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Our Sustainable Practices

We are committed to reducing the impact our business and manufacturing operations have on society and the environment.

MANAGING OUR IMPACTS

Protecting the future

The Bauder group is totally committed to reducing the impact our business has on the environment. Our goal is to ensure we pass to future generations an intact ecological, social and economic company.

Manufacturing

As a company, we aim to manufacture the highest quality flat roof systems, which offer the longest service life possible to provide lower whole life costs. By continually focusing on improving manufacturing processes for all of our products, we are able to further reduce raw material usage, waste, and emissions. For example, across our manufacturing factories we utilise shredders to recycle any membrane offcuts and waste back into production.

Operation of Our Production Plants

Our manufacturing plants use closed rotation cooling systems which dramatically reduce water consumption and avoid environmental pollution.

Over a five-year period we have successfully reduced the energy consumption for the manufacture of PIR insulation by 20% and is a reflection of our ISO 50001 Energy Management accreditation. This is good for the business, good for clients and good for the environment.

Packaging and Site Waste

On site, we work closely with recycling specialists to reduce rubbish going to landfill. The protective paper covers on our membranes are easily recycled, as are the plastic wrappings on the insulation board packs.

The offcuts of membrane during a roof installation are utilised at the detail flashings so that the amount of membrane required for a project is strictly calculated to reduce waste and costs.

As an example, on a large local authority refurbishment scheme we were instrumental in successfully achieving recycling targets by diverting and reducing the volume of waste to landfill by 90%.

PROVING OUR STANDARDS

Recognised commitment to sustainability

As a company we work hard to ensure our systems and products meet the latest criteria and recognise the importance of assisting our customers, specifiers and contractors to achieve their sustainable targets by providing them with informative, honest data that enables them to make an informed choice when selecting our roofing systems.

International Organisation for Standardisation (ISO)

The ISO develop and publish international standards that serve as a benchmark by which to evaluate companies, ensure the safety and quality of products and services, improve the environment in which we live in and facilitate business.

We have the following verified ISO certification:

- **ISO 9001:2015 Quality Management Certificate**
  EN1271 (UK) and 70499/03-15_e (Germany). and FM 86932 for Holt Melt manufacturer.
- **ISO 14001:2015 Environmental Management Certificate** A10552 (UK) and 70499/03-15_d (Germany).
- **ISO 50001: 2011 Energy Management Certificate**
  70499/03-15_c (Germany).

Environmental Product Declaration (EPD)

This certification is based on ISO 14025 and EN 15804 and is a global programme for verifying and registering comparable information about the life-cycle environmental impact of a product.

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

We have EPD certificates covering:

- **Bitumen Membranes**
  S-P-00414
- **Thermofol PVC Membranes**
  EPD-BAU-20130188-IBCC-EN
- **Thermoplan FPO Membranes**
  EPD-BAU-20130189-IBCC-EN
- **LiquiTEC Products**
  EPD-DBC-20130101-IBE1-EN
- **PU Insulation - Mineral Fleece Facing**
  EPD-IVP-20140206-IBE1-EN
- **PU Insulation - Aluminium Facing**
  EPD-IVP-20140207-IBE1-EN

Green Roof Benchmarks

We are a founder member of the Green Roof Organisation (GRO). The GRO Guidelines, which refer back to the original German association The Landscaping and Landscape Development Research Society e.V. (FLL), recommends levels of performance, longevity of components and technical design criteria.

Our membership of the International Green Roof Association (IGRA) sees us supporting and promoting ecological green roofs in the UK and Ireland through the exchange of ideas and technologies.

Royal Horticultural Society (RHS) – Perfect for Pollinators and Flora Locale

The United Kingdom's wild bees and other pollinators are considered to be in decline. By planting nectar and pollen rich flowers over a long season, this trend can be reduced. The plant varieties within our Flora Seed Mixes for substrate green roofs have been specially selected and blended to give a high diversity of wildflowers included in the RHS Perfect for Pollinators list to provide a rich habitat for priority pollinators, larval food plants for butterflies and seed sources for birds.

