BAUDER

Single Ply Systems

Our single ply roofing systems are ideal for lightweight, fast track and cost effective construction projects with performance characteristics expected in today's industry.

The systems provide solutions that are durable, resistant to the natural elements and able to support extensive green roofs and photovoltaic arrays.

OVERVIEW OF WATERPROOFING

NEW WOLSEY THEATRE

Location: **Ipswich, Suffolk**

Roof size: 500m².

Waterproofing system:

- **Synthetic membrane:** Thermofol U15 FB Anthracite bonded directly onto the insulation using the Bauder Spray Contact Adhesive
- **Insulation:** BauderPIR FA
- **AVCL:** BauderTEC KSD Foil

SYSTEMS

The roof refurbishment at New Wolsey Theatre in Ipswich, Suffolk was long overdue with historical water ingress causing internal challenges for the venue. The theatre is visually prominent in the town and so an aesthetic finish was imperative to reflect the original slate pitched roof. The Thermofol PVC single ply system in anthracite was adhered to the upgraded insulation. All works were carried out to maintain daily operations of the theatre and especially between rehearsals and productions to eradicate disruption of performances.

A single ply system provides many advantages to the modern building, particularly if weight and load bearing limits are an important consideration. Single ply waterproofing offers fast track, flame-free installation.

Our systems suit all dimensions, sizes and shapes of flat roof, offer different advantages and provide solutions to many flat roof projects, as well as being suitable for extensive green roof landscaping.

The systems are installed using hot air welding techniques with mechanical fastenings or adhesive bonding to provide solutions that are durable and resilient to the natural elements.

We have two systems within our single ply portfolio.

Thermofol PVC

This single ply waterproofing membrane ensures a fast track, torch-free installation. The membranes have high levels of elasticity and tensile strength to provide a robust solution. The BBA certificate relating to this product indicates a service life in excess of 35 years.

Thermoplan FPO

Our flexible polyolefin (FPO) single ply membrane is long lasting and represents a major advancement in synthetic waterproofing technology. The BBA certificate relating to these membranes states that the products should have a life in excess of 20 years, however we are confident that with correct installation and maintenance the life expectancy will be at least 30 years.

All products within the systems are manufactured by us, providing a single point of contact and exact specification formulations for complete compatibility.

ENVIRONMENTAL CREDENTIALS

British Research Establishment (BRE) Green Guide

The BRE Green Guide to Specification gives our products and systems various generic ratings, depending on the type of deck construction and the support structure used.

Generic Ratings

- 'A'+ generic rating, element numbers 1212540003 for PVC and 1212540004 for FPO when used with warm roof insulation on a profiled steel deck with steel supports.
- 'A'+ generic rating, element numbers 1212540043 for PVC and 1212540044 for FPO when used with warm roof insulation on plywood deck and timber joists.
- 'A' generic rating, element number 812530084 for FPO when used with inverted roof insulation and pebble ballast on ply lined profiled steel deck with steel supports and 'B' rating for PVC, element number 812530082.
- 'B' generic rating, element numbers 1212540029 for PVC and 1212540036 for FPO when used with warm roof insulation on concrete beam and block.
- 'B' generic rating, element numbers 1212540023 for PVC and 1212540024 for FPO when used with warm roof insulation on pre-cast concrete hollow slab with screed.

Environmental Product Declaration (EPD)

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

Within our single ply waterproofing systems we have the following EPD certificates for our membranes and PIR insulation.

- **Thermofol PVC Membranes**
  EPD-BAU-20130188-IBCC-EN
- **Thermoplan FPO Membranes**
  EPD-BAU-20130189-IBCC-EN
- **PU Insulation - Mineral Fleece Facing**
  EPD-IVP-20140206-IBE1-EN
- **PU Insulation - Aluminium Facing**
  EPD-IVP-20140207-IBE1-EN

All certificates can be downloaded from our website 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.

Insulation

Our BauderPIR insulation has extremely high thermal efficiency and is CFC and HCFC free. It has zero ODP and a Global Warming Potential of less than 5Kg CO_2 - Eq/Kg. 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.

Recycled Content

We have proactively recycled factory production waste back into new membranes since production began in 1960 and currently includes recyclate into the backing layer of the membrane. However, as with many high quality, long life products, we include this relatively low percentage content of recyclate to ensure that whole life performance is maintained while providing a good environmental profile. Higher volumes of recyclate could be used, but this would reduce the durability of the membrane, shorten life expectancy, increase building life-cycle costings and environmental impact.

Recycling and Reusing Single Ply Membranes

The mechanically fastened option for either of our single ply systems makes it possible to independently remove all the component parts. If only the membrane needs renewal, but the insulation and air and vapour control layer are still sound, then this element can be replaced separately.

All our single ply production waste is recycled into the manufacturing process, enabling us to keep the use of raw materials to a minimum. Our manufacturing production plants use closed rotation cooling systems, which drastically reduces water consumption and avoids environmental pollution. The systems are automated and concentrate on recycling waste and by-products and reducing emissions.

Single ply membranes comprise high quality polymer and at end of life stage, polymer waste is a high value commodity with many re-uses; though if re-use is not possible, ultimately the carbon content can be recovered by high temperature incineration.

TECHNICAL CREDENTIALS

BBA Certification

Our single ply systems have been tested and approved by the BBA and carry certificate No 06/4354 for Thermofol PVC and 04/4120 for Thermoplan FPO.

Factory Mutual (FM) Approval

Thermofol PVC & Thermoplan FPO mechanically fastened membranes 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 Thermofol PVC and Thermoplan FPO waterproofing membranes, 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 Thermofol PVC and Thermoplan FPO membranes, as with all other products that are FM Approved, are under regular surveillance by FM Approvals to confirm the consistency of production.

Single Ply Membranes are tested under Category 4470 for Class 1 Roof Covers, which incorporates assessment with different deck structures, insulation types, installation and fixing methods, air and vapour control layers and test resistance to fire and climatic conditions, such as wind uplift and hail resistance. Each combination of products is given a rating and assembly number to assist a specifier in selecting the correct build up for their requirements.

TYPICAL EXAMPLE (more assembles are available on request)

Assembly Number	Deck Type	Rating	Membrane & Installation	Insulation
230103	Steel	105	Thermofol U15 mechanically fixed	FA
230098	Steel	90	Thermoplan TS15 mechanically fixed	FA

Further testing maybe required to validate a small change within a system if required.

ISO Accreditation for Manufacturing

Our single ply membranes and PIR insulation are manufactured in our factories operating an Environmental Management System that has been certified to be in accordance with ISO 14001 and ISO 50001 for Energy Management.

CE Marking

All membranes and insulations carry a CE mark as required by the Construction Products Regulations.

Root Resistance for Green Roofs

Our single ply systems are manufactured to FLL (Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau) guidelines, which is the benchmark test for root resistance in Europe and has been for the last 25 years.

Fire Performance

Our systems hold fire classification BROOF (t4) for compliance with building regulations under TS1187 test method 4 for external fire exposure to roofs.

Bauder waterproofing systems verified by the BBA are deemed 'unrestricted' and suitable for use on any part of a roof.

Our single ply membranes and systems have also been fire tested to the globally recognised FM Approvals assessment and meet the Standards and Category 4470 for Class 1 Roof Covers.

Product and Installation Technology

Welding Techniques for Thermoplastic Membranes

Hot air welding fuses the two adjacent pieces at temperatures between 380 - 500°C to form a monolithic seam, which has proven to be a superb method of assuring a watertight join.

There are principally two types of welding equipment, hand held and automatic machines; both require an electrical supply to the roof.

Single Ply Roofing Association

We are a manufacturer member of the Single Ply Roofing Association (SPRA). As an 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 it assures 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 download the industry design guide, visit www.spra.co.uk or call 0845 154 7188.

THERMOFOL PVC

OUGHTERARD NATIONAL PRIMARY SCHOOL

Location: **Oughterard, County Galway**

"Bauder provided all the roofing materials needed and delivered a comprehensive solution and guarantee. They satisfied all delivery commitments and the new single ply roof looks and performs just as we expected."

