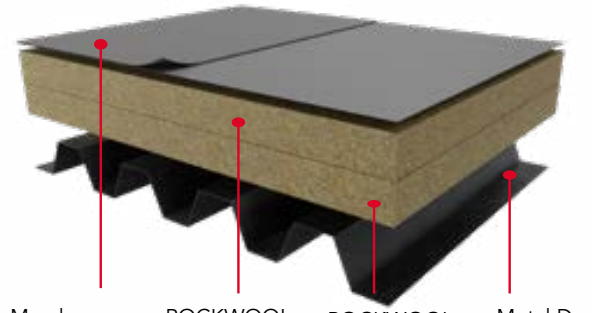
Technical Specification for Roofrock 30	
Normal Density	120kg/m^3
Thermal Conductivity	0.037W/mK at 23°C (ASTM C518)
Reaction to Fire	Non-combustible (AS1530.1) Euroclass A1 (EN13501-1)
Fire Hazard Properties	Ignitibility: 0 Spread of flame: 0 Heat evolved: 0 Smoke developed: 0-1 (AS1530.3)
Compression Strength	>30kPa at 10% deformation (EN826) (Ơ10)
Delamination Strength	>7.5kPa (EN1607)
Water Absoption (partial immersion)	<0.5kg/m^2 (EN ISO 29767)
Water Vapor Absoption	<1% Vol. (ASTM C 1104/C 1104M)
FM Approval	Class 1 and Non-combustible Roof Deck Construction (FM 4470)

ROCKWOOL Hardrock & Roofrock

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Flat Roof Plus

ROCKWOOL Flatroof Plus insulation system provides superior mechanical strength to meet all challenges on the roof. The 60kPa roofing boards provide resistance to foot traffic during periodic roof maintenance. With ROCKWOOL stateof-the-art technology, Hardrock 60 roofing boards delivers the combination of mechanical strength, lighter weight and resistance to fire. When tested to EN 1606, Flatroof Plus can withstand a permanent load of 3kPa.



Technical Specification for Hardrock 60	
Normal Density	160kg/m^3
Thermal Conductivity	0.038W/mK at 23°C (ASTM C518)
Reaction to Fire	Non-combustible (AS1530.1) Euroclass A1 (EN13501-1)
Fire Hazard Properties	Ignitibility: 0 Spread of flame: 0 Heat evolved: 0 Smoke developed: 0-1 (AS1530.3)
Compression Strength	>60kPa at 10% deformation (EN826) (Ơ10)
Point Load (Ơ p)	>500N at 5mm deformation (EN 12430
Delamination Strength	>7.5kPa (EN1607)
Water Absoption (partial immersion)	<0.5kg/m^2 (EN ISO 29767)
Water Vapor Absoption	<1% Vol. (ASTM C 1104/C 1104M)
FM Approval	Class 1 and Non-combustible Roof Deck Construction (FM 4470)

Flat Roof Pro

ROCKWOOL Flatroof Pro insulation system provides an unsurpassed performance over a range of parameters. The system provides excellent acoustic performance due to the higher mass and damping ability of the boards. This roofing system is proven with excellent track records in Asia. When tested to EN 1606, Flatroof Pro can withstand a permanent load of 4kPa.



Technical Specification for Hardrock 80	
Normal Density	175kg/m^3
Thermal Conductivity	0.039W/mK at 23°C (ASTM C518)
Reaction to Fire	Non-combustible (AS1530.1) Euroclass A1 (EN13501-1)
Fire Hazard Properties	Ignitibility: 0 Spread of flame: 0 Heat evolved: 0 Smoke developed: 0-1 (AS1530.3)
Compression Strength	>80kPa at 10% deformation (EN826) (Ơ10)
Point Load (Ơ p)	>700N at 5mm deformation (EN 12430
Delamination Strength	>7.5kPa (EN1607)
Water Absoption (partial immersion)	<0.5kg/m^2 (EN ISO 29767)
Water Vapor Absoption	<1% Vol. (ASTM C 1104/C 1104M)
FM Approval	Class 1 and Non-combustible Roof Deck Construction (FM 4470)

