BAUDER
making roofs secure.

Solar PV Systems

Flat roof solutions

Photo Credit: Ivegate Ltd

Noah's Ark Children's Hospice
Barnet

BUILDING BOARD

Roof Size:	5,100m²
Roof Systems:	BauderSOLAR G LIGHT with extensive green roof Bauder Total Green Roof System
Specifier:	Squire and Partners
Approved Contractor:	Voland Roofing Limited
Green Roof Contractor:	Bridgeman & Bridgeman
PV Installer:	Joju Solar

Bauder is a leading European manufacturer of flat roof waterproofing membranes and insulation to make buildings watertight and thermally efficient; photovoltaic systems for renewable energy generation; green roofs to support the environment and create better living and working spaces for people; and blue roofs for stormwater attenuation and prevention of localised flooding.

Customers choose us because of the way in which we do business, for our robust advice on the right system, and our approach to delivering projects. We work alongside clients to deliver the best solution for a building from our broad portfolio of systems.

Solar PV

Photovoltaic systems for flat, green, and blue roof applications

Our photovoltaic solutions are innovative, penetration-free, quick to install, and provide a cost effective and highly efficient solution.

Our solar photovoltaic (PV) systems are designed to ensure the Bauder waterproofing beneath remains completely intact and without compromise.

The entire installation process of both of our photovoltaic systems is quick and simple. Through our portfolio, we guarantee the entire Bauder specified roof package rather than a separate element, giving single source point of contact and responsibility to reduce risk.

Specifying a solar PV array

A flat roof is the ideal place for a solar photovoltaic installation to generate site-sourced electricity. Renewable energy generation has a big role to play in the delivery of a net zero carbon building and integrating renewables allows it to meet a proportion of its own energy needs, minimise carbon emissions, and reduce building running costs.

Outline of our solar PV systems

- Two systems for new build and refurbishment projects, BauderSOLAR and BauderSOLAR G LIGHT.
- Penetration-free installation of mounting system to reduce risk.
- Variety of solar PV modules to suit client needs and budget.
- Range of Bauder waterproofing options.
- Comprehensive range of guarantee packages to suit project requirements.

Achieving technical objectives

- Bauder solar PV array designs meet MCS PV Guide requirements and IET Codes of Practice.
- System designs comply with:
  - BSEN 62446 Grid Connected Photovoltaics
  - BSEN 61853-1 Defining Solar Photovoltaic Power
  - BSEN 1991-1-4 Wind Actions on Structures
  - BRE Digest DG 489 rev 2014

BauderSOLAR PV Solutions

Two systems for creating a rooftop solar PV installation

Integrated photovoltaic solutions for flat roofs on both new build construction and retrofit for current buildings.

Through our systems we guarantee the entire roof package for single source point of contact and responsibility to reduce risk.

BauderSOLAR F and BauderSOLAR F XL

Flat roof photovoltaic mounting system that is attached to the roof without penetration of the waterproofing system or roof deck. The systems are designed to be used in conjunction with our single ply or bituminous membrane waterproofing solutions and are lightweight at 9-12.5kg/m², depending on the module selected.

As module manufacturers strive to increase the efficiency of solar modules, the industry is moving to larger format cells and module structures.

BauderSOLAR F XL System allows the installation of larger format modules ensuring we can provide our clients with the most efficient solar solutions for their flat roof projects. BauderSOLAR F fits modules up to 1060mm wide to embrace the refurbishment sector where an existing PV array is being replaced.

BauderSOLAR G LIGHT

Our biosolar photovoltaic solution that integrates a Bauder green or blue roof where the substrate and vegetation provide the ballast to secure the array. This system allows for the entire roof area to qualify as a green roof, and if a biodiversity vegetation finish is specified, this can help the building achieve Urban Greening Factor, Biodiversity Net Gain, and BREEAM ecology credits whilst simultaneously maximising solar generation.

BauderSOLAR PV Design Fundamentals

Brief outline of some key considerations

Solar PV is a popular and mature renewable energy technology, and its deployment is rising due to the combined importance of achieving net zero and reducing energy costs.