Flora Locale

In addition to our seed mixes being perfect for pollinators, the mixes and wildflower blankets have native British provenance for perennial wildflowers, annuals and grasses to meet BREEAM and Biodiversity Action Plan (BAP) requirements.

Buglife

Buglife is the only organisation in Europe devoted to the conservation of all invertebrates. We work with Buglife to advance biodiversity standards on green roofs through the development of design criteria for biodiverse green roofs. Our systems are the only roofs endorsed by Buglife.

REDUCE, REUSE, RECYCLE, RECLAIM

Using recyclate in the manufacture of our products

Recycled Content in Our Products

Working closely with our suppliers and using data from extensive research, we have steadily increased the recycled content of many of our products without detrimental effect on their durability, performance or longevity of service. Our principles are to focus on life cycle and deliver systems with extended life expectancies rather than compromising on quality by producing lower grade membranes that would consequently require replacement sooner.

Bitumen Membrane Waterproofing

Our manufacturing processes include returning any offcut waste back into production so that bituminous waste is kept to a minimum.

The reinforcement fleece within our bitumen membrane and cap sheets is made from 250g/m^2 recycled spunbond polyester for high tensile strength.

Single Ply Waterproofing

Currently, the production of our single ply membranes includes recyclate to the base layer.

Hot Melt Waterproofing

This system has recycled content incorporating post-consumer recycled rubber.

Green Roof Build Up Components

Many recycled or waste materials are used within our green roof components to enable us to provide environmental solutions to the industry.

Water Retention and Drainage Layers - Our DSE 20, 40 and 60 boards all utilise 100% recycled high density polyethylene moulded to create the cupped profile boards that provide water retention and multi-directional drainage.

Our Attenuation Cell 100 board is manufactured from recycled PolyPropylene.

Protection Layers - Our FSM 600 and 1100 are made from a mixture of recycled reground polyester and polypropylene fibre, which are combined before being mechanically and thermally solidified to create a layer to prevent mechanical damage to the waterproofing.

ProMat for intensive green roofs is made of granulate from recycled shredded tyres reformed and bound by Polyurethane to give a protective layer against mechanical damage.

Ecomat is a protective layer created from recycled Polyester clothing and fabric.

Substrates and Growing Mediums - Our substrates are based around recycled crushed brick and composted organic material to give growing mediums which balance water storage, structural stability, water permeability and grain size distribution according to the requirements of the planting scheme

Separation and Slip Layer - PE Foil is manufactured from recycled polyethylene granulate.

End-of-Life, Recycling and Upcycling of Our Products

Single Ply Membranes

FPO membrane offcuts can be recycled by returning them to the manufacturing process to be used instead of raw materials. If, however, the membranes have become contaminated by external agents during their serviceable life, then the membranes can be downcycled into other products .

When PVC membranes are upcycled, they can be processed and reintroduced into a manufacturing stream where they are typically converted into other components such as walkway membrane and protection or separation layers for roof systems.

Bitumen Membranes

Recycling end of life bitumen membranes from a roof is a real challenge for all manufacturers because the membranes are made up of different constituents that together create a mixed waste which is currently non-recyclable.

Though energy can be generated through incineration of bitumen membranes at end of life, though the availability of suitable facilities is limited.

Our approach is to overlay an existing roof wherever possible so that the existing system doesn't have to go to landfill. Our moisture mapping technical diagnostic test, pinpoints the presence of dampness within the roof structure to depths of 300mm and is currently the only reliable way to test underlying sections of multiple layer roof systems for trapped water.

The results are delivered as a topographical map which can be analysed to identify precisely which areas of a roof need replacing and which areas are sound enough to install another solution over the top.

Hot Melt Life Cycle

The durability of hot melt waterproofing is such that there is no need to replace the product during the roof's expected life, giving excellent life-cycle costings.

Insulation

Bauder is active within the PU Europe organisation which is the voice of the polyurethane insulation industry contributing to the political and technical decisions in areas such as energy efficiency, sustainable construction, and health and environment.

