Firesafe application type	Thermal and acoustic
Construction type	Flat roofs

ROCKWOOL
FIRESAFE INSULATION

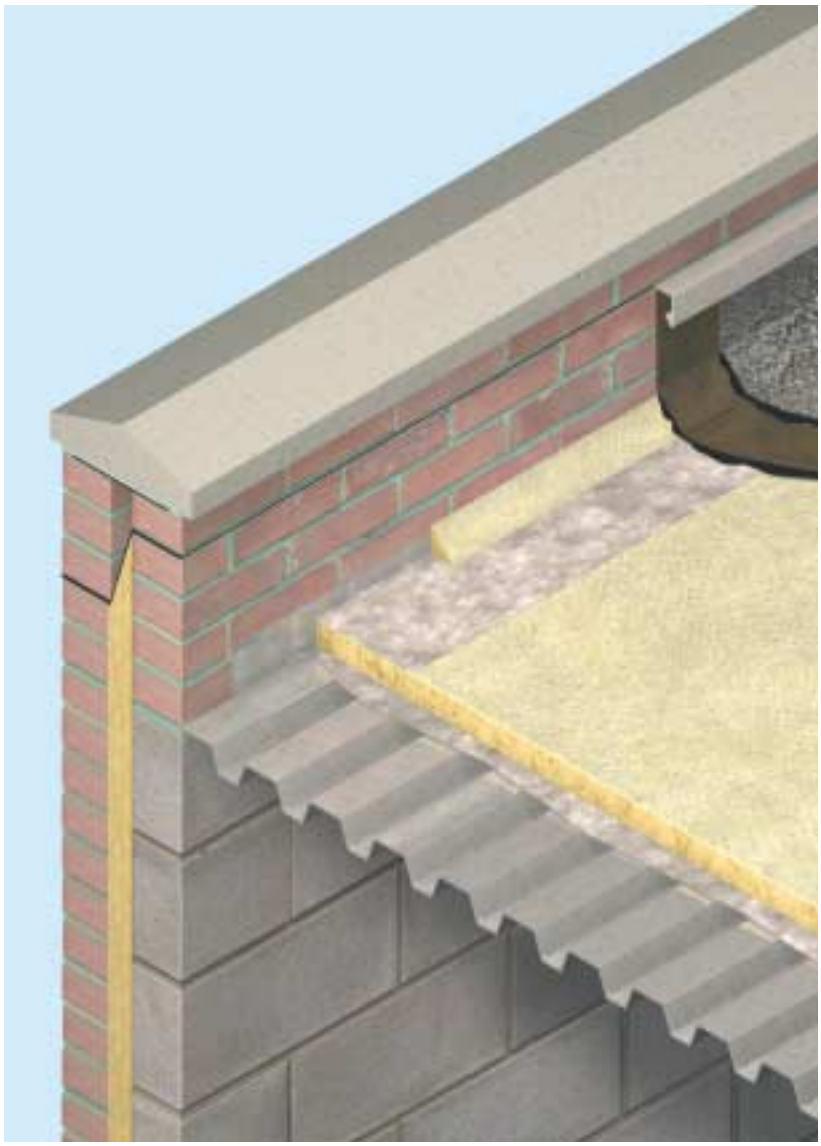
Rockwool Hardrock Range

Insulation systems for warm flat roofs

- Rockwool Hardrock Standard Roofing Board
- Rockwool Hardrock Single Ply Adhered Roofing Board
- Rockwool HD Hardrock Roofing Board
- Rockwool Hardrock Cut-to-Falls

Rockwool's range of Hardrock Roofing Board products has been developed to provide an unrivalled combination of thermal, acoustic and fire safe insulation for most flat roof constructions.

They are high performance products suitable for use with most types of roof deck, high performance built-up roofing, single ply and asphalt membrane systems.



Advantages

- Fire safe
- Excellent thermal and acoustic properties
- Dimensionally stable
- Fully tested systems
- Suitable for new build and refurbishment

Standards, performance and properties

Standards and Approvals

Rockwool Hardrock Roofing Boards satisfy the requirements of BS EN 3958: Part 5: 1986, 'Specification for bonded man-made mineral fibre slabs'.

Agrément Certification
Hardrock Standard Roofing Board carries British Board of Agrément Certificate No. 91/2588.

