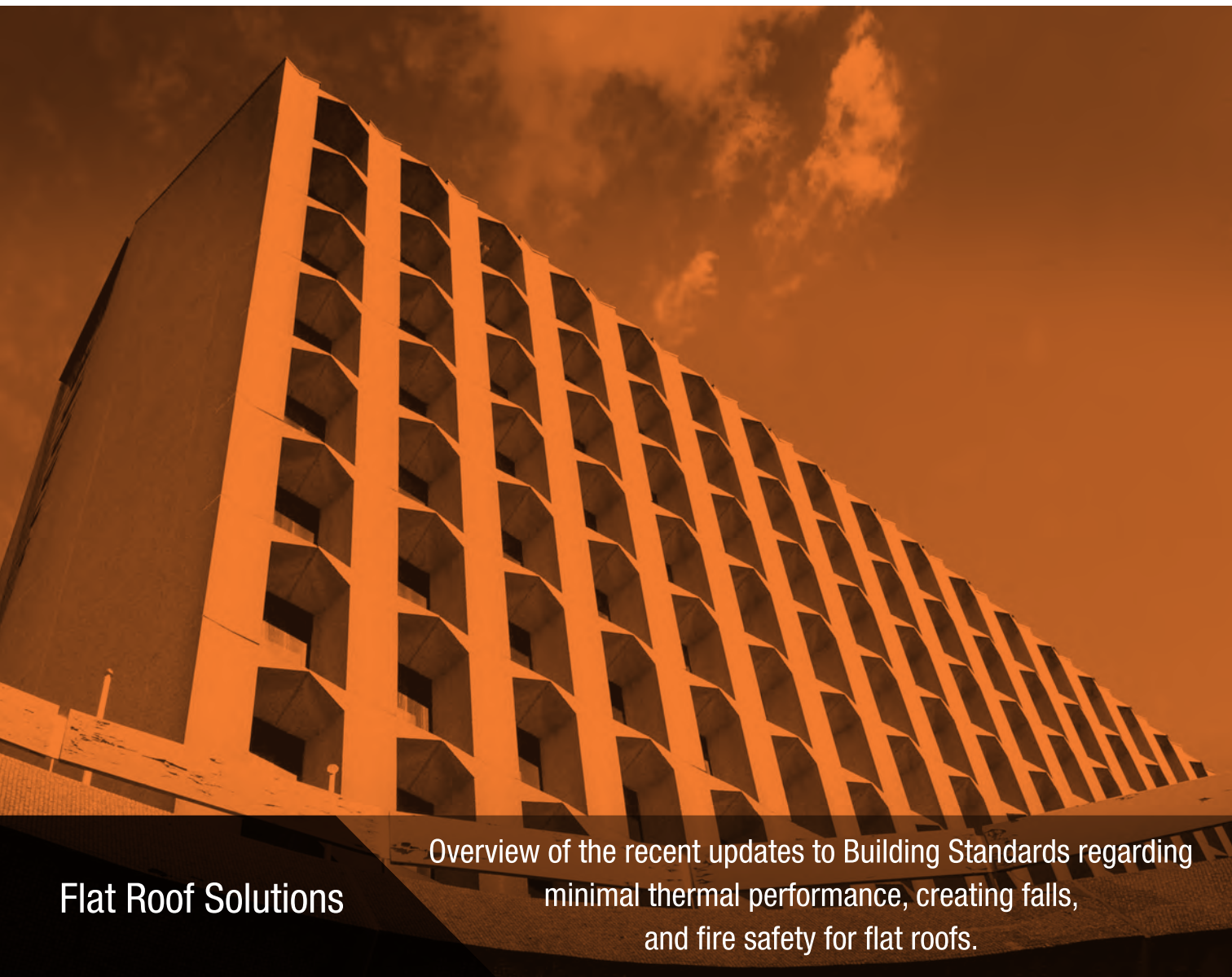
October/November 2019

BAUDER

Roof **review**



Flat Roof Solutions

Overview of the recent updates to Building Standards regarding minimal thermal performance, creating falls, and fire safety for flat roofs.

Building Regulations 2010

Fire Safety: Approved Document B

Published by: HM Government UK, Building Standards Institute
Update effective: 30 August 2019
Supersedes: 2006 Edition, which is now withdrawn

Overview of changes affecting flat roofs

On the 30th August 2019 a new edition of 'Fire Safety: Approved Document B' (ADB) came into force to give practical guidance regarding fire and how to meet the technical requirements of the Building Regulations 2010 for England. There are two volumes for the ADB; volume 1 is for dwellings and volume 2 for buildings other than dwellings – both of which bring several changes to flat roofing.

Gone is reference to the National Classification system set out in BS 476-3:2004 as the principle determinant of external fire performance for roofs with its familiar double letter categories (AA through to DD) to full adoption of the European Classification system set out in BS EN 13501-5 that has run alongside the National Classification system in the UK for many years. The EU classification still covers the response of roof systems to external fire penetration from outside the building and should not be confused with individual product components tested for their separate reaction to fire. The test is not concerned with the behaviour of roofs when subjected to the effects of fire from the underside, i.e. from within the building.

The present-day fire standards

To advance and clarify the fire standards across Europe for External Fire Performance, the roofing industry has been going through a changeover from the test and classification of BS 476-3:2004 to the tests of TS 1187 (planned to become BS EN 1187 in the next few years) and classification using BS EN 13501-5, the culmination of which is in the new ADB 2019 edition. The standardisation into one European test proved indefinable as many countries within the EU had differing regulations and so four test standards were required to cover the legislation in place within the various member states at the time. As such, the TS 1187 has four tests for roof covering systems: t1 for Germany, t2 for Scandinavia, t3 for France and t4 for the UK (and used in the Republic of Ireland).

The results from testing under TS 1187 with BS EN 13501-5 are given as European Class ratings B_{ROOF}(t4), C_{ROOF}(t4), D_{ROOF}(t4), E_{ROOF}(t4) and F_{ROOF}(t4) and can be related to the longstanding BS 476-3 two letter ratings as follows.