Martin Keaveney, JJ Rhatigan & Company

Award winning new build primary school in West Ireland consisting of eight roof areas totalling over 3,400m² waterproofed with Thermofol PVC.

Our Thermofol is a PVC membrane with a formulation of high grade virgin polymer and superior fire retardants ensuring optimum membrane characteristics to deliver high performance and a life expectancy in excess of 35 years BBA stated.

With over 50 years of technical and production experience of PVC membranes, this system has a proven track record.

Suitable for either new build or refurbishment projects, our Thermofol is a lightweight, fast track and cost effective waterproofing solution that is resilient to the natural elements. It is flexible with a high tensile strength that is easy to install and weld.

Key Features

- Developed to withstand climatic extremes and temperature shocks. Our experience in chemical formulation and commitment to only using superior polymers and blending techniques gives this product cold-bending flexibility at less than -30˚C without losing elasticity.
- The high tensile strength of over 1100N is achieved by incorporating a high quality polyester reinforcement within the membrane to resist tears and punctures to ensure durability.
- BBA certified 06/4354 with stated life expectancy in excess of 35 years.
- Tested and approved for green roof landscaping by the FLL.
- Suitable for ballasted or green roofs.
- FM Approved.
- Fire classification BROOF (t4) and verified by the BBA as 'unrestricted' and suitable for use on any part of a roof.
- Guaranteed system.

When to Specify

The Thermofol PVC System has a high grade virgin polymer formulation with superior fire retardants that is suitable for either new build or refurbishment projects. The PVC formulation ensures it is resistant to chemicals and microorganism attack making it ideal for green roof situations.

This system can also be specified with the BauderSOLAR PV for flat roofs or the Bauder BioSOLAR green roof system.

Specification Support

Specification downloads:
www.bauder.co.uk/technical-centre

NBSPlus BIM DWG

Telephone helpline:
0845 271 8800

BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 06/4354 · ECO PLATFORM EPD EN 15804 VERIFIED · CE bre · FM APPROVED · MEMBRANE MEMBER SPRA Single Ply Roofing Association

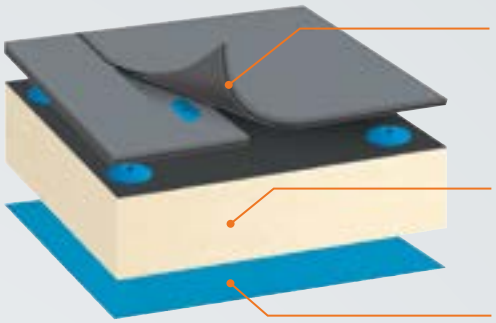
THERMOFOL PVC

Example System Configurations

Thermofol PVC is suitable for extensive green roofs, which can incorporate XF301 sedum system to make it the most lightweight solution available on the market.

MECHANICALLY FIXED SYSTEM

Ideally suited for metal or timber decks, though it can be used on concrete if required. It gives outstanding performance if there is a high risk of wind uplift and provides a secure, durable and economical installation.



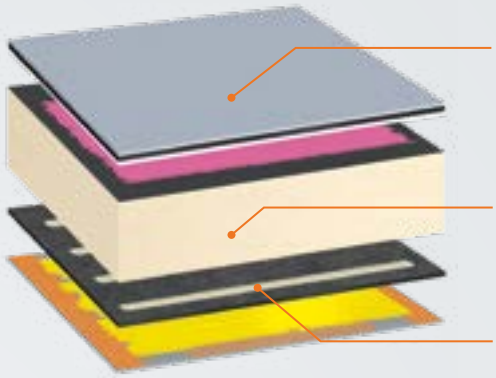
Thermofol U12, U15, U18 & U20
stocked membranes, with thicknesses of 1.2, 1.5, 1.8, and 2.0mm respectively. The membranes are reinforced with a pre-coated polyester cross weave matting which provides the high levels of tear resistance required of a mechanically fastened membrane.

BauderPIR FA Insulation
foil faced insulation which is thermally efficient, lightweight, fire resistant and zero ODP rated. As an alternative, **BauderPIR FA Tapered Insulation** can be used to improve drainage falls.

Bauder Air and Vapour Control Layer
we manufacture a range of torch bonded bituminous, self adhesive or loose laid air and vapour control layers and a recommendation can be made according to cost plan and project programme.

ADHERED SYSTEM

Particularly suitable for complex building shapes, where mechanical fastenings are unsuitable such as on concrete decks with a high proportion of stone or where the visibility of the fixings from within the building are undesirable.



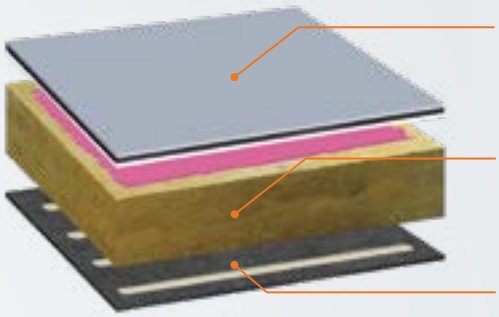
Thermofol U15 FB
1.5mm membrane (2.5mm with fleece), which can be easily adhered to glass tissue faced insulation using the Bauder Fleece-Backed Membrane Adhesive. The standard Thermofol membrane may also be bonded using Bauder Thermofol Full Bond Contact Adhesive.

BauderPIR FA Insulation
foil faced insulation which is thermally efficient, lightweight, fire resistant and zero ODP rated. As an alternative, **BauderPIR FA Tapered Insulation** can be used to improve drainage falls.

Bauder Air and Vapour Control Layer
we manufacture a range of torch bonded bituminous, self adhesive or loose laid air and vapour control layers and a recommendation can be made according to cost plan and project programme.

ACOUSTIC PERFORMANCE SYSTEM

Combining a fleece-backed single ply membrane with BauderROCK mineral fibre insulation and a self-adhesive bituminous AVCL provides a build up that delivers high acoustic and fire performance.



Thermofol U15 FB
1.5mm membrane (2.5mm with fleece) can be adhered to BauderROCK with many of our membrane adhesives, including contact spray adhesive and PU FB adhesive canister.

BauderROCK
mineral fibre insulation ideally suited for projects that require a high level of sound induction. PIR insulation can be combined with mineral wool if height restrictions are a consideration.

Bauder KSD Mica Air and Vapour Control Layer
we manufacture a range of torch bonded bituminous, self adhesive or loose laid air and vapour control layers and a recommendation can be made according to cost plan and project programme.

System Variations
The Thermofol membrane can be aesthetically enhanced with the use of extruded PVC profiles to replicate lead or standing seam roof appearances.

