Wallbarn

GREEN ROOFS

Featuring our unique M-Tray® modular system

wallbarn.com

BENEFITS OF GREEN ROOFS

Green roofs bring nature back into urban spaces. They improve air quality, aesthetics, help prevent flash flooding and encourage wildflife while mitigating the impact of humidity on the climate.

Green roofs are very adaptable and can be designed for large or small areas on many different structural decks.

IMPROVING THE ENVIRONMENT

- Aesthetically pleasing
- Provides valuable habitat
- Attracts insects, invertebrates and birdlife
- Absorbs CO2, pollution and dust particles
- Helps combat the Urban Heat Island Effect
- Part of SUDs performance

PROTECTING THE WATERPROOFING MEMBRANE

- Extends roof membrane's life by protecting it from pests
- Protects roof membrane from UV and heat degradation
- Provides an attractive alternative to pebbles or concrete slabs for holding down insulation boards or loose laid waterproof systems

RAINWATER ATTENUATION

- Absorbs rainwater into the substrate
- Reduced run-off by up to 50%
- Delays discharge into outlets by up to an hour

ENHANCING INSULATION

- Sound: reduces transmission of noise and vibration
- Thermal: absorbs solar heat and provides cooling

OPTIMISING THE DEVELOPMENT FOOTPRINT

- Softens the building envelope
- Provides additional green space and helps BREEAM ratings
- Brings a feeling of open space to high density environments which can help with planning permission
- Improves financial yield of building

M-TRAY®

MODULAR GREEN ROOF

Wallbarn has developed a modular system which makes installing a green roof incredibly easy with far less disruption to both plants, structure and inhabitants than other methods. The modules simply click together to create a seamless, instant green roof.

All the elements required for a successful green roof have been designed into the M-Tray® modules at our UK nursery to ensure strong, healthy long- lasting vegetation. The trays are grown on site for at least 6 months and all will have been through at least one Spring growing season; so the plants are well established, healthy and strong, and fully integrated into the substrate (unlike sedum blankets, which are not).

CONVENIENCE

Mess and disruption can be a problem with roll- out systems. Bags of aggregate-based substrate can spill easily and being so granular, can damage waterproofing membranes. Sedum blankets are also supplied rolled up so the plants get damaged during the transport and installation process. Our M-Tray® modules overcome all of these issues.

ACCESSIBILITY

As each module is 500 x 500mm, one M-Tray® can be carried by one operative. For areas which are very difficult to access such as single storey extensions, domestic projects and other completed structures where roll-out is simply not possible. M-Tray® can be handballed into even the most awkward areas, even carried through a window if necessary. They are the perfect retro-fit product.

SPEED

It is estimated that our M-Tray® can be installed at least twice as quickly as roll-out systems. A team of contractors can easily install approx. 400 square metres in a day.

INSTANT RESULTS

It is also an instant green roof. Since the plants are less shocked by the installation process, as soon as the trays are connected together the whole area is filled with well established plants. They will continue to mature straight away, forming a seamless layer of vegetation much faster.

FUTURE-PROOF YOUR GREEN ROOF

Access to the roof is futureproofed. If there are problems with the deck beneath or inspection is required, one M-Tray® or section can easily be lifted out without disruption to the whole roof.

‘M-TRAY® - THE PERFECT INGREDIENTS

Wallbarn has designed, developed and produced the M-Tray® module from scratch, creating a product that combines optimum nutrient level and drainage whilst taking into account the practical constraints of construction.

The M-Tray® module is manufactured in England.

MODULE

The current module design is the fourth generation of our green roof system and has the following benefits:

- Each module measures 500 x 500 x 100mm
  - 4 x units make up exactly 1 sqm making estimating far easier
  - 100mm buildup gives sedum more room to develop healthy root growth
- Carefully positioned drainage holes
  - Allow sedum plants to absorb more rainfall, increasing attenuation and delaying discharge into outlets
  - Stronger plant growth at the edges creates a more seamless layer of vegetation when the modules are connected
- Smooth edges
  - The underside has a smooth surface to prevent abrasion with the sub-deck
  - Inset ridges at the discharge points maintain free drainage without clogging
  - The corners of the modules are rounded and smooth, so no sharp edges are present
  - Hand grips on the underside are positioned to enable installers to carry each module easily
- Tight connection
  - The connecting brackets ensure minimum gap between each module

SUBSTRATE

An engineered growing medium is specially mixed by Wallbarn. It is designed to provide a lightweight, free draining mass for green roof plants to root into and grow healthily in the long-term.