European Class	National Class (now withdrawn)	Minimum distance from any point on relevant boundary (England)	Minimum distance from any point on relevant boundary (Scotland)
B_{ROOF}(t4)	AA, AB or AC	Unrestricted and can be used anywhere on the roof	Low Vulnerability (<6m)
C_{ROOF}(t4)	BA, BB or BC	At least 6m of the boundary	Medium Vulnerability (6-24m)
D_{ROOF}(t4)	CA, CB or CC	At least 6,12 or 20m of the boundary depending on the building type and use	Medium Vulnerability (6-24m)
E_{ROOF}(t4)	AD, BD or CD	At least 6,12 or 20m of the boundary depending on the building type and use	High Vulnerability (>24m)
F_{ROOF}(t4)	DA, DB, DC or DD	At least 20m of the boundary depending on the building type and use	High Vulnerability (>24m)

The focus has always been, and rightly remains, to save human lives within the building rather than protecting the building itself. In order to do this the TS 1187 Test 4 examines two aspects; how the sample responds to fire penetration and how it responds to ignition (the previous test BS 476-3:2004 also looked at fire penetration, but additionally provided a classification for spread of flame). In TS 1187 Test 4 the ignition test provides the criterion to determine the spread of flame straightaway by assessing if the specimen did not burn for more than five minutes after removal of the test flame and the spread of flame was not more that 381mm and as such would thereby achieve the original class 'C' – anything other than this would be specified as the old 'D' rating. This is why Test 4 only requires the preliminary (ignition) test and the penetration test.

The external fire classification of B_{ROOF}(t4) is currently the highest rank which then progressively lowers through levels of performance culminating in the F_{ROOF}t4) rating where the test roof system alarmingly allows the fire to both penetrate and spread from the introduction of the test flame.

The important European classification to observe in all flat roof refurbishment scenarios is to ensure the selection of a system that delivers performance level of B_{ROOF} - the tested sample does not burn for more than five minutes after the test flame is removed, the spread of flame was not more than 381mm and it did not allow penetration of flame for at least one hour - thus the sample is deemed to be appropriate to shield human lives within the building and allow opportunity for safe egress.

The additional advantage of specifying systems achieving B_{ROOF}(t4) is that there is no minimum distance required between adjacent buildings and this is often referred to as 'unrestricted' or 'low vulnerability'.

In roofs 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. The national designations in the previous Approved Document B in Appendix A Table A5 for 'Flat Roofs Covered with Bitumen Felt' have been removed which means reinforced bitumen membranes with bitumen-bedded chippings or non-combustible tiles on the surface need to be tested.

Green roofs

Approved Document B references 'Fire Performance of Green Roofs and Walls' published by the former Department of Communities and Local Government (DCLG) in 2013 and this document is the basis of the Green Roof Organisation (GRO) Design Guidance. In summary, the growing medium should be certified for use on green roofs and, where there is no permanent irrigation, organic content should be <20% and peat free. Fire Breaks should be min 50mm thick 20-40mm rounded pebbles or min 40mm thick concrete or stone paving slabs around all perimeters and glazing ideally 500mm wide, with a 1m wide Fire Break across the roof every 40m. Maintenance is important to prevent vegetation growing over Fire Breaks and to remove wildflower dry thatch in the autumn.

Roof insulation fire performance

Individual construction products are covered within EN 13501-1 for which insulation, as a separate component, will be encompassed and allocated a Euroclass according to their separate reaction to fire test results with letter classifications from 'A1' through to 'F'. Overall, materials manufactured from plastics will achieve an 'E' rating, which will include the insulants Expanded Polystyrene (EPS), Extruded Polystyrene (XPS) and Polyisocyanurate (PIR).

continued...

Continued from page 03

Non-combustible insulants, such as cellular glass and mineral wool, are clearly desirable materials to include in a flat roof specification because of fire performance, and it is important to consider and balance the factors for inclusion within a roof system. In general, non-combustible insulants are not as thermally efficient as PIR insulation and therefore extra thicknesses, increased weight per m3 and reduced compressive strength can be a limitation in some applications. PIR has the advantage of being highly efficient, which reduces the height and weight of a roof covering build-up whilst also offering good compressive strength meaning greater versatility on a project.

Within a warm roof waterproofing system the insulation, be it mineral wool, cellular glass or PIR, is not exposed and is therefore protected through 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.

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 etc and are therefore often deemed to meet Building Regulations without testing, with exception of a Specified Attachment.

Within a warm roof waterproofing system the insulation, be it mineral wool, cellular, glass or PIR, all achieve the same fire classification.

Looking at Bauder insulation

Bauder insulations within a warm roof construction all achieve the fire rating pertinent to the waterproofing system, as mentioned previously, so BauderPIR, BauderROCK and BauderGLAS are protected by the cap sheet, and therefore not exposed, because it is the cap sheet that has to perform against external fire exposure.

Therefore, all Bauder warm roof insulants conform to Building Regulations in the same way.

Additionally, Bauder PIR insulation has also been tested and approved by fire experts Factory Mutual (FM), whose principle global business is the insurance of buildings and loss prevention. FM currently offers PIR insulation within a flat roof just the same as they would mineral wool without an exclusion or premium adjustment to the building owner if they are installed as part of a FM Approved Assembly, i.e. a stated system configuration. Bauder PIR, as with all other products with FM Approval, are under regular surveillance by the insurer to confirm performance on buildings.

Bauder inverted insulation is specified in buried scenarios and are fully covered with paving slabs etc and meet current Building Regulations without testing, again with the exception of being used in the construction of a 'Specified Attachment' (see below).

'Specified attachment' - new requirement of Approved Document B

In late 2018 Approved Document B was amended to incorporate in B4 Regulation 7, the Government requirement to ban combustible materials as part of the external wall in buildings containing dwellings or institutions. This includes student accommodation, care homes, sheltered housing, hospitals and school dormitories in buildings where there is a storey at least 18m above ground level. It also introduced a new term 'Specified Attachment' which was included in the ban of combustible materials like the parts of an external wall. The definition includes a balcony 'attached' to an external wall. Notable exclusions are membranes and any part of a roof (except habited mansards with a slope greater than 70°).

This new term has caused much misunderstanding with what is the definition of a balcony and it contradicts the European Commission Directive 2000/553/EC and Regulation 7(3) if a balcony is deemed to include an insulated roof. The flat roofing industry believes that attached balconies are differentiated from roof terraces in that they are not over habited conditioned spaces and are usually bolted to or cantilevering from the external wall, however this opinion requires clarification by the Ministry for Housing, Communities and Local Government (MHCLG).

Bauder waterproofing systems

Bauder exposed membrane waterproofing systems achieve the highest classification for external fire testing in compliance with Approved Document B and are classed as 'unrestricted' or 'low vulnerability' due to the fire retardant in the top layer and the mineral chippings on the reinforced bitumen membrane's surface.

Bauder ballasted membrane waterproofing systems generally achieve compliance with Approved Document B due to the European Commission classification without further testing rules or the DCLG fire guidance on Green Roofs.

Bauder has a continuous fire testing programme where all the most common Bauder system build-ups have been tested including thick and thin insulation which means that all thickness in between are covered in the same approval to give the most complete cover for certification. Having only one test thickness of insulation is only valid for that thickness and no other because variance in thickness can change the test result, just as using generic insulation types is not acceptable as there can be differences due to the core or facings. 'As built' should match 'as tested'. Our BBA certification for fire testing was up to date at publication but results can be extended by our continuous testing.