www.bauder.co.uk/technical-centre

Membrane Colours

RAL 7035	RAL 7031	RAL 7016
Light Grey	Blue Grey	Anthracite

PROJECTS

UWE Enterprise Zone
Bristol

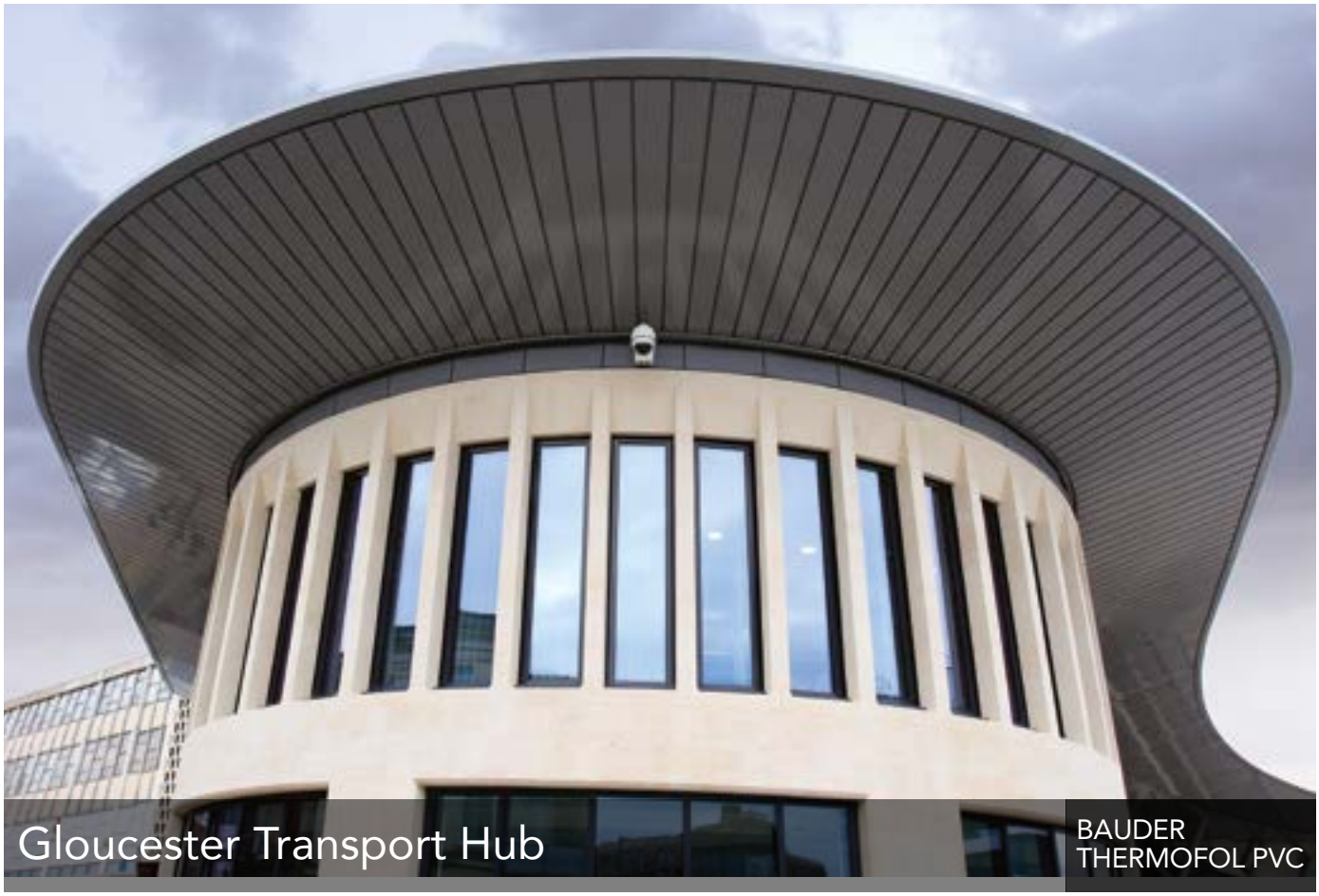
Cumbria University Sports Complex

Sony, Pencoed Technology Park
Mid Glamorgan

Battle of Britain Memorial
Capel-le-Ferne, Kent

The Walnuts School
Hazeley

PROJECT STUDIES



Gloucester Transport Hub

BAUDER
THERMOFOL PVC

BUILDING BOARD	
Project:	**Gloucester Bus Station**
Location:	**Gloucester**
Roof Area:	**1520m²**
Main Contractor:	**Kovara Projects Limited (Reading)**

APPLIED PRODUCTS

- Single ply roof with 40 solar PV units mounted in one area.
- **PV system:** BauderSOLAR PV system.
- **Waterproofing:** Thermofol U15 mechanically fastened with OMG Rhinobond induction welding.
- **Insulation:** Bauder PIR FA flat board insulation.
- **Vapour control layer:** Bauder VB20 vapour control layer.

This new build project in the centre of Gloucester combining both Bauder's single ply Thermofol system and the BauderSOLAR PV solution. A very specific configuration of the roof area on the new Gloucester bus station meant that a large amount of design consideration was required in order to provide a secure waterproofing system without compromising the aesthetics of the roof project. This meant strong collaboration and communication was required to maintain high standards throughout the complexities of the project.

The BauderSOLAR PV energy system incorporates a unique installation system with membrane sleeves iwelded into position over the baseplates before the substructures and PV modules are then placed into position. This innovative installation technique removes the need for any penetration into the waterproofing, therefore safeguarding the integrity of the waterproofing and roof deck.

Project Management

Bauder and approved roofing contractor, Kovara collaborated closely in order to agree on the final design of the unusual and highly aesthetic roof design.

The delivery logisitcs for the roofing products had to be carefully managed to avoid creating congestion around the city centre location.

Scoil Phadraig School

BAUDER THERMOFOL PVC

Scoil Phadraig National School is situated in the heart of Westport. Being the largest school in the town, it provides education to over 300 children.

Designed by Westport based SJK architects, thstate of the art school comprises of 16 classrooms, a general-purpose room and ancillary accommodation, creating the best learning environments for the school's pupils.

Located on the west coast of Ireland and facing the Atlantic, one of the major challenges was the meteorological factors. With high winds and storms occurring frequently, the new building had to be waterproofed rapidly in order to allow other trades to progress and to keep in line with the building programme schedule. Consequently, the plywood decking of the building was immediately installed with the Bauder air and vapour control layer making the building weathertight.

Bauder approved contractor, Priority Roofing, installed the 2300m² roof areas with the mechanically fastened Bauder Thermofol PVC system which provides a high tear resistance waterproofing membrane and a strong fixation system to resist the high wind loads of the area.

Aesthetics also being paramount for this project, careful attention was given to the detailing of the upstands. Vertical pitches and decorative profiles at 460mm centres were also installed, disguising the laps of the thermofol membrane and ensuring a stunning finish to the building.

BUILDING BOARD

Project:	**Scoil Phadraig**
Location:	**Westport, County Mayo**
Roof Area:	**2,300m²**
Client:	**SJK Architects**
Approved Contractor:	**Priority Roofing & Cladding Ltd**

APPLIED PRODUCTS

- Bauder Thermofol PVC
- Bauder PIR Insulation
- Bauder DS1 DUO

THERMOPLAN FPO

The Mount Wolseley Golf and Country Club, Co. Carlow
(photograph prior to the installation of Bauder XF301 sedum system)

Set in the idyllic Irish countryside, Mount Wolseley offers visitors an exceptional place to play golf or simply relax. The new extension developments have greatly enhanced the facilities to guests.

The main criteria for the roofing material was that the low level roofs had to be a green roof, low in maintenance and aesthetically pleasing, the high level roofs had to withstand large amounts of foot traffic due to the positioning on the roof of M & E equipment, both roofs had to be economically viable and be covered by a robust guarantee.

Our Thermoplan is a flexible polyolefin (FPO) single ply membrane that is long lasting and represents a major advancement in synthetic waterproofing technology.

The BBA certificate relating to these membranes states that the products should have a life expectancy in excess of 20 years, however, we are confident that with correct installation and maintenance, the life expectancy will be at least 30 years.

Leading specifiers are now increasingly demanding construction materials that meet their requirements for environmental impact and sustainability, the Bauder Thermoplan System matches both these needs.

Key Features

- Low embodied energy used in its production and free from halogens and heavy metals.
- BBA stated life expectancy in excess of 20 years.
- With high tensile strength in excess of 1200N, the closed fibre polyester cross weave reinforces the membrane and makes it resistant to tears and punctures.
- The membrane has no inherent memory and therefore will not shrink.
- Our use of high quality polymers and constituents in the formula ensures the membrane remains flexible at -45 °C.
- The FPO formulation ensures it is resistant to chemicals and micro-organism attack, which is vital to the membrane's success in ballasted or green roof situations.
- BBA Certificate 04/4120.
- Tested and approved for green roofs by the FLL.
- Fire classification BROOF (t4) and verified by the BBA as 'unrestricted' and suitable for use on any part of a roof.
- Guaranteed system.

When to Specify

The Thermoplan FPO system is free of plasticisers, halogens and heavy metals and is suitable for either new build or refurbishment projects. The FPO formulation ensures it is resistant to chemicals and micro-organism attack making it ideal for green roof situations.