With recent fluctuations in energy markets and carbon reductions initiatives coming to the fore, the number of solar PV installations on flat roofs will continue to rise as local authorities and businesses look to reduce their carbon footprint and gain energy security for the future.

Sizing of Solar PV systems

The size of the solar PV array will be determined by the overall aim of the scheme, the building's energy consumption, available non-shaded roof space, and client's budget.

On new build developments, the size of the array will usually be determined by either Part L requirements or local planning conditions. This can lead to complications if the size of the output required is not applied to the available roof space to ensure that the system will physically fit on the roof whilst also considering safe access, shading, and fire breaks between the array and other roof items.

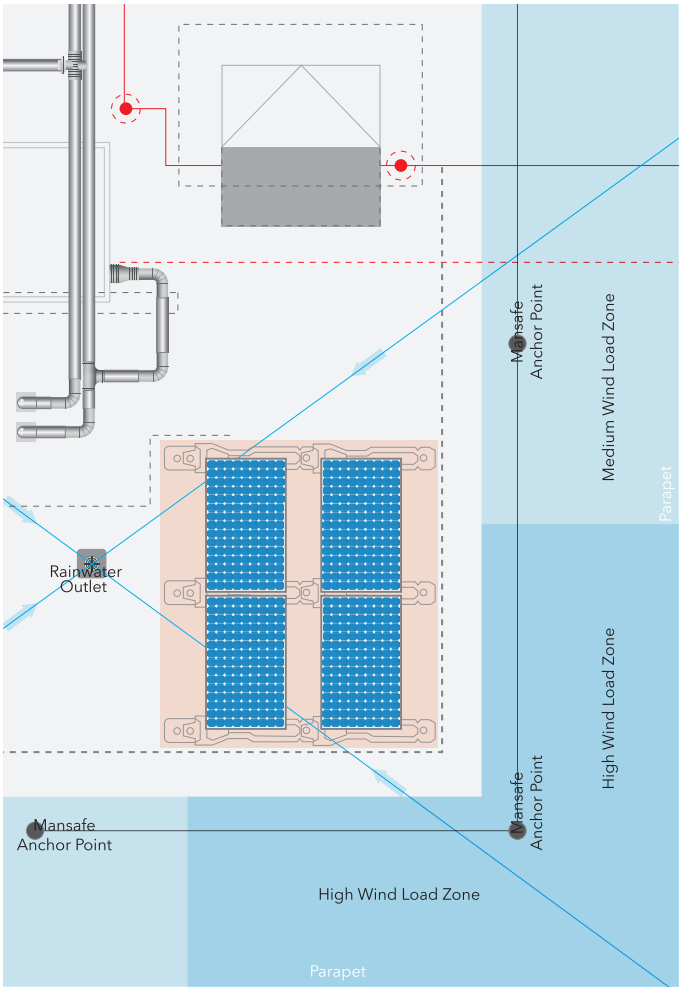
Our photovoltaic solutions are designed for the maximum number of modules to be installed on the identified roof area maximising energy generation from the roof.

Retrofitting PV

Retrofitting photovoltaic panels is possible on many existing buildings and the primary considerations are the additional weight loading, wind uplift factors that the PV array will impose, and what the impact of a retrofitted solar array may have on existing roof warranties.

Durability of the waterproofing system is also a key consideration as its remaining lifespan should, at a minimum, match that of the PV scheme, as well as be able to withstand any additional access requirements for maintenance.

The most popular system installed as a retrofit on refurbishment projects is the BauderSOLAR F system.



BauderSOLAR F and BauderSOLAR F XL Systems

Flat roof PV solutions for new build and retrofit projects

The mounting system is secured to the roof using membrane-to-membrane welding techniques on our bituminous and single ply waterproofing systems.

Our BauderSOLAR PV systems deliver technically advanced solutions through design of the mounting system and efficiency of the solar PV modules for both new build and retrofit projects.

