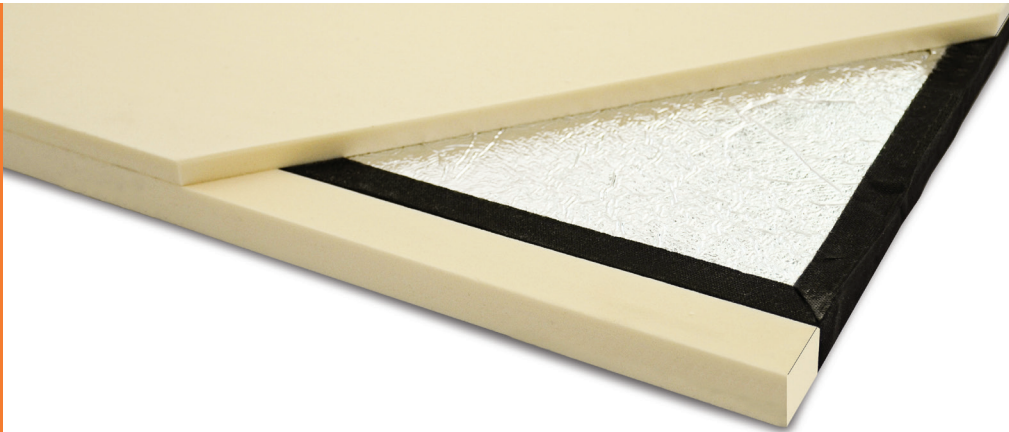


# BAUDER

## Insulation



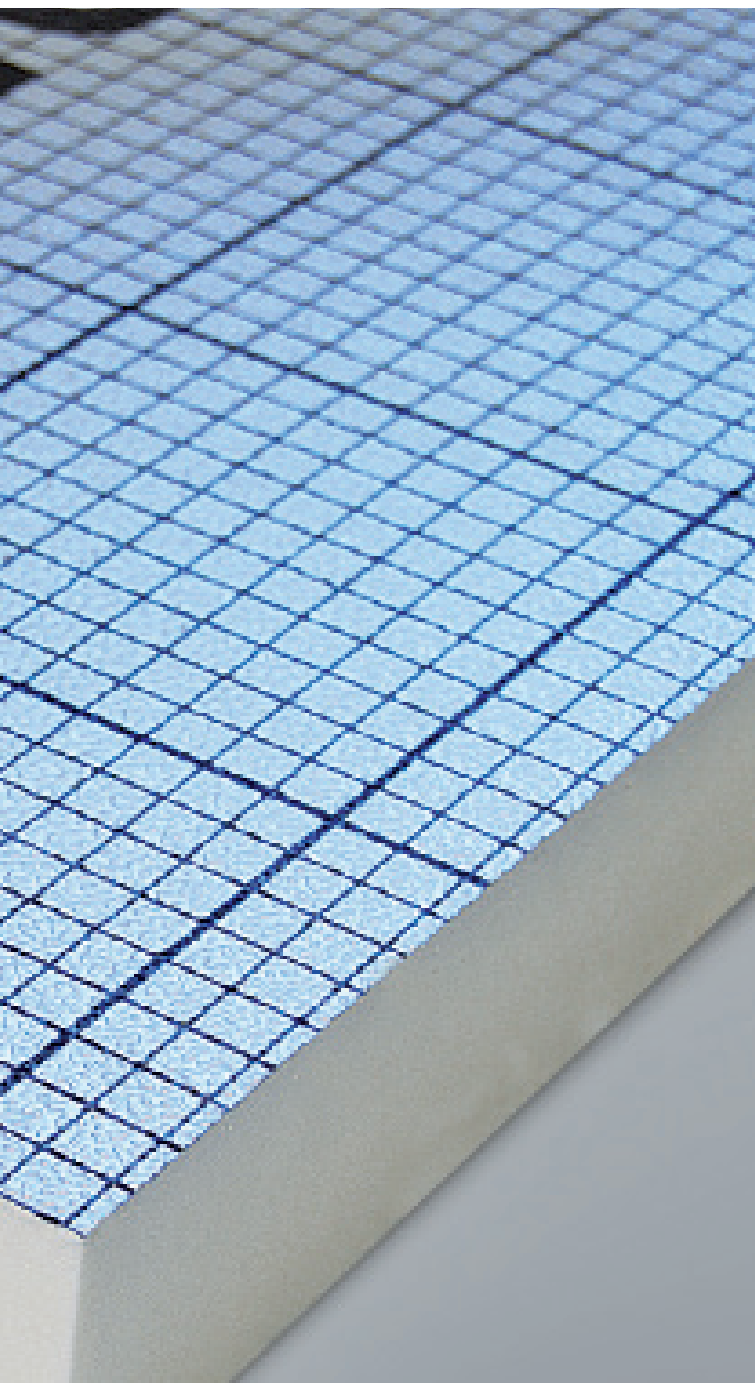
Improved energy efficiency has very positive effects on the environment in terms of reduced greenhouse gas emissions, whilst also providing consumers with lower energy bills.

The range of insulants incorporated within our systems help to meet this objective.

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# OVERVIEW OF INSULATION





The insulation for flat roofs is commonly produced as rigid boards making them easy to handle and install with the variety of waterproofing types and systems. Ordinarily, the insulation used within warm roof construction has excellent dimensional stability and compressive strength, which enables it to withstand foot traffic without depression. Within an inverted roof construction the insulation needs to be able to endure a 'buried' scenario beneath ballast or a green roof without detriment to its properties or insulating capability.

### Bauder Insulations

There are different insulation options available depending on the roof type being constructed, the thermal performance required, any height limitations applicable, and the fire performance necessitated.

**BauderPIR** is both strong and inert and has a good compressive strength making it suitable for all kinds of load bearing decks in warm roof construction.