Green roof substrates should contain the following criteria:

- Lightweight and free draining;
- Varied particle sizes with resistance to compaction
- Low organic content with balance of nutrients for sustainable & healthy plants long term
- Avoidance of weeds, impurities and contaminants and chemically stable;
- No peat in the mix;
- Adherence to green roof codes, standards and regulations

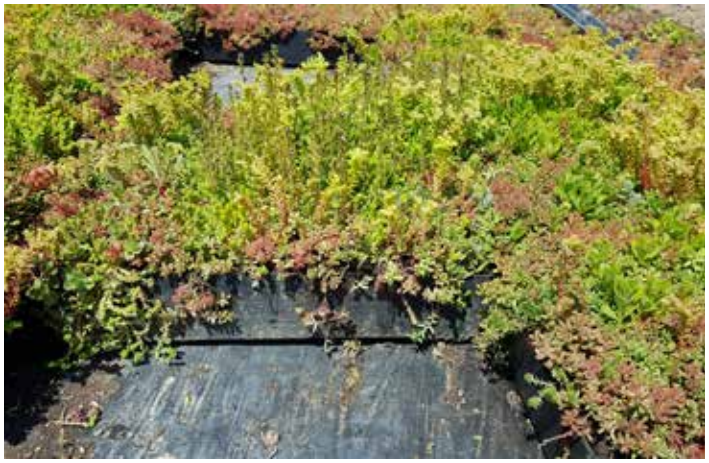
Wallbarn designed and developed its own substrate mix using leading independent soil specialists to create a bespoke recipe which complies to Building Regulations Approved Document B, BS 8616:2019 and the GRO Code.

We use a number of ingredients, including:

- Lightweight, non-organic, mineral aggregate to provide bulk, good drainage and improved rooting conditions.
  - Lytag is a by-product of the power station industry, so waste material is recycled and put “back into the ground”.
  - Leca is lightweight, expanded clay balls. They soak up water and are inert; ideal for gardening and green roofing.
- Coir is recycled coconut husk fibre, used to complement the compost. It is resistant to slumping and holds moisture and has high lignin.
- Recycled organic compost sourced from the local camomile and lavender farms which provides slow release of nutrients and water absorption.

We do not use crushed brick or building rubble. Bricks and rubble often contain contaminants and also crush down into fines which can clog the drainage. They can also form a crust layer within the substrate which creates an impermeable layer, killing the sedum.

Wallbarn does not and has never used peat in our substrate.



SEDUM & WILDFLOWER

All our M-Tray® sedum and wildflower green roof modules are grown from seed. We source only the finest quality seeds from leading horticultural specialists to ensure comprehensive coverage and long-term viability.

We have selected a large selection of different North European sedum species and native British wildflowers suitable for the British climate to bring biodiversity to the roof space.

More details are given on planting schemes overleaf. Please ask us for a current species list.

‘M-TRAY® - PLANT VARIETIES

Our M-Tray® green roof modules are supplied from stock in two standard types: sedum and sedum / wildflower.

SEDUM

Sedum is a stone crop; a low growing, hardy succulent plant found in mountainous regions and areas with poor soils. This means it can cope with inhospitable conditions such as low nutrient levels, high exposure to wind and drought conditions; making it the ideal plant for green roofing.

The sedum genre is incredibly diverse with many different species and a whole host of different heights, leaf structure and growth patterns. Sedums flower, in fact bringing a huge variety of colour throughout the summer and attracting pollinators.

Wallbarn has chosen a selection of 12 species of North European sedum species which we grow from seed. These species were selection to provide a year round comprehensive green cover of thick leaves in different leaf shapes, colour shades and sizes across the roof space. They are perennial and easy to maintain, all being particularly adept at coping with lack of water.

Wallbarn sedum green roofs flower prolifically, with masses of different yellow, pink and white flowers appearing throughout spring, summer and even in autumn; attracting bees, butterflies and other wildlife to the roof space.