The mechanically fastened system is ideally suited for metal and timber deck constructions and the adhered option is favoured for concrete decks.

This system can also be specified with the BauderSOLAR PV for flat roofs or the Bauder BioSOLAR green roof system.

Specification Support

Specification downloads:
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nbsPlus BIM DWG

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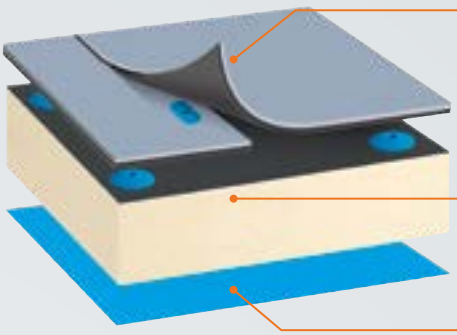
THERMOPLAN FPO

Example System Configurations

MECHANICALLY FIXED SYSTEM

Ideally suited for metal or timber decks, though it can be used on concrete if required. It gives outstanding performance if there is a high risk of wind uplift and provides a secure, durable and economical installation.



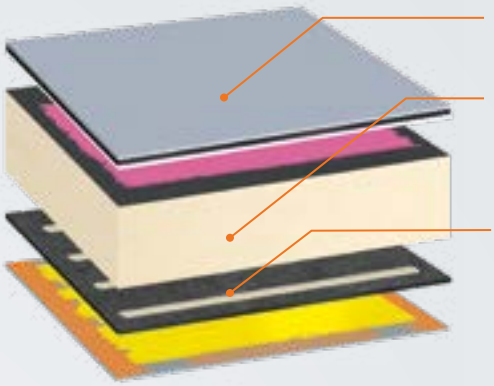
Bauder Thermoplan T-SV
1.5mm membrane is one of our stocked products, with other thicknesses available for specific project types. The product is reinforced with a pre-coated polyester cross weave matting, which provides the high levels of tear resistance required of a mechanically fastened membrane.

Bauder PIR FA Insulation
foil faced insulation which is thermally efficient, lightweight, fire resistant and zero ODP rated. As an alternative, **BauderPIR FA Tapered Insulation** can be used to improve drainage falls.

Bauder Air and Vapour Control Layer
we manufacture a range of torch-bonded bituminous, self-adhesive or loose laid air and vapour control layer. All of these products can be used within a Thermoplan mechanically fastened system and a recommendation can be made according to cost plan and project programme.

BAUDER FA TAPERED

Particularly suitable for complex building shapes, where mechanical fastenings are unsuitable such as on concrete decks with a high proportion of stone or where the visibility of the fixings from within the building are undesirable.



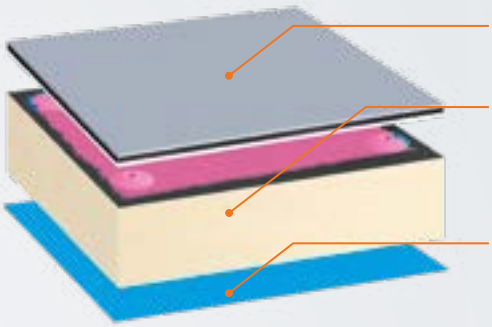
Bauder Thermoplan T-SV 15FB
easily adhered to insulation using the Bauder Fleece Backed Membrane Adhesive.

Bauder PIR FA Insulation
foil faced insulation which is thermally efficient, lightweight, fire resistant and zero ODP rated. As an alternative, **BauderPIR FA Tapered Insulation** can be used to improve drainage falls.

Bauder Air and Vapour Control Layer
we manufacture a range of torch applied bituminous or self adhesive air and vapour control layer. All of these types of product can be used within a Thermoplan adhered system and a recommendation can be made according to cost and project programme.

HYBRID SYSTEM

Frequently specified when a balance between enhanced aesthetics and commercial pressures are prevalent. This installation method combines both adhered and mechanically fastened techniques. Typically a polyethylene AVCL with mechanically fixed insulation and an adhered fleece-backed membrane.



Bauder Thermoplan T-SV 15FB
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Bauder Air and Vapour Control Layer
we manufacture a range of torch-bonded bituminous, self-adhesive or loose laid air and vapour control layer. All of these products can be used within a Thermoplan mechanically fastened system and a recommendation can be made according to cost plan and project programme.

Membrane Colours

RAL 1013	RAL 7001
Pearl White	Silver Grey

www.bauder.co.uk/technical-centre

PROJECTS

Thurlton Primary School, Norfolk
(embossed walkway membrane with Thermoplan T installed in harmony with bituminous membrane)

Copyright: Ulrich Brunner GmbH Ofen- und Heiztechnik
Photographer: Christine Schaum

Dresden Airport
Dresdon

PROFILED EPS OVERLAY SYSTEM

Our Profiled EPS Overlay System incorporates a bespoke expanded polystyrene (EPS) insulation board that is manufactured to match profiled sheet metal and roof structures, typically comprised steel, composite panels or aluminium. The system includes a single ply waterproofing membrane to provide a long term, lightweight and durable solution.

Key Features

- The EPS insulation has a generic Green Guide A+ rating (Element no. 815320024).
- Fire classification BROOF (t4) and verified by the BBA as 'unrestricted' and suitable for use on any part of a roof.
- Suitable for use with Thermofol (PVC) & Thermoplan (FPO) systems.
- BBA certified products.
- Single source supply.
- One point guarantee.
- No building interruption.
- More cost effective than re-cladding.

When to Specify

The Profiled EPS overlay system is primarily intended for refurbishing profiled sheet metal roofs or increasing the thermal performance of existing insulated cladding systems, bringing the construction up to current building regulation requirements.

The profiled insulation boards are manufactured to order and samples are produced to ensure that the profiles match the existing roof sheets. U-values are calculated using the average thickness of the profiled insulation board.

Measuring Service

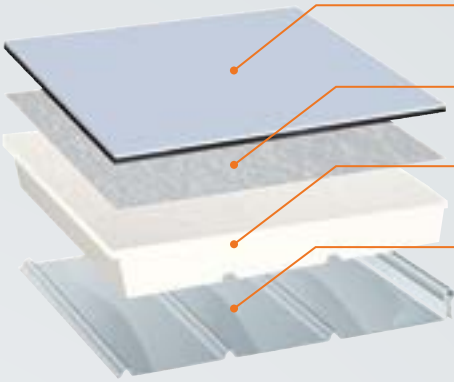
Our measuring service will ensure that the boards are manufactured to match the profile of the metal roof to be overlayed.

System Configuration

MEMBRANE APPLICATION

Our EPS profiled insulation board can be installed by mechanically fastening with a suitable fastener and washer. When a non fleece-backed Thermofol PVC membrane is used our GV120 glass separation fleece is also required to protect the upper surface of the insulation product.

If the single ply membrane is to be adhered to the profiled EPS then the membrane will need to be fleece backed and the GV120 can be omitted.



Bauder Single Ply Membrane
Thermofol or Thermoplan membranes are suitable for installation with this system.

GV120
Glass separation fleece used only when non-fleece-backed Thermofol PVC is specified.

Profiled EPS
Expanded polystyrene profiled board manufactured to order to match the existing roof sheets.

Existing Profiled Metal Roof

www.bauder.co.uk/technical-centre

George Abbot School - Before - After

Cumbria University - Before - After

SINGLE PLY GREEN ROOF SYSTEMS

Single ply extensive green roof systems can be the lightest weight option available for a building and consist of low maintenance vegetation on landscaping components tested to meet FLL guidelines. Both our Thermofol and Thermoplan systems are suitable for an extensive green roof.

Our Sedum System combines the vegetation support layer with a moisture retention fleece to provide the perfect base without the need for additional components.

An extensive substrate green roof vegetation can comprise the WB wildflower blanket, SB sedum blanket, plug plants or a seeded option for natural colonisation.

Key Features

- Simple, lightweight green roof solutions.
- Environmental masking or biodiverse habitats are easily created.
- Extends the life of the waterproofing and thereby reduces life cycle costings.
- Meets planning requirements.
- Cost effective.
- Low maintenance.