**BauderVIP** is a vacuum insulation panel designed to provide high thermal performance in areas with limited installation height and is ideally suited for roof terrace applications in warm roof construction.

**BauderROCK** is a non-combustible mineral fibre insulation that achieves Euroclass A1. The flatboards are utilised within warm roofs with exceptional acoustic and fire resistance properties. BauderROCK NC Upstand Insulation is used with inverted roofs alongside the specified Bauder inverted insulation.

**BauderGLAS** and **BauderGLAS Inverted** are non-combustible cellular glass insulations that can achieve Euroclass A1 rating for warm or inverted roofs. The rigid boards give very high compressive performance.

**BauderJFRI** is a high performance rigid expanded polystyrene (EPS) insulation designed for inverted roof systems. It is lightweight, has a high compressive strength, is resistant to the passage of water, and will not degrade with regular wetting.

**BauderXPS** is a CO<sub>2</sub> blown extruded polystyrene insulation designed for inverted roof construction. It has high compressive strength and low water absorption.

### Specification Support

Specification downloads:  
[www.bauder.co.uk/technical-centre](http://www.bauder.co.uk/technical-centre)



Telephone helpline:  
 0845 271 8800



# ENVIRONMENTAL CREDENTIALS



## Environmental Product Declaration (EPD)

The Eco Platform accreditation, where relevant, is recognised by the BRE as valid and transferrable environmental documentation towards obtaining BREEAM credits within their assessment process for BREEAM UK New Construction 2018.

Within our waterproofing systems we have the following EPD certificates for our insulation.

- **PU Insulation - Mineral Fleece Facing**  
EPD-IVP-20140206-IBE1-EN.
- **PU Insulation - Aluminium Facing**  
EPD-IVP-20140207-IBE1-EN.
- **PU Insulation - Unfaced**  
EPD-IVP-20160147-IBE1-DE.
- **Cellular Glass Insulation**  
EPD-PCE-20150042-IBA1-DE.
- **Mineral Wool**




## Building Research Establishment (BRE) Green Guide

The BRE Green Guide to Specification, which is now historic date a gave generic ratings for various product types. For current schemes working to BREEAM, please contact our technical department.

### Product ratings

- 'A' generic rating, element number 1415320205 for Bauder FA-TE & FA.
- 'A+' generic rating, element number 915320051 for cellular glass insulation - density 100 kg/m<sup>3</sup>.
- 'A+' generic rating, element number 815320025 for JFRI 200 HP.
- 'A' generic rating, element number 1315320001 for BauderJFRI 300.

 Visit our website for the latest information and to download the certificates, [bauder.co.uk/technical-centre](http://bauder.co.uk/technical-centre)

## Our Products in Practice

We are committed to reducing the impact our manufacturing has on the environment as well as how our products can support the environment through a reduction of energy usage, recycling and reusing.

### PIR Insulation

Our BauderPIR insulation has extremely high thermal efficiency and is CFC and HCFC free. It has zero ODP and has EPD certification. As part of our PIR insulation manufacturing process, offcuts and waste are readily recycled and used in the production of hand cleansers and decking materials.

The embodied energy of our rigid polyurethane PIR insulation accounts for as little as 4% of the energy the board can save during its serviceable life.

### Cellular Glass Insulation

This insulation is manufactured from more than 60% recycled glass and without any addition of binders or use of harmful blowing agents.

### Mineral Wool Insulation

The natural basic rock mineral used in BauderROCK is an abundant resource. It is naturally fire resistant and therefore does not require the addition of a fire retardant.

### Designing Insulation Schemes

Effective and efficient use of insulation boards on a roof is a consideration so that resource efficiency is maximised and site waste minimised. At Bauder, it is our aim to design out waste arising from a scheme layout, though the success of this can depend more on the way the building is designed rather than the way the product is used. This is particularly important when tapered insulation schemes are required where boards are precisely positioned and less transposable.

### Upgrading Insulation on Current Roofs

Utilising moisture mapping and other sophisticated diagnostics and software, we are able to offer a refurbishment service that identifies precisely where on a current roof the insulation is perfectly sound and efficient and therefore does not need replacing, and the areas suffering from water ingress which need to be removed as the insulation is ineffectual. This provision proactively analyses the exact project requirements, rather than working with assumptions, to reduce the materials required for refurbishing the roof and keeping costs to the building owner at a minimum.

# TECHNICAL CREDENTIALS

## British Standards - BS EN13165

Our BauderPIR insulation range complies with BS EN13165 Thermal Insulation Products for Buildings factory made rigid polyurethane foam (PU) products.

## Certification

Our BauderPIR insulation boards have been tested by the BBA and carry certificate number 16/5365.



Our BauderVIP panels are certified under European Technical Approval ETA-13/0493.

## ISO Accreditation for Manufacturing

Our PIR insulation boards are manufactured and certified to be in accordance with ISO 9001, ISO 14001 and ISO 50001.



## Associations and Industry Bodies

We are members of representative bodies for the rigid PIR and PUR foam industry in the UK and Europe which offer informed advice and opinion on the use of PUR/PIR insulation products and related issues.

## Fire Performance

Within a warm roof waterproofing system for TS 1187 Test 4, the insulation, be it mineral wool, cellular glass or PIR, is not exposed directly and is therefore determined by the performance of the cap sheet and its system classification; thus these insulants all conform to Building Regulations in the same way - not one achieving a higher rating than the other.

Select grades of Bauder PIR insulation have also been tested and approved by fire experts FM Approvals, whose parent company's (FM Global) principal global business is the insurance of buildings and loss prevention. When tested to meet the performance limits of FM Approvals standard 4470 FM Approvals recognises the performance of defined PIR insulation and mineral wool insulation in a similar manner, so long as they are installed as part of a recognised FM Approved Assembly, i.e. a stated system configuration listed on FM Approvals' up-to-date online database, 'RoofNav'. Bauder PIR, as with all other products that are FM Approved, are under regular surveillance by FM Approvals to confirm the consistency of production.