The distinctive element of our lightweight PV mounting system is the prefabricated Bauder membrane sleeves which slip over the mounting plates and are welded into position, anchoring the plates to the surface of the Bauder waterproofing system. Once this is completed, the rest of the solar PV installation is simply locked into place without any requirement for tools or sharp fixings.

Plus points

- Penetration and ballast free installation method reduces risk.
- High output to roof space ratio.
- Range of solar PV panels to suit client needs and budget.
- Lightweight system 9-12.5kg/m², depending on the module selected.
- Single source for design of waterproofing and solar PV array with clear accountability.
- Comprehensive range of guarantee packages to fulfil cover requirements for the project (dependant on system/product selection). For more information contact our technical dept for a sample guarantee outlining cover level, terms and conditions.

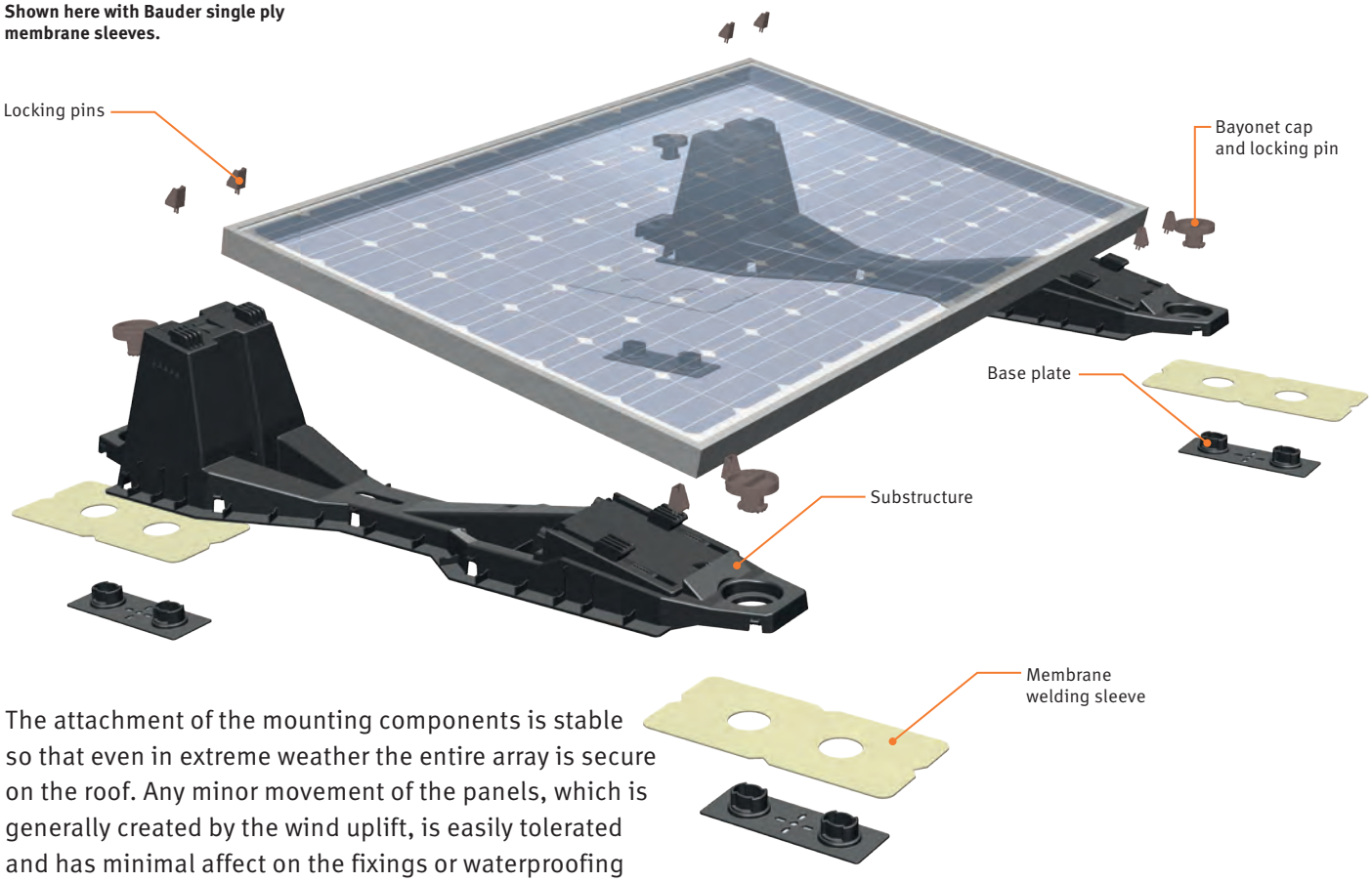
Church Building
Edinburgh

Retail Distribution Centre
Peterborough

Wythenshaw Forum
Manchester

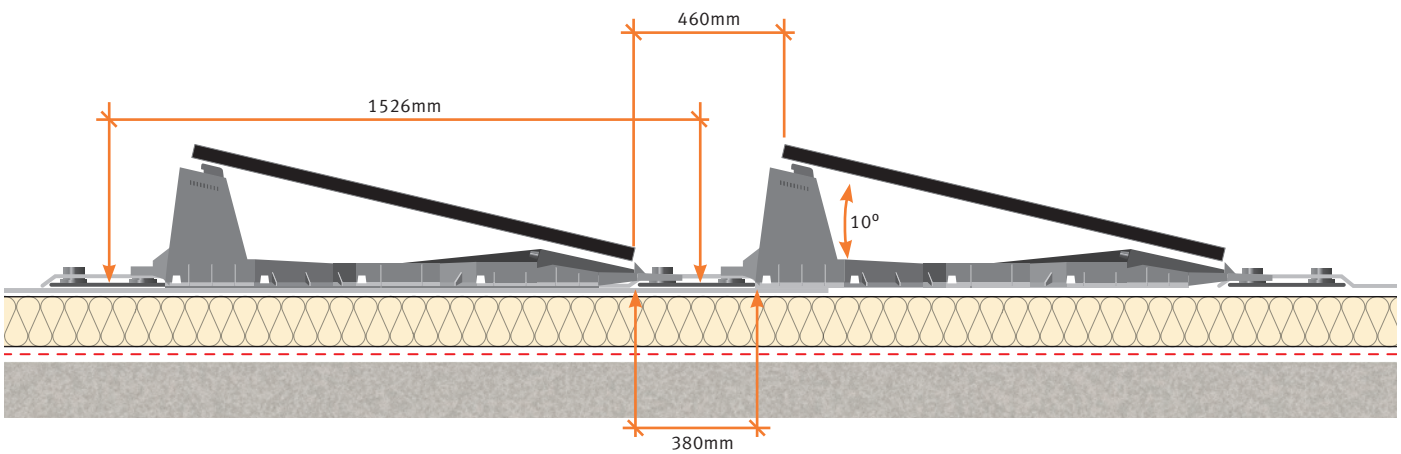
BauderSOLAR F and BauderSOLAR F XL Systems

Shown here with Bauder single ply membrane sleeves.



The attachment of the mounting components is stable so that even in extreme weather the entire array is secure on the roof. Any minor movement of the panels, which is generally created by the wind uplift, is easily tolerated and has minimal affect on the fixings or waterproofing system.

Dimensions shown are for BauderSOLAR F XL mounting system.



BauderSOLAR G LIGHT System

Biosolar PV solution for green roofs with substrate based biodiverse and extensive vegetation

This is a unified solution for mounting solar PV arrays where the substrate and biodiverse vegetation provide the ballast to secure the array for new build and retrofit projects.

BauderSOLAR G LIGHT system brings together net zero and environmental advantages to allow the entire roof area to qualify as a biodiverse green roof to meet planning, biodiversity net gain, and BREEAM requirements. Additionally, the biosolar system can increase the efficiency of the array because the vegetation preserves ambient rooftop temperatures, helping to keep solar modules closer to optimal output.

