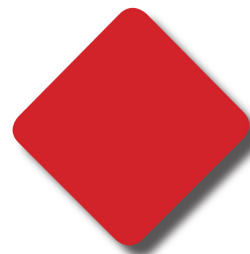
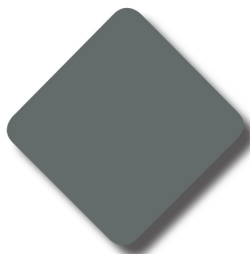




Paratherm F Data Sheet





Moy Materials – Paratherm F PIR Insulation

INSULATION FOR FLAT ROOFS WATERPROOFED WITH MECHANICALLY FIXED SINGLE-PLY WATERPROOFING

- High performance rigid thermoset insulation – thermal conductivity 0.022 W/m²K
- LPCB approved to LPS 1181: Part 1
- FM approved for Class 1 steel deck roof assemblies
- Fully compatible with Moy mechanically fixed single-ply waterproofing systems
- Compatible with Moy green roof systems
- Installation technique is ideal for fast track building programmes
- Resistant to the passage of water vapour
- Easy to handle and install
- Ideal for new build and refurbishment
- Non-deleterious material
- Manufactured with a blowing agent that has zero ODP and low GWP

Green Guide Rating

An Eco-profile, certified by BRE Certification to the 2008 BRE Environmental Profiles Methodology, has been created for Paratherm F PIR Insulation produced under licence at Kingspan Insulation's British manufacturing facilities. The BRE has assigned the product a 2008 Green Guide Summary Rating of A.

Responsible Sourcing

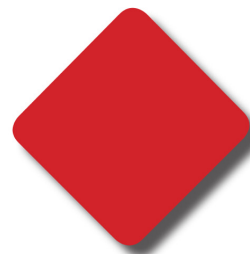
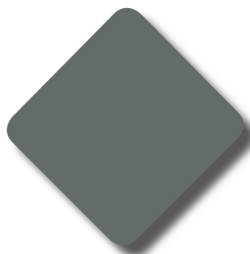
Paratherm F PIR Insulation produced under licence at Kingspan Insulation's Pembridge, Herefordshire and Selby, North Yorkshire manufacturing facilities is certified to BES 6001 (Framework Standard for the Responsible Sourcing of Construction Products) 'Excellent'.

Paratherm F PIR Insulation is manufactured under a management system certified to ISO 14001: 2004.

Wind Loading

Wind loadings should be assessed in accordance with BS / I.S. EN 1991-1-4: 2005 + A1: 2010 (National Annex to Eurocode 1 Actions on Structures. General Actions. Wind Actions) taking into account:

- length / width / height of the building;
- orientation of the building;
- wind speed;
- aspect (e.g. on a hill side); and
- topographical value of the surrounding area.



Roof waterproofing

Paratherm F PIR Insulation is suitable for use with Moy mechanically fixed single-ply waterproofing membranes.

NB Paratherm F PIR Insulation is not suitable for use with bitumen based built-up waterproofing systems or mastic asphalt. Paratherm G PIR Insulation can be used instead in these applications.

Water Vapour Control

Paratherm F PIR Insulation should be installed over a separate vapour control layer, in new build roofs, unless it is being used in conjunction with a sealed metal deck. Regardless of the deck type it is recommended that a condensation risk analysis is carried out for every project.

For refurbishment projects, involving the addition of insulation to existing insulated flat roofs, or roofs constructed of insulated steel faced composite panels, it is imperative that a U-value calculation and condensation risk analysis is carried out for every project, in order to ensure that the correct thickness of insulation is installed to achieve the required thermal performance, whilst avoiding interstitial condensation.

In refurbishment projects, where Paratherm F PIR Insulation is to be installed over an existing bituminous waterproofing membrane, the membrane can be used as a vapour control layer, as long as it is in a good water tight condition. Where this is not the case, a separate vapour control layer should be installed.

A minimum separate vapour control layer should consist of a 1000 gauge (250 micron) polythene sheet, with all joints lapped and then sealed with double sided self-adhesive tape.