Inverted roof constructions also generally use plastic-based insulants such as EPS and XPS, though these are only used when they are fully covered with paving slabs or stones and are therefore often deemed to meet Building Regulations without testing, with exception of a Specified Attachment where the insulation should be non-combustible.

## Non-combustible Insulations

There are two types of insulants in our range for specification that are non-combustible; BauderROCK with products for warm roof and BauderGLAS with products for warm roof and inverted scenarios. These options give specifiers, building owners, and insurers enhanced security to protect the building from external fire penetration.

## Conservation of Fuel and Power - Building Regulations

Roof insulation thickness for building regulations will vary depending on the country within the United Kingdom where the building is to be sited and the type of insulation used.

Different insulants have different efficiencies and performance levels, that affect the thickness required to meet building regulations. These tables show a comparison of the insulations when looking to achieve a 0.18 W/m<sup>2</sup>K U-value.

### WARM ROOF INSULATIONS TO ACHIEVE A U-VALUE OF 0.18 W/M<sup>2</sup>K ON A PLYWOOD DECK

Insulation Type	Thickness (mm)	Approx Weight (Kg/m <sup>2</sup> )
<b>BauderVIP</b> (weighted average)	60	13
<b>BauderPIR FA-TE</b>	120	3.6
<b>BauderPIR FA</b>	120	3.6
<b>BauderPIR Flatboard</b>	140	4.2
<b>BauderGLAS</b>	190	19
<b>BauderROCK</b>	205	32

### INVERTED ROOF INSULATIONS TO ACHIEVE A U-VALUE OF 0.18 W/M<sup>2</sup>K ON A CONCRETE DECK (uncorrected as BS 6229:2018 recommends uplifting by 10%)

Insulation Type	Thickness (mm)	Approx Weight (Kg/m <sup>2</sup> )
<b>BauderJFRI 200 HP</b> (with JFRI WFRL)	185	6.5
<b>BauderXPS 300</b> (with XPS WFRL)	190	5.7
<b>BauderJFRI 300</b> (with JFRI WFRL)	200	9
<b>BauderGLAS Inverted</b> (with JFRI WFRL) two layers	220	22



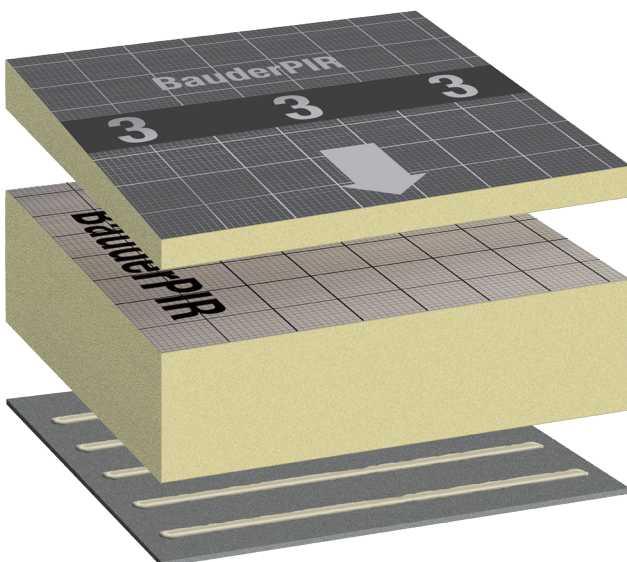
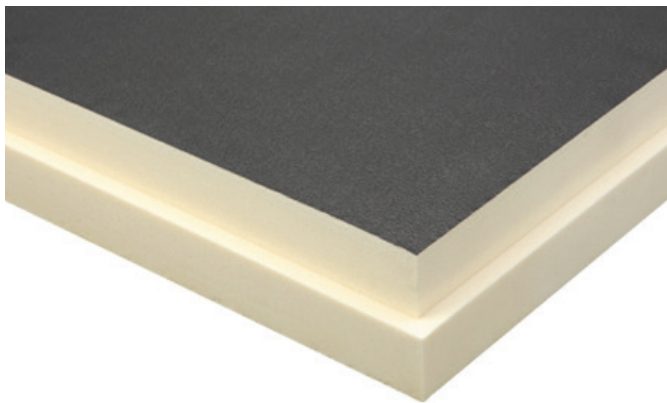
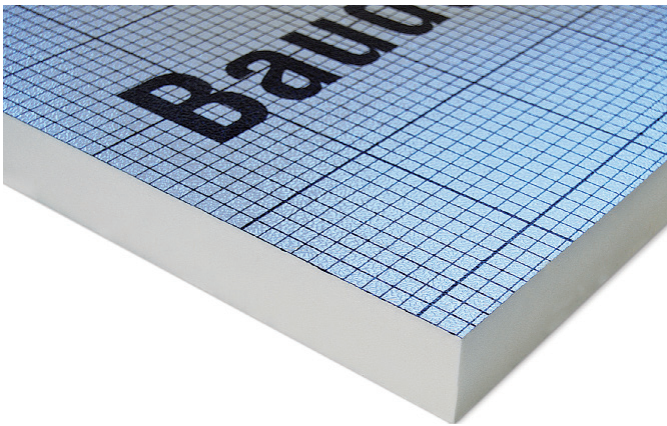
# INSULATION FOR WARM ROOFS

## Bauder PIR Insulation

Our own manufactured insulation, of which there are four variations, is a closed-cell rigid polyisocyanurate (PIR) board. It is both strong and inert and has a compressive strength of minimum 0.12N/mm<sup>2</sup> making it suitable for all kinds of load bearing decks. The low thermal conductivity allows for the insulation to be of a reduced thickness compared to many other well known insulants.