Supporting flora and fauna

The panels create a mixture of sunny, shaded, and sheltered zones to give a matrix of different habitats for a broader range of vegetation whilst also providing refuge areas for small invertebrates from inclement weather.

Undulations in the substrate can be created to further enhance the diversity of flowering plants that then provides a rich foraging environment for bees and insects.

The substrate can be vegetated in several ways or combinations of planting schemes can be specified to create a variety of finishes. The BauderFLORA 3 seed mix is a specific blend of low growing and shade tolerant native plants; plug plants can be used where specific species are required; and vegetation blankets provide instant coverage between the panels and stabilisation of the substrate in exposed locations.

Plus points

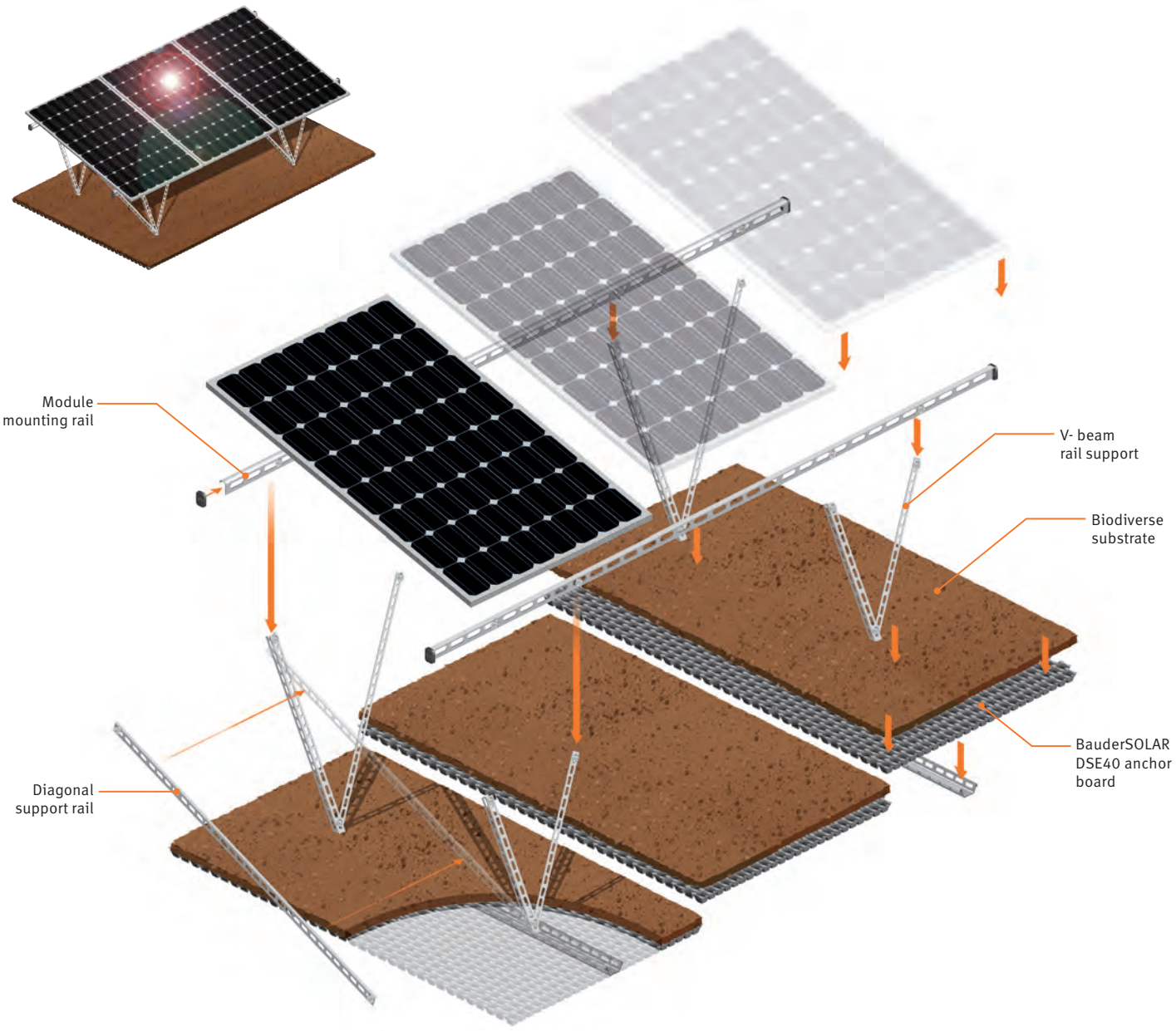
- Raised modules allow light and moisture under the panels and the creation of a variety of habitats supporting a greater range of plant species and small invertebrates.
- Single point responsibility for the waterproofing, green roof and PV installation.
- Comprehensive range of guarantee packages to fulfil cover requirements for the project (dependant on system/product selection). For more information contact our technical dept for a sample guarantee outlining cover level, terms and conditions.