When to Specify

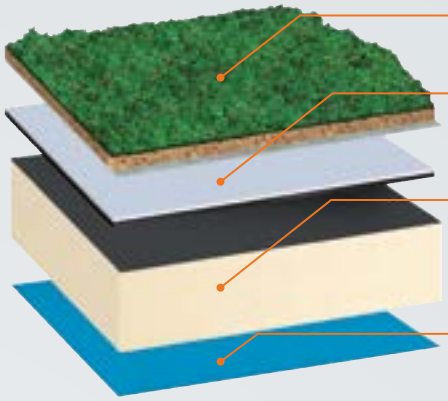
A lightweight green roof that delivers aesthetic masking and environmental benefits and will satisfy planning requirements and conditions for a building. These systems are also ideal for refurbishment projects where a green roof can generally be retrofitted, subject to a structural report on the building.

Travelodge
Bristol

Example System Configurations

XF301 SEDUM SYSTEM

Our unique patented lightweight carrier fleece and specially developed growing medium creates one of the few sedum blankets available that can be installed and retained on slopes as steep as 25°, using our special retention strips and drainage edge trims.



Bauder Sedum System
pre-cultivated plants for instant greening of a roof.

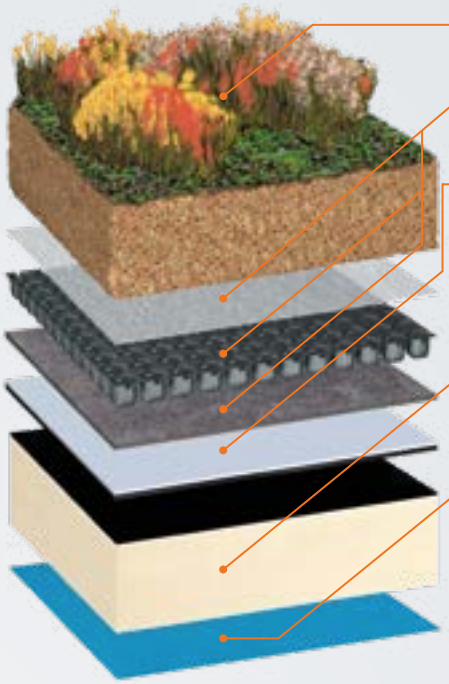
Bauder Single Ply Membrane
resistant to micro-organism attack and tested to meet FLL standards for root resistance.

BauderPIR FA Insulation
foil faced insulation which is thermally efficient, lightweight, fire resistant and zero ODP rated. As an alternative, **BauderPIR FA Tapered Insulation** can be used to improve drainage falls.

Bauder Air and Vapour Control Layer
we manufacture a range of torch-applied bituminous, self adhesive or loose laid air and vapour control layers and a recommendation can be made according to cost and project programme.

EXTENSIVE SUBSTRATE SYSTEM

These systems incorporate a greater depth of substrate for improved levels of water retention and a broader variety of vegetation.



Extensive Substrate and Vegetation
planted with vegetation blanket, plug plants, seeding or with a biodiversity finish.

Bauder Landscaping Components
will vary to suit planting scheme and water retention requirements.

Bauder Single Ply Membrane
resistant to micro-organism attack and tested to meet FLL standards for root resistance.

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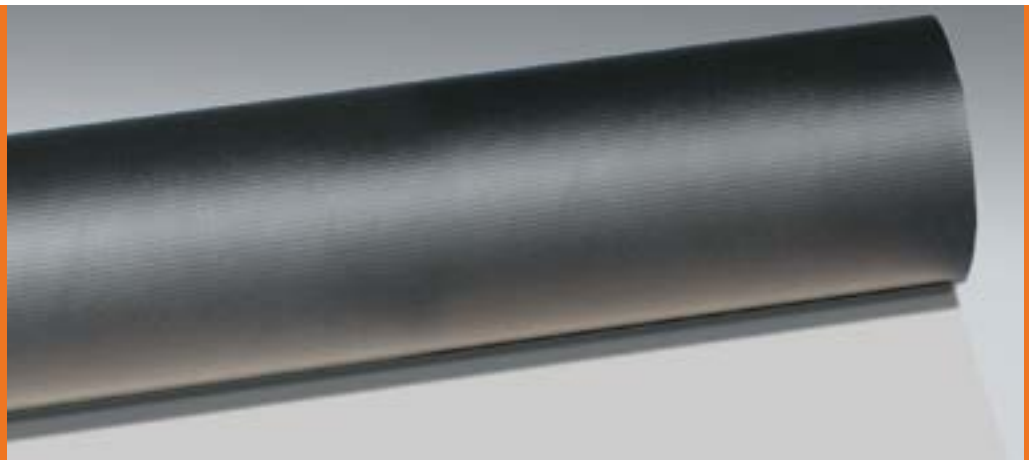
www.bauder.co.uk/technical-centre

TECHNICAL DESIGN

Single Ply Systems



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INSTALLATION OPTIONS

Bauder Membrane Colour Options

Our PVC and FPO single ply membranes come in a variety of colour options to suit the most popular preferences of building specifiers in today's market.

PRODUCT	DESCRIPTION	RAL NUMBER
Thermoplan FPO	Silver Grey	7001
	Pearl White	1013
	Walkway	7016
Thermofol PVC	Light Grey	7035
	Blue Grey	7031
	Anthracite	7016
	Walkway	7012

Air and Vapour Control Layers

The selection of either bituminous or polyethylene air and vapour control layers can have a number of different benefits to the overall design of the scheme.

DB100 Air and Vapour Control Layer

Extremely cost effective 0.16mm polyethylene AVCL that is loose-laid and laps sealed with Bauder Tape 03 and Tape 20. This AVCL was formerly known as VB20.

KSD Foil Air and Vapour Control Layer

1.5mm thick self-adhesive elastomeric bitumen membrane with aluminium foil facing for high vapour resistance for specification on most deck types within adhered or mechanically fastened systems.

BauderTEC KSD Mica Air and Vapour Control Layer

Self-adhesive elastomeric bitumen AVCL with a mica finished upper surface to allow easy bonding of insulation.

The membrane is 2.5mm thick and has a polyester coated aluminium foil + 200g/m^2 glass fleece reinforcement.

This air and vapour control layer is suitable for metal, timber and concrete decks.

Thermal Insulations (see chapter 8)

PIR FA Insulation

This foil faced insulation can be mechanically fixed or adhered directly to the surface of a air and vapour control layer which has been fully bonded to the structural deck, or mechanically fixed.

BauderROCK

Dual density mineral fibre insulation providing superior acoustic and fire performance. The insulation is multi-spaced so it can be either mechanically fixed or adhered.

EPS Insulation

Polystyrene insulation for a warm roof ballasted or profiled overlay application. When using non fleece-backed Thermofol PVC membrane a separation layer is used between the membrane and the insulant.

XPS Insulation for Ballasted Applications

A separation layer of GV 120 is required over the upper surface of the membrane. Applications either a fleece-backed membrane can be used in adhered applications or the GV 120 can be loose laid between the upper surface of the insulation and the underside of the membrane.

Adhered or Mechanically Fastened Systems

As with the insulation, the two main types of attachment methods can be adopted with the membrane itself.

A general guide can be given here, but early discussion with your Bauder area technical manager can ensure the correct details for a specific project build up.

Adhered Systems

This option can be used effectively when the structural decking is either difficult to mechanically fasten into, or the use of fasteners will compromise the air leakage or internal aesthetics of the project. The adhered system can be used with either a fleece-backed membrane or the standard non fleece-backed membrane.

Adhered systems still require an amount of mechanical restraint installed around the perimeter of the roof area, which is designed to assist in the resistance of wind uplift.

ADVANTAGES OF ADHERED	DISADVANTAGES OF ADHERED
Non penetration of AVCL	Weather dependant
No internal aesthetic issues	Cost and time of installation
Membrane is fully restrained over roof surface	Reduced possibilities of recycling

Mechanically Fastened

This option can be used on most decking types, metal and timber being the most common. A concrete deck with a high proportion of stone can be difficult to mechanically fasten to, though it is possible if no other option is suitable. If this type of system is selected then consideration should be given to the aesthetic appearance of the protruding fasteners on the underside of the structural decking. The inclusion of an internal ceiling readily solves this issue.

