Effective warm pitched-roof insulation

ROCKWOOL ROCKFALL® is an effective warm pitched-roof insulation system for rafter level applications. The system, made from renewable stone wool, is adaptable to most pitched roof configurations.
ROCKFALL® warm pitched roof system

The ROCKWOOL ROCKFALL® warm pitched roof system consists of HARDROCK® Multi-Fix (DD) Overlay Boards mechanically fixed over the rafters and ROCKWOOL FLEXI® fitted between rafters.

The ROCKFALL® system is completely fire safe, and provides an effective acoustic barrier to outside noise pollution. The system is suitable for use on domestic and commercial roofing applications.

Advantages

- Provides a fully insulated habitable loft space
- No ventilation required in roof voids or at eaves, etc. providing a vapour-permeable underlay is used below the roof covering, and a continuous air tight VCL is installed at ceiling line
- A uniquely fire safe warm pitched roof insulation system
- Provides an excellent acoustic barrier to external noise pollution

Standards and approvals

ROCKWOOL ROCKFALL® roofing boards comply with the requirements of BS EN 13162:2012. Thermal insulation products for buildings factory made mineral wool (MW) products specification.

Dimensions

ROCKFALL® overlay boards
HARDROCK® Multi-Fix (DD) 1200 x 1000mm available in thicknesses of 60mm and 85mm (other thicknesses are available refer to the HARDROCK® Multi-Fix (DD) datasheet for more details).

Average weight per m²

<table>
<thead>
<tr>
<th>Overlay board thickness (mm)</th>
<th>Average weight per board (kg/m²)</th>
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<tbody>
<tr>
<td>60</td>
<td>10.38</td>
</tr>
<tr>
<td>85</td>
<td>14.06</td>
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</tbody>
</table>

ROCKFALL® underlay boards
ROCKWOOL FLEXI®: available in standard widths of 600mm and 400mm to suit rafter spacing.

Standard thickness range
1200 x 600 @ 50, 60, 70, 90, 100, 120, 140, 180 & 200mm (NOTE 180 and 200mm will be subject to minimum order quantities)
1200 x 400 @ 50, 100 & 140mm (for further details refer to the ROCKWOOL FLEXI® datasheet).

Performance

Acoustic
Discounting roof windows, the ROCKWOOL ROCKFALL® system could be expected to provide a minimum noise reduction of 40 dB depending on actual construction details.

Fire
ROCKWOOL ROCKFALL® insulation boards have an A1 European Reaction to fire classification, offering a significant contribution towards improved fire safety.

The Loss Prevention Council’s advice to insurers is to regard all ROCKWOOL insulation as being non-combustible.

Thermal
Overlay boards: HARDROCK® Multi-Fix (DD)
Thermal conductivity 0.039W/mK
Underlay boards ROCKWOOL FLEXI®:
Thermal conductivity 0.038W/mK for 50-120mm and 0.035W/mK for 140-200mm
ROCKFALL® warm pitched roof system

Design considerations

The ROCKFALL® system is capable of resisting the wind and snow loads that are normally experienced in the United Kingdom. However, the fixing supplier should be consulted for advice.

ROCKWOOL ROCKFALL® is suitable for roof pitches of 15° and above, including Mansard roofs.

Structural stability
The ROCKFALL® system is suitable for most roof pitches. It is not, however, designed to add to the structural stability of the roof. Advice regarding the requirements for any additional bracing etc should always be sought from a qualified engineer or the truss manufacturer (see ‘installation guidance’ for further details).

It is recommended that the overlay board should not be considered as an alternative to cross bracing, and that the roof design should be based on the following structural Euro codes and recommendations:
- BS EN 1991-1-1: Imposed loads for buildings
- BS EN 1991-1-3: snow loads
- BS EN 1991-1-4: wind actions

Water vapour and control of condensation in roofs
The ROCKFALL® system is vapour permeable and eliminates the need for ventilation when used with an approved LR underlay below the roof covering to allow moist air to migrate to the atmosphere and a continuous air tight VCL is installed at ceiling line.

