

DuoRock Roofing Boards

Robust insulation boards for warm flat roofs

DuoRock is a cost-effective and durable insulation solution. The dual density roofing boards are manufactured with a robust top surface, offering effective point load resistance.



The following NBS clauses include DuoRock: J-41-110, 115, 425, 680 J42-110, 425, 680

DuoRock Roofing Boards

Made of stone wool fibres, DuoRock is perfect for use with mechanically fastened or ballasted single ply membrane systems. The rigid boards are non-combustible and energy-efficient, providing exceptional acoustic performance and roofing insulation.

Available in the following board types:

- Plain
- Tissue faced
- Single ply adhered (SPA)
- Tapered (please see separate datasheet)

Advantages

- Non-combustible
- Fast installation
- Minimal insulation fasteners
- Cantilever performance
- Dimensionally stable
- Fully tested systems
- Suitable for new build and refurbishment
- Approved membrane system
- Superior sound reduction and absorption

Product properties and design

Dimensions

DuoRock plain, tissue faced and SPA roofing boards are manufactured in the following sizes:

- Length/width: 1200 × 1000mm
- Thicknesses: 50mm to 180mm

The dimensions meet EN 822 requirements for length and width, EN 823 Class T4 for thickness and , EN 824 for squareness.

Dimensional stability

Being made from volcanic rock, DuoRock roofing boards are dimensionally stable and therefore do not:

- Require any mechanical fasteners to prevent differential thermal expansion
- Exert any undesirable stress on the waterproofing membrane

Installation guidance

General

1. DuoRock roofing boards should be laid with staggered joints wherever possible and tightly butted to avoid gaps. Ensure that the dense layer of the board is used on the upper side towards the membrane. This is clearly marked on the boards as 'Rockwool This side up'.
2. The use of small pieces of insulation board should be avoided.
3. Care should be taken to clean off all surfaces prior to the laying of insulation boards and membrane.
4. Appropriate stop battens should be installed to protect open edges of boards.
5. Day joints must be formed at the conclusion of each section of work to seal exposed edges of insulation boards and prevent damage.

Membrane installation/fasteners

The membrane should be installed strictly in accordance with the manufacturer's specification and fastening requirements for wind uplift.



Typical application of a single ply membrane over DuoRock (plain) roofing boards

Water absorption

Rockwool consists of randomly orientated water-repellent fibres that prevent the centre of the boards from moisture. Wetting will therefore only occur in proximity to its surface.

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

Cutting DuoRock roofing boards

The boards are easy to cut to shape using a sharp knife or panel saw.

Protection of DuoRock roofing boards during installation

Adequate temporary protection must be provided above the installed boards where any of the following occur:

- Unloading or access points
- Temporary walkways
- Stockpiles of roofing materials
- Waste skips
- 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.

Preparation work for refurbishment

1. Check that the existing roof finish is sound and watertight.
2. Check that the type and condition of the surface is suitable for bonding or mechanical fixing of DuoRock roofing boards.
3. If the roof is not sound and watertight or does not have a suitable surface, remove all previously applied finishes and, if necessary, insulation layers.

Handling and storage

- Rockwool DuoRock roofing boards are fully palletised and wrapped in a polythene shroud for protection during transit and in the short- term if stored outside.
- For longer- term protection, the pallets should be stored under a secure waterproofing covering.
- DuoRock should be stacked no more than 2 pallets high for safety.
- The use of a pallet fork attachment is recommended where craning of pallets to roof level is required.

Rockwool Rock Roller trolley

To facilitate fast and easy movement of the DuoRock roofing boards from the loading area to the point of installation on the roof deck, Rockwool has developed a purpose made 'trolley' (see above). Each Rock Roller comes complete with operating instructions, which should be followed by the roofing contractor.



Use of the Rockwool Rock Roller allows fast and easy movement of boards across the roof decking.

Design considerations

Profiled metal deck installations

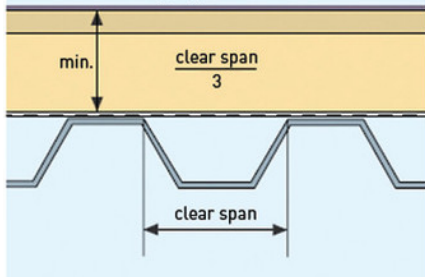
Free spanning capability

The minimum DuoRock roofing board thickness required equals the maximum trough width divided by three. The maximum trough width suitable for free spanning using DuoRock is 300mm

Please note: The maximum trough width for 50mm DuoRock is 75mm.