Mechanical fastening is not affected by the ambient weather conditions or temperature and is therefore suitable for installation all year round.

ADVANTAGES OF MECH FIX	DISADVANTAGES OF MECH FIX
Calculated to BS EN 1991-1-4:2005	Concrete needs pre-drilling
Fast track installation	Under wind Membrane can tent or bag
Not affected by adverse weather or temperature	Fasteners visible on underside

INSTALLATION TECHNIQUES

Fasteners

We have a strategic alliance with SFS Group Fastening Technology Ltd to ensure that when its products are selected the warranty for the mechanical fixings installed with our single ply system matches that of our guarantee so all components are covered.

We require that any fasteners used are tested to EAD 0303512-00-0402 to achieve ETA Certification and CE Mark. Within our single ply system we require where possible the use of a tube and screw type fastener for both the attachment of the membrane and insulation. These types of fasteners provide a thermal break in the system and reduce the transfer of heat from inside to out and are therefore far more thermally efficient than a traditional type of fastener.

Welding Techniques

Hot air welding is the method used to securely join the laps of single ply membranes. There are principally two types of welding equipment, hand held and automatic machines. Both require an electrical supply to the roof which is fed through a residual circuit breaker and is normally obtained direct from the mains supply or by generator where appropriate.

SURFACE PROTECTION

The life expectancy of a flat roof system is extended if it incorporates an aesthetic finish, which provides protection of the membrane from the natural elements. This includes finishes such as ballast, paving or an extensive green roof.

Ballasted or Paved

This particular finish is ideal where regular access is required, such as on a roof terrace. It is also specified where wind uplift is a risk, as the membrane is loose-laid and then held on the deck by the weight of the ballast or paving. If this type of surface protection is to be incorporated, it needs to be considered at the design stage as provision has to be made for the supporting structural deck and the associated cost implications.

Walkways

Clearly identified walkways should be installed from roof access points to areas of plant and equipment. Walkway material should be considered for use on all areas likely to carry foot traffic.

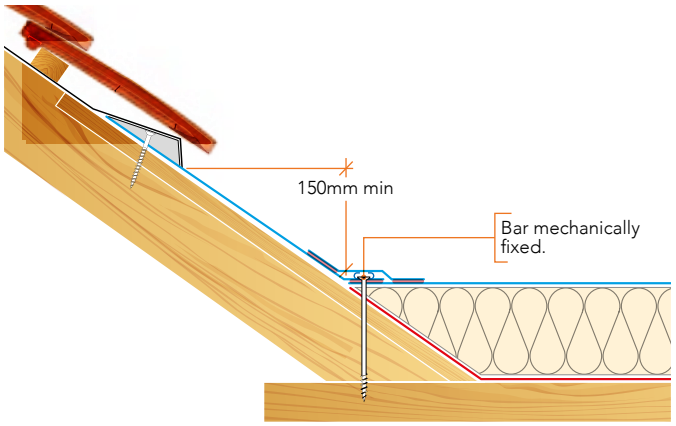
Our walkway membranes are embossed to provide a greater level of slip resistance, as well as a contrasting colour to the main roof area sheet to clearly mark access routes.

Working platforms may be created by placing coated flat metal sheet on the surface of the insulation and mechanically fastening to the deck. The area should be waterproofed as normal and then the walkway material placed onto the surface of the waterproofing to be hot air welded into place.

Extensive Green Roofs

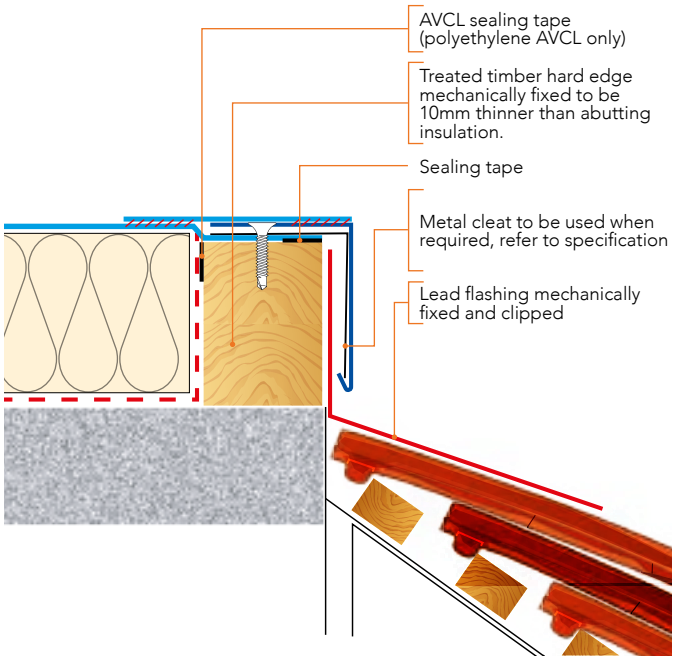
Creating an extensive green roof as a surface protection gives many environmental benefits and helps to mask the building into its surroundings, particularly if it is positioned in areas sensitive to construction. It uses low maintenance, frost and wind hardy vegetation, such as sedum plants. The roof is lightweight and cost effective, though it is not suitable for recreational use and should only be accessed for routine maintenance.

GENERAL DETAILING



Upstand to Pitched Roof

To ensure waterproofing integrity at an upstand to a pitched roof a lay board should be incorporated at the base of the rafters. This provides the substrate required to run the Bauder single ply membrane up behind the tiles. A tilt fillet can then be mechanically fastened to the lay board. This ensures the tiles cannot damage the membrane and provides a further mechanical restraint at the termination of the waterproofing. A fixing bar or pre-fabricated Bauder metal should be employed at the base of the upstand and the flexible detailing membrane welded securely.

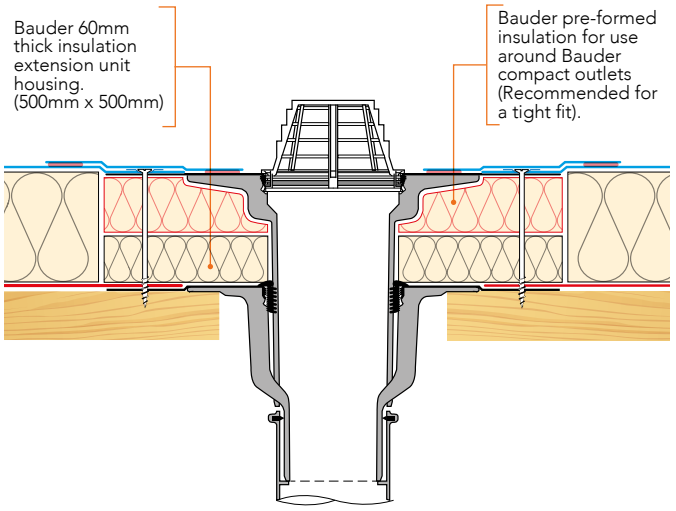


Mansard Roof

The field sheet membrane should be clamped under the pre-fabricated metal drip section at the perimeter and then a 200mm cover-strip heat welded to the metal and the membrane ensuring a encapsulated system.

This detail will require the addition of a pre-formed galvanised metal cleat mechanically fastened behind the pre-fabricated metal trim; if the roof is more than 8m high or if the trim face depth is ≥ 100mm.

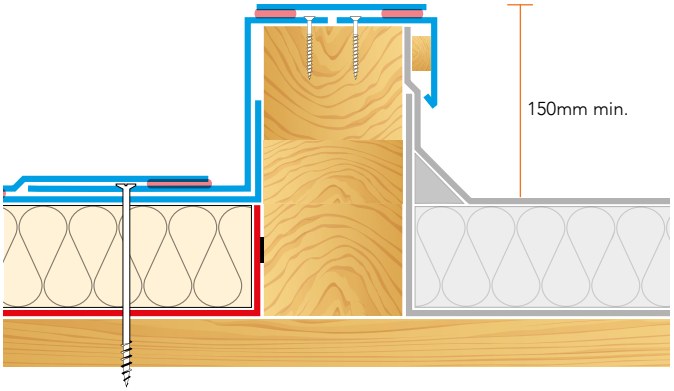
A lead flashing should be mechanically fastened to counter flash the tiles.