IN SUMMARY

- Bauder waterproofing systems are tested to TS 1187 Test 4.
- Bauder exposed membrane waterproofing systems achieve the highest classification for external fire testing in compliance with Approved Document B 2019 and are classed as 'unrestricted' or 'low vulnerability.'
- Introduction of the term 'Specified Attachment' has created the question 'what is a balcony?'

More information

Call **0845 271 8800** and arrange a meeting with your local Bauder technical manager to discuss the latest fire performance standards for flat roofs.

BS 6229:2018 Overview of significant changes impacting the refurbishment of a flat roof

Published by: Building Standards Institute
Supersedes: BS 6229:2003, which is now withdrawn

The latest edition of BS 6229:2018 Flat roofs with continuously supported flexible waterproof coverings came into effect in November 2018. The standard brings in a number of significant changes that affect the design of flat roofs and the installation of a waterproofing system and associated insulation; new terminology is also included to clarify the use of products and their roles.

The standard itself describes best current practice in the design, specification, construction and installation, and aftercare of a flat or curved roof with a pitch not greater than 10 degrees to the horizontal, with a continuously supported flexible waterproof covering on a supporting structure that is both dense and heavy (i.e. a concrete slab), or consists of framing members supporting a lightweight deck of metal or of timber-based material. Importantly, the standard no longer covers fully supported metal roof coverings, these are now under the responsibility of British Standards Technical Committee B/542 Roofing and Cladding Products for Discontinuous Laying. Additionally, certain subject areas are better covered in other British Standards of guidance so were removed or shortened.

Condensation Risk Analysis – BS 5250:2011+A1:2016.
Workmanship – BS 8000-0:2014
Sound and noise reduction – BS 8233:2014

The document BS 6229:2018 comprises updated practices that directly impact the refurbishment of roofs as well as others that are more pertinent to the design of roofs on new buildings.

Terms and definitions – Section 3

A number of definitions have been updated or added to enhance clarity, principally the key term to grasp is that a vapour barrier is now to be referred to as an Air and Vapour Control Layer (AVCL) which acknowledges the layer performs both functions.

Design – Section 4

Types of Flat Roof System - Section 4.2
Cold Roof System - Sub-Section 4.2.3

- Cold roof design and construction should be avoided.

This flat roof construction is where the principal thermal insulation is placed below the deck resulting in the deck and waterproofing layers being close to the external climatic temperature, as such there is a high risk of harmful interstitial and surface condensation on the underside of the supporting structure or the upper surface of the insulation. If it is not possible to eliminate a cold roof design, the standards should be referred to, and the recommendations followed.

Roof Falls to Achieve Drainage - Section 4.4

- All flat roofs should be designed with a 1:40 fall to ensure a 1:80 fall is achieved on the completed roof.

The standard recommends a minimum fall of 1:80 to both the general area of the roof and any formed internal gutters. As a result of this gradient advice, construction tolerances should be accounted for.

Falls on a roof can be created through the design and specification of tapered insulation in both new build or refurbishment projects. This solution is lightweight and cost effective compared to screed to falls and further information on this topic can be read in the article on page 08.

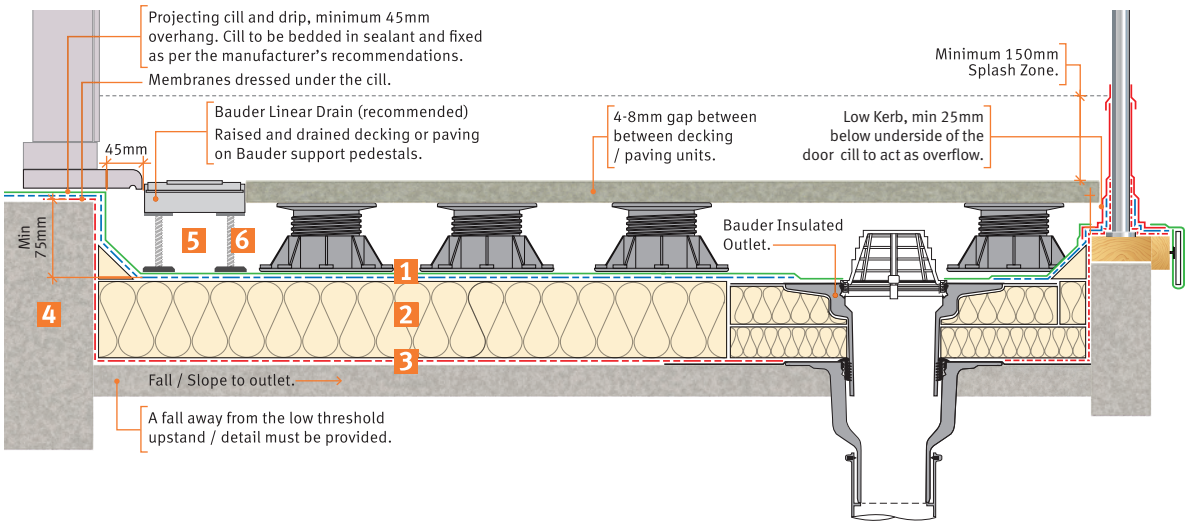
Rainwater Disposal - Section 4.5

- Adequate provision should be made to ensure rainwater is drained from the roof as quickly as possible.

It is a requirement of Building Regulations Part H that 'adequate provision is made for rainwater to be carried from the roof of the building', and BS 6229:2018 considers it good practice for flat roofs to be designed to clear surface water as rapidly as possible.

At all abutments and penetrations, the waterproof layer should still be installed to a height of 150mm above the finished roof level and in the case of protected roof systems this is where the top of paving, gravel, planted vegetation etc. is the finished roof level.

Where a flat roof includes a level access, such as for disability access at door thresholds, the NHBC technical standard has been adopted with the advice of utilising a 75mm upstand height under an overhanging (minimum 45mm) door sill provided that the roof fall is away from the doorway and an adequate outlet and overflow pipe is provided, or a balcony kerb is set to a minimum of 25mm below the underside of the door sill.



Thermal Performance - Section 4.6

The roof of a heated building should achieve a U-value not exceeding 0.35W/m²K at any point.

To maintain thermal performance of a heated building the minimal (U-value) levels permitted at any point on a roof must be 0.35W/m²K (clause 4.7.2). This is already covered in the respective Building Regulations of the Nation States of the UK but highlights 'at any point' covering the minimum thickness of tapered roof areas and gutters.

Our design advice is in keeping with best practice, and based upon BS 6229:2018. If you or your client are not able to follow this new advice, we recommend that you consult with Building Control.

Control of Condensation - Section 4.7
Surface Condensation – Sub-Section 4.7.2

To reduce risk of surface condensation, thermal continuity should be maintained across the roof.