Mastic Asphalt Council
HD (High Density) Hardrock Standard Roofing Board is approved for use with modified asphalt membranes by the Mastic Asphalt Council.

Factory Mutual
Hardrock Standard Roofing Board and Hardrock HD Roofing Board are approved for Class 1 insulated steel roof deck constructions, Approval Report No J.I. 3B8 A5.AM.

Environment

No CFCs, HCFs or HCFCs are used in the manufacture of Rockwool products.

Shape and dimensions

Hardrock Roofing Boards are manufactured in a standard size of 1200 × 600 mm. Other board sizes are available subject to quantity, manufacturing process and dimensional tolerances.

Standard thicknesses range from 30 to 100 mm. Greater thicknesses are obtained by using two layers, e.g. 120 mm can be made up with two layers of 60 mm.

Performance and properties

Density
The nominal density of Hardrock Roofing Board is 175 kg/m^3, unless otherwise specified. A nominal 200 kg/m^3 High Density (HD) version is also available

Where the High Density variant is required, please ensure that the product description is clearly prefixed with HD.
For example:
HD Hardrock Standard Roofing Board
HD Hardrock Single Ply Adhered
HD Hardrock Cut to falls

Strength
Rockwool Hardrock Roofing Boards are strong enough to bear the normal foot traffic associated with installation and routine maintenance inspections.

Heat sink
The natural properties of Hardrock enable it to act as a heat sink. This allows a controlled thermal transfer from the waterproof membrane, thereby reducing undesirable stresses on the membrane due to solar radiation.

Dimensional stability
Hardrock Roofing Boards are dimensionally stable and therefore do not exert any undesirable stress on the waterproof membrane.

Fire
Fire not only destroys buildings, but can cost lives, due to smoke and fumes that hinder rescue and escape. Insulation materials should be specified not only for their effectiveness as insulants but also to ensure that no toxic fumes are emitted in a fire.

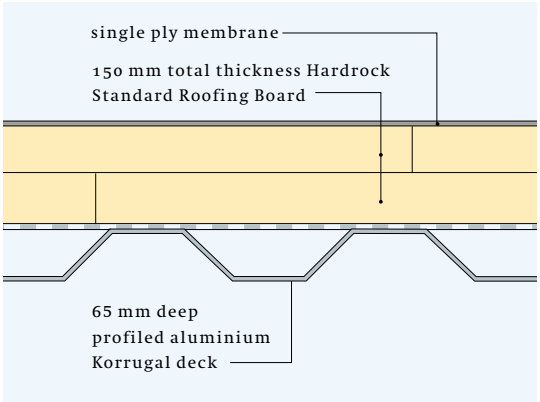
Hardrock Roofing Boards offer a high level of fire safety. The base mineral wool is inherently non-combustible. If exposed to fire, Rockwool products will not release dense smoke and will withstand temperatures in excess of 1000°C without melting.

A metal roof deck construction including Hardrock Standard Roofing Board has been tested by the LPC in accordance with BS 476: Part 21) and achieved 80 minutes fire resistance, integrity and insulation (see page 3 for details).

Acoustics
Effective sound insulation is an essential requirement where commercial or industrial operations generate noise, at levels which could be harmful to the health or efficiency of the building occupants, or present an environmental nuisance.

Hardrock has been proved over the years to be the ideal material for all applications where noise attenuation or absorption is required.

The roof construction shown in the detail below is particularly suitable for buildings at airports and similar environments.



Stansted Airport: Flat roof detail with Hardrock Standard Roofing Board, Average Rw = 44 dB

U-values
Insulation thicknesses relating to typical roof constructions are provided in the separate U-value section of the Rockwool Red Book.

Resistance to moisture
Hardrock Roofing Boards are water repellent and unaffected by the freeze/thaw cycle.

Hardrock Standard Roofing Board

Hardrock Standard Roofing Board is a versatile tissue faced product suitable for most types of roof deck. The glass tissue face of Hardrock Standard Roofing Board significantly reduces bitumen uptake and ensures an excellent bond between the first layer of membrane and the insulation.

Rebated edge boards

Hardrock uniform thickness roofing boards are available with rebates on all four edges. When correctly installed the rebated edges provide a tight and continuous layer of insulation over the entire roof, thus reducing cold bridging.