Sedums are completely hardy and will tolerate the most inhospitable conditions. Although they appear red in times of drought and very hot weather, they are not dying but “sleeping”, retaining moisture within their stems and leaves ready to regrow once they get access to water.

Remember, however, that no plant is very drought proof. The more care and attention and crucially the more water the plants receive; the better they will look. If you want green and flowers, water your green roof periodically.

Wallbarn has selected a variety of wildflowers to compliment a limited sedum mix. The sedum plants provide a base cover of year round greening. The wildflowers will grow among and between these plants to give a burst of colour from native British flowers.

The wildflower species are chosen to provide low growing flowers and herbs with where possible succulent leaves and stalks which will rot down after flowering to reduce fire hazard.

They include different varieties of thyme, vetches, campions and thrifts which are native to UK and in some cases becoming rare in the wild. Therefore, we try to reintroduce traditional planting at roof level to sustain local nature.

These are perennial wildflowers which will spread across the roof rather than grow very tall. They have also been selected to cope well with life at height. They are ideally suited to low nutrient and low moisture soils so can cope better in the free draining substrate required for green roofs.

This is not a spring field of meadow plants. Do not think masses of poppies and moon daisies at hip height. Such “ground” wildflowers are not suitable for sustainable green roof construction and can often be dangerous.

Because there is such a large range of wildflowers within the mix they will flower throughout the summer months, attracting a whole host of wildlife to the roof. They will produce seeds which should be collected and sown back into the substrate for long-term performance.

PRODUCTION

The essential elements to growing a top quality and truly sustainable green roof include:

SUBSTRATE MIXING

Our bespoke substrate is produced by putting the ingredients into an agricultural feed mixer with water to create the optimum consistency; before being loaded into a large compost spreader.

TRAY-LAYING

Wallbarn has automated the tray laying process. We have created our own bespoke tray laying machine which is towed behind a tractor. The pallets are stacked onto the laying machine and the trays are then placed onto the upper platform in lines of three units and connected. The trays slide down the ramp slowly still connected to form a single, three abreast line of trays in a dead straight line.

FILLING

The compost spreader is towed by a farm tractor and shoots the substrate into the trays via a conveyor belt at the side. The moving floor ensures that the mixed substrate flows onto the conveyor belt consistently without clogging and the trays are filled evenly.

We overfill the green roof trays to allow for settlement. A second pass is then carried out. Another farm tractor, which can straddle the line of the trays easily, pulls a levelling box which gently presses the substrate into the trays and creates a level, even surface.

HYDROSEEDING

The sedum seeds are incredibly small and ensuring even distribution is not easy. We have developed a hydroseeding system where the seeds are mixed into water and released either with a boom (pictured) or an with an agricultural spinning disc dispenser. This distributes the seed evenly and helps the seeds sink into the substrate slightly to start germination process.

WEEDING NURTURING

We have a full-time maintenance staff at our nursery and they monitor the development and quality of the sedum and wildflower crops whilst they grow. We check the automatic irrigation systems, weed regularly and “gap up” the beds by adding sedum plugs where appropriate.

TIME

Letting Mother Nature work her magic. The plants need to be left to grow and mature in as natural a way as possible. We do not “hot house” them to speed up production. Therefore, they produce strong roots and are hardened to the elements. We can help them along with care and attention, but such things cannot be rushed if we are to produce truly sustainable green roofs.

HARVESTING M-TRAY® FOR TRANSPORT

We have automated our harvesting process and built our own harvesting machine.

The self-propelled machine passes up the bed of trays and the specially designed wedges and spokes lift the trays off the ground and separates them, drawing them up the conveyor belt ramp to the processing platform. The operatives check the M-Tray® for quality and stack them onto pallets in the field.

The pallets are collected by tractor and brought into the yard where they are strapped and labelled. A forklift then moves them onto the delivery vehicle.

Our M-Tray® is harvested and loaded the day before delivery to site. Our sedum green roof systems, therefore, are not stacked for longer than 24 hours

STEP BY STEP INSTALLATION

Wallbarn M-Trays® have all the necessary elements contained within them

1 M-Tray® modules are transported to site on strapped pallets for easy, clean delivery. They can then be craned safely onto the roof if necessary. Because the modules are securely fitted onto the pallets, the green roof can be moved with minimum delay or disruption. It is essential that pallets are unstacked immediately upon delivery.If sedum is packed tightly for more than 24 hours, particularly in heat, it will deteriorate and 'cook'.