Clapham Park

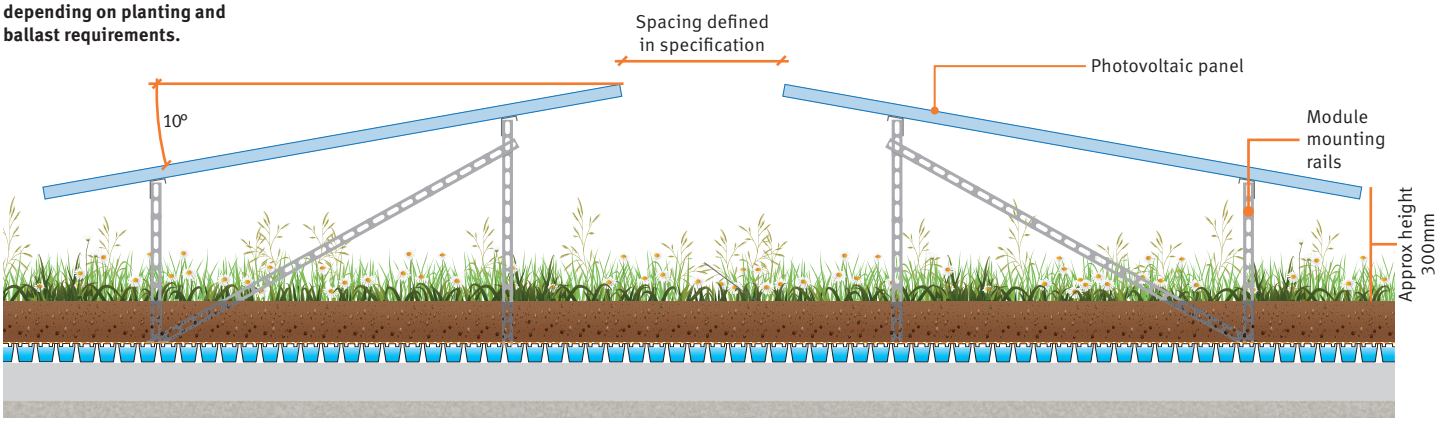
Portsmouth University

The Catalyst, National Innovation Centre Newcastle

BauderSOLAR G LIGHT System



Substrate depth variable depending on planting and ballast requirements.



BauderSOLAR G LIGHT with a Blue Roof Solution

Incorporating a rooftop SuDS to attenuate stormwater on a flat roof for up to a 48 hour period

Integrating the BauderBLUE STORMcell system where heavy rainfall drains into the attenuating cavity forming layers that is then restricted at the outlet to meet defined discharge rates for the site.

The BauderSOLAR G LIGHT is combined with the BauderBLUE STORMcell blue roof system that creates a void space beneath the green roof components and uses the BauderBLUE ST adjustable outlet flow restrictor to limit rainwater leaving the roof via the drainage system.

The BauderGREEN RWR 100 creates the void space and is manufactured to achieve >95% cavity. The green roof components installed atop the RWR 100 also contribute to water storage for SuDS and support the vegetation.