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Figure 1. Note that the span to be measured is across the clear width of the trough, and not from the centre of the crowns.



Crown and trough position:

The roofing boards must be laid with the long edge at right angles to the profiles of the metal deck. Butt joints should occur at the mid-crown position, except where cantilevering is applicable.

Cantilevering

DuoRock roofing Boards greater than 50mm thick may cantilever over a trough. For cantilevering, the minimum board thickness required is equal to the maximum trough width divided by two. The maximum trough width suitable for use with DuoRock is 300mm.

Vapour control layer

The need for a vapour control layer with DuoRock roofing boards should be calculated in accordance with BS 5250 and with reference to BS 6229 (Code of Practice for Flat Roofs with Continuously Supported Coverings).

Flat roof design

Mechanical fastening of insulation

1. Single ply mechanically fixed systems (DuoRock plain and tissue faced boards)

Where the complete roofing system is mechanically fastened (for example single ply), Rockwool recommends that a minimum of one mechanical

fastener is used per board (or part thereof) to locate and secure each one during installation (see fig. 2).

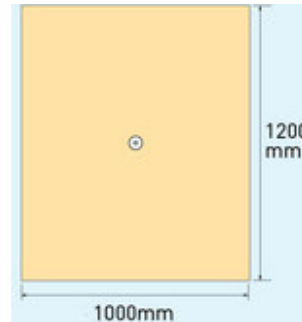


Figure 2: Location of mechanical fasteners for securing DuoRock roofing Board to metal, concrete and timber decks

This recommendation is based on independent wind uplift tests to determine the wind-induced load on mechanically attached DuoRock 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 sufficient stability is achieved when using one fastener for both the field area and the edge region of flat roofs. 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.

For the mechanical fastening of DuoRock roofing boards to metal, concrete or timber decks Rockwool recommends the use of fasteners incorporating either a plastic tube washer or stress plate support thread.



Application of a plastic tube fastener

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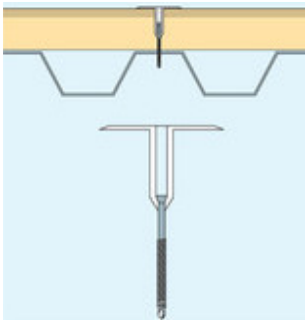


Figure 3: Plastic tube fastener

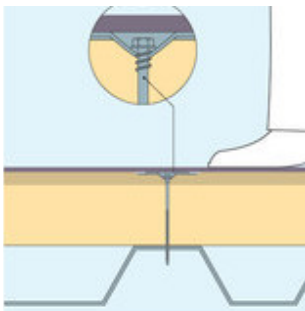


Figure 4: Plastic tube fastener support thread

2. Fully bonded membrane system (DuoRock SPA boards)

Where the membrane is fully bonded to the insulation surface, the number of mechanical fasteners per board should be determined by windloading calculations conducted by the membrane manufacturer.

Adhesive bonding

a) Hot applied adhesive

DuoRock tissue faced boards may be fully bonded in hot bitumen to a suitable vapour control layer.

b) Cold applied adhesive

All DuoRock roofing boards may be bonded to suitable vapour control layers using approved PU and cold bituminous adhesives.

A list of compatible single ply adhesives is available from Rockwool Technical Support (0871 222 1780).

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, further protection to spread the load on the DuoRock roofing Board may be required. In such cases advice should be sought from Rockwool Technical Support (0871 222 1780) and the membrane manufacturer.

Walkways and access areas:

Additional protection to spread the load on DuoRock roofing Board is also recommended in walkway and access areas. Advice should be sought from the membrane manufacturer on the options available.

Durability

DuoRock roofing boards are strong enough to bear normal foot traffic associated with installation and routine maintenance inspections of the roofing system.

Resistance to moisture

DuoRock roofing boards are water repellent and are unaffected by the freeze/thaw cycle.

Standards and approvals

Rockwool DuoRock roofing boards comply with the requirements of BS EN 13162: 'Thermal Insulation products for buildings Factory made mineral wool (MW) products specification.'

European Union of Agrément (UEAtc)

DuoRock has been assessed by the BBA to the UEAtc Technical guidelines MOAT No 50: 1992 'Thermal insulation systems intended for supporting waterproof coverings on flat and sloping roofs'. DuoRock roofing boards have been tested for the effects of mechanical stress and have achieved Classification B, 'Roof only accessible for purpose of maintenance. It may be used without any restrictions.'