BS5250 discusses the principles of condensation formation and protection. It also provides detailed guidance for the design of different roof types to minimise problems of condensation.

Condensation risks can be attributed to various sources, such as areas of high humidity, the purpose/use of the building and the type of external roof covering.

Further guidance on preventing interstitial condensation can also be found in BRE Digest 369.

Vapour permeable underlays for slate and tile roofing
Low water vapour resistance (type LR) underlays are sometimes referred to as vapour permeable or breather underlays. The fibrous structure of vapour permeable underlays is sufficiently dense to prevent liquid water from penetrating, while allowing water vapour to diffuse.

LR membranes will generally have a water vapour resistance of not more than 0.25 MNs/g, which allows the transfer of water vapour.

Ventilation above underlays
Lightweight vapour permeable roofing underlays offer an opportunity to create simple or complex roof configurations without the need for additional eaves ventilation.

For air-open outer coverings (such as clay, concrete or natural slates) no specific provision for batten-space ventilation is required. However, for some tight fitting outer coverings (e.g. fibre cement slates or metal tiling) there may be a need to ventilate the batten void between the roof covering and the underlay using an “over fascia” ventilator.

It is therefore important to follow the manufacturer’s recommendations and third party certifiers, to ensure effective diffusion of water vapour to the outside.

Roof drainage and wind action
The LR underlay can be installed either below the counter battens or above the counter battens. When installed above the counter battens the LR underlay should be draped by no less than 10mm allowing free drainage down the roof slope.

With lightweight membrane underlays there is a risk of vibration or ‘drumming’ under high wind loads. During installation, care needs to be taken to ensure that the underlay is sufficiently draped to ensure drainage but sufficiently taut to prevent the underlay touching the underside of the slating or tiling.
ROCKFALL® warm pitched roof system

Minimising thermal bridging

Continuity of thermal insulation
To limit heat loss and prevent problems such as thermal bridging and condensation occurrence, junctions between elements should be designed to maintain continuity of insulation. For roofs, the key junctions are those at eaves and gable, where the wall insulation should meet roof insulation.

To avoid these issues, the following points should be addressed:
- At eaves, the wall insulation should be continued between the rafters until it butts the underside of the overlay boards (or alternatively to the underside of the ROCKWOOL FLEXIR® underlay slab)
- The habitable roof void should be completely insulated, including any associated gable walls.
- All roof insulation boards should be tightly fitted, with no gaps.
- Any gaps around ridges, roof lights or similar penetrations should be filled and sealed.
- Ensure that all fascia’s and soffits are non-vented and should be sealed with mastic at abutment with walls.

Construction

A timber rafter pitched roof with tiles or slates on battens and counter battens and a LR vapour permeable underlay, ROCKWOOL HARDROCK® Multi-Fix (DD) overlay board laid over the rafters and ROCKWOOL FLEXIR® slab friction fitted between the rafters. A continuous air tight VCL, with all joints lapped and sealed stapled to the underside of rafters. Ceiling finished with 12.5mm plasterboard.

Installation

Overlay board installation
A timber stop batten is fixed across the foot of the rafters. This provides resistance against the downward counter-batten loads, relieving the fascia board of any horizontally applied load.

The overlay boards are fitted starting from the timber stop rail, with all boards tightly butted together and laid with staggered joints. The boards may be cut to length to suit the rafter spacing. Ensure that the dense layer of board (tissue faced side) is used ‘face up’.

Overlay boards should be laid across the rafters, starting from the timber stop rail. All boards must be close butted and laid with staggered joints. The boards may be cut to length to suit the rafter spacing. Ensure that the dense layer of board (tissue faced side) is used ‘face up’.