Roof Loading / Traffic

Paratherm F PIR Insulation is suitable for use on access roof decks subject to limited foot traffic.

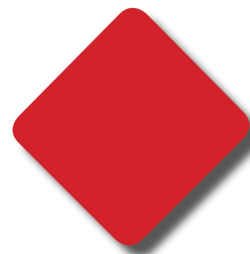
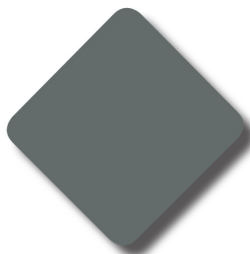
Where inappropriate foot traffic is liable to occur it is recommended that the roof surface is protected by specially constructed walk-ways.

For further advice on the acceptability of specific foot traffic regimes, please contact the Moy Technical Service Department.

Spanning on Metal Decks

Insulation boards should comply with the minimum thicknesses shown in the table below, when used over metal decks with trough openings.

Trough Opening (mm)	Minimum Insulant Thickness (mm)
≤ 75	25



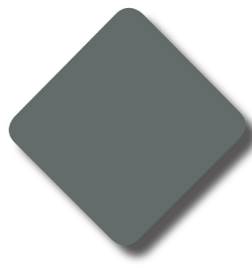
76–100	30
101–125	35
126–150	40
151–175	45
176–200	50
201–225	55
226–250	60

Lightning Protection

Building designers should give consideration to the requirements of BS / I.S. EN 62305: 2011 (Protection against lightning).

Installing over Metal Decks

- Where an FM or LPCB approved construction is required, please refer to 'LPCB & FM Certification' on page 14.
- Metal decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- If using a sealed metal deck there is no requirement for a separate vapour control layer.
- If the metal deck is not sealed the vapour control layer should be loose-laid.
- Where one run of the specified vapour control layer laps another, there should be minimum 150mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane
- Boards of Paratherm F PIR Insulation should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the trough openings, or diagonally across the corrugation line, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of Paratherm F PIR Insulation as the general roof area.
- A 25mm thick Paratherm F PIR Insulation upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact Moy for more details.
- The waterproofing membrane is mechanically fixed in accordance with Moy's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

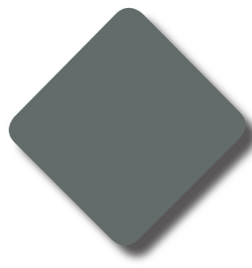


Installing over Concrete Decks

- Concrete decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- The vapour control layer should be loose-laid over the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of Paratherm F PIR Insulation should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of Paratherm F PIR Insulation as the general roof area.
- A 25mm thick Paratherm F PIR Insulation upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact Moy for more details.
- The waterproofing membrane is mechanically fixed in accordance with Moy's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

Installing over Plywood Decks

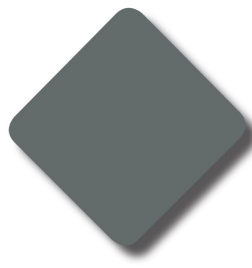
- Timber decks should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- The vapour control layer should be temporarily stapled or nailed to the deck.
- Where one run of the specified vapour control layer laps another, there should be minimum 150mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified waterproofing membrane.
- Boards of Paratherm F PIR Insulation should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.



- Joints between insulation boards should not coincide with those between the plywood sheets.
- Roof-light or ventilator kerbs etc. should always be insulated with the same thickness of Paratherm F PIR Insulation as the general roof area.
- A 25mm thick Paratherm F PIR Insulation upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact Moy for more details.
- The waterproofing membrane is mechanically fixed in accordance with Moy's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