The boards have also been assessed for cantilever and free spanning capabilities.

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Factory Mutual

DuoRock (Plain) roofing boards are Factory Mutual approved for Class 1 insulated steel deck constructions. Approval Report No. J.I. 3010637.

Product performance

Thermal performance

The Thermal Conductivity (W/mK) of DuoRock roofing Board is 0.038 W/mK.

U-values

The following examples indicate typical U-values attained using DuoRock roofing boards in combination with a mechanically fastened single ply membrane system.

Table 1. Typical constructions for use with Single Ply Membrane System

Calculations assume that insulation and membrane fasteners are of the telescopic type.

U-value (W/m ² K)	Thickness ³ (mm)			
	Fig 5	Fig 6	Fig 7	Fig 8
0.25	135	145	135	145
0.22	165	165	165	165
0.20	165	180	170 (85+85)	180
0.18	185 (50+135)	200 (95+105)	190 (95+95)	210 (105+105)
0.16	210 (105+105)	220 (85+135)	210 (105+105)	230 (95+135)
0.13	270 (135+135)	270 (135+135)	270 (135+135)	280 (135+145)

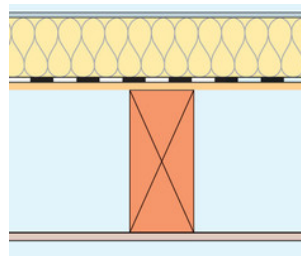


Figure 5: 19mm timber deck with 12.5mm plasterboard and skim fixed to timber joists



Figure 6: 150mm dense concrete deck and 50mm screed with 16mm plaster finish

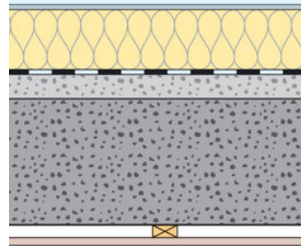


Figure 7: 150mm dense concrete deck and 50mm screed with suspended 12.5mm plasterboard ceiling

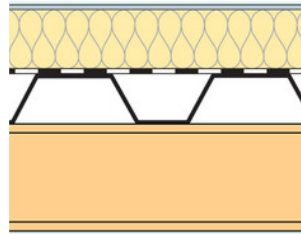


Figure 8 Troughed steel decking without underlining

Part L: 2010 (Amendment) U-value requirements for insulation on flat roofs:

Extensions:	0.18 W/m ² K
Renovation and repair work:	0.18 W/m ² K (subject to building control approval)
New build requirement:	0.18 - 0.13W/m ² K
Scotland Section 6 (2010)	
Extension:	0.18-0.15 W/m ² K
Conversion:	0.25 W/m ² K
New build requirements:	0.15 - 0.13 W/m ² K

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Fire performance

Rapid spread of fire not only destroys buildings, but can cost lives too. Smoke and fumes can hinder escape and rescue. The specification of insulation materials should consider each characteristic as well as any tendency for toxic emissions to contaminate water courses and the environment.

DuoRock roofing boards offer a high level of fire safety and are classified as non-combustible to Approved Document B of the Building Regulations and LPCB (Red Book ref. 022e).

LPCB approvals

Roofing constructions incorporating DuoRock roofing boards have achieved the highest possible classification to LPS 1181:Part 1 (i.e. EXT-A). This was accomplished by successfully undertaking and passing the Part 1 test for Reaction to Fire and the more onerous LPS 1208 Resistance to Fire test. Rockwool roofing boards are the only insulation products to have achieved this classification with respect to built up warm flat roofing constructions.

Approvals for DuoRock Plain roofing Board within specified metal deck flat roof constructions (LPCB ref No 022g/03) are detailed in the table below.

1) Roof board system LPCB Ref No. 022g/03:
Mechanically fastened Sarnafil single ply type S327-12EL (1.2mm thickness), external weather proof

membrane (or alternative membrane less than 3.5 kg/m² e.g. PVC, Chlorinated PE, Butyl Rubber with welded seams).

Comprising of two layers of Rockwool roofing board with staggered joints (100mm minimum stagger for fire resistance up to 90 minutes and 300mm stagger for 2 hours fire resistance), vapour control layer and 0.7mm thickness 35mm deep profile steel metal deck.

2) For EXT-A fire resistance grading, the trial construction was tested unloaded. However, deflection of the roof did not exceed the allowable limits set out in BS 476: Part 20: 1987 for load bearing horizontal elements.

3) Decking side laps were stitched at 450mm centres. The built up roofing system was tested with Eurobond Stone wool core sandwich wall panels.