BS 6229:2018 replicates Building Regulation Guidance (Approved Document C, Section 6 for England & Wales. Technical Handbook Section 6 for Scotland) which requires the roof of a heated building to achieve a U-value not exceeding 0.35W/m²K at any point. This uplift in the standards looks to eradicate the practice of thinly insulated gutter soles and excessively low points in tapered schemes.

In such roofs, the risk of surface condensation is removed if continuity of insulation at upstands and roof penetrations exists. As such, insulation should be included at the vertical elements and encapsulated by the waterproofing system to a height of 150mm. In some refurbishment situations this can be a challenge, particularly if a cavity tray is present within the upstand and the increased height of the replacement waterproofing system covers the weep holes, and eventually the system will fail. A following article on page x reviews this precise challenge.

A surveyor can have a real challenge meeting the new standards of BS 6229:2018 and so to assist in appreciating what needs to be achieved and how to deliver it, Bauder, the flat roof systems manufacturer, has a national team of specialist technical managers that will provide a without charge service to survey a troublesome flat roof and propose the solution, all respecting the new British Standards. You can easily book a meeting to discuss a project by contacting their head office and arranging it with your local Bauder technical manager: **01473 257671or online via their contact form bauder.co.uk/contact-us**

1. Waterproofing layers (Bauder bitumen membrane illustrated)
2. Insulation with angle fillet to eradicate 90° internal change of direction to vertical.
3. Bauder AVCL
4. 75mm upstand height under an overhanging (minimum 45mm) door sill.
5. Bauder recommend a Linear Drain be included in the design.
6. Minimum 10mm gap between decking/paving and perimeter upstands/thresholds.

Even a flat roof should have falls!

How to comply with recently updated British Standards

A common problem when refurbishing a flat roof is insufficient falls. This can cause significant areas of ponding water and thereby additional loading on a roof. Tapered insulation solves this issue by creating drainage falls that can be quickly installed as part of a waterproofing solution.

Tapered insulation is a lightweight, convenient and cost-effective method of reinstating falls on a current roof and is quick to install as the insulation and falls are applied in a single operation, with site times greatly reduced. Additionally a tapered insulation scheme means that complex fall configurations can be created in the design.

Complying to new British Standards

Falls

A requirement of Part H of the Building Regulations is that 'adequate provision is made for rainwater to be carried from the roof of the building'. BS 6229 & BS 8217 also state, flat roofs should be designed with minimum falls of 1:40 to ensure a finished fall of 1:80. This applies to all roof areas, including internal gutters and sumps. Tapered insulation is manufactured with a specific gradient, usually 1:60, to satisfy the requirements of the standards.

Thermal performance

The minimum U-value permitted on any point of a roof over a heated space is 0.35W/m²K, including the thinnest areas of a tapered scheme and gutters. A value achieved with setting a minimum thickness criteria on the thinnest board in the designed scheme. Insulated outlets are also required to maintain thermal continuity at drainage points.

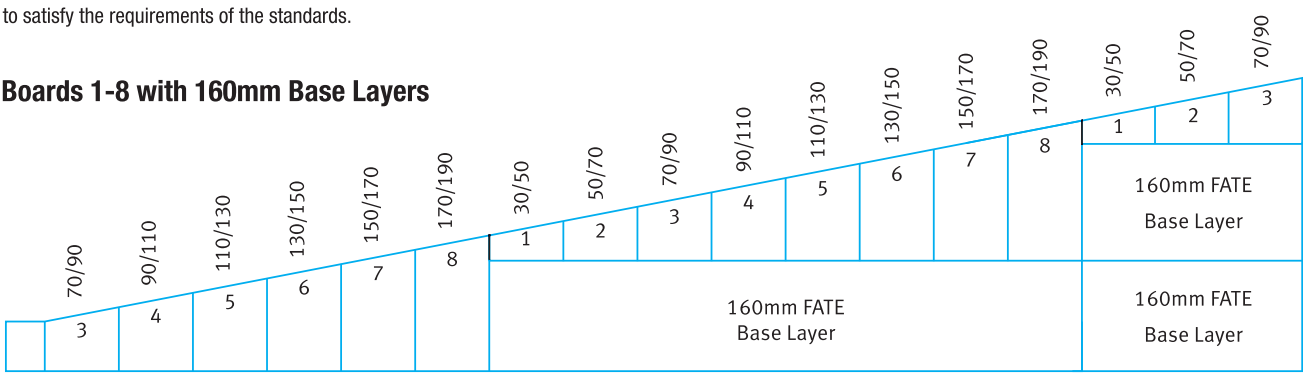
Solving the challenge

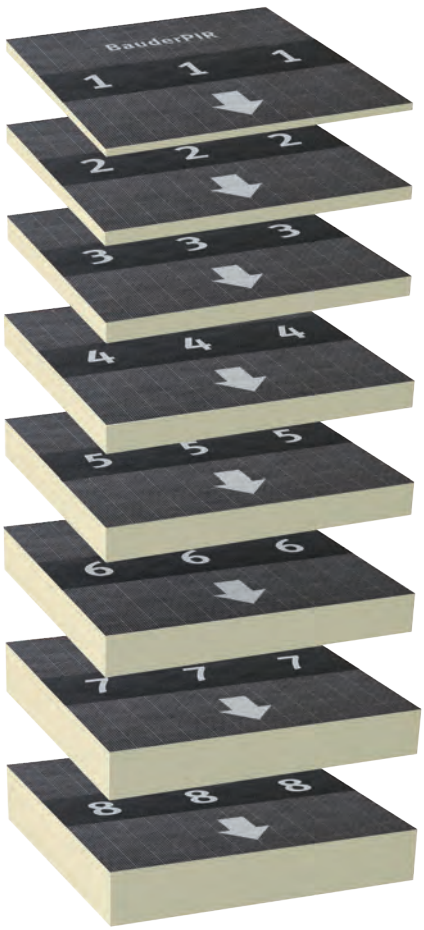
Bauder has a unique patent-pending tapered insulation system with innovative ridge and valley infills, which enables both simplistic and complex multi-directional fall configurations to be supplied.

Key benefits

- Falls and thermal properties incorporated within the one element.
- Suitable for use with bituminous, single ply or cold applied systems.
- Flexibility to create endless configurations.
- Creates 1:60 falls to comply with BS 6229:2018
- Granted BROOF (t4) when used in a Bauder system (unrestricted).
- Very good compressive strength - resist physical damage and support plant loads.
- Foil-faced for improved thermal efficiency.

Boards 1-8 with 160mm Base Layers





Bauder Tapered Insulation Design

Each roof requires a bespoke design to account for the location of the drainage points, as this will dictate the direction of falls, maximum thickness / heights, acceptable weight loading, U-value to be achieved and allow us to provide accurate costs.