Prior to ordering, consideration must be given to the actual board cover area, allowing for the effect of the rebated edges. See ordering instructions on page 8.

HD Hardrock Standard Roofing Board

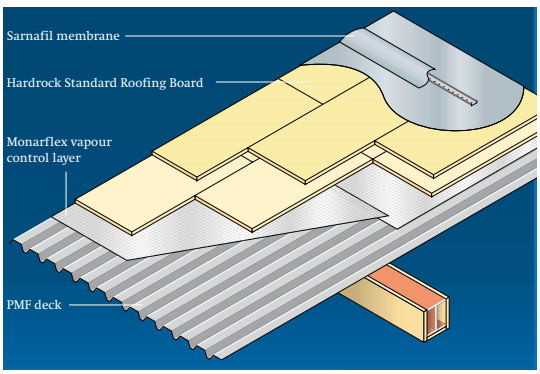
A High Density (HD) version (nom. density 200 kg/m^3) is also available for use with asphalt membranes.

Mechanical Fastener Type
(see Design Considerations, page 7)

Fire test
Loss Prevention Council 80 minute fire resistance test LPCB Ref No. 0022a/01.

When tested in accordance with BS 476: Part 21: 1987, using standard roofing components, Hardrock Standard Roofing Board achieved an 80 minutes fire resistance solution for a steel deck roof, using a mechanically fastened Sarnafil single ply membrane.

Further details are available on request from the Technical Helpine Services Department.



Rockwool Hardrock 80 minute fire resistance, integrity and insulation solution for profile metal deck LPCB Ref No. 022a/01

Typical Specifications

1 Hardrock Standard Roofing Board with built-up high performance bituminous membrane
The roof insulation is to be Rockwool Hardrock Standard Roofing Board, BBA Certificate number 91/2588, as manufactured by Rockwool Ltd. Pencoed, Bridgend, CF35 6NY. Board size is to be 1200 mm × 600 mm × ..... mm thick.

The boards are to be laid strictly in accordance with the manufacturer's recommendations, staggered butt jointed, and either fully bonded in hot bitumen or mechanically fastened through the vapour control layer to the deck.

When laid on a profiled metal deck, all board ends must be supported on the crowns and not cantilevered over the deck troughs.

The first layer of high performance built-up membrane is to be fully bonded using hot bitumen in accordance with BS 8217: 1994, and subsequent layers treated in the same way.

A ventilating sheet is not required with Hardrock Standard Roofing Board.

The advice of the membrane manufacturer should be sought when specifying all aspects of the vapour control layer and waterproof covering.

2 Hardrock Standard Roofing Board with mechanically fastened single layer membranes
The roof insulation is to be Rockwool Hardrock Standard Roofing Board, BBA Certificate number 91/2588, as manufactured by Rockwool Ltd. Pencoed, Bridgend, CF35 6NY. Board size is to be 1200 mm × 600 mm × ..... mm thick.

The boards are to be laid strictly in accordance with the manufacturer's recommendations, staggered butt jointed, and mechanically fastened through the vapour control layer to the deck.

When laid on a profiled metal deck, all board ends must be supported on the crowns and not cantilevered over the deck troughs.

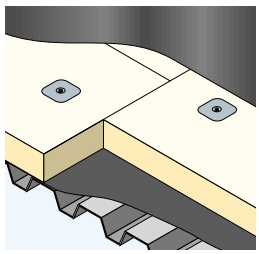
The Hardrock Standard Roofing Board and single layer membrane are to be mechanically fastened in accordance with the membrane manufacturer's recommendations.

3 HD Hardrock Standard Roofing Board with MAC approved asphalt membrane
The roof insulation is to be Rockwool HD Hardrock Standard Roofing Board as manufactured by Rockwool Ltd, Pencoed, Bridgend, CF35 6NY. Board size is to be 1200 mm × 600 mm × ..... mm thick.

The boards are to be laid strictly in accordance with the manufacturer's recommendations, staggered butt jointed, and either fully bonded in hot bitumen or mechanically fastened through the vapour control layer to the deck.

The two coat mastic asphalt membrane on sheathing felt is to be applied over the HD Hardrock Standard Roofing Board in accordance with the manufacturer's and MAC recommendations.