Outlet within Gutters

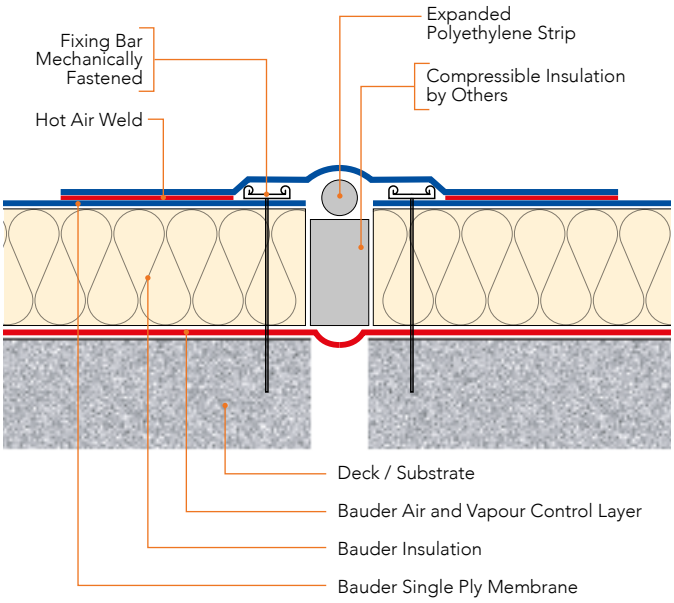
Key to a successful installation is a full range of compatible accessories. One of the most important of these is the rainwater outlets. With all of the surface water being directed to the outlets by the use of falls in either the deck or insulation the joint of the waterproofing membranes to the outlet itself is a critical area.

Bauder outlets are manufactured with a compatible membrane flange to ensure a watertight joint at this point. Each Bauder FPO and PVC system has its own range of compatible outlets to suit either vertical or horizontal drainage. Our range of standard outlets is designed to fit directly into the preformed socket of UPVC drainage down pipes.



Separation Kerb

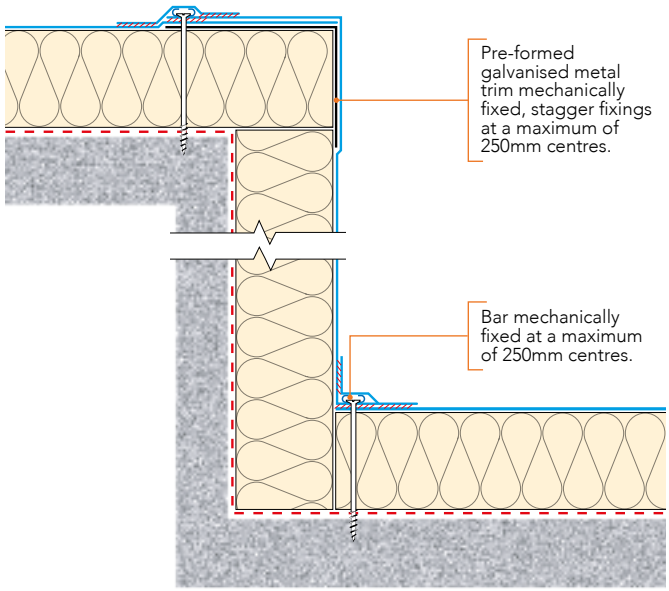
Whenever the Bauder single ply system is to abut an adjacent existing waterproofing system it is advisable to incorporate a separation kerb. This has two purposes, firstly it forms a defined edge to the roof, and secondly it ensures that any incompatibility of dissimilar products is avoided as they do not need to come into direct contact with each other. However, consideration must be given to avoid interruption of any drainage falls that may currently exist. Pre-formed metal flashings should be used in the same way as all operimeter details.



Expansion Joint

When exaggerated movement is anticipated within the substrate then a movement joint should be incorporated to ensure the waterproofing integrity is not compromised. An unreinforced detailing membrane is to be used for covering this junction providing greater flexibility.

Fixing bars should be employed for mechanically fastened installations and peel bars for fully adhered projects.

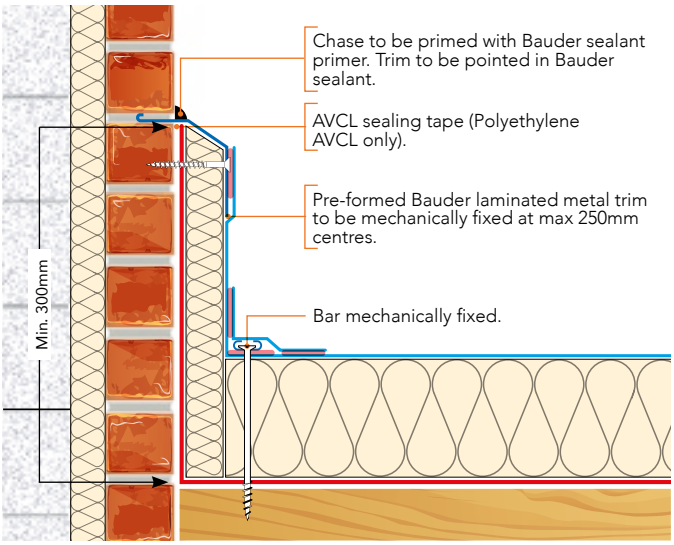


Change in Levels

Wherever there is a change in direction on a single ply roof it is good practice to mechanically restrain the membrane. This provides additional security at areas that are potentially under the greatest tensile stress.

Within a warm roof build up, the insulated external angle should be protected from compression with either pre-fabricated Bauder metal trim or a once bent galvanised metal angle mechanically fastened under the membrane.

GENERAL DETAILING



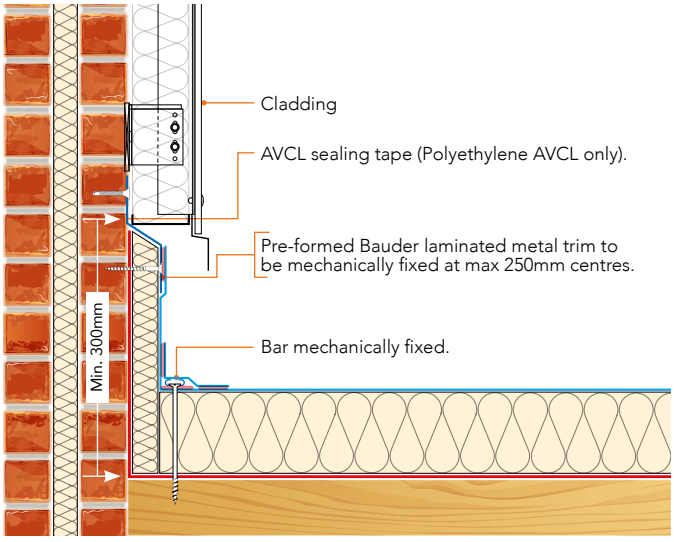
Insulated Upstand

The pre-formed metal flashing plays an important part in the integrity of the roof and should be pointed with Bauder mastic sealant. Pre-formed metal angles are mechanically fixed where the angles change by 90° and the flexible detailing membrane welded securely.

It is important that any cavity tray that exists is situated above the metal flashing to avoid water ingress behind the Bauder single ply waterproofing system.