## Fire Performance

Our PIR insulation can achieve B<sub>ROOF</sub> (t4) to TS 1187 and BS EN 13501-5 when used in standard Bauder warm roof systems. BauderPIR insulation has a Class E Reaction to Fire classification to BS EN13501-1.



## Key Features

- Superior thermal performance.
- Can achieve B<sub>ROOF</sub> (t4).
- Compressive strength of 0.12N/mm<sup>2</sup>.
- Lightweight.
- High index PIR.
- Provides superior life cycle performance.
- CFC and HCFC free giving zero ozone depletion potential (ODP).
- FA & FA-TE hold EPD certification.
- Water absorption rate of 2% vol at the surface as the closed cell structure does not permit capillary action.

## BauderPIR FA-TE Insulation

This insulation is faced on both sides with aluminium foil to increase thermal efficiency and is available in various thicknesses to achieve different thermal requirements.

The FA-TE insulation is utilised in bituminous systems and installed between the air and vapour control layer and underlayer membranes.

## BauderPIR FA Insulation

This insulation is faced on both sides with black aluminium foil to increase thermal efficiency and is super-sized to enable fast track installation within our single ply systems for both adhered and mechanically fixed orientations. It is available in various thicknesses.

The boards are rebated to ensure thermal continuity.

## BauderPIR FA Tapered Insulation

This is a lightweight, convenient and cost effective alternative method of providing falls to a roof instead of incorporating them into the structure, whilst also providing thermal insulation. A tapered insulation scheme creates 1:60 falls on a flat roof and is ideal for improving drainage falls on refurbishment projects (for other falls an un-faced PIR is available to order).

The square boards combined with infills make it easier to install mitres in cross falls and reduce waste.

Our technical team can design bespoke tapered insulation schemes for individual projects and provide advice for flat roof fall design.

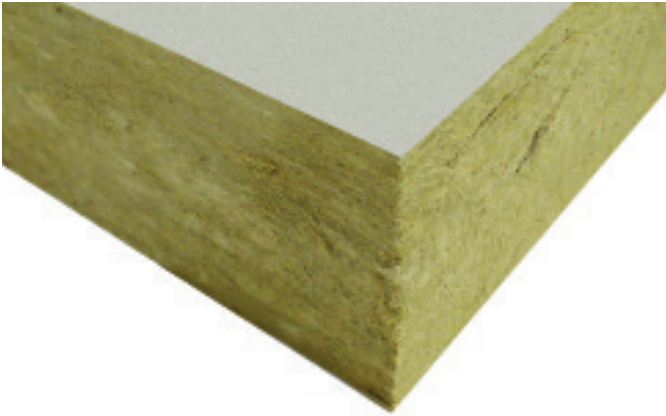
See pages 16-17.

## Non-Combustible Insulations

### BauderROCK Mineral Fibre Insulation

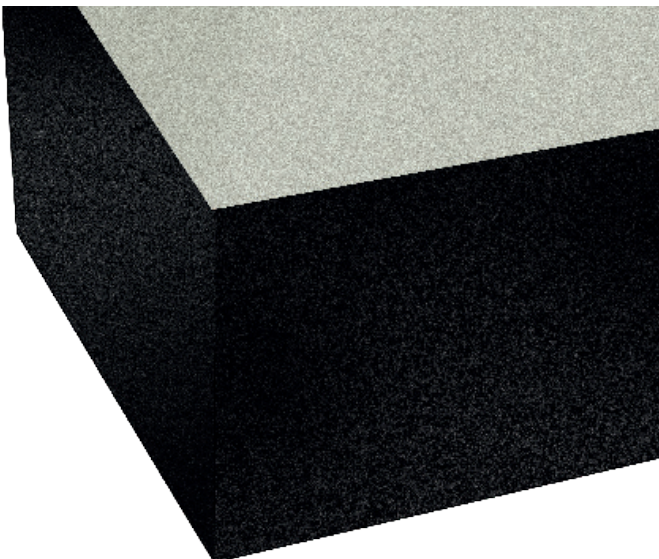
Mineral fibre insulation provides thermal and acoustic insulation, whilst offering superior fire performance for both new and refurbishment projects. The insulation is produced through spinning molten rock to produce a mass of fine, intertwined fibres and pressed into boards.

The multi-purpose facing allows the insulation to be either mechanically fixed, torch applied, or adhered within the roof system.



### BauderGLAS Cellular Glass Insulation

Cellular glass insulation provides compressive performance, whilst also offering superior fire performance for both new build and refurbishment projects. The board is a rigid material composed of millions of completely sealed glass cells.



### Key Features

---

- BauderROCK achieves B<sub>ROOF</sub>(t4) to TS 1187 and BS EN 13501-5 when used in a Bauder warm roof system.
  - Excellent sound absorption and noise reduction.
  - Heat resistant.
  - Dual density for improved compressive strength.
  - Non-combustible, delivering high fire performance.
  - CFC and HCFC free, with EPD certification.
- 

### BauderROCK Insulation

This mineral fibre flatboard insulation is ideal for projects that are required to achieve a high level of sound reduction and fire performance within a warm roof construction for bituminous, single ply, or cold liquid systems.

BauderROCK Tapered Insulation is ideal for projects that require improved drainage falls.