ROCKWOOL
Hardrock & Roofrock

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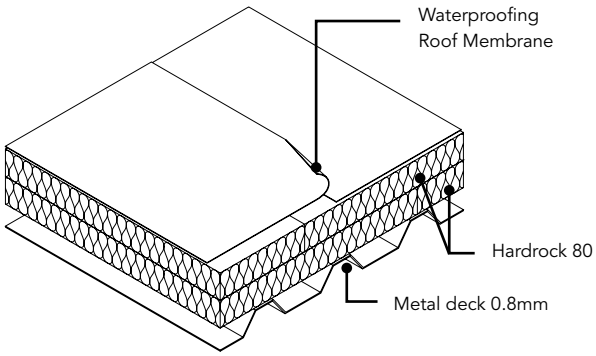
FM Approvals

ROCKWOOL roofing insulation – Roofrock 30, Hardrock 60 and Hardrock 80 are approved products under Factory Mutual (FM). For FM requirements, ROCKWOOL roofing boards should be fixed in accordance in accordance with FM Approved Guide and appropriate FM data sheets. Additionally, the insulation boards should be mechanically fixed in accordance with FM pre-securement requirements. ROCKWOOL FM approved assemblies are available in www.roofnav.com.

Acoustic Performance

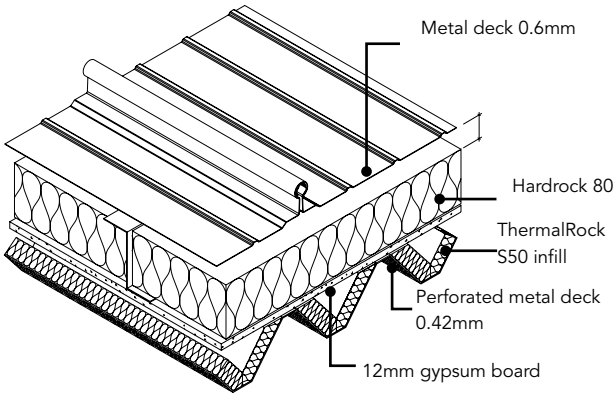
ROCKWOOL stone wool is the ideal material for use in achieving a desired acoustic performance. It is made up of fibroporous basalt stone with air-filled interconnected spaces. This structure gives excellent acoustic properties as it significantly diminishes occurrences of vertical sound waves on adjacent surfaces.

Membrane Roof System
STC 33



With the high density of ROCKWOOL Hardrock roofing boards and the structure of the product, it provides the added mass necessary for effective sound insulation of membrane roof system. Additionally, the single-ply roof membrane coupled with ROCKWOOL stone wool insulation effectively minimizes rain impact noise on the roof system.

Membrane Roof System
STC 44



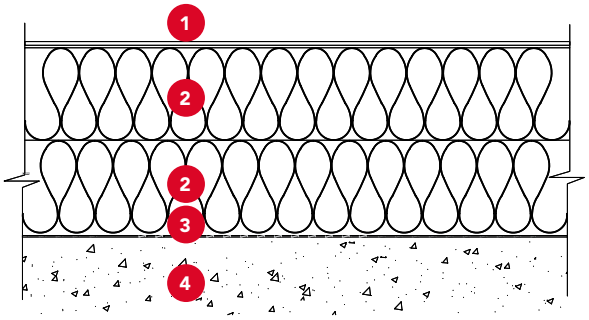
With the high sound absorption characteristics of ROCKWOOL roofing boards, it provides an effective damping of sound resonance within the roofing system. To enhance the quality of sound, ROCKWOOL stone wool infills can be introduced inside the trapezoidal of the perforated metal deck to provide added sound absorption for reverberation control.

