Icopal Green Roof Systems

Waterproofing & Living Roof Solutions

Proven Experience | Technical Expertise | Waterproofing Solutions | Exceptional Performance | Quality

Canon Burrows Primary School
Ashton-under-Lyne

Why Choose An Icopal **Green Roof**

As the global leader in roof waterproofing systems, Icopal offers comprehensive beginning-to-end project support to provide the strongest possible foundation for every green roof project. Icopal is dedicated to providing the right balance of system performance, reliability and cost to help you meet the challenge of delivering best value.

The Strength of a Global Partner

Icopal builds its position on 160 years of experience in roofing and waterproofing. This demonstrates our commitment to provide waterproofing and green roof systems which can fully satisfy your project requirements.

Single Source Responsibility

Icopal as a single source provider eliminates the significant risk of problems occuring over liability should faults occur in the waterproofing integrity. Our multi-product portfolio includes reinforced bitumen systems, single ply and solvent free liquid applied waterproofing which allows us to specify without any bias the correct solution for the roof in question.

Commitment to Sustainability

As a company, Icopal is proud of its strong environmental credentials, actively promoting the recycling of its products whenever possible, in order to minimise the use of raw materials and energy in the development and production of roofing and waterproofing solutions.

This means that many of our products already meet and often exceed environmental standards, and are already recognised by many of the industry bodies promoting excellence in this field.

Technical Expertise

The financial implication of inappropriate design, poor recommendation or sub-standard product and workmanship can be considerable and can impact on the long term performance of the building. The Icopal approach to any roof is well proven over many thousands of succesful projects and ensures success from the initial survey and consulation to the guarantee sign off.

ISO 14001 ISO 9001

Environmental Consideration

Icopal high performance green roof systems are designed to deliver sustainable and environmentally considerate solutions which can provide a wide array of benefits such as air quality, health and wellbeing.

Icopal is a Technical Advisor to the Green Roof Code.

The Green Roof Code is intended to be recognised as a code of best practice and as such it should be used to guide behaviour relating to green roof design, specification, installation and maintenance.

This code has been developed in partnership with national and European experts, including The Green Roof Centre at the University of Sheffield, Livingroofs.org, GRO (Green Roof Organisation) members, the Environment Agency and Homes and Communities Agency.

MoHo Apartments
Manchester

Culloden Battlefield Visitor Centre
Culloden, Inverness

Benefits of a Green Roof

Green roofs offer many advantages for building developers, owners and their users. They benefit the wider environment through their positive impact on sustainability, biodiversity and the attenuation of storm water. They create visual enhancement of the landscape and fully exploit the spatial opportunities for visual and recreational benefit with the possibility of planning gain.

- Improved air quality
- Roof membrane protection
- Wildlife habitats
- Aesthetics
- Improved temperature regulation
- Reduced stormwater run-off
- Reduced energy costs

Residential Apartments
Southwark, London

Improved Air Quality

Green roof planting will improve air quality by absorbing atmospheric carbon dioxide and releasing oxygen. Airborne particulate pollutants are washed into green roof substrates via rainfall where they are filtered out. Plants and their growing substrate release water vapour so humidifying the air.

Roof Membrane Protection

Vegetation on a roof deck protects the roof surface from the extremes of weather, temperature and ultra-violet radiation, prolonging its life.

Cley Marshes Visitor Centre
Cley, Norfolk

Wildlife Habitats

Rooftop habitats can provide a 'green link' connecting natural pockets of habitat with each other. They can also provide isolated habitats, which aren't disturbed by other green areas at ground level. In Germany it has been shown that green roofs can harbour 10 – 40 different insect species and have been found to support nesting birds.

Aesthetics

Urban greening has, for a long time, been seen as a way to make towns and cities look more pleasing to the eye, and be of great value to the well being of building users.

Improved Temperature Regulation

In the process of evapotranspiration, plants use heat energy from their surroundings when evaporating water. Through the daily cycles of condensation and evaporation, plants are able to cool and humidify the surrounding air improving the microclimate.

Reduced Stormwater Run-Off

Water is stored by the green roof substrate and then taken up by the plants from where it is returned through transpiration and evaporation into the atmosphere. In summer, green roofs can retain 70 – 80% of the precipitation that falls on them; in winter they can retain 25 – 40%.