35 thick x 50mm wide treated counter-battens, spaced at rafter positions, should be fixed through the overlay boards using spiral fixings such as Helifix inskew at maximum 400mm centres with a minimum penetration into the rafter of 35mm (fixing centres may vary pending site exposure and construction type, hence further guidance should be sought from the fixing manufacturer).

The LR underlay can be installed either below the counter battens or above the counter battens. When installed above the counter battens the LR underlay should be draped by no less than 10mm allowing free drainage down the roof slope.

The fascia height must be sufficient to accommodate the level of the roof finish up to the overlay boards and counter-battens.

Note; for tight fitting outer roof coverings (e.g. fibre cement slates or metal tiling) there may be a need to ventilate the batten void between the roof covering and the underlay using an “over fascia” ventilator.
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Underlay board Installation
From below, ROCKWOOL FLEXI® is friction fitted and close butted between the rafters, so that it is in direct contact with the underside of the overlay board [with no air gaps between the two layers of insulation]. To avoid a thermal bridge at the eaves, the ROCKWOOL FLEXI® slabs should link with the wall insulation.

At eaves, the wall insulation should be continued between the rafters until it butts the underside of the Overlay boards [or alternatively to the underside of the ROCKWOOL FLEXI® underlay slabs].

To avoid a thermal bridge at the eaves, there must be continuity between roof and wall insulation. This can be achieved by either:

- Extending the height of the wall insulation to the underside of the overlay or underlay slabs
- Extending the ROCKWOOL FLEXI® underlay slabs into the eaves box to link with the wall insulation.

Eaves details
Figure 3 shows a timber stop batten fixed to the foot of the rafters. This provides resistance against the downward counter-batten loads, relieving the fascia board of any horizontally applied load.

A continuous plywood tilting board fixed to the top of the fascia carries the breather membrane over and into the gutter so that it does not sag and allow moisture to collect at the eaves position.

Ventilation
There is no requirement for eaves ventilation when using the Rockfall system. However for some tight fitting outer coverings (e.g. fibre cement slates or metal tiling ) there may be a need to ventilate the batten void between the roof covering and the underlay using an “over fascia" ventilator. It is therefore important to follow the membrane manufacturer’s recommendations and third party certifiers, to ensure effective diffusion of water vapour to the outside.

A continuous air tight vapour control layer (VCL), with all joints lapped and sealed must be used directly above the internal ceiling lining to prevent water vapour entering the roof envelope and to achieve air tightness of the habitable space. To achieve a truly sealed roof, all penetrations and all junctions must be adequately sealed [e.g. between the floor and sloping ceiling].

Figure 3
ROCKWOOL overlay boards over rafters
ROCKWOOL FLEXI® between rafters
BBA approved breather membrane
Vapour control layer above
Plasterboard
Seal to reduce air leakage
Over fascia ventilation
(if required)
Stop batten
Sealed soffit
ROCKWOOL Cavity full fill slab taken up to the underside of FLEXI® slab to provide tight fit

Fixings
Information and advice on the type and frequency of fixings should be obtained from the relevant manufacturers.

On steeper roof pitches, such as Mansard roofs, additional timber stop battens may be required to resist shear forces, as well as additional mechanical fixings.

Valley and ridge details
ROCKWOOL ROCKFALL® Overlay Boards should be mitred to make a tight butt joint at the ridge and valley locations.

The breather membrane should be made continuous with minimum sealed overlaps of 150mm. Lead valley gutters are an acceptable alternative to pre-formed valley tiles or slates and should be constructed in accordance with good roofing practice. Further guidance can be sought from The Lead Sheet Association (LSA).
ROCKFALL® warm pitched roof system

Building Regulations (thermal requirements)

**England 2014 Part L U-value requirements at rafter line:** Extensions, Renovation & Repair work: 0.18 W/m²K. New build requirements ranges between 0.18 – 0.13 W/m²K subject to build type

**Wales 2014 Part L U-value requirements at rafter line:** Extensions 0.15 W/m²K, Renovation & Repair work: 0.18 W/m²K. New build requirements ranges between 0.15 – 0.11 W/m²K subject to build type

**Typical U-value examples using ROCKWOOL ROCKFALL®**

The U-Value tables below are based on the following: 47mm wide rafters @ 600mm ctrs [7.8% timber bridging] Overlay board: ROCKWOOL HARDROCK® Multi-Fix (DD), 60mm or 85mm Underlay board: ROCKWOOL FLEXI® between rafters, fully filling rafter depth.