ROCKWOOL Hardrock & Roofrock

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Reference Projects

Project: Renewable Energy Corporation (REC) plant, Singapore

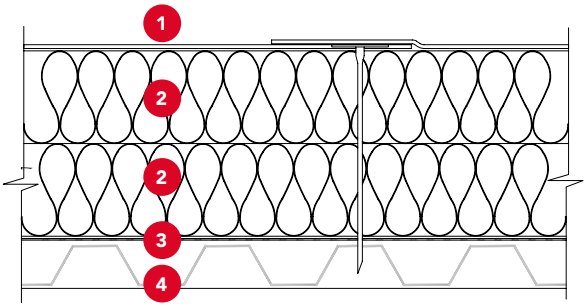


ROCKWOOL Flatroof Pro Concrete Deck System

1) Roof Membrane
2) Hardrock 80
3) Waterproofing Layer
4) Concrete Deck

- ROCKWOOL roofing boards provide an unrivalled combination of thermal, acoustics and fire performances.
- The roofing boards were FM Approved, assuring a high standard of quality products while providing compliance towards insurance requirements.

Project : First Solar plant, Kulim, Malaysia



ROCKWOOL Flatroof Pro Metal Deck System

1) Roof Membrane
2) Hardrock 80 with Tissue Facing
3) Air Barrier
4) Trapezoidal Metal Deck

- ROCKWOOL roofing boards have excellent acoustical properties and were able to achieve STC 41.
- The boards were secured with insulation fasteners into the concrete or metal deck, hence allowing fast installation to reduce construction time.

Product specification

Roofrock 30

R-Value m²K/W	*Thickness (mm)*	*Width (mm)*	*Length (mm)*	*# Pieces per pack*	*Area per pack (m²)*
1.35	50	600	1200	4	2.88
2.70	100	600	1200	2	1.44

Hardrock 80

R-Value m²K/W	*Thickness (mm)*	*Width (mm)*	*Length (mm)*	*# Pieces per pack*	*Area per pack (m²)*
0.65	25	600	1200	8	5.76
1.30	50	600	1200	4	2.88
2.55	100	600	1200	2	1.44

Hardrock 60

R-Value m²K/W	*Thickness (mm)*	*Width (mm)*	*Length (mm)*	*# Pieces per pack*	*Area per pack (m²)*
1.30	50	600	1200	4	2.88
2.65	100	600	1200	2	1.44

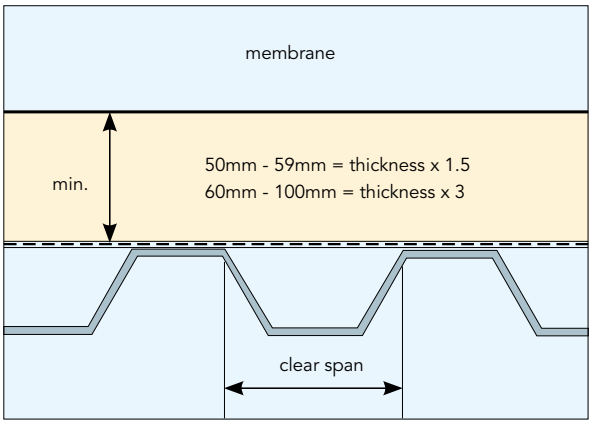
ROCKWOOL Hardrock & Roofrock

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Design Considerations

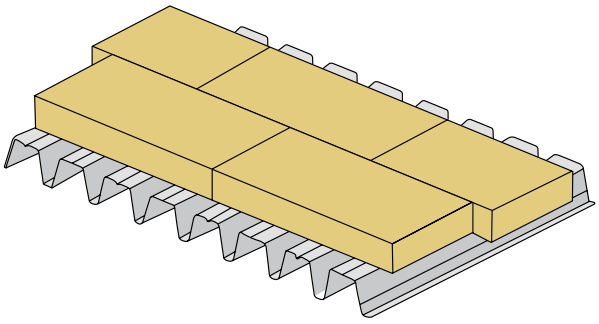
Clear Span

ROCKWOOL roofing boards between the thickness of 50mm and 59mm shall have the maximum clear span of = thickness of insulation board x 1.5
ROCKWOOL roofing boards between the thickness of 60mm to 100mm shall have the maximum clear span of = thickness of insulation board x 3