2 Unpacking the pallets is a simple process. None of the contents will spill out and each module can easily be carried by one person. The substrate and plants are undisturbed, greatly reducing the shock and enabling the sedum to establish itself across the green roof quickly.

3 Even very difficult to access roof spaces can be fitted with green roofs using the modular system. Restricted areas and occupied buildings have been successfully retro-fitted with M-Tray®.

4 A separation and filtration geotextile layer, supplied by Wallbarn, should be firstly installed. This protects the waterproofing and prevents abrasive damage.

5 Place each module down and then click together using the integrated connection clips and points.

6 If irrigation is being installed this should be connected at the base of the trays and installed during installation of the trays, not after

7 M-Trays can be cut to shape around objects if needed.

8 The edges should be filled with a border of washed riverstones, in accordance with the GRO code of practice. Objects such as roof lights and cables should be surrounded with riverstones to prevent root invasion and act as a fire break

9 An aluminium edge trim can be added to any exposed edges or where the stones need to be separated from objects such as drainage outlets.The modular sections mean detailing around objects is a simple process and clean lines are created.

10 We recommend that hard landscaping sections such as paving and decking, mounted onto Wallbarn pedestals, are installed to allow for regular access. As everything is suspended on top of the deck, drainage is uninterrupted.

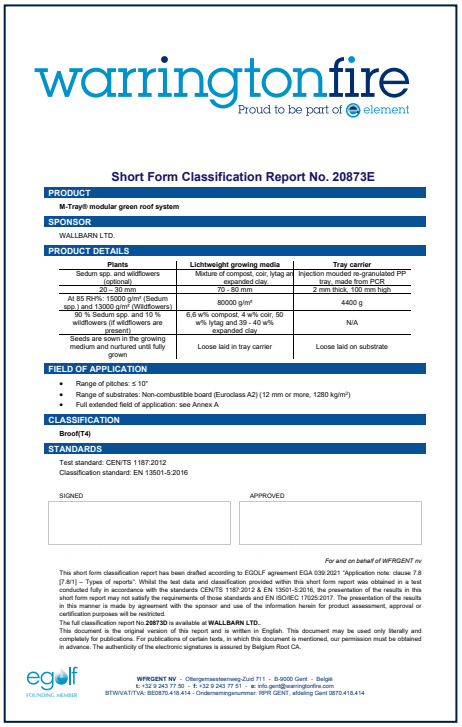
A full Installation Guide and instruction videos are available – visit www.wallbarn.com or view our YouTube channel.

FIRE TESTING

The Building Regulations 2010 (as amended) Approved Document B are the main rules for fire safety on largescale, commercial and high rise green roofs.

They reference the 'Fire Performance of Green Roofs and Walls' and state “The main objective in relation to all elements of construction, including roofs, is that they should not significantly contribute to the growth and spread of fire, either internally or externally.....”

To meet these fire regulations stakeholders need to demonstrate that the whole ‘as installed’ roof system has a valid fire certificate. The whole roof system needs to achieve a European classification rating of B ROOF t(4).



warringtonfire
Proud to be part of element

Short Form Classification Report No. 20873E

PRODUCT

M-Tray® modular green roof system

SPONSOR

WALLBARN LTD.

PRODUCT DETAILS

Plants	Lichtweight growing media	Tray carrier
Sedum spp. and wildflowers (optional)	Mixture of compost, coir, lytag an expanded clay.	Injection moulded re-granulated PP tray, made from PCR
20 – 30 mm	70 - 80 mm	2 mm thick, 100 mm high
At 85 RHfs: 15000 g/m² (Sedum spp.) and 13000 g/m² (Wildflowers)	80000 g/m²	4400 g
90 % Sedum spp. and 10 % wildflowers (if wildflowers are present)	6,6 w% compost, 4 w% coir, 50 w% lytag and 39 - 40 w% expanded clay	N/A
Seeds are sown in the growing medium and nurtured until fully grown	Loose laid in tray carrier	Loose laid on substrate