Plus points

- Maximises environmental opportunities for the flat roof.
- Attenuates precise volumes of rainwater.
- Depth of substrate to meet needs of the vegetation.
- Full design support and blue roof calculations to meet discharge rates for the site.
- Comprehensive range of guarantee packages to suit project and cover requirements and comply with client's insurance company requirement.

Vegeatation options

- BauderGREEN WB native species wildflower blanket.
- BauderGREEN Plugs.
- BauderGREEN Flora 3 biosolar and shade tolerant seed mix.

BauderBLUE ST adjustable blue roof outlet flow restrictor

Department of Engineering
Cambridge University

BUILDING BOARD

Roof Size:	1,610m²
Waterproofing:	Bauder Total Green Roof System
Specifier:	R H Partnership Architects
Main Contractor:	SDC Limited
Approved Contractor:	Voland Roofing

Waterproofing the Roof for the PV Array

Ensuring the PV array is secure and the building is watertight

The waterproofing system is a key element in the success of the solar PV array and specific systems from our portfolio are suited to the different solar solutions.

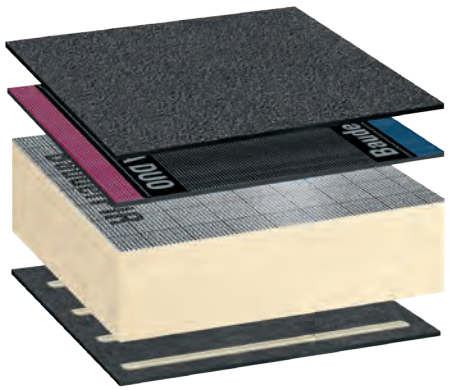
Your area technical manager will work with you to select the right Bauder waterproofing system for the type of solar PV system being specified on each roof area.

When the BauderSOLAR G LIGHT system is specified, a root resistant cap sheet is used.

Reinforced bitumen membrane systems

Noted for their lifespan and ability to sustain foot traffic as well as loads associated with the installation and maintenance of a solar, biosolar green, or blue roof.

- BauderSOLAR F
- BauderSOLAR F XL
- BauderSOLAR G LIGHT
- BauderSOLAR G LIGHT with BauderBLUE STORMcell

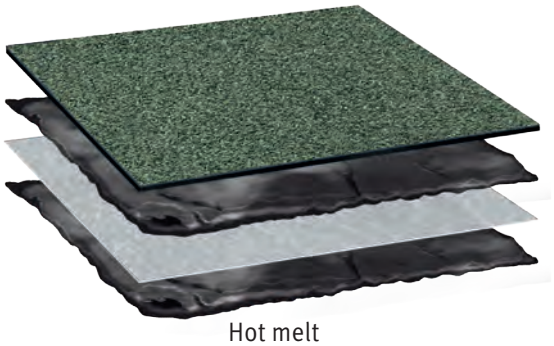


Reinforced bitumen membrane system

Hot melt structural waterproofing

Cost-effective waterproofing specified primarily for new build construction of protected, inverted, or buried roofs such podiums and plazas.

- BauderSOLAR G LIGHT
- BauderSOLAR G LIGHT with BauderBLUE STORMcell



Hot melt

Single ply system

Lightweight and advantageous if the project has load bearing considerations.

- BauderSOLAR F
- BauderSOLAR F XL

Single ply system

Technical Support Service for Roofs with a Solar PV System

Supporting you in the design of a PV solution to meet project requirements and budget

Our technical managers are based nationwide and play a vital role in the success of every project from conceptual stage through to hand-over and sign-off of the Bauder installation.

We assist you with the design of the detailing, writing the specification for the flat roof solution, and recommend suitable approved contractors to tender for the project. The service is without charge, and we work with you to ensure your roof specification meets all your needs.

Working with you to understand

- Drivers for solar PV installation.
- Building's energy consumption.
- Useable non-shaded roof space.
- Budget.
- Waterproofing system requirements.
- Funding opportunities available.
- Meeting any planning constraints.
- Energy generation requirements.