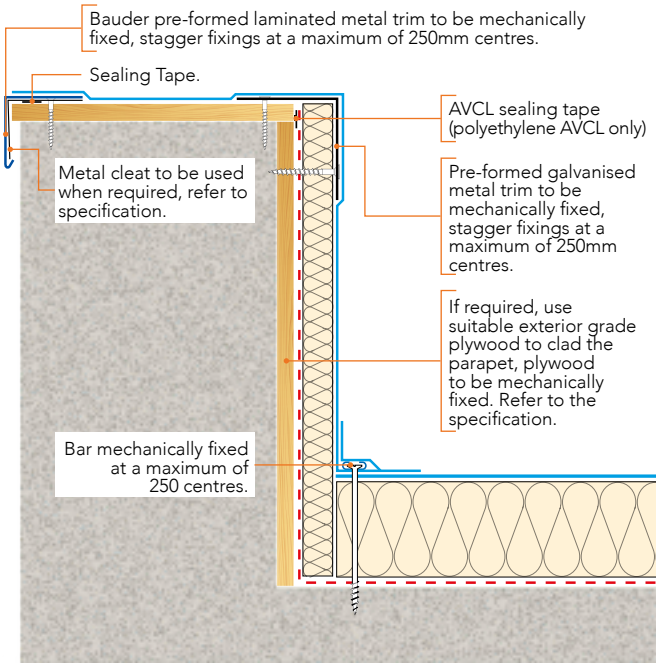
All upstands should be a minimum 150mm high in order to conform to Codes of Practice BS 8217:2005.

The vertical section of insulation needs to be provided to prevent cold bridging through the inner skin of brickwork whenever an insulated wall is present.



Insulated Upstand to Vertical Cladding

It is important that any waterproofing is situated behind the cladding system is positioned in front of the Bauder products to ensure water is nor directed behind the upstand flashing. Pre-formed metal angles are mechanically fixed where the angles change by 90° and the flexible detailing membrane welded securely.

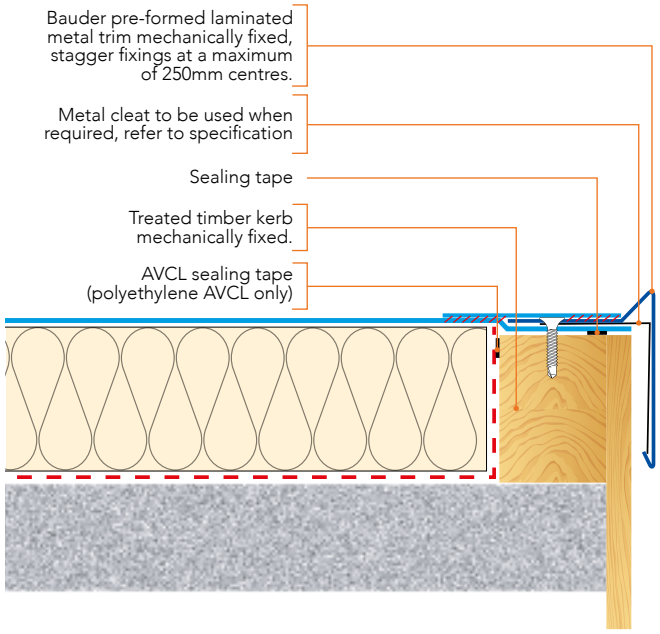


Insulated Parapet

Fully encapsulating a parapet with a combination of membrane and pre-fabricated Bauder metal ensures the waterproofing is not compromised by the potential for cappings or coping stones damaging the membrane. This detail ensures the responsibility for the waterproofing extends to the termination of the drip edge on the outside of the building.

If the parapet upstand exceeds 500mm then additional fasteners may be required to restrain the membrane. Refer to Bauder technical dept for further details.

The parapet drip edge will require the addition of a pre-formed galvanised metal cleat mechanically fastened behind the pre-fabricated metal trim in the event that the roof is more than 8m high or if the trim face depth is ≥ 100mm.



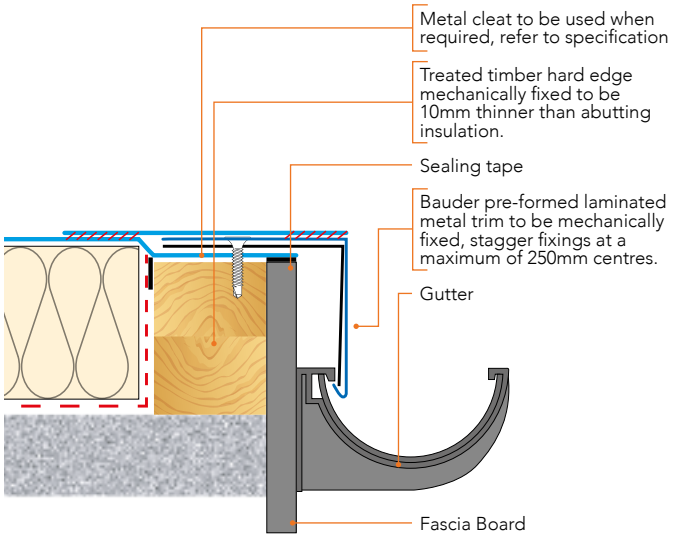
Perimeter Kerb

A water check kerb is a frequently requested detail and there is more than one method to ensure compliance within our system.

A prefabricated metal check kerb combined with a drip edge is ideal since it ensures complete continuity of the waterproofing membrane to the termination of the building.

The kerb drip edge will require the addition of a pre-formed galvanised metal cleat mechanically fastened behind the pre-fabricated metal trim in the event that the roof is more than 8m high or if the trim face depth is ≥ 100mm.

An alternative to the kerb created using Bauder pre-fabricated metal (illustrated) is to employ the decorative profile heat welded to the membrane around the perimeter.



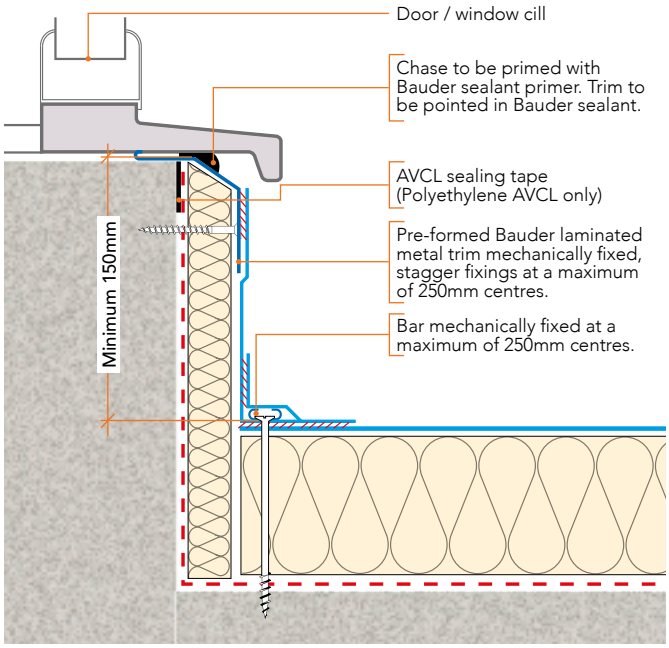
External Gutter

A treated timber hard edge must be installed at the perimeter of the roof to ensure the fastening of the Bauder pre-fabricated metal can be carried out.

The treated timber hard edge should be 10mm thinner than the abutting insulation.

The drip edge must be a minimum of 75mm.

The drip edge will require the addition of a pre-formed galvanised metal cleat mechanically fastened behind the pre-fabricated metal trim in the event that the roof is more than 8m high or if the trim face depth is ≥ 100mm.



Upstand to Door / Window

It is essential for this detail to be completed in compliance with our recommendations that pre-fabricated Bauder laminated metal is installed prior to the window cill or door framework.

A minimum 150mm upstand height is also required to ensure the waterproofing is not compromised.

The field sheet membrane should be terminated at the base of the upstand with either a fixing bar (mechanically fastened system) or peel bar (adhered system). Alternatively, pre-fabricated Bauder metal can be used at this junction. Membrane is then used to join the field sheet with the metal that is chased underneath the cill or door.

Finally Bauder sealant should be used at the chase trim to ensure complete integrity is maintained to the detail.

If level access is required, refer to BS 6229:2018.

Marischal Square,
Aberdeen, Scotland