Green roofs also delay the time at which run-off occurs, resulting in decreased stress on drains and sewers at peak flow periods.

Reduced Energy Costs

The layers of a green roof system are able to improve the thermal performance of the roof, thereby reducing solar heat ingress into the building below. Rooms under a green roof can be at least 3 – 4 °C cooler than the air outside when temperatures range between 25 – 30 °C, therefore reducing the costs to condition the air temperature within the building. In winter the green roof can also help reduce heat loss through the roof.

The popularity of green roofs within the built environment has increased dramatically over recent years, with their inclusion in both urban and rural projects now being mainstream. Although the basic categories of green roofs have remained un-changed over the years, the development of different types of systems and the plant species within them has progressed as more experience has been gained.

Types of Green Roof

There are a number of different types of garden roof, defined by the way they are used. The basic types of green roof fit into either extensive or intensive categories, but there are also those which are a hybrid of both - these types of systems could be termed semi-extensive or semi-intensive.

MoHo Apartments
Manchester

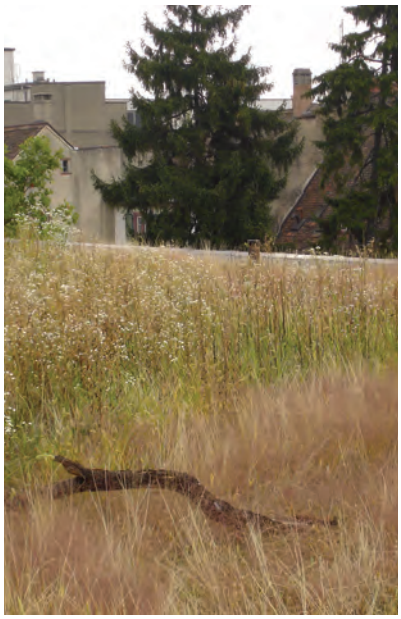
Intensive Systems

These systems are designed to be used as recreational spaces and often involve many features similar to traditional ground level gardens which can include paving, water features, lawns, shrubs and trees. These intensive 'roof gardens' are soil based multi layered systems and are so called because they are labour-intensive; requiring higher levels of irrigation, feeding, and other maintenance compared to their extensive counterparts.

Sedum Roof
Ebford House, Exeter

Extensive Systems

Extensive green roof systems are generally intended to be viewed from another location as a decorative/ ecological feature. They are not normally used as a recreational space to be walked through or sat in and often have limited access used for maintenance only.



Due to the shallower substrate depths of extensive systems, the plant choices are more restricted to drought tolerant species such as sedums, grasses, wildflowers and mosses.

- **Extensive Sedum Roofs**

The sedum family of flowering plants is large and widespread throughout the Northern Hemisphere, varying from annual and creeping herbs to shrubs. They are succulents and therefore have leaves which are able to store water.

- **Extensive Biodiverse/Meadow Roofs**

Biodiverse and meadow roofs are intended to generally provide a habitat to create a wider diversity of flora and fauna compared to a traditional sedum green roof. They are often designed to either recreate or even improve the habitat that was lost when the building was erected. These types of roofs can be constructed to provide the right conditions for specific plants which in turn support other insect and bird species. Often wildflowers, grasses and sedums are the main species of vegetation designed to thrive within such systems.

Green roof systems can be established in a number of different ways which generally relate to budget, logistics and aesthetics:

- Vegetation Mats – Pre-grown vegetation mats which are laid onto the surface of the substrate are an ideal way to create a green roof that provides instant impact. This method of establishment is very common with extensive sedum and meadow systems. Of course, installing a pre-grown lawn turf is also a common method of creating an intensive recreational area.

- Plug Plants - This method uses individually planted plug plants allowing a greater flexibility in the choice of species for the green roof, and is generally more cost effective compared to using vegetation mats. However, the establishment time to get full ground cover is longer (2-3 years).

- Seed – Mixed seeds can be sown over the top of the installed substrate to create the habitat of choice. Although very cost effective, it takes several years for the vegetation to establish, therefore the combination of seed with plug planting is often used to speed up colonisation of the green roof.

Brewery Wharf
Leeds

Design Considerations For A Successful Green Roof

For a green roof to flourish it requires suitable amounts of sunlight, water, sufficient drainage and aeration to encourage healthy plant growth. To deliver a successful green roof the designer must consider the building's position and location, along with the orientation of the roof during the day and any shade from surrounding buildings. The roof's height can have an affect due to wind action, and can cause wind scour of the substrate. Pebble borders are generally used to avoid this.