BauderPIR FA Tapered Insulation boards are 1200 x 1220mm, foil faced on both sides and with a with a 1:60 gradient covering a range from 30mm to 190mm. Most tapered schemes will start with the use of a 70-90mm at its lowest point, to meet the 0.35W/m2K requirement of Part L of Building Regulations. Using only one layer of tapered board or atop a 160mm FATE base layer of insulation, makes for an easier, quicker and more cost-effective method of installing a tapered scheme. While also achieving the desired pitch and meet project specific thermal requirements.

Ridge and valley solution
Unique ridge and valley infill boards are combined with the BauderPIR FA Tapered boards to simplify the scheme and installation. The ridge pieces allow water to drain off a roof in opposing directions, while the valley pieces ensure water can only run off the roof in one direction.

How to specify a tapered scheme
As part of its refurbishment project package, Bauder offers a tapered insulation design service. With every scheme bespoke and designed to match the specific needs of the project and meet building regulations - BS 6229:2018 (thermal performance / thermal bridging), BS 5250:2011+A1:2016 (control of condensation) and BS 6946 Annex E (U-value calculations).

Give Bauder a call on 0845 271 8800, to arrange a meeting with your local technical manager to discuss how a tapered scheme can rectify your challenge of creating falls on your flat roof project.

bauder.co.uk/roof-systems/insulating-flat-roofs

Focus on the challenge:
Cavity Trays

The positioning of existing cavity trays can often present a challenge when refurbishing flat roofing. If the finished height of the new flashing is higher than the drainage point of the existing cavity tray, then any water which seeps down through the external brickwork and or cavity has the potential to ingress into the building. Overlooking this scenario seriously jeopardises the functionality of the waterproofing and can cause significant water ingress leading to internal water damage.

THE CHALLENGE

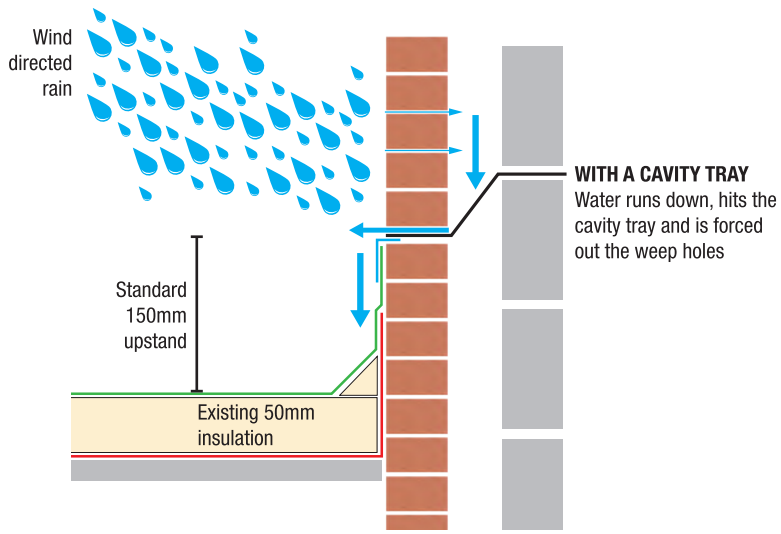
If wind driven rain hits an external wall, depending on the porosity of the brickwork, it can penetrate and track down through the outer skin of brickwork and cavity. This water ingress, managed by cavity trays, is forced out of weep holes in the perpend of the brickwork or blockwork to discharge directly above the cover flashing and onto the flat roof area.

Typically, when an existing roof is refurbished the insulation thickness is increased. This has the potential to result in raising the upstand above the drainage level of the existing cavity tray. If the position of the cavity tray is not raised the water being forced out through the weep holes will discharge behind the waterproofing upstand. The water then bypasses the waterproofing and can now penetrate the building. Depending on the exact position of the existing cavity tray, relative to the new waterproofing upstand, water may also penetrate into the new waterproofing system resulting in saturation of the insulation.