FIELD OF APPLICATION

- Range of pitches: ≤ 10°
- Range of substrates: Non-combustible board (Euroclass A2) (12 mm or more, 1280 kg/m³)
- Full extended field of application: see Annex A

CLASSIFICATION

Broof(T4)

STANDARDS

Test standard: CEN/TS 1187:2012
Classification standard: EN 13501-5:2016

SIGNED APPROVED

For and on behalf of WFRGENT nv

This short form classification report has been drafted according to EGOLF agreement EGA 039:2021 “Application note: clause 7.8 [7.8/1] – Types of reports”. Whilst the test data and classification provided within this short form report was obtained in a test conducted fully in accordance with the standards CEN/TS 1187:2012 & EN 13501-5:2016, the presentation of the results in this short form report may not satisfy the requirements of those standards and EN ISO/IEC 17025:2017. The presentation of the results in this manner is made by agreement with the sponsor and use of the information herein for product assessment, approval or certification purposes will be restricted.
The full classification report No.**20873D** is available at **WALLBARN LTD.**
This document is the original version of this report and is written in English. This document may be used only literally and completely for publications. For publications of certain texts, in which this document is mentioned, our permission must be obtained in advance. The authenticity of the electronic signatures is assured by Belgium Root CA.

egolf FOUNDING MEMBER

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Physical samples of M-Tray® by Wallbarn were tested by an independent fire authority according to CEN/TS 1187:2012 ***Test 4 Test Methods For External Fire Exposure To Roofs.***

They were burned for 60 minutes and reported zero penetration of fire in all tests across all samples.

This test was carried out within classifications under BS EN 13501-5:2016 ***Fire classification of Construction Products and Building Elements.***

M-Tray® has a classification of B ROOF t(4) EXAP carried out in conformity with CEN/TS 16459:2019.

EXAP is an extended application, meaning M-Tray® can be used as part of a green roof system with a variety of membrane/insulation build-ups so long as all products also have B Roof t(4) EXAP.

Specifiers and contractors need to be sure their green roofs comply to the new regulations.

This is construction law in England. Similar laws apply for Wales, Northern Ireland and in Scotland but there are differences and should be read carefully.

SUBSTRATE COMPLIANCE & PERFORMANCE

FIRE

BS 8616: 2019 Specification for performance parameters and test methods for green roof substrates is the British Standard specifying requirements for all green roof substrates.

This British Standard provides methodologies for testing green roof substrates and lays out the requirements for all physical and chemical characteristics. This includes fire safety criteria.

In order for your green roof to meet building regulations, the substrate should comply to BS 8616:2019.

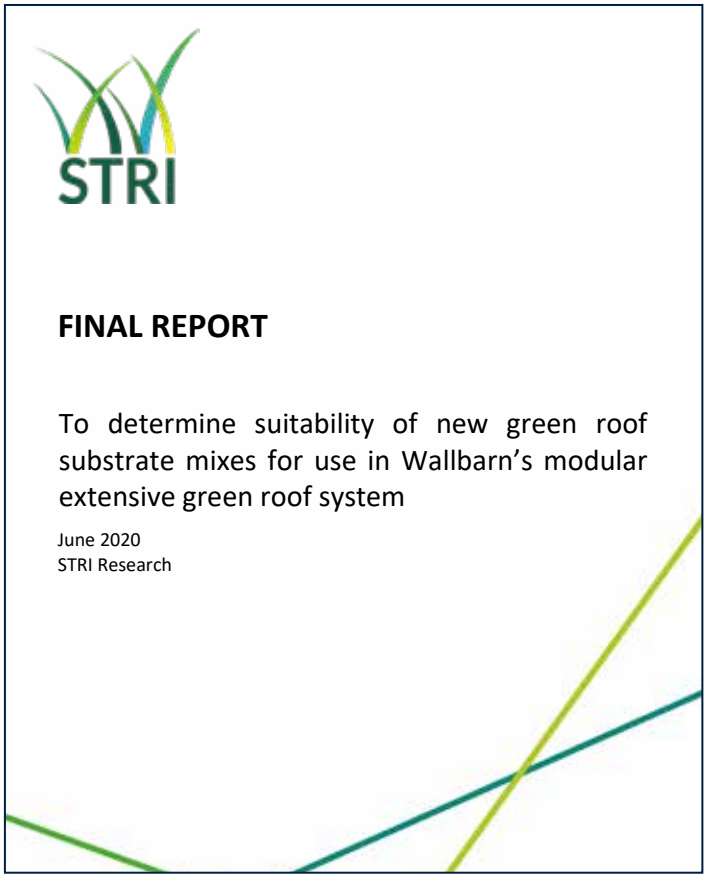
Wallbarn commissioned an independent consultant to do a thorough analysis of our substrate, who confirmed that we comply to BS 8616:2019 in all aspects.