The additional weight loading from a green roof is a major factor to consider as the structure must have sufficient load bearing capacity to support a water saturated green roof system. The roof must have sufficient drainage which will help reduce the imposed loads and prevent excessive saturation of the growing substrate which can lead to deterioration of the planting.

A green roof will require regular safe access for maintenance and it is important that adequate fall protection measures are put in place to allow for safe inspection and maintenance of the roof.

The waterproofing system is paramount to the success of the green roof, as it is fundamental to prevent water ingress into the building. Many Icopal waterproofing systems are suitable for use beneath a green roof and it is essential, when designing the roof details, that all adjacent building elements and interfaces are considered.

Green roofs will require water and provision for irrigation should be considered at the planning stage. All Green roofs will require irrigation during the establishment period and so a temporary water source should be provided. Intensive roof planting and lawns will require a permanent irrigation system to keep them supplied with water during hotter, drier, summer months. Extensive roofs will only need irrigating during the establishment phase, and very little subsequently except during longer periods of drought. Pitched roofs retain less water and therefore a permanent irrigation system should be considered.

Comparison

The table opposite provides a comparison of some of the differences between extensive and intensive green roof systems.

	Intensive Systems	Extensive Systems
		
Usage	Generally as a recreation space.	Generally for visual / environmental /biodiversity.
Landscaping	Trees, shrubs, lawn turf, hard landscaping.	Sedums, wildflowers, grasses, mosses.
Maintenance	Regular maintenance required.	Minimal requirement.
Irrigation	Regular irrigation required. Usually dedicated systems installed.	Only generally required during the establishment phase, or in times of prolonged drought conditions.
Build-Up Depth	Typically around 200 mm - 1.0 m	Typically around 80 - 200 mm
System Weights	Typically 150 - 1000 kg/m^2	Typically 100 - 180 kg/m^2
Roof Slopes	Less suited to sloped roofs.	Suitable for flat or pitched roofs (with suitable retention systems in place).
Water Attenuation	Greater water attenuation due to deeper substrate depths.	Less water attenuation due to shallower substrate depths.

Project : Canon Burrows School, Tameside

ICOPAL IS NATURAL CHOICE FOR SCHOOL

Icopal has supplied the roof waterproofing and a green roof system to a new classroom extension at an eco friendly school in Tameside.

Canon Burrows Church of England Primary School is situated in Ashton-under-Lyne, Tameside.
The school has a strong focus on sustainability and commitment to reduce its carbon footprint, and has won the coveted ECO Green Flag award. During a major rebuilding project, the school took the opportunity to boost this commitment by introducing solar panels and a living 'green' roof.

The new green roof was always going to be the centre piece of the new classroom extension block for a school that prides itself on sustainability, and provides an eco-friendly case study for the school children.

CLIENT: Tameside Metropolitan Borough Council.
ARCHITECT: Thorpe Whyman & Briggs.
COMPLETION: 2010.

REINFORCED BITUMEN SYSTEMS

SINGLE-PLY SYSTEMS

HOT-MELT STRUCTURAL WATERPROOFING

COLD APPLIED LIQUID SYSTEMS

The Icopal technically advanced and innovative range of high performance waterproofing systems are ideal for both new build and refurbishment green roof projects. The wide product portfolio offers solutions for flexibility of design with guaranteed quality and long term durability.

Waterproofing Systems

The waterproofing is paramount to the success of a green roof. It has a fundamental requirement to prevent water ingress into a building and resist damage from root penetration. The roofing system also provides thermal performance, roof drainage falls, air tightness and vapour control to the building.

Icopal can provide traditional high performance multi-layer reinforced bitumen roofing to innovative synthetic single layer energy efficient solutions designed for the most complex building forms. Our roofing products combine fully guaranteed membranes manufactured on high performance polyester and glass fibre reinforcements, and can be applied using a variety of techniques.

Icopal's experience in waterproofing technology allows us to deliver the correct specification of roof membrane and system to suit the criteria of the green roof project based on the choice of landscaping, performance and robustness required.