Alliances with other forward thinking companies has resulted in innovative recycling opportunities, so that our PIR insulation manufacturing facilities readily recycle and upcycle offcuts and fragments for use in hand cleaners as well as for the manufacture of decking boards.

The expanded polystyrene (EPS) scrap from the manufacturing process is reintroduced back into making our EPS insulation boards to keep waste to a minimum. When it is not used to make more EPS, foam scrap can be turned into a variety of products such as clothes hangers, park benches, flower pots, toys, rulers and seedling containers.

Green Roof Components

Our green roof components are themselves made from recycled content and at the end of their life, they too can be returned to their originating recycling process to be converted again into other products and components.

To give an example, our water retention and drainage layers DSE20, DSE40, DSE60 and Attenuation Cell 100 are made from recycled high density polyethylene (HDPE), a plastic polymer with flexible properties, that continues to be commonly recycled or downcycled into other durable plastic products.

Photovoltaic Panels and Components

In Europe, solar panel disposal falls under the European Union's Waste of Electrical and Electronic Equipment (WEEE) directive and is strictly regulated. Our module supply partners are all members of PV Cycle framework which is a not-for-profit association managing a fully operational collection and recycling scheme for end-of-life photovoltaic modules. www.pvcycle.org

BauderSOLAR

The individual components of the BauderSOLAR flat roof system are single-origin and can be individually removed and completely recycled. The main support structure and locking pin are made from plastic category 05 Polypropylene and is widely recycled; with the base plate, bayonet fitting and module clamp all from plastic category 07 Polyamide which is recycled into plastic timber and other custom-made products.

Bauder BioSOLAR

The mounting boards for the BioSOLAR system that provides the water retention and drainage layer for the vegetation beneath the array are made from HDPE which is widely recycled.

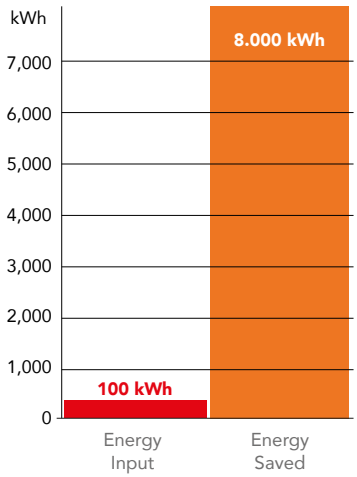
The support system for the Bauder BioSOLAR system is made from aluminium; the arms, support rails and clamps can be recycled by melting down and reforming the metal without losing quality.

SAVING ENERGY

Reducing the environmental impact of a building

Effective Roof Insulation

It has long been recognised that the insulation of a building is essential to improve thermal performance and reduce the carbon emissions associated with heating buildings, in addition this improves quality of life and increases productivity through better working conditions.



Energy profile for 1m² of BauderPIR FA 80mm foil-faced board after 50 year life span

The embodied energy of our rigid polyurethane PIR insulation accounts for as little as 4% of the energy the board can save during its serviceable life. With buildings accounting for 50% of the energy consumption in Europe, the inclusion of insulation when installing new or refurbished roofs plays a significant part in reducing CO_2 emissions.

Designing Insulation Schemes

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

Upgrading Insulation on Current Roofs

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

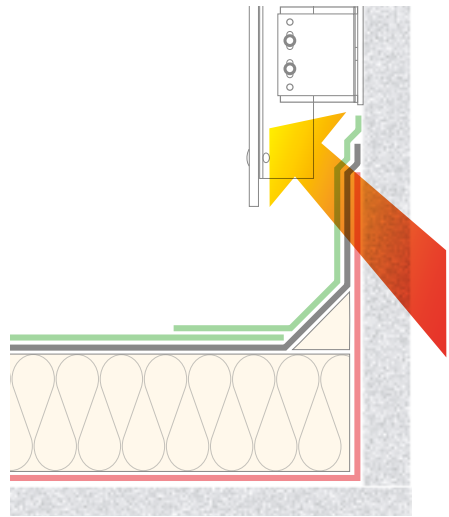
Building Research Establishment (BRE) Study on Roof Design and Detailing

The BRE has researched energy loss through air leakage and cold bridging at penetrations and junctions on roofs and estimates that 30% plus of all energy loss in a building occurs at these points.