Crown and Trough Position

ROCKWOOL roofing boards must be laid with the long edge at right angles to the profiles of the metal deck. Butt joints can be made freely on the roof, if rules for cantilevering have been adhered to. If cantilevering has not been adhered to butt joints should occur at the mid-crown.

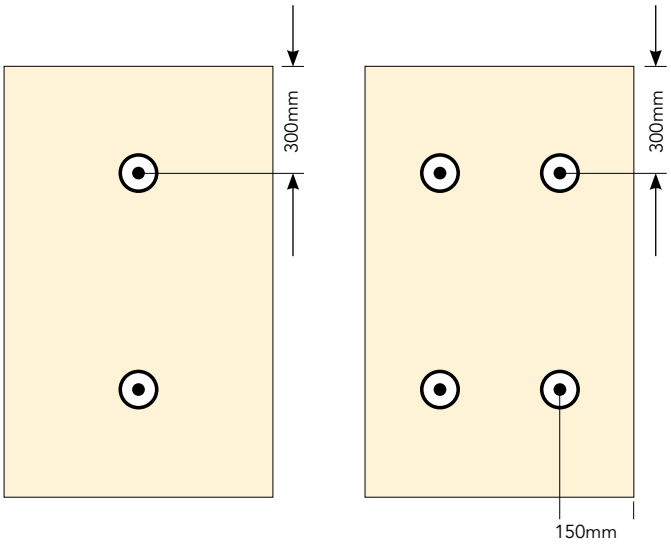


Cantilevering

ROCKWOOL roofing boards of 60mm or greater thickness may cantilever over a trough, provided that the maximum trough width does not exceed twice the board thickness.
For example, 80mm thick Hardrock roofing board may cantilever over a maximum through width of 160mm.

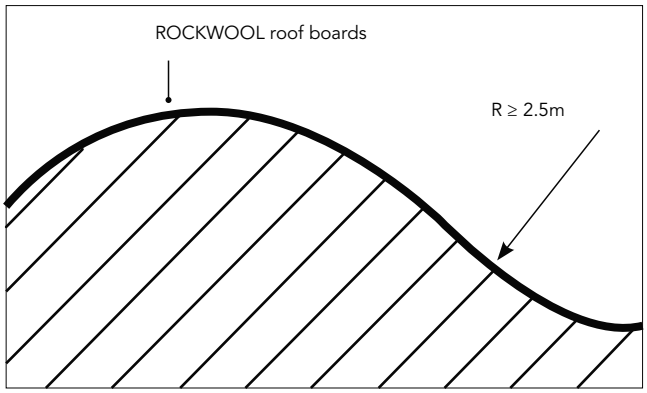
Mechanical Fastening of Insulation

Where the roofing system is mechanically fastened, 2 fasteners per 0.72m^2 (1200mm x 600mm board size) is recommended for membrane roof system.
For both the field area and the edge region of flat roofs sufficient stability is achieved when using 2 fasteners. However, for the corner region of flat roofs, it is universal practice to increase the number of membrane fasteners per m^2, and also to reduce the distance between the rows of fasteners.



Mechanical Fastening of Insulation for Roof with Curvatures

ROCKWOOL roofing boards can be installed in curved roof with a radius as low as 2.5m. For application at curved roofs, a minimum of 4 fasteners per board to locate and secure the boards during installation (see under 'mechanical fastening').