### Key Features

---

- Non-combustible, delivering high fire performance.
  - Excellent compressive strength.
  - Heat resistant.
  - Vapour and watertight.
  - Long lasting thermal performance.
- 

### BauderGLAS Insulation

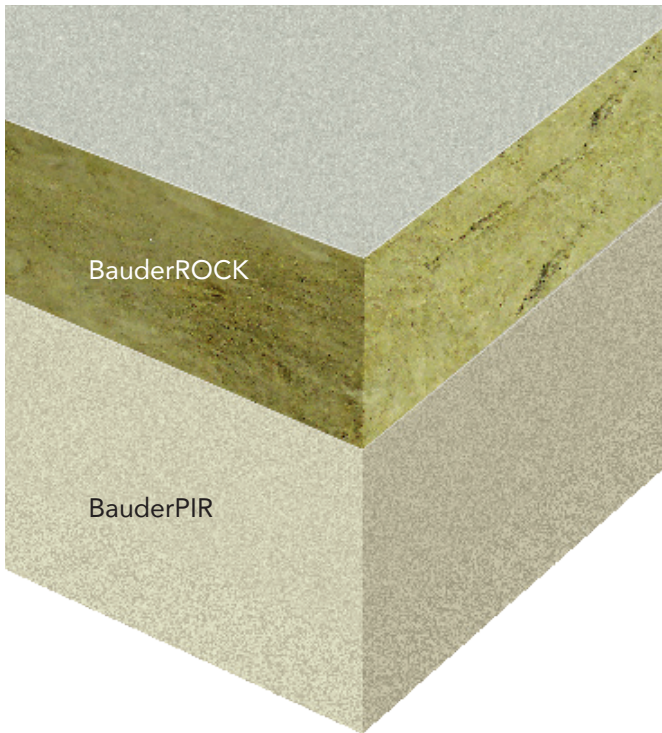
Used in both new build and refurbishment projects, the non-combustible core is produced with a choice of facings to provide options for self-adhesive and torch-on membranes, or without facings for alternative applications.

BauderGLAS Tapered Insulation is ideal for projects that require improved drainage falls.



# SPECIALIST INSULATION SOLUTIONS

## Combined Acoustic System



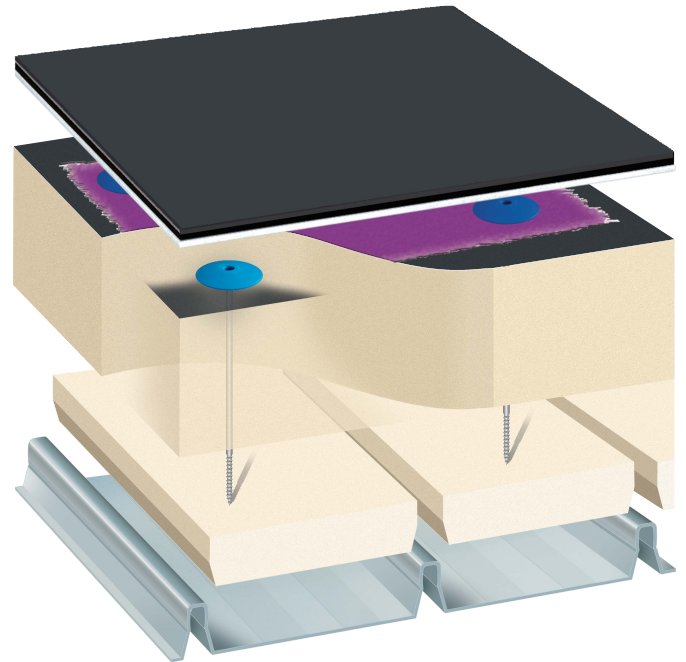
Combining BauderROCK with BauderPIR can reduce rain noise and airborne sound transmission whilst reducing weight loadings and system thickness.

- Improved sound reduction compared with solely BauderPIR.
- Can achieve  $B_{ROOF}(t_4)$ .
- Thinner build-up than solely BauderROCK.
- Less weight loading than solely BauderROCK.
- Vapour permeability.
- Added thermal performance.
- Dimensional stability.

The sound properties of the base layer of BauderPIR Insulation are enhanced with an upper layer of BauderROCK.

Installation of the boards can be mechanically fastened or adhered and is suitable for both refurbishment and new build.

## Bauder PIR Infill System



The PIR Infill Overlay System is used within refurbishment projects to overlay an existing profiled sheet metal roof covering to improve thermal performance without re-cladding.

The PIR Insulation is cut on site to match the profile of the sheet metal roof currently in situ, typically steel, composite panels or aluminium, and is cut to sit within the ribs of the existing standing seam to provide a substrate for the flat FA PIR to site above.

The PIR Infills are loose laid and the FA PIR above is mechanically fastened ensuring both layers of PIR are secured. The insulation is then waterproofed with a Bauder Single Ply membrane which can be either mechanically fastened or adhered.

For full information on the Infill Overlay system, see chapter 5.