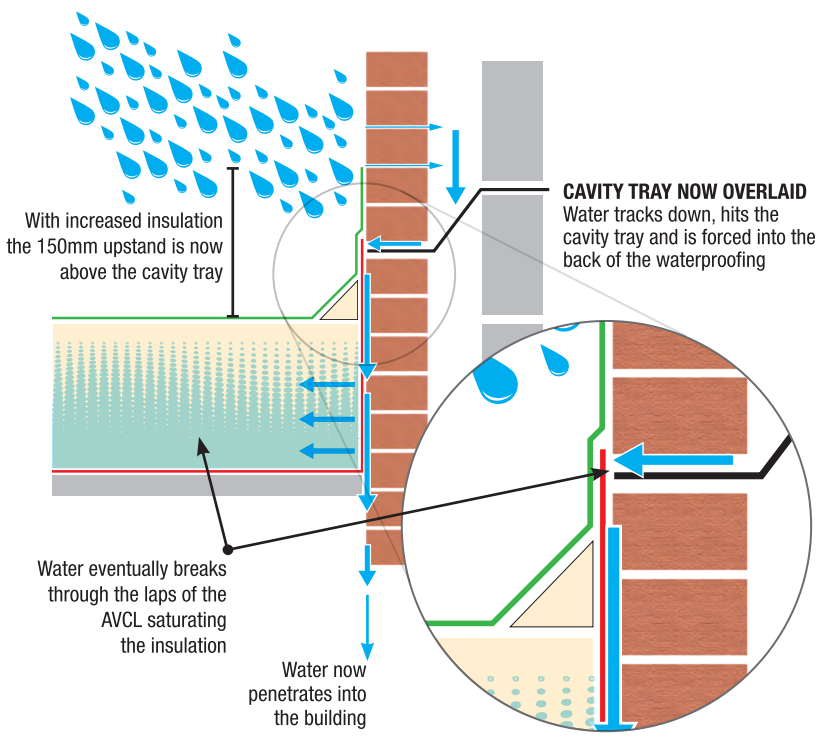
THE SOLUTION

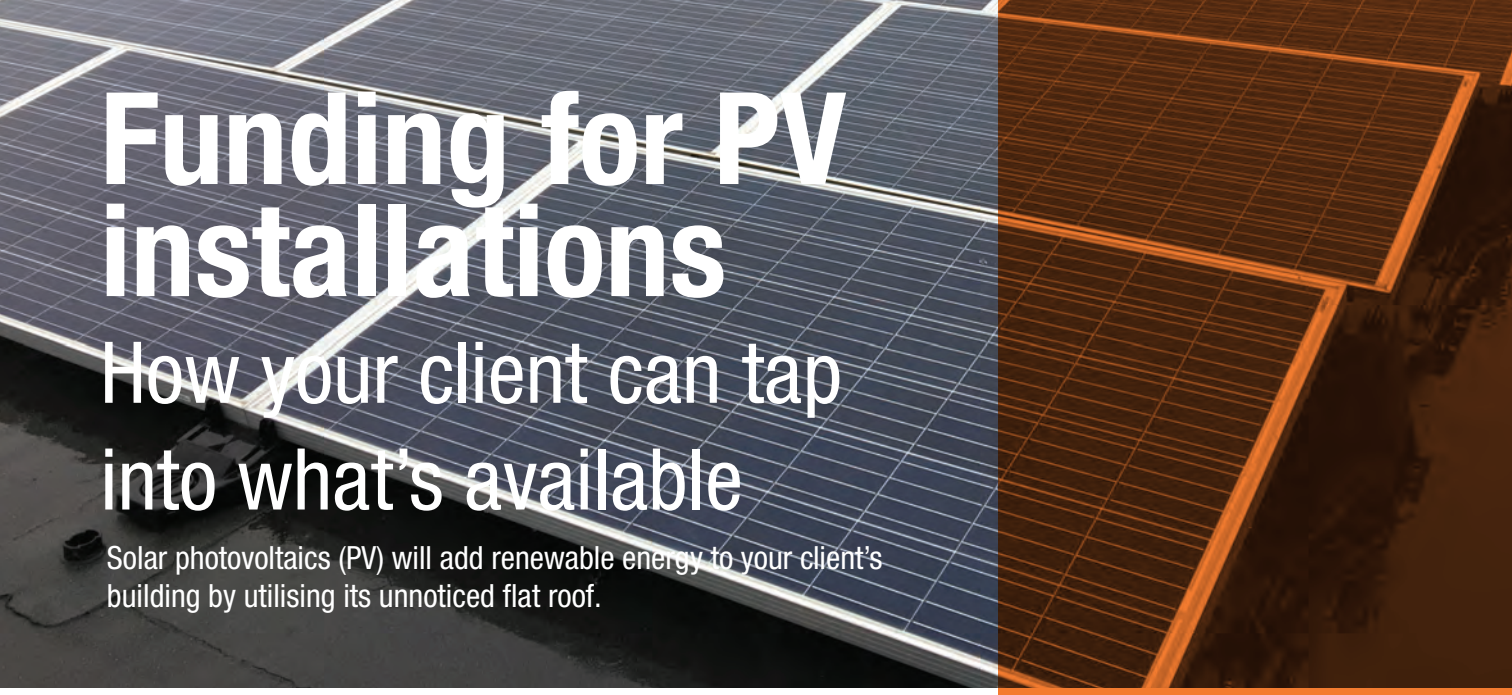
By installing a new refurbishment cavity tray at the correct height above the revised upstand detail, any penetrating water within the brickwork or cavity will be properly managed to drain over the new waterproofing system therefore eliminating any water ingress into the building or insulated roofing system. This is the advised method to provide the most appropriate long-term solution to maintain the integrity of these critical details

UPSTANDS WITH CAVITY TRAY



UPSTAND REFURBISHMENT CAVITY TRAY CONCERN





Funding for PV installations

How your client can tap into what's available

Solar photovoltaics (PV) will add renewable energy to your client's building by utilising its unnoticed flat roof.

When maintaining or upgrading buildings, clients are constantly looking to make the keenest investment to provide and improve energy efficiency savings. Retrofitting solar photovoltaic (PV) panels onto a roof can not only produce significant financial savings, cheap, clean electricity for the building's use, but also help landlords and building owners reduce their carbon emissions and meet the current standards and regulations for energy efficiency in buildings.

FUNDING OPPORTUNITIES

Photovoltaic panels are thoroughly cost effective as there are various funding and investment streams available for solar PV projects so that your client can benefit from the advantages of a PV array, with no capital outlay.

Power Purchase Agreements (PPAs)
Private funders offering a PPA solution enable property owners to take advantage of a fully installed PV system for zero capital outlay. The building owner enters into a long-term contract to purchase the electricity generated by the solar array from the private funder at a rate that is lower than their current purchase price and guaranteed for 20 years. As the array is owned and maintained by the funder there is no maintenance requirement for the building owner.

Power Purchase Agreements (PPAs)
Similar to a commercial PPA, but capital is raised to provide funds for the installation of the solar array through a community share offer. The building owner benefits from reduced energy costs, but the PV array is owned by the cooperative or community benefit society from whom the building owner purchases the electricity.

RETROFIT CONSIDERATIONS

A significant factor when considering retrofitting PV panels is ensuring that waterproofing membranes are in a suitable condition, that waterproofing warranties will not be impacted, and the life expectancy of the waterproofing system matches that of the new technology. Discounting this consideration could potentially result in the array needing to be removed early in order to reinstate the integrity of the roof. Thus, the ideal time to add photovoltaics is to do it simultaneously when refurbishing the waterproofing system.

Solving the challenge
Bauder can supply all of the waterproofing and solar requirements for your flat roof project and offers the most lightweight PV system on the market, between 9-12.5Kg/m² depending on module selected, making it a natural choice for retrofit applications.

The integrity of the Bauder flat roof waterproofing system, bitumen membranes or single ply, is also completely upheld during the installation as the BauderSOLAR array is fitted using a unique penetration-free fixing method. This installation method means that the roof is not compromised by mechanical fixings through the waterproofing nor is it ballasted, which would add additional weight loading to the roof. Moreover, the low-profile modules are set at a 12° angle, ensuring they are unobtrusive.

Bauder also offers a full design service including roof layouts, wind load calculations and ROI calculations ensuring complete peace of mind for yourself and your client. For more information, call 0845 271 8800 and book a meeting with your local Bauder PV technical manager to discuss the options for your client.

PROJECT STUDY

Project:
Sheringham High School

Size:
1,500m²

Waterproofing:
BTRS Charcoal Grey

Roofing contractor:
R T Roofing

Electrical installer:
Joju Solar

Funding for the solar array on Sheringham High School's bitumen Bauder roof was provided through a community share offer, The Schools' Energy Co-operative, ensuring both the school and the local community benefited financially from the installation whilst also providing clean renewable energy.

Mike Smyth Chairman, Energy4All, commented on the project, "The BauderSOLAR PV system is not only lightweight and high quality but it also has excellent energy generation capabilities, which will result in significant cost savings for Sheringham by producing electricity that is cheaper than that off the grid. In addition, because of the co-operative nature of our social enterprise it means that all profits will subsequently be paid back to the school. Sheringham's retrofit PV solution not only supports the school's sustainability efforts and provides them with financial benefits, but it also gives our co-operative members an investment opportunity that makes a tangible contribution to the development of renewable energy and the mitigation of climate change."