Our service to you delivers

- Detailed PV specification package.
- Proposed waterproofing system.
- Array layout roof plan.
- Number of panels and orientation.
- System output.
- Carbon savings.
- Wind load calculations.
- Electrical design and inverter sizing.
- Budget costing.
- Green or blue roof integration and vegetation scheme for BauderSOLAR G LIGHT system.
- Comprehensive range of guarantee packages to suit project and cover requirements.

Our installations

Bauder approved contractors deliver the installation of our roofing systems and they receive the support and expert advice they need to ensure a high-quality roof solution.

Once your roofing works commence, our experienced team of site technicians will monitor and inspect the workmanship to ensure that our standards are fulfilled.

Project Studies

Sybil Andrews Academy, Suffolk

BauderSOLAR F

Sybil Andrews Academy was designed so that the building can be adapted as the Academy grows. Working closely with the architect and the client, Bauder developed a bespoke specification package to maximise the solar output from the available roof space and satisfy all relevant local planning conditions.

BUILDING BOARD	
Roof Size:	5,000m²
PV Scheme:	313 modules; 74.32 MWh
Client:	Suffolk County Council
Specifier:	Concertus Design and Property Consultants Ap-
proved Contractor:	GRM Roofing
PV Installer:	Chelsfield Solar

Advocacy

Paul Denton, Concertus Design and Property Consultants: *"Bauder's comprehensive system portfolio of waterproofing and solar solutions made the specifications straight forward as we were able to select an integrated solution delivered from a single source supplier."*

System summary

Solar PV	BauderSOLAR F
Waterproofing	Bauderflex RBM system

University of West England, Bristol

BauderSOLAR F

UWE quadrupled its solar generating capacity through the installation of 1,731 solar panels during roof refurbishment, enabling it to produce over 400 MWh of electricity each year and making it the largest solar panel array in the UK university sector.

BUILDING BOARD	
Roof Size:	12,000m²
PV Scheme:	1,713 modules; 402 MWh
Client:	University of West England
Specifier:	Parsons Brinckerhoff
Approved Contractor:	Mitie Tilley Roofing
PV Installer:	Dulas

Advocacy

Fabia Jeddere-Fisher, Energy Engineer at UWE: *"The system we chose means the panels are welded into place, reducing load, and the need for roof penetrations and thereby risk of leaks. The University will use 100% of the power generated. As a large organisation we want to set an example for others to undertake similar projects."*

System summary

Solar PV	BauderSOLAR F
Waterproofing	Bauder Thermofol System

Project Study

Department of Engineering, Cambridge University

BauderSOLAR G LIGHT with BauderBLUE STORMcell

This new build project in the centre of Cambridge combines a Sustainable urban Drainage Solution (SuDS) with vegetation and renewable energy in a warm roof construction.

Synposis

The client identified sustainability as being a key driver in the design of the roof, and also sought a single source supplier that could provide a guarantee for both workmanship and products. The Bauder team created the solution bringing together the entire roof requirement for a single guarantee.

The challenge

The roof deck was constructed using a pretensioned concrete plank roof structure. Due to the large span of these planks, the dead load weight to the roof was restricted requiring a measured approach to the design of the solar PV, green and blue roof.

To achieve the flat deck, with no backfalls, the final deflection of the fully loaded roof was calculated and the concrete deck was screeded to give a flat finish.

System summary

Solar PV	BauderSOLAR G LIGHT
Waterproofing	Bauder Total Green Roof System
Green roof	Bauder biodiverse substrate with native species
Blue roof	BauderBLUE STORMcell

Highlights

- Deck deflection calculated and screed finish ensured compliance to BS 6229:2018.
- Warm roof construction with 160mm BauderPIR FA-TE insulation.
- Unified approach to the design of the solution.
- Full Bauder support for technical advice, design, installation monitoring and inspections.

BUILDING BOARD	
Roof Size:	1,610m²
PV Scheme:	40 modules; 9.91MWh
Specifier:	RH Partnership Architects
Approved Contractor:	Voland Roofing
Main Contractor:	SDC Limited
PV Installer:	Voland Limited

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Respecting the planet

Reducing use of materials

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