GROWTH

This independent soil specialist also conducted a series of 12 month growth trials on the Wallbarn substrate.

We took an initial batch of 11 different substrate mixes and grew sedums for 12 months, measuring the results from a number of aspects.The best performing substrate is what we grow our M-Tray® sedum and M-Tray® sedum / wildflower modules into.

We can therefore be assured it complies to all safety rules and is the optimum mix for growing and sustaining extensive green roofs in the long term.



Plates

Plate 1: Trial site with mixed substrate before plot randomisation

Plate 2: Trial site after plot randomisation and installation of protective wooden edging

Plate 3: Trial site on 29.08.19 (58DAS). *Sedum* seeding just visible with weed ingress

Plate 4: Trial site on 29.08.19 (58DAS). *Sedum* seeding just visible with weed ingress

Plate 13: Treatment 2 on 04.06.20 (142DAS)

Plate 14: Treatment 3 on 04.06.20 (142DAS)

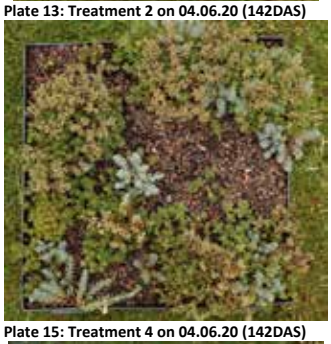


Plate 15: Treatment 4 on 04.06.20 (142DAS)

Plate 16: Treatment 5 on 04.06.20 (142DAS)

Plate 20: Trial site on 24.01.20 (206DAS)

Plate 21: Trial site on 24.04.20 (297DAS)

ROLL-OUT EXTENSIVE GREEN ROOFS

Wallbarn also supplies roll-out systems for larger scale green roof projects or those schemes with complicated shapes or a variety of substrate depths.

The required elements are all supplied to site separately. The protection membranes, separation fabrics and drainage membranes are supplied in large rolls. The substrate and edging pebbles are supplied in bags and the sedum and / or wildflower is supplied rolled up loose blankets.

Roll-out green roof construction is significantly slower than modular and makes a lot more mess. A far greater amount of horticultural and construction skill is required and we recommend that roll-out green roof construction is carried out by experienced landscaping professionals.

Wallbarn can give advice and guidance for roll out extensive, biodiverse and intensive green roof schemes. Please speak to a member of the Wallbarn team for help in design and specification of your project.

ACCESSORIES

EDGING BAR

An aluminium angle can be installed around your green roof modules both to improve the aesthetic finish and to create a separation between the vegetation and areas such as drains and roof lights.

The aluminium profile is right angled where it meets the deck, so it can sit underneath and be weighed-down either by the M-Trays® themselves or by pebbles. These are available in high finish aluminium or a range of powder coated RAL colours.

PEBBLES

Building regulations and the GRO Code stipulate that a border of pebbles should be installed around the perimeter of the green roof, around objects such as rooflights and drainage outlets at certain intervals within the roof to provide a fire break.

We recommend using clean, rounded riverstone pebbles which are free from fines and dirt.

Wallbarn can supply jumbo bags of 1 tonne, 25kg single bags and pallet loads of 40 x 25kg bags from stock to site quickly.

We also have a range of decorative stones in many colours and sizes available.

SUBSTRATE

Wallbarn has spent several years developing the right balance of ingredients to go into the substrate for our M-Tray®. Our substrate can also be purchased separately.

GEOTEXTILE FLEECE

For our green roof products we recommend using our recycled geotextile fleece to act as a separation, filtration and protection layer

IRRIGATION SYSTEMS

Wallbarn supply a range of irrigation systems from simple timer based sprinkler networks to fully automated, web based irrigators, which feature drought and leak detectors.