Bituminous membrane being applied to Hardrock Standard Roofing Board using pour and roll technique



Mechanical fasteners used with Hardrock Standard Roofing Board on a profiled metal deck

Hardrock Single Ply Adhered

Hardrock Single Ply Adhered is a specially developed board for use with tested and compatible single ply roofing membranes, designed to be adhesive bonded on site to the insulation.

The special scrim facing of the board encourages a strong bond between membrane and insulation whilst limiting the amount of adhesive used.

Rebated edge boards

Hardrock Single Ply Adhered boards are available with rebates on all four edges. When correctly installed the rebated edges provide a tight and continuous layer of insulation over the entire roof.

HD Hardrock Single Ply Adhered

Should a higher density board be required, an HD version is also available (nom. density 200 kg/m³).

Typical specification – uniform thickness boards

The roof insulation is to be Rockwool Hardrock Single Ply Adhered Roofing Board as manufactured by Rockwool Ltd. Pencoed, Bridgend, CF35 6NY. Board size is to be 1200 mm × 600 mm × ..... mm thick.

The boards are to be laid strictly in accordance with the manufacturer's recommendations, staggered butt jointed, and either fully bonded in hot bitumen or mechanically fastened through the vapour control layer to the deck.

The vapour control layer is to be fixed to the deck in accordance with the manufacturer's recommendations.

When laid on a profiled metal deck, all board ends must be supported on the crowns and not cantilevered over the deck troughs.

The boards are to be laid in a clean dry state and fully protected from water prior to the application of the adhesive.

A single ply membrane which has been tested and deemed compatible for bonding to Hardrock Single Ply Adhered is to be applied to the insulation with the relevant adhesive.

Details of the adhesive, its application and other appropriate fixing considerations should be sought from the manufacturer of the single ply membrane.

When applying adhesive by hand roller, lifting of the Hardrock Single Ply Adhered scrim corners may occur. Care should be taken to re-position the scrim prior to the application of the roofing membrane.

Typical specification – Cut to Falls boards

The roof insulation is to be Rockwool Single Ply Adhered, single layer Cut to Falls (Ref: CTF 1234), as manufactured by Rockwool Ltd. Pencoed, Bridgend, CF35 6NY. Minimum thickness (..... mm)*, rising to a maximum thickness of ..... mm)* with falls of 1:60.

The boards are to be laid strictly in accordance with the design drawings provided, Cut to Falls guidance notes and manufacturer's recommendations.

*Insert as appropriate.

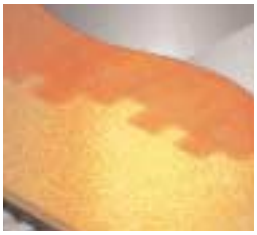
This specification should now be completed with the selected membrane description.

Mechanical Fastener Type
(see Design Considerations page 7)

Taping of board joints
In most cases, taping the joints of Hardrock Single Ply Adhered, to prevent adhesive attack, is not required. Please contact the Rockwool Technical Services Department and the membrane manufacturer for further advice.

Tested membrane systems
Rockwool has a list of membranes that have been tested and deemed compatible, by Rockwool and the membrane manufacturer, with Hardrock Single Ply Adhered Roofing Board. Please contact the Rockwool Helpline Services Department for the current list.

Patent
Hardrock Single Ply Adhered Roofing Board is protected by Patent Number 2312695.



Hardrock Single Ply Adhered boards on profiled steel decking

Application of adhesive to Hardrock Single Ply Adhered boards.

Hardrock Cut to Falls

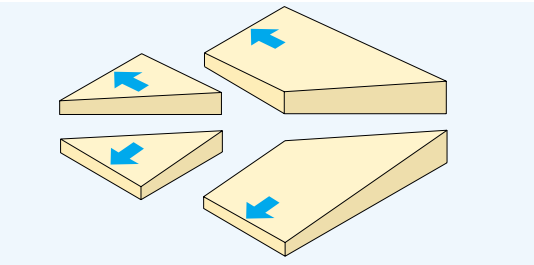
Hardrock Cut to Falls is engineered to meet the demand for tapered solutions for existing and new roof constructions at an economical cost. The system provides a choice of design features and benefits to suit most applications. Available in Standard Roofing Board and Single Ply Adhered versions, the system is backed by a complete 'drawing board to site' service.