Installing over Existing Flat Roofs

- The existing waterproofing membrane surface should be clean, dry, without large projections, steps or gaps, and should be graded to allow correct falls to all rainwater outlets.
- Where the existing waterproofing membrane is not fit for purpose as a vapour control layer, a separate vapour control layer should be loose-laid over it.
- Where one run of the specified vapour control layer laps another, there should be minimum 150mm side and end overlaps, which should be adequately sealed.
- Turn up the vapour control layer at the edge of the roof to a height appropriate to the specified new waterproofing membrane.
- Boards of Paratherm F PIR Insulation should be secured to the deck using mechanical fixings e.g. telescopic tube fasteners (see 'Mechanical Fixings').
- Insulation boards should always be laid break-bonded, either with their long edges at right angles to the edge of, or diagonally across the roof, and with joints lightly butted. There should be no gaps at abutments.
- Roof-light or ventilator kerbs etc. should always insulated with the same thickness of Paratherm F PIR Insulation as the general roof area.
- A 25mm thick Paratherm F PIR Insulation upstand should be used around the perimeter of the roof on the internal façade of parapets.
- A minimum distance of 300mm should be maintained between the top of the insulation upstand and the bottom of the horizontal roof insulation.
- For roofs without parapets, a timber edging batten of the same height of the insulation is to be used to fix the fascia board to the gutter system. Please contact Moy for more details.
- The waterproofing membrane is installed in accordance with Moy's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

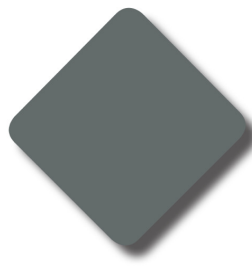


Installing over Existing Composite Panel Roofs

- If the existing profile provides inadequate support for the insulation boards, the existing roof should be over-boarded, e.g. with plywood, prior to their installation.
- Boards of Paratherm F PIR Insulation should be secured to the deck using mechanical fixings. Please refer to the Moy Technical Advice Service (see rear cover) for advice on fixing specification.
- Insulation boards should always be laid break-bonded and with joints lightly butted. There should be no gaps at abutments. If the existing roof has been over-boarded, then insulation boards should be laid with their long edges at right angles to the edge of, or diagonally across the roof. If not, they should be laid either with their long edges at right angles to the trough openings, or diagonally across the corrugation line
- Roof-light or ventilator kerbs etc. should always insulated with the same thickness of Paratherm F PIR Insulation as the general roof area.
- The waterproofing membrane is installed in accordance with Moy's instructions, over the whole insulated area including any insulation upstands, as soon as possible after laying the insulation boards.

Mechanical Fixings

- The number of mechanical fixings required to fix Paratherm F PIR Insulation will vary with the geographical location of the building, the local topography, and the height and width of the roof concerned along with the deck type.
- A minimum of 6 fixings are required to secure boards of Paratherm F PIR Insulation to the deck.
- The requirement for additional fixings should be assessed in accordance with BS / I.S. EN 1991-1-4: 2005 + A1: 2010 (National Annex to Eurocode 1. Actions on structures. General Actions. Wind Actions).
- Mechanical fixings must be arranged in an even pattern.
- Fasteners at insulation board edges must be located > 50 mm and < 150 mm from edges and corners of the board and not overlap board joints.
- Please refer to page 12 for recommended fixing patterns.
- Each fixing should incorporate a square or circular plate washer (50 x 50 mm or 50 mm diameter).
- If two layers of insulation are to be installed, the base layer should be mechanically fixed with minimum 1 No. fixing in the centre of the board before fixing the top layer as described above.
- Where alternative mechanical fixing systems are specified, such as bar fixing systems, the specified system must give similar restraint to the insulation board as would be attained by the use of conventional telescopic tube fasteners.



Installing in Two Layers

- In situations where two layers of insulation are required, both layers should be installed in the same manner, as detailed in the preceding sections. However, refer to 'Mechanical Fixings' for guidance on the number of fixings to be used in each layer.
- In all cases, the layers should be horizontally offset relative to each other so that, as far as possible, the board joints in the two adjacent layers do not coincide with each other.

Following Trades

The roof must be adequately protected when building works are being carried out on or over the roof surface. This is best achieved by close boarding. The completed roof must not be used for storage of heavy building components such as bricks or air conditioning equipment.

