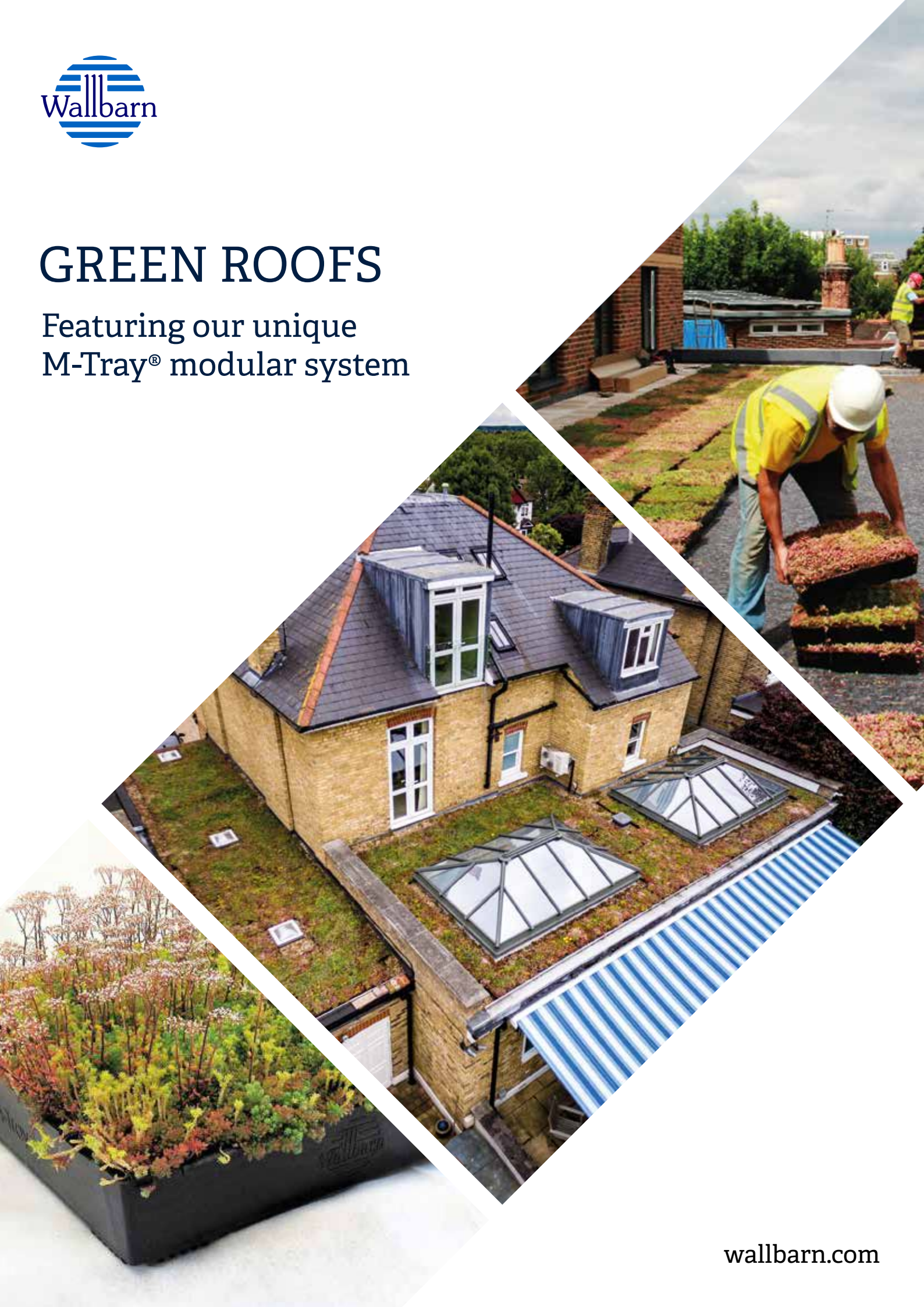
Wallbarn

GREEN ROOFS

Featuring our unique M-Tray® modular system



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BENEFITS OF GREEN ROOFS

Green roofs bring nature back into urban spaces. They improve air quality, aesthetics, help prevent flash flooding and encourage wildlife while mitigating the impact of construction in urban areas.

Green roofs are very adaptable and can be designed for large or small areas on most 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, 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 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.

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

Our substrate mixture has been carefully composed with the help of independent soil specialists. The mixes are our own bespoke recipes and the raw materials are all recycled and come from local sources where possible. Our substrate complies with BS 8616:2019 and GRO Code. We use three key ingredients:

1. Coir, or recycled coconut fibre, holds moisture and nutrients and has good drainage properties. It has high lignin content and is relatively resistant to slumping, providing long-term sustenance to the plants.
2. Lightweight mineral aggregate is the main component of the substrate, giving bulk and improved rooting conditions. We use a variety of different aggregates including Lytag, pumice and expanded clay balls (Lecca).
3. Locally sourced organic compost which provides water absorption whilst slowly releasing nutrients.