Insurance requirements for protected zones

Systems that have only achieved EXT-B Grade are not suitable for use in roof areas adjacent to 'protected zones' as defined by the 'LPC Design Guide'. Appendix B, LPS 1181: Part 1 outlines three specific levels of Grade EXT-A fire resistance requirements for compliance with insurance industry standards within 'protected zones'.

Please contact Rockwool Ltd for details of approved constructions (0871 222 1780).

Product	Description	Specification system thickness (mm)	Fire resistance (min) integrity	Fire resistance (min) insulation	Grade [2]	Core Material	LPCB reference number
DuoRock Roof Board system		100-210	60	60	EXT-A60	Stone wool	022g/03
DuoRock Roof Board system		100-210	60	60	EXT-B	Stone wool	022g/03

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Acoustic performance

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

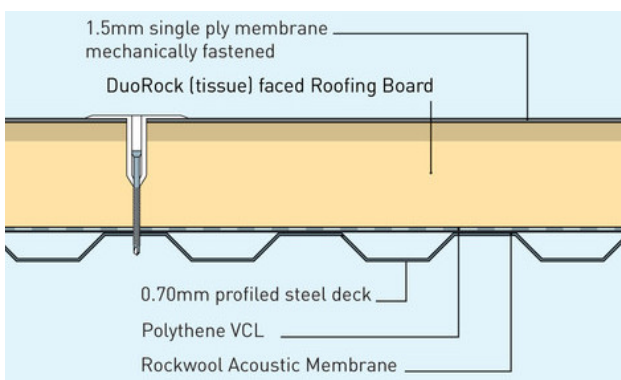
The control of noise pollution is an ever-increasing problem and one that is best addressed at the design stage. The solution tends to be specific to each building and is dependent on the type and source of the noise, both inside and outside the building. DuoRock roofing boards are proven to be the ideal acoustic insulation material for use in warm flat roof construction.

Sound attenuation

Noise intrusion from heavy traffic or aircraft can be reduced by using DuoRock roofing boards as part of the roof system, creating a quieter ambience within the building. The product may alternatively be used to assist containment of the noise source within the same building.

For high performance acoustic specifications, the use of a mass layer may be required. The combination of DuoRock and Rockwool Acoustic Membrane (RAM) results in improved sound insulation levels across the frequency range.

Figure 9. A typical high-performance flat roof detail with DuoRock roofing board



The construction denoted by fig.9 has been acoustically tested using specific combinations of metal deck, DuoRock and Rockwool Acoustic Membrane. An assessment has then been made by Sound Research Laboratories Limited to calculate DuoRock's performance in the equivalent constructions. Weighted apparent sound reduction index (Rw) values for each combination are summarised below.

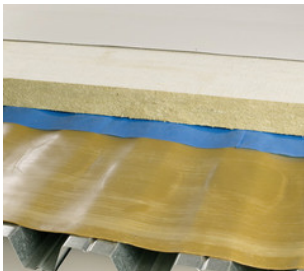
Deck type: 35mm deep profile, 0.7mm thick;
thickness: 145mm

Layers of RAM5	Rw	Ctr	Report No.
	dB	Value	
None	34	-4	C/02/5L/0526/1 Test 2
One	37	-5	C/03/7H/10161/L2
Two or one layer of RAM10	41	-5	C/02/5L/056/1 Test 5

Deck type: 60mm deep profile, 0.7mm thick; thickness:
210mm(105+105mm)

Layers of RAM5	Rw	Ctr	Report No.
	dB	Value	
None	35	-5	C/06/5L/3434/1 Test 2
One	41	-7	C/06/5L/3434/1 Test 6
Two or one layer of RAM10	44	-6	C/06/5L/3434/1 Test 3
Four or two layers of RAM 10)	47	-6	C/06/5L/3434/1 Test 4

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Typical application of DuoRock and Rockwool Acoustic Membrane

The roof insulation is to be Rockwool DuoRock (plain or tissue faced) roofing board as supplied by Rockwool Limited, Pencoed, Bridgend, CF35 6NY.

The board size is to be: 1200 × 1000mm × mm* thick.

The boards are to be loose laid directly onto the vapour control layer, strictly in accordance with manufacturer's recommendations, staggered and tightly butt jointed.

The single ply membrane followed by a fleece filter/cushion layer should both be loose laid and installed over the insulation in accordance with the membrane manufacturer's recommendations.