Daily Working Practice

At the completion of each day's work, or whenever work is interrupted for extended periods of time, a night joint must be made in order to prevent water penetration into the roof construction.

Cutting

- Cutting should be carried out either by using a fine toothed saw, or by scoring with a sharp knife, snapping the board over a straight edge and then cutting the facing on the other side.
- Ensure accurate trimming to achieve close-butting joints and continuity of insulation.

Packaging and Storage

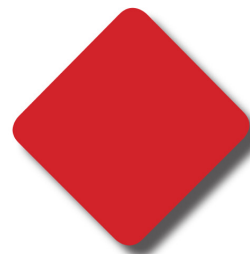
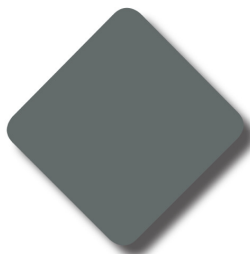
- The polyethylene packaging of Paratherm F PIR Insulation products, which is recyclable, should not be considered adequate for outdoor protection.
- Ideally, boards should be stored inside a building. If, however, outside storage cannot be avoided, then the boards should be stacked clear of the ground and covered with an opaque polythene sheet or weatherproof tarpaulin. Boards that have been allowed to get wet should not be used.

Health and Safety

Paratherm F PIR Insulation products are chemically inert and safe to use.

Recommended Fixing Patterns

The number of fixings necessary should be assessed in accordance with BS / I.S. EN 1991-1-4: 2005 + A1: 2010 (National Annex to Eurocode 1. Actions on structures. General Actions. Wind Actions).



The Facings

Paratherm F PIR Insulation is faced on both sides with a low emissivity composite foil, autohesively bonded to the insulation core during manufacture.

The Core

The core of Paratherm F PIR Insulation is manufactured with Nilflam® technology, a high performance fibre-free rigid thermoset polyisocyanurate (PIR) insulant manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Standards and Approvals

Paratherm F PIR Insulation is manufactured to the highest standards in accordance with requirements BS 4841-4 (Rigid polyisocyanurate (PIR) and polyurethane (PUR) products for building end-use applications. Specification for laminated boards (roofboards) with auto-adhesively or separately bonded facings for use as roofboard thermal insulation under single-ply roofing membranes).

Paratherm F PIR Insulation is also manufactured to the highest standards under a management system certified to ISO 9001: 2008 (Quality management systems. Requirements), ISO 14001: 2004 (Environmental Management Systems. Requirements), BS / I.S OHSAS 18001: 2007 (Occupational Health and Safety Management Systems. Requirements) and ISO 50001: 2011 (Energy Management Systems. Requirements with Guidance for Use).

The use of Paratherm F PIR Insulation produced under licence at Kingspan Insulation's Pembrige and Selby manufacturing facilities is covered by BBA Certificate 16/5332.

Standards Dimensions

Paratherm F PIR Insulation is available in the following standard size:

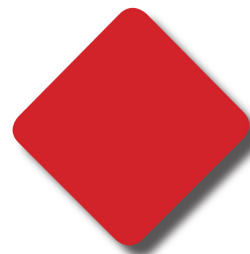
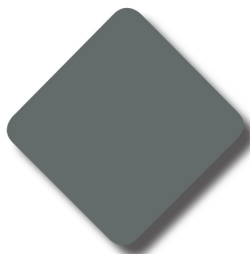
Nominal Dimension	Availability
Length (m)	2.4
Width (m)	1.2

Compressive Strength

The compressive strength of Paratherm F PIR Insulation typically exceeds 150 kPa at 10% compression, when tested to BS / I.S. EN 826: 2013 (Thermal insulating products for building applications. Determination of compression behaviour).

Water Vapour Resistance

Adjusted for the effect of board joints, the product achieves a resistance far greater than 100



MN.s/g, when tested in accordance with BS / I.S. EN 12086: 2013 (Thermal insulating products for building applications. Determination of water vapour transmission properties). Paratherm F PIR Insulation should always be installed over a vapour control layer or sealed metal deck (see 'Water Vapour Control' on page 7).