Making technical roof surveys work for you

COST CERTAINTY AND CLIENT SAVINGS: How to deliver both on flat roof refurbishment projects

When maintaining or upgrading buildings, clients are constantly trying to make the smartest investment, this presents surveyors with the challenge of delivering predictable project costs and providing precise technical data to enable clients to make the correct decision.

Establishing water ingress

To get to the point quickly - clear identification of the extent of water ingress in an existing roof system through a moisture mapping survey is certainly the most reliable method of detection. This scientific form of technical roof diagnostics verifies and plots the dry and moisture impeded areas of a roof so that its true condition is established, removing the situation of conflicting opinions.

Clearly, other survey services have their place as well, including a traditional visual appraisal and localised core samples taken of the existing system construction; though add to this a moisture map analysis and the results surpass all other combinations of survey information.

Moisture mapping

This unique scientific survey utilises a moisture mapping gauge to take measurements, performed in a two-metre grid pattern, that are plotted on a scaled drawing of the roof. The readings create a histogram and the values are charted in a visual report, like a topographical survey but for water levels instead of land mass. This clarifies which areas are showing high levels of moisture that will require removal and new insulation put back, and the dry areas that can be overlaid.

Moisture mapping is suited for all roof structures, particularly those with multiple layers of insulation and previous waterproofing systems. The gauge will also detect moisture within certain decks or supporting structure in uninsulated roof situations.

The report allows you to justify costs to the client as unnecessary works are eliminated because remedial work will only be carried out on essential areas.

Commissioning a moisture map

Clearly, this form of survey and interpretation of the data is carried out by a specialist, though this doesn't mean that huge costs are incurred, in fact, quite the opposite if you use the right company.

Bauder, the flat roof waterproofing manufacturer, is providing this survey as part of its without charge package to clients in the refurbishment sector. Bauder offers surveyors differing diagnostic methods to generate specific data on a roof's actual condition and creates a comprehensive survey package and specification for you to propose to the client.

A Bauder report is comprehensive and normally encompasses:

- The deck construction and existing roof coverings.
- Thermal performance appraisal and requirement for upgrade in line with Building Regulations.
- Fittingness of the falls and drainage and recommendations for any improvement needed.
- Upstands and details, with identification of any that are constructed with combustible materials.
- Rooflights appraisal and rationale for any replacement.
- Location of plant and rooftop equipment.
- Associated works where required.

The survey report then concludes with a roof system proposal based on your client's requirements and budget, conforming to current regulations and industry best practice. This report can be in a specific format or for an explicit reason, such as to meet funding criteria.

The real benefit is being able to provide clients with the report which includes the data gained from the moisture mapping survey proving the extent of the works required and proposals for waterproofing options with enhanced cost data at an early stage. In this way the client is assured they are making investment decisions based on fact rather than on subjective opinions.

Book a meeting

This is the easy bit, just pick up the phone and call **0845 271 8800** to book an appointment for your local Bauder technical manager to meet you on site or at your offices.

More information

Go to **bauder.co.uk/refurbishment-projects**

PROJECT STUDY

Project:
Woolwich Polytechnic

Woolwich Polytechnic is a leading co-educational college in South East London.

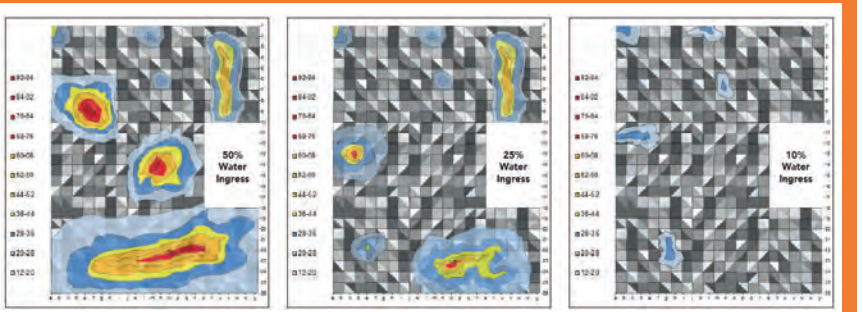
Surveying Practice:
Barker Associates Limited

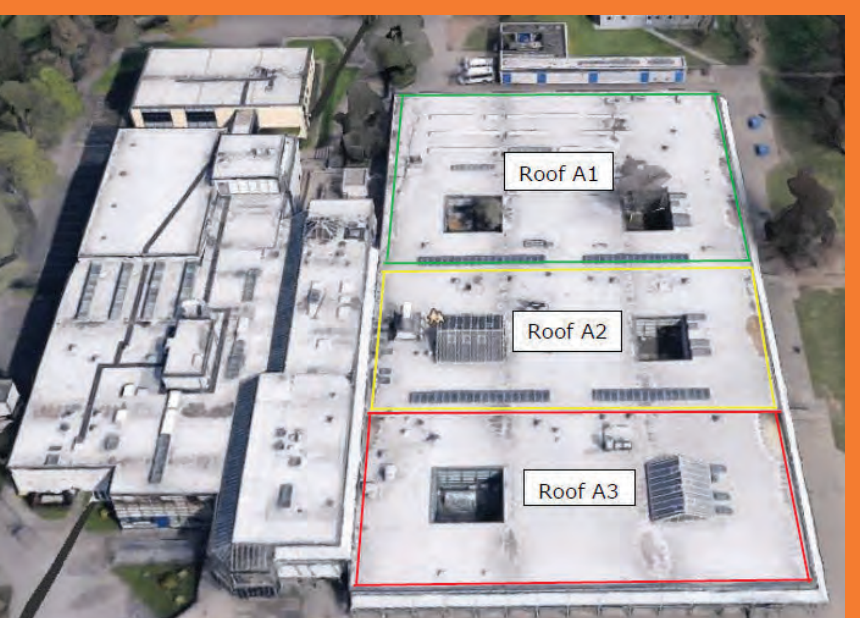
The surveyor commissioned Bauder to carry out a moisture mapping roof survey to three roof areas within the main roof with a total area of 500m². Using a Troxler 3216 Roof Reader, Bauder project surveyors were able to measure the moisture concentration within the roof structure to determine the source and extent of the water ingress.

The moisture mapping exercise concluded that the existing single ply insulated waterproofing system contained water to several areas with the addition of there also being some localised small areas of water within the existing original build-up. This was estimated to be in the region of 30-40% on the first roof section and 25-35% on the second. The third section of roof contained water to one localised area.

After completing the roof survey, Bauder was able to recommend that only the upper roof system required stripping and with some minimal repair the original roof this could be left insitu and overlaid in the usual manor with an upgrade of insulation to comply with the current part 'L' building regulations.

The moisture mapping gave the client an exact scientific appraisal about the roof which lead substantial costs savings on the project.