The Cut to Falls Service

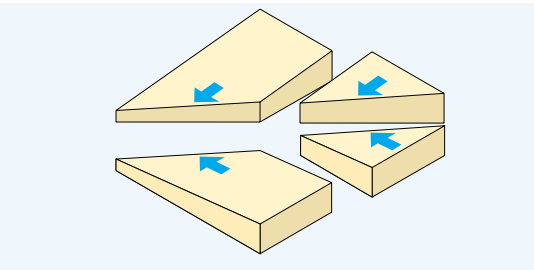
- Site surveys
- Preparation of bespoke and considered design solutions, to any fall
- Quotations for the supply of insulation systems
- Precision manufacture and supply to order
- Site advisory service prior to and during installation.

Pre-cut Mitres

The use of factory made pre-cut mitres reduces site cutting requirements and ensures accurate installation.



Cut to Falls pre-cut mitred boards at hip



Cut to Falls pre-cut mitred boards at valley

U values

Consideration should be given as to whether an average or a minimum U value is required for the particular roof.

However, as a result of the tapered thickness of the insulation, determining the overall U value for a particular roof requires a series of calculations. A full thermal calculation analysis is available on request.

A Cut to Falls system will normally enhance the thermal performance of the roof in excess of Building Regulations requirements.

Achieved design fall

Where practical, it is recommended that the minimum achieved design fall should be 1:60, with an enhanced gradient of 1:40 at critical drainage points, such as gutters or outlets.

Typical specification

The roof insulation is to be Rockwool Hardrock Standard Roofing Board Cut to Falls (Ref: CTF 1234), as manufactured by Rockwool Ltd, Pencoed, Bridgend, CF35 6NY. Minimum thickness (.... mm)*, rising to a maximum thickness of (.... mm)* with falls 1:60.

The boards are to be laid strictly in accordance with the design drawings provided, Cut to Falls guidance notes and manufacturer's recommendations.

* insert as appropriate

This specification should now be completed with the selected membrane description.

Fixing

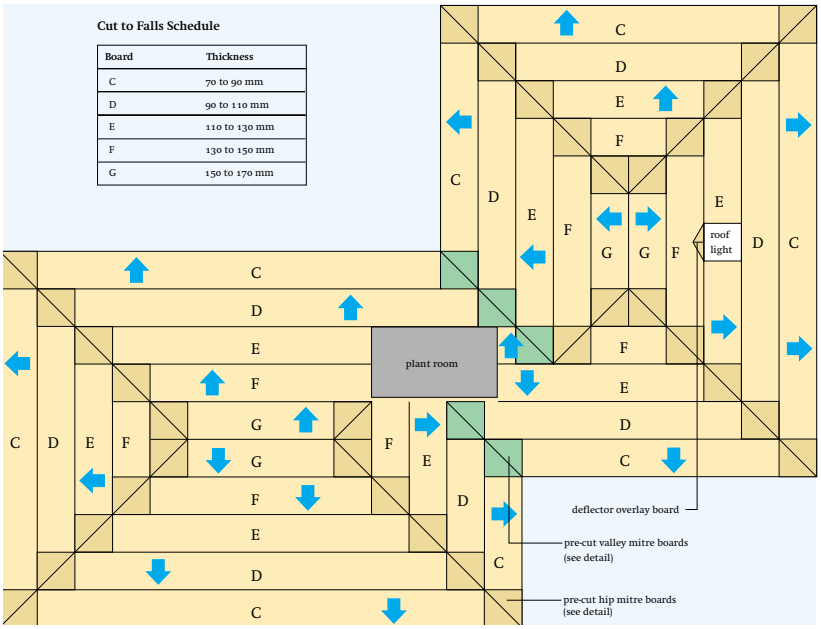
Boards are delivered to site individually marked with a positional code corresponding to the detailed layout drawing provided.

The board layout should strictly follow that shown on the drawing, and to avoid error it is advisable to place each board in position temporarily prior to attachment.

The boards are either fully bonded to the vapour control layer with hot bitumen or mechanically fastened through the vapour control layer to the deck. (see Design Considerations, page 7.)

Typical application of pre-cut mitre

Hardrock Cut to Falls – additional design features



Typical Rockwool layout plan using Hardrock Single Layer Cut to Falls system

Good roofing design

Flat roofs may include a variety of obstructions such as rooflights, concrete plinths and air-handling units, where ponding water may collect unless correctly detailed.