## Bauder Vacuum Insulation Panel

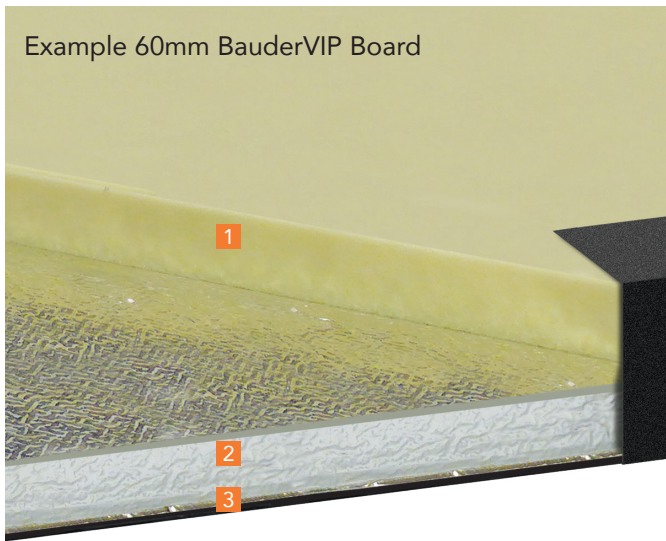


### BauderVIP

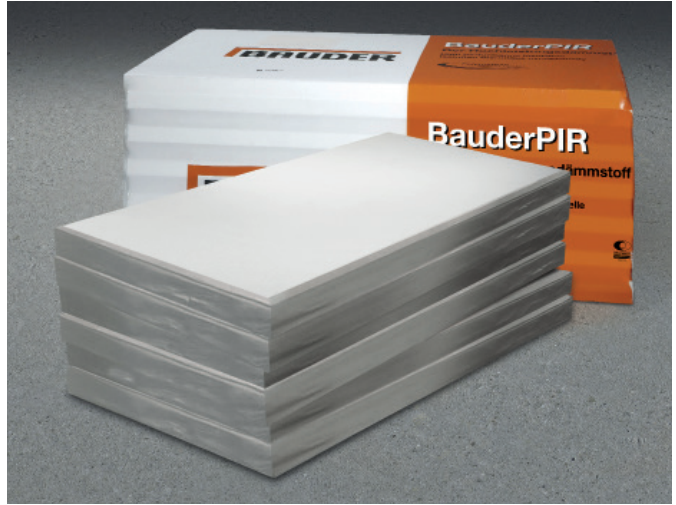
This vacuum insulation panel is designed to provide high thermal performance in areas where system build-up height is limited and is ideally suited for terrace and balcony applications with a landscaped finish. The insulation can achieve  $B_{ROOF}$  (t4) in a Bauder roof system.

The exceptional insulating properties (calculated value of thermal conductivity -  $0.0072$  W/mK) achieved by BauderVIP is due to the high performance vacuum silica core. This silica is encased by a multi-layer composite aluminium foil, and then the air is removed from the silica to create a vacuum.

BauderVIP insulation panels are available in 60mm and 80mm thickness and can be used in conjunction with other Bauder insulation boards to further enhance U-values if required. As VIP panels cannot be cut it is necessary to use Bauder FA-TE insulation boards at the roof perimeters and penetrations. Bauder offers a design service for this and for calculation of the area weighted U-value for the roof area.



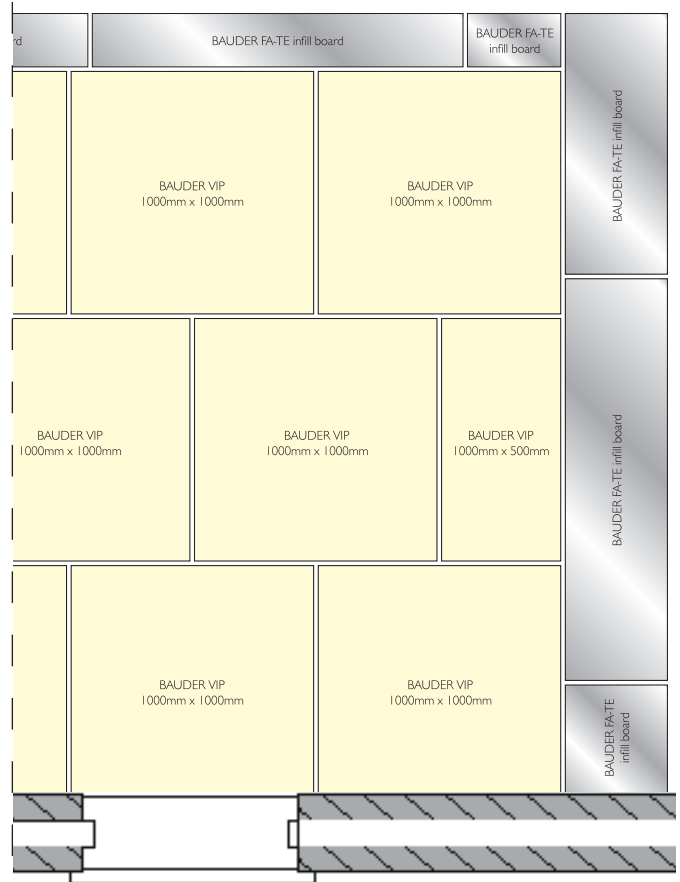
1. 17mm High Density PIR
2. 40mm VIP Core
3. 3mm Recycled Rubber Mat



BauderVIP is available as a 60mm or 80mm thick panel and supplied in the following sizes:

- 1000 x 1000mm
- 1000 x 500mm

The Bauder VIP panels are certified under a European Technical Approval ETA-13/0493.