Cold Bridging

A cold bridge, also called a thermal bridge, is an area of a building construction, which has a significantly higher heat transfer than the surrounding materials resulting in additional heat loss. This is typically where there is either a break in the insulation, less insulation or when the insulation is penetrated by an element with a higher thermal conductivity.

To eliminate cold bridging on a flat roof, our detail design focuses on identifying areas where heat transfer, and hence adverse heat loss, could occur. On warm roofs, upstands and parapets are insulated to a minimum height of 300mm above the deck. Additionally, our portfolio of accessories allows us to recommend and specify insulated outlets and soil vent pipes as well as using thermally broken fasteners in our mechanically fixed waterproofing systems.



Cold Bridging
Risk of cold bridging due to absence of upstand insulation

Air Leakage

Uncontrolled infiltration of air is generally considered undesirable, except for ventilation purposes, as it reduces the thermal efficiency of a building and therefore generally increases energy consumption. For all buildings, infiltration can be reduced via sealing cracks in a building's envelope, and for new construction or major renovations, by installing continuous air retarders.

To counteract air leakage, our roofs are detailed and installed to minimise air permeability, and therefore heat loss, by ensuring the correct sealing of membranes to all rooftop details.

BUILDING FOR THE FUTURE

Sustainable solutions for successful planning

Meeting Planning, the Merton Rule and Delivering Low or Zero Carbon (LZC) Technologies

The Merton Rule was a pioneering planning policy, developed by Merton Council, which at the time asked new commercial developments over 1000m^2 to generate at least 10% of their energy needs from site sourced renewable energy, in order to help reduce annual carbon dioxide (CO_2) emissions in the built environment. Merton Council established the rule and adopted it in 2003.

In 2008, the Government published its central planning guidance Planning Policy Statement – Planning and Climate Change – PPS1 that requires all UK local planning authorities to adopt a 'Merton Rule' policy and more specifically within PPS22 – Renewable Energy which planning authorities should have regard to when preparing local development documents and when taking planning decisions.

To date, the vast majority of councils have embraced the Merton Rule adopting pro-renewables planning policies within Unitary Development Plans (UDP) or Supplementary Planning Documents.

In Scotland, the Government has set clear targets for renewable electricity with the First Minister wanting renewable sources to generate the equivalent of 100% of Scotland's gross annual electricity consumption by 2020.

In addition to these planning resolutions, BREEAM requirements for buildings often call for site sourced renewables with a minimum of 30% CO_2 reduction from site based renewables required to achieve maximum credits.

With this background, all building designers, constructors and developers need to consider the options for on-site renewable energy and satisfying these obligations is frequently a driver for including a photovoltaic array on a roof. A flat roof being the ideal location for unobtrusive energy generation.

Our Solar PV solutions deliver these obligations on flat roofs without any penetrations of the waterproofing system to safeguard the integrity of the building. See chapter 10 for more detailed information.

Uniting the Challenges

The real challenge arises when a planning pre-requisite is placed on urban development to combine both a green roof and a renewable energy system and how to locate both within the same, and often size limited, roof area. A feasible solution is to layer the green roof and PV array with our BioSOLAR solution which means the systems can co-habit the same area where they mutually benefit each other. The advantage of this solution is that the entire roof area qualifies as a green roof, and if a biodiversity vegetation finish is chosen, this can further enhance the BREEAM credit rating for the roof element.

The distinctiveness of the system is in the design of the mounting system whereby the substrate and vegetation provide the ballasted installation mechanism to secure the array to the roof.

Synergy

The BioSOLAR system also has the advantage of increasing the efficiency of the solar array because the vegetation preserves ambient rooftop temperatures, keeping the PV modules at optimal output and increasing energy yields by 5% - 7%.