Standing water may also occur at roof edges, held back by the extra thickness of roofing membrane, or where outlets are positioned at some distance from each other.

Where such situations arise, Rockwool offer various solutions, by means of additional design features, which also benefit the long term performance of the overall roofing system.

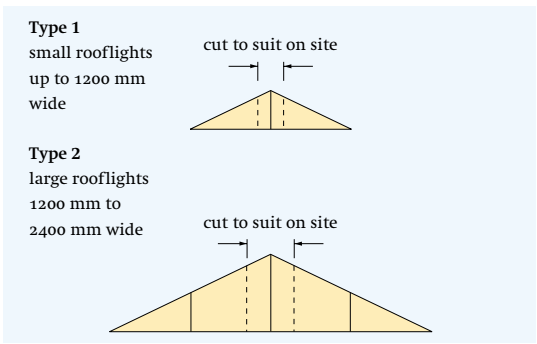
All items are manufactured to order, and to reduce wastage and installation time, are pre-cut and bonded where applicable.

Gutter runs and additional Cut to Falls systems
A Hardrock 'Cut to Falls' system can also be provided for level gutters or other similar constructions. Even where existing falls are available and uniform Hardrock is used, a 'Cut to Falls' scheme may be required at certain locations on the roof to improve drainage.

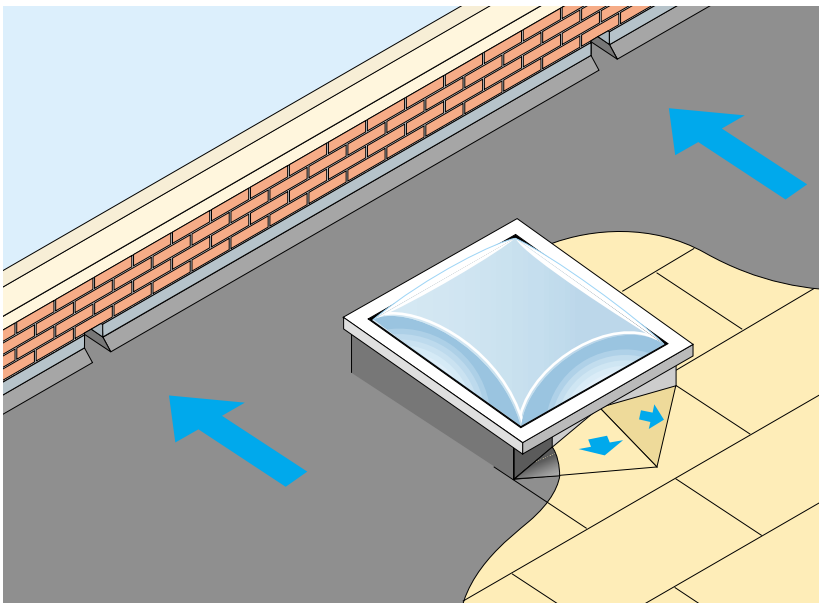
The effectiveness of Cut to Falls gutters is restricted to the available height created by the main roof or other design considerations.

Deflector overlay boards
Deflector Overlay Boards are designed to reduce the risk of water ponding behind rooflights, plant rooms and other roofline obstructions.

Deflector Overlay Boards are supplied in two sizes, for use with obstructions up to 1200 mm and 2400 mm wide, to be trimmed on site where necessary, to the exact size, as shown by the dotted lines on the diagram.



Deflector Overlay Board options – plan view

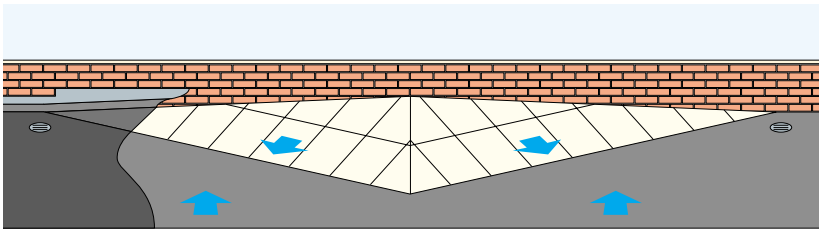


Use of Deflector Overlay Board where the roof fall is obstructed by rooflight

Cricket overlay systems
Cricket Overlay Systems are used to improve drainage between rainwater outlets by introducing cross-falls where none currently exist, as for example on a flat roof with falls in one direction only.