We do not use brick dust or building rubble as these can form a crust within the substrate, causing blockages and poor rooting. We never use peat or construction waste in our substrate.

We are constantly trialling and developing new mixes to provide our customers with the optimum substrate including carbon negative mixes.

SEDUM

All our M-Tray® sedum green roof modules are grown from seed. We have selected 13 different sedum species suitable for the British climate to bring biodiversity and variety across the roof throughout the year.

Sedum is a stone crop and a succulent and can cope with very harsh conditions. This means it is ideal for green roofing.

The sedum genre is incredibly diverse with different species flowering at different times of year. The species selection we use provides comprehensive green coverage throughout the year and a variety of different leaf shapes, sizes and colours across the roof.

These are flowering sedums, so masses of different yellow, pink and white flowers will appear throughout spring, summer and even in autumn; attracting bees, butterflies and other wildlife to the roof space.

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 here 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 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.

WILDFLOWER

We have supplemented our flowering sedum with a carefully selected a mix of low growing British native species of wildflower. This extends the flowering period of our trays from May to October and increases Biodiversity.

We have selected predominately native perennial species to attract bees, other insects, butterflies and birds to act as pollinators.

ROLL-OUT EXTENSIVE GREEN ROOFS

Wallbarn also supplies roll-out systems for larger scale green roof projects. The protection, separation, drainage, substrate and sedum blanket elements are supplied separately.

Roll-out green roof construction is significantly slower than modular, and a far greater amount of horticultural and construction skill is required. Roll-out green roof construction is usually carried out by experienced landscaping professionals.

Please speak to a member of the Wallbarn team for help in design and specification of your project.

ACCESSORIES

PEBBLES

We recommend laying a border of pebbles around the edges of your green roof. This provides a break between the vegetation and any outlets. We supply rounded Riverstone pebbles in 25kg bags and jumbo bags, which are in accordance with the GRO code of practice for green roof construction.

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 powder coated to RAL colour of your choice.

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 but periodic attention to soil moisture and feed levels as well as the removal of weeds is still recommended to maintain healthy vegetation. We recommend carrying out maintenance on your green roof at regular intervals, especially in the Spring and Autumn including:

- Removing weeds by hand.
- Clearing debris from drainage outlets.
- Applying Wallbarn slow-release granular fertiliser.

Sedum is unique in that its metabolism works in reverse to most other plants. For example, it closes its stamen during the day which makes it more efficient at conserving water.

- Sedum leaves naturally change colour throughout the year. They may take on a russet colour during droughts, strong winds and frosts. This is normal and they will revert to their green hues over time.
- Some sedum species keep their leaf structure all year round and some 'die back'. Their appearance throughout the year depends on the type of species they are.
- If stems and leaves start to ‘shrivel’ back, this is usually due to a lack of water.
- Irrigate and monitor moisture levels for several weeks until sedum recovers.
- The M-Tray® is populated with up to 13 species of Sedum, some of which are flowering.

WILDFLOWERS

Wildflowers are weeds and weeds are wildflowers and so care must be taken during maintenance NOT to pull out healthy and desired plants. Wildflowers by their nature thrive on poor soils where there is little competition however they are more vulnerable to drought. Drying of stems and leaves will be seen through hot dry periods and although irrigation can be applied it is not a requisite as the ‘stressed’ plants will flower and seed to propagate themselves and will often recover with the onset of rain. Some wildflowers need to 'die' and dry up entirely in order to produce seeds to produce flowers for the next season’s flowering. Do not be too hasty 'mourning', let the seeds enter the substrate in order to germinate. However, do not allow too much dry and dead vegetation to build up as this can present a fire risk.

MAINTENANCE

A comprehensive maintenance guide is available.

TECHNICAL DATA

TECHNICAL DATA	
PRODUCT	**M-TRAY® MODULAR GREEN ROOF CONTAINER**
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
Eu Design Trademark	No 002953943-0001
Us Design Trademark	No 29/553,129

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

EXPORT & LICENSING OPPORTUNITIES

- 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.
- We can supply the modules as empty trays for local landscapes worldwide to plant up and propagate according to the local climactic conditions and their own markets.
- M-Tray® has been designed and developed by Wallbarn in UK and is the subject of Community Registered Design (No. 002953943-0001) and US Design (No. USD787,186S). Further worldwide design registrations are currently being carried out.
- 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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