FERTILISER

We can supply fertiliser with your green roof order or as and when you need it.

CARE & MAINTENANCE

A simple, low maintenance solution supplied layer by layer

Sedum requires less maintenance than other types of green roof because it is so hardy and drought resistant but periodic attention is recommended. A green roof is a living thing which will change significantly over the seasons. It will be at its most splendent in the Spring & Summer months and it is important that care and attention to substrate moisture levels, nutrients and weeds is given throughout the year to maintain healthy growth of the vegetation. A maintenance programme for your green roof should be made for regular intervals, especially in the Spring and Autumn including:

EARLY SPRING

- Removing weeds, especially grass, by hand.
- Removing dead vegetation including leaves and stalks from surface of green roof.
- Clearing debris from drainage outlets.
- "Gapping up" patches of bare substrate by either separating clumps of sedum from the existing roof and planting; buying additional plug plants to insert or spreading sedum cuttings onto the surface of the substrate and watering in fully.
- Cuttings are made by snipping off the tops of the stems from sedum plants. They re-root very efficiently quickly into the substrate.
- Applying Wallbarn Vitax Q4 slow-release granular fertiliser.

MID SUMMER

- Watering – Sedum will survive for periods without rain, but if it starts to turn red it is in distress. Although in times of drought the sedum goes into suspended animation, if in times of very high temperatures and no rainfall it is possible to irrigate the green roof, do so. An integrated irrigation system built into the green roof during installation is recommended.

AUTUMN

- Wait until all sedums and wildflowers have finished flowering.
- Removing weeds, especially grass, using tools to remove all roots.
- Clearing dead vegetation using a rake. Remove dead stalks and other items which can cause a fire hazard. If any dead vegetation is holding seeds post flowering spread these seeds onto the surface of the substrate and rake in where possible.
- Clearing debris from drainage outlets.
- "Gapping up" bare patches with sedum clumps, purchased plug plants or sedum cuttings.
- Watering in fully.
- Draining irrigation systems before frost appears.
- Applying Wallbarn Vitax Q4 slow-release granular fertiliser.

Sedum changes colour and leaf structure naturally throughout the year. Some keep their leaves, others die back, depending on the type of species. They can turn red during droughts, strong winds and frosts. This is normal and they will revert to their green hues over time.

TECHNICAL DATA

TECHNICAL DATA	
PRODUCT	**M-TRAY® MODULAR GREEN ROOF**
Suitable for	Extensive green roof plants with lightweight, free-draining substrate
Type of construction	Permanent
Width / breadth	500mm x 500mm
Height	100mm
Shape of walls / sides	Tapered / angled
Units per m^2	4
Material	Recycled polypropylene
Thickness of material	3mm
Internal ridge height / reservoir height	20mm
Number of internal drainage reservoirs	25
Drainage holes per unit	8
Distance between trays at base	20mm
Distance between trays at 50mm from base	10mm
Dry weight (empty)	1.1Kg
Weight field capacity[1]	25kg
Connectors Per Unit	4
Number Of Handles On Underside	4
Detail Of Corners / Edges	Smooth / reinforced

1. Filled & fully planted field capacity of wallbarn substrate & mature sedum plants during / after abnormal rainfall conditions.

EXPORT & LICENSING OPPORTUNITIES

UK	Registered Design	6140192
UK	Registered Trademark	UK00003041800
UK	Registered Cloned EU design post-Brexit	90029539430001
USA	US Patent	D787,186S
USA	Registered Design Application	29/802,855
EU	Registered Design	002953943-0001
EU	Registered Tradename	015388523
Canada	Registered Design Application	205094
Argentina	Registered Design	Nº100508
UAE	Registered Design	7498

An M-Tray® “Bible” is available to guide partners in the growing, installation and long term maintenance processes and we can draw on many years of experience. As well as supplying live products for installation on UK green roofs and landscaping spaces, Wallbarn is committed to M-Tray® as an export product.

M-Tray® by Wallbarn has a number of different territorial registered designs and patents including:

Licensing opportunities are available for both the M-Tray® brand and the mould, which can be granted to specific partner companies across the globe.

An M-Tray® “Bible” is available to guide partners in the growing, installation and long term maintenance processes and we can draw on many years of experience.

Solutions for rooftop living

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