The wedge shaped tapers are pre-cut, thereby reducing wastage and any additional cutting that may be required on site.

Cricket Overlay Systems are most effective where the main roof fall is a minimum of 1:60.



Typical screeded roof without cross falls, showing use of a single Cricket Overlay System to improve drainage to perimeter rainwater outlets

Hardrock design considerations

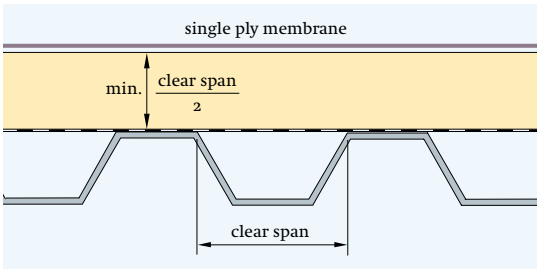
Profiled metal deck installations

Crown and trough position
The butt jointing and consequent cantilevering of Hardrock boards over the troughs of metal decks is not recommended. It is essential that butt joints occur at the mid-crown position.

Hardrock uniform thickness boards are available to order in sizes to suit the specific crown dimension of the deck used, subject to quantity, manufacturing process and dimensional tolerances.

Maximum spanning capability
The maximum spanning capability of Hardrock uniform thickness boards is dependent on the type of membrane system used, as follows:

Single ply membranes:
Minimum Hardrock thickness equals the width of the trough, divided by 2.



Note that the span to be measured is across the clear width of the trough, and not from centre to centre of the crowns.

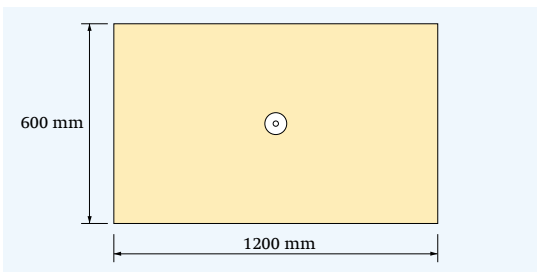
Built-up membranes:
Minimum Hardrock thickness equals the width of the trough, divided by 2.5.

Mechanical fastening of insulation

1 Single ply mechanically fixed systems
Where the complete roofing system is mechanically fastened (for example single ply), Rockwool Limited recommends that a minimum of one mechanical fastener is used per board (or part thereof) to locate and secure the boards during installation (see diagram below).

This recommendation is based on independent wind uplift tests to determine the wind-induced load on mechanically attached Rockwool boards. The tests comply with the boundary conditions specified in the UEAtc Supplementary Guide for the Assessment of Mechanically Fastened Roof Water Proofing.

The tests conclude that for both the field area and the edge region of flat roofs, sufficient stability is achieved when using one fastener. For the corner region of flat roofs external suction and internal pressure forces of up to 3.5 kN/m² must be expected. However, it is universal practice in such vulnerable areas to increase the number of membrane fasteners per m², and also to reduce the distance between the rows of fasteners.



Location of mechanical fastener for securing Hardrock Board to metal, concrete and timber decks.

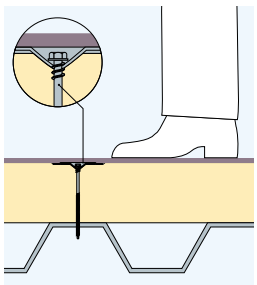
2 Fully bonded membrane system
Where the membrane is fully bonded to the insulation surface (e.g. with bitumen or adhesive) the number of mechanical fasteners per board should be determined by windloading calculations conducted by the membrane manufacturer.

Factory Mutual

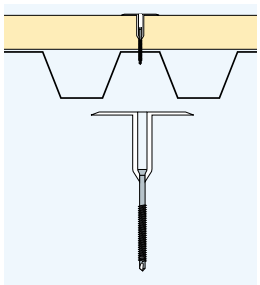
For Factory Mutual specifications, standard Hardrock Roofing Board and Hardrock HD Roofing Board should be fixed in accordance with the specification for Class 1 steel deck constructions and in accordance with the F.M. Guide and appropriate F.M. data sheets. Additionally, the insulation boards should be mechanically fixed in accordance with the FM Pre-securement Requirements. Further advice is available from Rockwool Ltd.