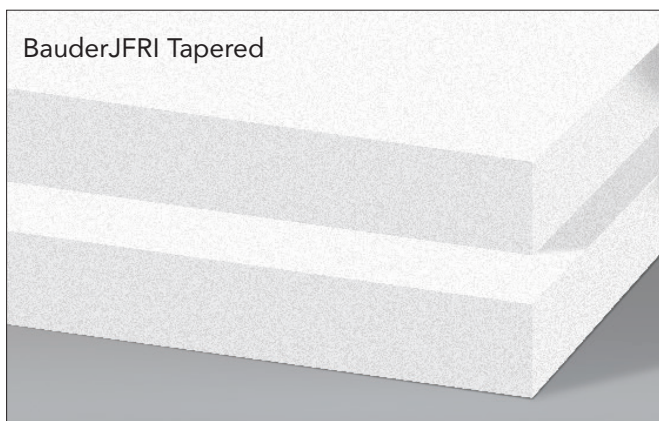
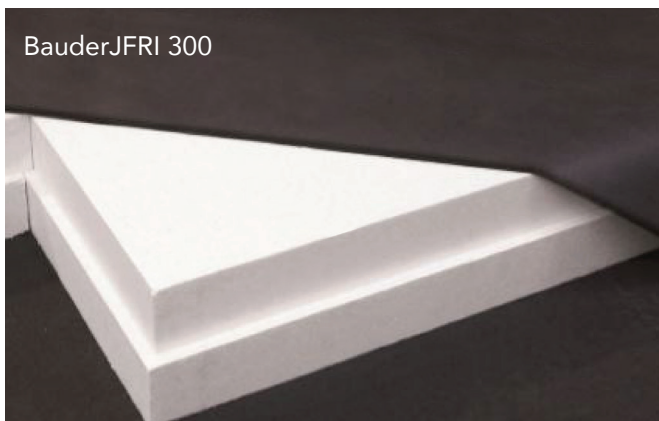
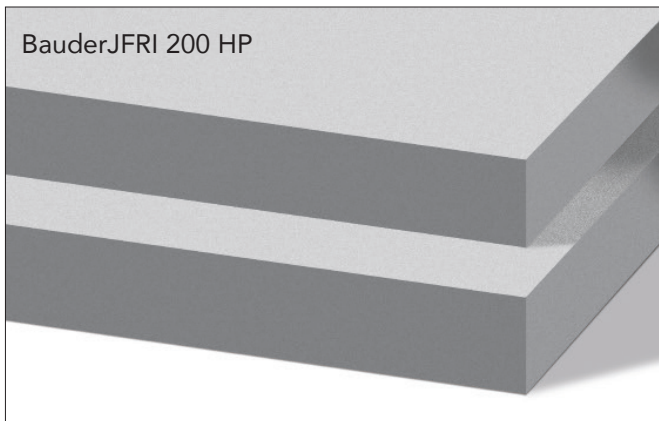
Example Layout

INSULATIONS

# INSULATION FOR INVERTED ROOFS

Insulation for use in inverted roof design needs to possess specific properties, as the environmental demands placed upon it are more severe than those placed upon insulation in a warm roof design. As the insulation does not benefit from the protection of the waterproofing membranes, it needs to have low water absorption, resistant to rot and decay, and have a higher compressive strength.

We offer a choice of insulation designed for use with inverted roof systems depending on the specific requirements of the project along with the preference of the client.



## Key Features

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- High compressive strength.
  - Low moisture absorption.
  - CFC and HCFC free giving zero ozone depletion potential (ODP) with a GWP (Global Warming Potential) of less than 5Kg CO<sub>2</sub> - Eq/Kg.
  - Ballast must be provided in the form of paving slabs, pebbles or a green roof.
  - Retains its thermal performance and structure in exposed conditions.
- 

## BauderJFRI Flatboard Insulation

An environmentally friendly, high performance rigid expanded polystyrene insulation, which is very lightweight and has a high compressive strength. It is resistant to the passage of water and will not degrade. The product is rebated on all four sides to ensure thermal continuity. It is CFC and HCFC free, with a global warming potential less than 5Kg CO<sub>2</sub>.

We have various grades of JFRI insulation;

BauderJFRI 200 HP - can withstand permanent loads of up to 60KPa. Due to an improved declared thermal conductivity (W/mk) this version can be reduced in thickness compared to the standard BauderJFRI 200.

BauderJFRI 300 - for permanent loads of up to 90KPa.

JFRI 200 HP, 300, 500 and 600 can be used in the inverted roof concepts and have a Class E reaction to fire classification BS EN13501-1:2007.

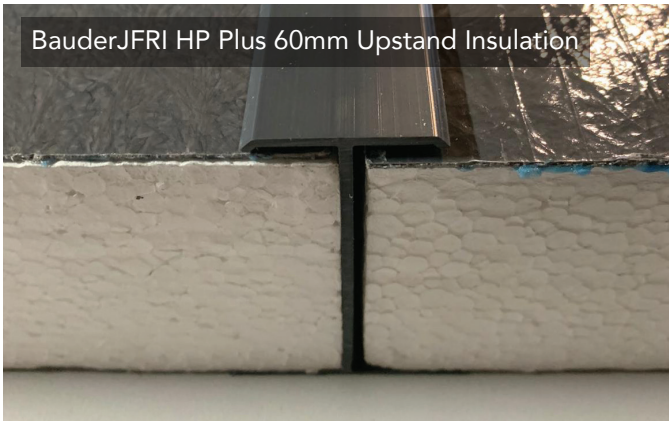
In roofs, but not 'specified attachments', that incorporate non-combustible surface finishes as set out in European Commission Directive 2000/553/EC (such as min 50mm thickness of stone ballast or min 40mm thick stone or concrete paving slabs that fully cover the roof), these are deemed to fully satisfy the regulations with no testing.

## BauderJFRI Tapered Insulation

Cost-effective alternative method of providing falls to a roof instead of incorporating them into the structure, whilst also providing thermal insulation.

An environmentally friendly, high performance rigid expanded polystyrene insulation, which is very lightweight and has a high compressive strength. The product is resistant to the passage of water and will not degrade. The product is rebated on all four sides to ensure thermal continuity. It is CFC and HCFC free, with a global warming potential less than 5Kg CO<sub>2</sub>.

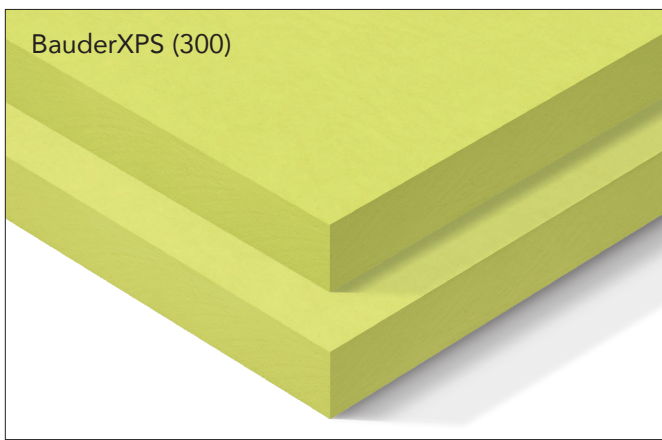




BauderJFRI HP Plus 60mm Upstand Insulation

### JFRI HP Upstand Insulation

BauderJFRI HP Plus 60mm Upstand Insulation with 1.5mm GRP facing is used in conjunction with BauderJFRI 200HP and 300 Inverted Insulation to reduce the risk of cold bridging.