<table>
<thead>
<tr>
<th>Table 1 using 60mm overlay board</th>
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<tr>
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</table>

<table>
<thead>
<tr>
<th>Table 2 using 85mm overlay board</th>
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</thead>
<tbody>
<tr>
<td>Insulation location U-values W/m²K</td>
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<td>0.21</td>
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<tr>
<td>0.17</td>
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<tr>
<td>0.15</td>
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<tr>
<td>0.14</td>
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<tr>
<td>0.13</td>
</tr>
</tbody>
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**Typical specification**

Insulation laid over rafters to be ROCKWOOL ROCKFALL® Multi-fix (DD) overlay board, ......mm thick.

All slabs tightly butted together and with staggered joints. A LR underlay should then be laid over the insulation [or over counter battens] with all edges lapped.

The overlay board to be held in place by 38mm thick x 50mm wide counter battens fixed through the slabs, into the rafters.

Tiling battens to be nailed into the counter battens. ROCKWOOL FLEXI® underlay ....mm thick, to be friction fitted between the rafters, so that it is in direct contact with the underside of the overlay board [with no air gaps between the two layers of insulation]. The width of the insulation should be appropriate to the spacing of the rafters.

Under draw the rafters with a continuous air tight VCL with all joints lapped and sealed above ceiling lining.

![Diagram of ROCKFALL® warm pitched roof system]

- BBA approved breather membrane
- ROCKWOOL ROCKFALL® overlay board laid staggered pattern over rafter
- Vapour control layer
- ROCKWOOL FLEXI® fully filling depth of rafter
As an environmentally conscious company, ROCKWOOL promotes the sustainable production and use of insulation and is committed to a continuous process of environmental improvement.

All ROCKWOOL products provide outstanding thermal protection as well as four added benefits:

- **Fire resistance**
- **Acoustic comfort**
- **Sustainable materials**
- **Durability**

The safety of ROCKWOOL stone wool is confirmed by current UK and Republic of Ireland health & safety regulations and EU directive 97/69/EC: ROCKWOOL fibres are not classified as a possible human carcinogen. A Material Safety Data Sheet is available and can be downloaded from www.rockwool.co.uk to assist in the preparation of risk assessments, as required by the Control of Substances Hazardous to Health Regulations (COSHH).

Made from a renewable and plentiful naturally occurring resource, ROCKWOOL insulation saves fuel costs and energy in use and relies on trapped air for its thermal properties.

ROCKWOOL insulation does not contain (and has never contained) gases that have ozone depletion potential (ODP) or global warming potential (GWP).

ROCKWOOL is approximately 97% recyclable. For waste ROCKWOOL material that may be generated during installation or at end of life, we are happy to discuss the individual requirements of contractors and users considering returning these materials to our factory for recycling.

For further information, contact the Technical Solutions Team on 01656 862621 or email technical.solutions@rockwool.co.uk.

Visit www.rockwool.co.uk to view our complete range of products and services.

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Whilst ROCKWOOL will endeavour to keep its publications up to date, readers will appreciate that between publications there may be pertinent changes in the law, or other developments affecting the accuracy of the information contained in this data sheet.

The above applications do not necessarily represent an exhaustive list of applications for ROCKWOOL ROCKFALL®.

ROCKWOOL Limited does not accept responsibility for the consequences of using ROCKWOOL ROCKFALL® in applications different from those described within this data sheet. Expert advice should be sought where such different applications are contemplated, or where the extent of any listed application is in doubt.