Durability

If correctly installed, Paratherm F PIR Insulation can have indefinite life. Its durability depends on the supporting structure and the conditions of its use.

Resistance to Solvents, Fungi & Rodents

The insulation core is resistant to short-term contact with petrol and with most dilute acids, alkalis and mineral oils. However, it is recommended that any spills be cleaned off fully before the boards are installed. Ensure that safe methods of cleaning are used, as recommended by the suppliers of the spilt liquid. The insulation core is not resistant to some solvent-based adhesive systems, particularly those containing methyl ethyl ketone. Adhesives containing such solvents should not be used in association with this product. Damaged boards or boards that have been in contact with harsh solvents or acids should not be used. The insulation core and facings used in the manufacture of Paratherm F PIR Insulation resist attack by mould and microbial growth, and do not provide any food value to vermin.

Fire Performance

Paratherm F PIR Insulation, when subjected to the British Standard fire test specified in the table below, will achieve the result shown, when waterproofed with a single-ply waterproofing membrane.

Test	Result
BS 476-3: 2004 (External fire exposure roof test)	Dependent on single-ply membrane adopted

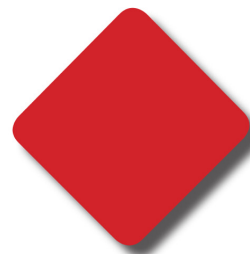
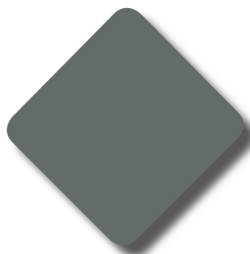
LPCB & FM Certification

FM Certification

Paratherm F PIR Insulation is certified as achieving Class 1 Insulated Steel Deck Pass to Factory Mutual Research Standard 4470: 2016 (Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Non-combustible Roof Deck Construction), subject to the conditions of approval as a roof insulation product for use in Class 1 roof constructions as described in the current edition of the Factory Mutual Research Approval Guide.

LPCB Certification

Metal deck roofing constructions incorporating Paratherm F PIR Insulation, produced under licence



at Kingspan Insulation's Pembridge and Castleblayney manufacturing facilities, have been successfully tested to LPS 1181: Part 1 (Requirements and Tests for Built-up Cladding and Sandwich Panel Systems for use as the External Envelope of Buildings).

Thermal Conductivities

The boards achieve a thermal conductivity (λ -value) of 0.022 W/m·K

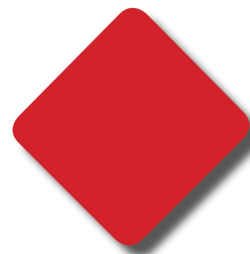
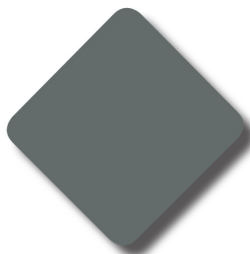
Thermal Resistance

Thermal resistance (R-value) varies with thickness and is calculated by dividing the thickness of the board (expressed in metres) by its thermal conductivity. The resulting number is rounded down to the nearest 0.05 (m²·K/W).

Insulant Thickness (mm)	Thermal Resistance (m ² ·K/W)
70	3.15
75	3.40
80	3.60
85	3.85
90	4.05
95	4.30
100	4.50
105	4.75
110	5.00
115	5.20
120	5.45
125	5.65
130	5.90
135	6.10
140	6.35
150	6.80
155	7.05
160	7.25
165	7.50
180	8.15
190	8.60
200	9.05
210	9.50

Paratherm PIR Insulation Range Products

With a thermal conductivity of 0.022–0.028 W/m·K these are amongst the more thermally efficient insulation products commonly used.



Manufactured with a blowing agent that has zero Ozone Depletion Potential (ODP) and low Global Warming Potential (GWP).

Sectors



Data Centres



IT Processing



Pharmaceutical



Commercial



Education



Agricultural



**Mixed-Use
Development**

**Safe2
Torch**
REGISTERED



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