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Additional Roof Loads

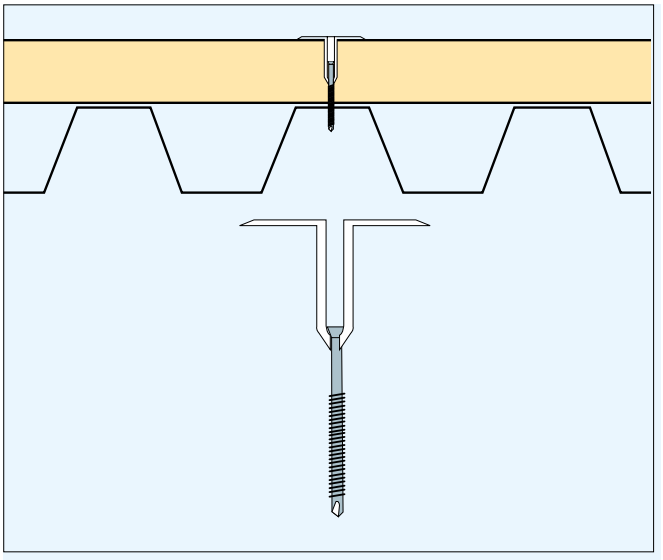
Plant and Machinery

Wherever possible, any roof-mounted plant, such as air handling and refrigeration units, should be positioned on independent upstands bearing directly onto the substrate.

Where this is not possible and the equipment is to be placed directly onto the finished roof, additional roofing boards should be used and further protection to spread the load may be required.

Mechanical Fastening of Roofing Boards

For the mechanical fastening of ROCKWOOL roofing boards to metal, concrete or timber decks, ROCKWOOL recommends the use of fasteners incorporating a plastic tube washer.



Plastic Tube Fastener

Sitework

Installation

ROCKWOOL roofing boards should be laid with staggered joints wherever possible and tightly butted to avoid gaps. The use of small pieces of insulation board should be avoided.
Care should be taken to clean off all surfaces prior to the laying of insulation boards and membrane. Appropriate stop battens should be installed to protect open edges of boards.

Water Absorption

ROCKWOOL stone wool consists of randomly oriented water repellent fibres. Wetting will therefore only occur in proximity to its surface.

As the stone wool is diffusion open, boards that become wet during installation must be allowed to dry out naturally, prior to the application of the roof membrane.

Installation of ROCKWOOL roofing boards during rain should be strictly avoided. Force water such as rain water will penetrate through the product and weaken the wool structure. The installation sequence shall follow the membrane installation. Install only as much insulation as can be covered by a complete roof membrane in the same day. Any exposed insulation boards should immediately be covered with waterproof covering to avoid penetration of rain water.

Cutting Roofing Boards

ROCKWOOL roofing boards are easy to cut or shape. Serrated knives or reciprocating "serrated" blades to be used to create cleaner cuts and reduce waste and dust on the job-site. The boards are non-brittle and will not crumble when cut.

Protection of Roofing Boards during Installation

Adequate temporary protection must be provided above the installed ROCKWOOL roofing boards where any of the following occur: unloading or access points, temporary walkways, stockpiles of roofing materials, waste skips or any other activities that might cause damage to the insulation.

Under no circumstances should the finished roof be used as a working platform without adequate protection being provided.

ROCKWOOL recommends that either the main contractor or the roofing contractor operate a 'permit to work' system for any follow-on trades in areas where the roof installation is complete.

Preparation Work for Refurbishment

Unless the existing roof finish is known to be sound and watertight, all previously applied finishes and, if necessary, insulation layers should be removed. It is recommended that the designer or contractor checks existing levels to ensure that the falls are correct.

Disclaimer: The information contained in this data sheet is only applicable for Australia and is believed to be correct at the date of publication and is subject to change after the date of printing. This data sheet was designed for general information purpose only. It's contents should not be construed as representing all performance for these insulation materials. You should not act or reply on any of the information contained herein without seeking professional advice. We make no representations as to accuracy, completeness, correctness, suitability or validity of any information in this document and will not be liable for any errors, omissions, or delays in this information or any losses, injuries or damages arising from it use. All information is provided on a as-is basis.

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