Mechanical fastener type

For the mechanical fastening of Hardrock Roofing Boards to metal, concrete or timber decks Rockwool Limited recommends the use of fasteners incorporating either a plastic tube washer or stress plate support thread (see illustrations below).



Fastener with stress plate support thread



Plastic tube washer and fastener

Preparation work for refurbishment

Unless the existing roof finish is known to be sound and watertight, and the type and condition of the surface suitable for the bonding or mechanical fixing of Hardrock, all previously applied finishes and, if necessary, insulation layers, should first of all be removed.

It is recommended that the specifier/ contractor check the existing levels to ensure that the existing falls are correct. If not, the appropriate Hardrock Cut to Falls system should be considered.

Walkways to finished roofs

Additional protection to spread the load on the Hardrock board is recommended in walkway areas. Advice should be sought from the membrane manufacturer on the options available.

Plant and machinery

Wherever possible, any plant, such as air handling and refrigeration units, should be positioned on independent upstands, located directly on the substrate.

Where this is not possible, and the equipment is to be placed directly on to the finished roof, further protection to spread the load on the Hardrock may be required. In such cases advice should be sought from the Rockwool Technical Helpline Services Department and the membrane manufacturer.

Storage and handling

Hardrock boards are fully palletised and wrapped in polyethylene for protection during transit. The pallets should be carefully unloaded by suitably trained personnel, and stored in a weatherproof location or under a secure waterproof covering.

This is also applicable where the product is supplied in packs. The packs must also be stored on pallets or skids.

Where the craning of pallets to roof level is required, the use of a pallet fork attachment is recommended.

Water absorption

Rockwool consists of randomly orientated water-repellent fibres. Wetting will therefore only occur in proximity to its surface. As Rockwool 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

Hardrock 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.

Cut to Falls schemes must be laid strictly in accordance with the layout drawings provided, and to avoid error, it is advisable to position each board temporarily prior to fixing.

Care should be taken to clean off all surfaces prior to the laying of insulation boards and membrane.

It is recommended that a suitable independent vapour control layer be used with the Hardrock roofing range. This should be detailed at perimeters, abutments etc, as described in the specification and manufacturer's recommendations.

Appropriate stop battens should be installed to protect open edges of boards.

Day joints must be formed at the conclusion of each section of work to seal exposed edges of insulation boards and prevent damage.

Built-up membranes should not be laid on insulation boards at temperatures below 5°C unless special care is exercised.

Membranes bonded to Hardrock using cold applied adhesive must strictly follow the manufacturer's recommendations regarding working temperature.

Any decision to work below these temperatures will be the responsibility of the contractor.

Cutting of Hardrock

Hardrock is easy to cut or shape using a sharp knife or panel saw.

Protection of Hardrock during installation

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

Working platform

Under no circumstances may 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.

Ordering

For uniform thickness boards, please quote the type, board size in mm, thickness in mm and the number of boards required.

Cover area of square edge Hardrock Roofing Board, overall size 1200 × 600 mm = 0.72 m².

When ordering rebated Hardrock Roofing Board, please quote the board type, overall size in mm (including the rebate), thickness in mm and the number of boards required.

Cover area of rebated Hardrock Roofing Board, overall size 1200 × 600 mm = 0.68 m².

For advice on Hardrock Cut to Falls systems and additional design features, please contact the Rockwool Technical Services Department.

Health and safety

A COSHH Data sheet is available from Rockwool's Marketing Services Department.

Current HSE 'CHIP' Regulations and EU Directive 97/69/EC confirm that Rockwool fibres are not classified as a possible carcinogen.

Site Advisory Service

Rockwool operates a dedicated Site Advisory Service. Rockwool engineers are able to offer advice prior to, during and on completion of the Hardrock installation, to the benefit of contractor, specifier, client and end user.

To take advantage of the Rockwool Site Advisory Service, please specify its use, and instruct the contractor to contact the Rockwool Technical Helpline Services Department.

Technical Helpline

Technical advice relating to Hardrock Roofing Boards is available from the Rockwool Technical Helpline Services Department on **0871 222 1780**.

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