Reinforced Bitumen Membranes

A multi-layer elastomeric Reinforced Bitumen Membrane (RBM) system incorporating the Rootbar Capsheet provides a high performance and extremely robust waterproofing system suitable for use under a wide range of green roof systems.

Single Ply Membranes

Sureplan FPO and Monarplan PVC single ply membranes provide a lightweight high performance waterproofing option. The nature of single-ply membranes makes them more suited to extensive roof systems. Green roof waterproofing systems using Icopal Universal WS combine the benefits of a single layer membrane with the robustness of a bitumen membrane.

Liquid Applied Roofing

Elastoflex cold applied liquid waterproofing offers environmentally considerate and flexible solutions to previously frustrating and difficult waterproofing problems.

Hot Melt Structural Waterproofing

The Parabit Hot Melt Structural Waterproofing System offers a seamless highly elastomeric bitumen waterproofing option ideally suited beneath large area intensive roof systems and podium decks.

Icopal Guarantees

As a world leader in the manufacture of waterproofing membranes, we pride ourselves on offering the most comprehensive guarantees available in the flat roof industry, giving further reassurance of our commitment in providing total confidence in our range of high performance waterproofing membranes.

Icopal guarantees incorporate a range of features and benefits tailored to suit the client's specific requirements including materials, insurance backing, design, consequential damage and approved installation. All guarantees offer up to 20 years as standard, subject to specification.

Approved Contractors

Installation of the Icopal Green Roof System is carried out exclusively by a network of trained and approved contractors who can demonstrate excellence in all aspects of roofing and landscaping.

Using an Icopal Approved Contractor ensures quality right from the start giving you access to a wealth of experience and technical skill protecting your investment with unrivalled guarantees.

Cannon Place
City of London

An **Innovative** technique for **Protecting** your **Investment**

THE ROOF IS ONE OF YOUR MOST VALUABLE ASSETS – PROTECT IT !

DON'T LEAVE THE SECURITY OF YOUR ROOFING SYSTEM TO CHANCE

The fifth façade is often out of sight and out of mind until something goes wrong. The results can be catastrophic not only for internal occupants and valuable contents but for the building owner who will carry the weight of an expensive repair or roof replacement well before it's necessary.

LEAK DETECTION TAKES A GIANT STEP FORWARD

Integrating the latest leak detection technology within your high performance Icopal roofing system ensures that you maximise your investment preventing premature roof replacement, minimises risk and cost reduces not only internal damage but the expensive removal of roof surfacing, such as Green Roofs and roof ballast from the disruptive nature of finding a roof leak.

DON'T LET YOUR MAJOR ASSET JUST LEAK AWAY

The roof is one of your most valuable assets and should be protected. Even the smallest undetected penetration or damage can ruin an otherwise excellent roofing system resulting in unwanted replacement and extensive costs. The inclusion of Icopal's Roof Protect System can significantly reduce the risk of extensive damage from undiagnosed roof leaks.

MINIMUM INPUT = MAXIMUM OUTPUT

Icopal Roof Protect™ is economical and easily installed by the Roofing Contractor as part of the waterproofing system.

The benefits are exceptional. Finding a leak by conventional methods can be a hit-or-miss process, relying in many cases on waiting for moisture to penetrate completely through the roofing system to find an earth; usually the roof deck. By this time extensive amounts of water could have entered the roofing system and the building. Even worse water could reside undetected within the roofing system insulation layer causing long term issues like reduction in thermal performance, along with mold and mildew.

TRUE ASSET MANAGEMENT TOOL

Once installed, Icopal Roof Protect™ is there for the life of the roof and provides a sustainable, non-destructive asset management tool which can be used as part of a pro-active maintenance program to regularly test the integrity of the roof well beyond expectation, saving repair cost and extending the life of the roof.

PINPOINT LEAK DETECTION ACCURACY

Icopal Roof Protect™ can pinpoint a roofing membrane defect within a 100 sq.mm using ILD's Electric Field Vector Mapping (EFVM®) technology fully integrated within the high performance Icopal roof waterproofing system. Defects can be detected, repaired and retested within the same day without major disruption and cost.

Further Information

For full information on Icopal Roof Protect™ please see the separate system brochure. This, along with further information on our green roof and waterproofing systems, as well as other Icopal products, is available from our website at

www.icopal.co.uk

PREVENTION IS BETTER THAN CURE

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