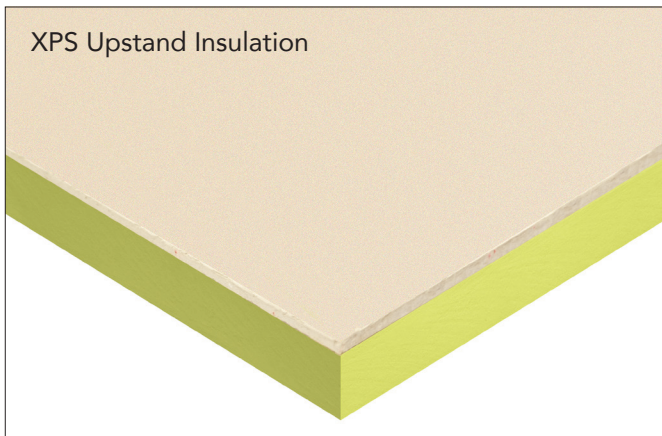
BauderXPS (300)

### BauderXPS (300)

This CO<sub>2</sub> blown extruded polystyrene insulation is CFC and HCFC free with zero ODP.

This insulation has high compressive strength and low water absorption making it a tried and tested material for inverted flat roofs. Ballast must be included in the form of paving slabs, pebbles, landscaping etc. to provide resistance against flotation and wind uplift.

The boards are rebated on all four sides to ensure thermal continuity.



XPS Upstand Insulation

### XPS Upstand Insulation

BauderXPS Upstand Board with 6mm cementitious facing is used in conjunction with BauderXPS to reduce the risk of cold bridging.



BauderJFRI WFRL



BauderXPS WFRL

### Water Flow Reducing Layers (WFRL)

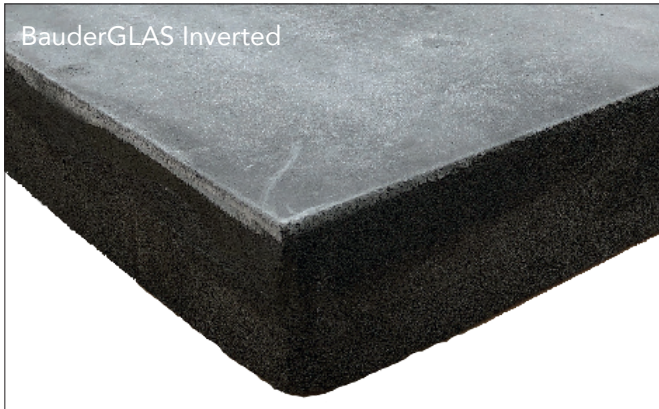
When carrying out thermal calculations for inverted roof design, allowance is made for the cooling effect of rainwater, which seeps between the joints in the insulation causing thermal bridging.

The use of a WFRL above the insulation not only prevents debris from tracking beneath the insulation but also reduces the level of cooling as most of the rainwater is discharged before it reaches the insulation. This means that by using a WFRL, better U-values can be achieved with the same thickness of insulation.

We offer two vapour permeable membranes, BauderJFRI WFRL for use with BauderJFRI, and Bauder XPS WFRL for use with Bauder XPS.

# NON-COMBUSTIBLE INVERTED ROOF INSULATION

It is becoming increasingly challenging to specify a system that satisfies the recent non-combustibility amendments to Approved Document B (AD B) for 'specified attachments' on Relevant Buildings. The Euroclass A1 rating achieved by our non-combustible insulations not only meets these obligations, but also satisfies both the client's and insurers' requirements for new build or refurbishment projects.



## Key Features

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- Non-combustible – achieves A1 Euroclass rating.
  - High compressive strength.
  - Manufactured from more than 60% recycled glass.
  - Totally inorganic.
  - Specified for areas on 'specified attachments' requiring the highest level of fire rating.
- 

### BauderGLAS Inverted

A non-combustible insulation that achieves Euroclass A1 rating. It has been designed for use on most deck types whilst being ideally suited to balconies, terraces, podiums, green roofs or in areas requiring a non-combustible inverted insulation option. The system is complemented by a BauderGLAS Inverted Upstand Insulation for use in exposed upstand situations requiring a Euroclass A1 rating.

If the client, building owner, or building insurer wishes to achieve a Euroclass A1 rating for an inverted roof, then BauderGLAS Inverted should be specified.

### BauderGLAS Inverted Upstand

BauderGLAS Inverted Upstand Insulation is used in exposed upstand situations requiring a Euroclass A1 rating. The boards typically reduce the risk of cold bridging at the roof wall thermal break.

### BauderROCK NC 56mm Inverted Upstand

This insulation board is non-combustible consisting of a dense mineral wool insulation slab bonded to a rigid 6mm exterior grade fibre cement board, this combination of two non-combustible products provides an impact and weather resistant insulation for inverted roof upstands including to and across party walls.

This insulation board can be used in tandem with our flat roof solutions where a Euroclass A1 rating is required for upstands.

## Key Features

---

- Non-combustible, achieves Euroclass A1 rating.
  - Specified for vertical upstands requiring the highest level of fire rating.
  - Provides thermal break at base of upstand.
  - Impact and weather resistant.
  - Compatible with all Bauder waterproofing systems.
-