The Right Waterproofing Solution for Every Scenario

Bauder offers a variety of waterproofing solutions to suit any refurbishment project whether stripping, overlaying or a combination of both when reinstating the integrity of a flat roof. Tricky rooftop challenges can be solved, such as, low cavity trays, level thresholds, high capacity of plant and equipment or penetrations, by specifying multiple waterproofing systems.

The Bauder waterproofing systems can incorporate a range of insulants to meet building standards and the needs of the project, whether the preference is for highly efficient PIR or superior fire-performance mineral fibre, BauderROCK.

Airedale Academy

As a result of a comprehensive Bauder roof survey it was identified that all of the original waterproofing at the academy had exceeded its serviceable life. Prior to the work commencing on site, Bauder helped the client secure £1.5 million of funding for the required refurbishment. All of the original waterproofing was then removed before being replaced with 7,100m^2 of Bauder's premium reinforced bitumen system, BTRS, by FRS Roofing Services. The system build-up included Bauder's PIR Insulation for superior thermal performance and tapered insulation to effectively create drainage falls.

A challenging element of this installation was the number of intricate detailing requirements, with the roof possessing over 20 separate roof areas, calling for exceptional levels of workmanship. There were also health and safety implications with there being significant amounts of asbestos that needed removing. Despite these challenges all works were completed as expected, much to the delight of the client.

Andrew Spurr, Premises Manager at Airedale Academy: *"Bauder provided us with all the support we needed and we are delighted with the outcome. Their waterproofing systems are of the highest quality and they helped us overcome all of the funding, design and logistical issues we encountered."*

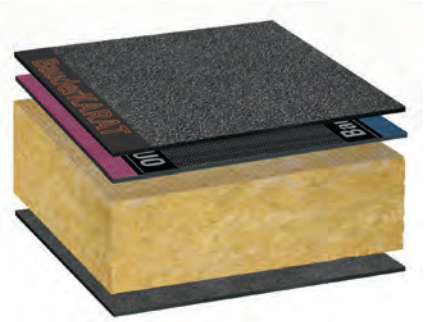
Bauder's systems can be used to overhaul or renew a failing roof by removing and replacing elements with water ingress where the roof deck is sufficiently robust; similarly they can be used to thermally upgrade a roof, overlay an existing system or renovate a sheet metal profile roof with project specific contoured EPS insulation and single ply membrane. All Bauder's solutions are durable, resilient to the natural elements and achieve excellent fire ratings.

Reinforced Bitumen Membrane

A robust form of waterproofing with long-term durability and life-expectancy. Bauder's bituminous membrane roofing systems incorporate modified elastomeric bitumen membranes and feature torch-free and torch-safe installation techniques for detailing on, or adjacent to combustible materials.

Key advantages

- Wide range of systems to meet project and budget requirements
- BBA certification with stated life expectancy
- Guarantees for waterproofing and associated rooflights, outlets etc
- Durable and long-lasting systems that are able to sustain heavy foot traffic and permanently sited rooftop plant.
- Exceptionally long lifespan



BTRS PLUS shown with BauderROCK mineral wool insulation.

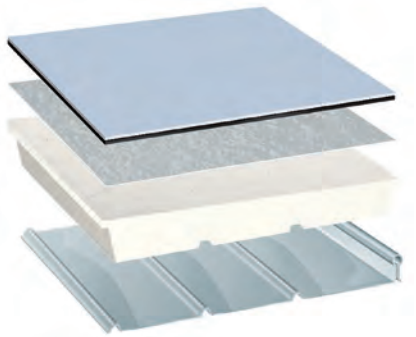
Single Ply

Single ply is a popular selection for buildings that have weight and load bearing considerations. The membrane is durable and incredibly lightweight and the speed of installation makes it a cost-effective method of waterproofing.

Where aesthetics is a consideration, the membrane can be detailed to reflect the standing seam finish of a lead roof. This is especially popular if the client is looking to preserve the look of the building or remain in keeping with other buildings.

Key advantages

- Lightweight, typically 2kg per square metre, and cost-effective
- BBA certification with stated life expectancy
- Guarantees for waterproofing and associated rooflights, outlets etc
- Versatile to suit varying degrees of failing roofs
- Perfectly suited for overlaying profiled metal roofs when used in conjunction with profiled EPS insulation.



Thermofol PVC shown with profiled EPS insulation overlaid on an existing metal deck.

Cold Liquid Applied

Bauder's LiquiTEC range has systems for different roof applications as well as terrace, balcony and walkways. Using proven, fast curing PMMA technology, the waterproofing systems incorporate polyester fleece reinforcement. This application method, coupled with the fast and controlled chemical cure of the waterproofing, allows roof areas to be fully waterproofed in a few hours. A cold liquid coating is a cost-effective method of making an existing roof waterproof and is particularly successful where there is a multitude of awkward details to roof sited plant and equipment.

Key advantages

- No hot works during installation
- Fast cure gives short trafficking times to allow access of completed areas
- BBA certification with stated life expectancy
- Guarantees for waterproofing and associated rooflights, outlets etc
- Highly adaptable and can be used for large open areas, areas with complicated detailing, small roofs and balconies and gutters.

LiquiTEC Roof shown with BauderPIR insulation.

CASE STUDY:

Hexagon Tower

BAUDER

Project name:
- Hexagon Tower

Location:
- Manchester

Roof size:
- 6,000m^2

Waterproofing system:
- Bauderflex

Client:
- IF Building Consultancy

Roofing contractor:
- BBR Roofing

The project

Hexagon Tower is a specialist science and technology facility located in North Manchester. The roofs of the laboratories were experiencing water ingress due to poor original detailing and aged interfaces. Whilst looking to replace the failing roof, the client also wanted to upgrade the insulation to increase the U-value and improve the appearance of the rooftop using a trusted system. Bauder was selected as the supplier due to its comprehensive service offering, which includes detailed report, bespoke specification, project advice and ongoing inspections to ensure a full system guarantee can be issued.

The challenge

The building was occupied by employees during the works with multiple trades onsite. Bauder provided a system and installation methodology, to keep disruption to a minimum for both the employees within the building and the residents of the surrounding areas. The sensitive nature of the work being carried out within the building meant that mechanical and electrical equipment could not be switched off for more than a few hours at a time.

The solution

Elements of the existing roof surface were removed, details modified and then a Bauderflex system incorporating vapour control layer, 120mm PIR FA-TE insulation and two-layer bitumen waterproofing, with a brown finish was installed. BBR Roofing installed the system, finishing the roof area with expertly installed complex detailing around columns, windows and the area protected with a new free-standing guard rail.

Testimonial

Tom Frankel, Director at IF Building Consultancy, was delighted with the finished result. His words to Bauder were: *"Thank you for making this project as seamless as possible. Your continued support has reaffirmed my position that you are the 'go to guys' for flat roofing. A job well done."*