Ballast to be spread evenly to a minimum depth of 50mm† and should consist of 20–40mm diameter, well rounded, ovoid shaped stones, washed free of sand and fine particles.

Additional ballast may be needed for areas which are subjected to greater wind uplift, such as perimeters. This should be confirmed by the membrane manufacturer.

The maximum combined weight of ballast and external loading applied to the insulation board should not exceed 360kg/m².

Walkway routes, where required, should be established prior to laying the single ply membrane and be formed from 50mm thick precast concrete paving slabs on purpose - made and compatible support pads (Minimum 150mm diameter).

Walkways to be fully supported by a load-spreading layer applied between the insulation and the membrane.

The advice of the membrane manufacturer should be sought when specifying all aspects of the vapour control layer, fasteners, waterproof covering, fleece filter/cushion layer, and construction of walkways.

*Insert thickness as appropriate

†To be confirmed by calculation conducted by the membrane manufacturer.

Rockwool Acoustic Membrane

Rockwool Acoustic Membrane is a flexible, high-density polymer mass layer. When combined with DuoRock, it offers an ideal acoustic solution for buildings requiring high levels of acoustic performance. These include cinemas, airports, concert halls, stadia, retail and leisure developments, call centres, schools, etc.

Contact Rockwool Technical Support (0871 222 1780) for further details and solutions.

Typical specifications

Specification clause

1 DuoRock plain and tissue faced roofing boards with mechanically fastened single layer membranes

The roof insulation is to be Rockwool DuoRock (plain or tissue faced) roofing Board, as supplied by Rockwool Limited, Pencoed, Bridgend, CF35 6NY.

The board size is to be: 1200 × 1000mm × 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.

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

2 DuoRock (plain and tissue faced) roofing Board within a warm ballasted roof construction (light access)

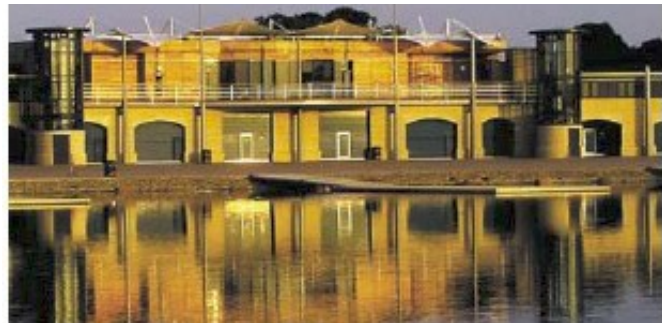
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BBC Scotland, Glasgow. DuoRock (plain) roofing board. 2,000m²



IKEA Distribution centre, Doncaster. DuoRock (plain) roofing board. 80,000m²



Eton boat house. DuoRock (plain) roofing board. 1,200m²



Specify SPRA

The Single Ply Roofing Association (SPRA) represents membrane manufacturers, associated component manufacturers and specialist subcontractors and aims to ensure the delivery of best value single ply roofing systems, through a quality assured partnership.

By specifying products and specialist installation by SPRA Manufacturer, Associate and Contractor members you can be assured that all parties meet strict quality criteria.

Compliance with these criteria and with the Code of Conduct is assessed at application, by annual audit and by random spot checks.

For further information, and to obtain copies of the SPRA Design Guide and other documents, go to www.spra.co.uk or call 0115 914 4445.

DuoRock Roofing Boards

Sustainability

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
- Durability
- Sustainable materials

Health and safety

The safety of Rockwool stone wool is confirmed by current UK and Republic of Ireland health and 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 from Rockwool Technical Support (0871 222 1780) 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).

Environment

Relying on entrapped air for its thermal properties, we are proud to say that Rockwool insulation does not contain (and has never contained) gases that have ozone depleting potential (ODP) or global warming potential (GWP). Rockwool therefore complies with the relatively modest threshold of GWP<5 included in documents such as the Code for Sustainable Homes.

Rockwool is increasingly involved in recycling 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 Rockwool materials to our factory for recycling.

More information

For further details visit our website at www.rockwool.co.uk or phone Rockwool Technical Support on 0871 222 1780.

DuoRock Roofing Boards

Rockwool Limited reserves the right to alter or amend the specification of products without notice as our policy is one of constant improvement. The information contained in this data sheet is believed to be correct at the date of publication.

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 DuoRock.

Rockwool Limited does not accept responsibility for the consequences of using Rockwool DuoRock in applications different from those described above. Expert advice should be sought where such different applications are contemplated, or where the extent of any listed application is in doubt.

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