

Product Data Sheet

HYDROSEED® EXTENSIVE LIVING ROOF

Living Roofs

Comprising a water retention and drainage layer with bonded filter fleece, engineered growing medium and mixed seed and sedum shoots

Axter's living or green roof systems are designed to accommodate the most varied ecological and environmental requirements. The combination of long-term system performance with horticultural expertise ensures full compliance with national, local and project specific environmental biodiversity and attenuation criteria.

A living roof, as well as being an aesthetically pleasing addition to a building, offers many other advantages:

- Increased biodiversity, creating habitat for birds, bees and invertebrates
- More usable space on the roof (e.g. for gardens, amenity, play and educational areas)
- Less urban heat island effect
- Reduced rainwater run off flow rates
- Better air filtration
- Increased sound insulation and thermal efficiency



Extensive living roofs are not usually trafficked but are intended to be visual or ecological features. Typically, they have thin substrate layers to minimise depth and weight and are designed to be low maintenance with slow growing vegetation. They are often created to provide habitat for flora or fauna and to enhance building performance by reducing rainwater flow rates and increasing thermal efficiency.

Key benefits

- Provide biodiversity for flora and fauna
- Visually appealing; minimal maintenance required
- Can be installed on flat or sloping roofs
- Thin soil substrate
- Self-sustaining vegetation such as succulents, grasses and wildflowers

Soils or substrates for extensive living roofs are usually of a low nutrient type thus suppressing the growth of invasive weed species and of minimal thickness. Plants are selected for their ability to thrive in such conditions and to establish a self-sustaining living roof. Sedum and wildflower mats, pre-grown trays or plug plants can all be incorporated into an extensive design.

Hydrosoil® Extensive Living Roof options:

HYDROSEED®

HYDROSOIL® WILDFLOWER

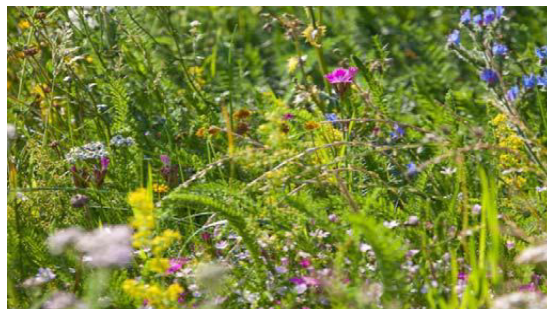
HYDROSOIL® SEDUM

HYDROSOIL® PLUGPLANT

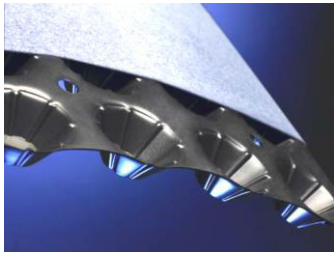
HYDROSEED® EXTENSIVE LIVING ROOF

- Water retention and drainage layer (20mm)
- Filter layer (1mm)
- Substrate layer (80mm)
- Mixed seed (sedum, wildflowers, alpines) and sedum shoots.

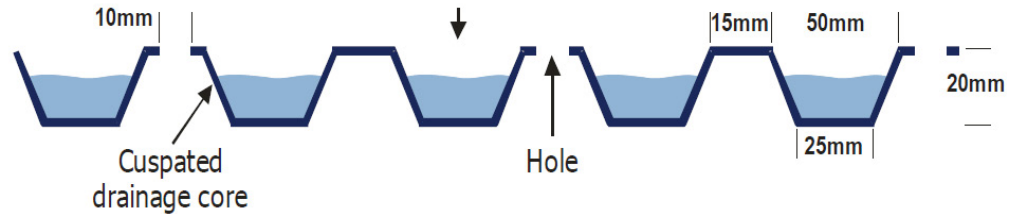
Standard mix is London wildflower seed mix; other combinations available on request to suit local ecological requirements.



Water retention and drainage layer (20mm)



High compressive strength, rigid HDPE board acting as both drainage and water retention layer, with a geotextile filter layer bonded to one side. The board is dimpled and contains high capacity dimples (height approx. 20mm) for water retention and perforations to drain surplus water. It is resistant to root penetration and to chemicals.



Drainage sheet (cusped, perforated)	Test Standard	Units	Value
Polymer	High Density Polyethylene		
Cusate height		mm	20
Compressive strength	EN ISO 25619-2	kPa	115
Tensile strength (MD/CMD)	EN ISO 10319	kN/m	17
Static Puncture (CBR)	EN ISO 12236	kN	2.6
Perforations per m ²			49
Perforations diameter		mm	10
Thickness @ 2kPa	EN ISO 9863-1	mm	21
Water flow through perforations	EN ISO 11058	l/(m ² .s)	24
Water storage capacity		l/m ²	4
Roll dimensions		m	0.97 x 50
Roll diameter (approx.)		m	1.1
Roll weight (approx.)		kg	60

Geotextile

Polymer	Polypropylene		
Water permeability (V _{H50})	EN ISO 11058	l/(m ² .s)	100
Apparent opening size	EN ISO 12956	µm	80

Filter layer (1mm)

Fleece filter layer for use on all sedum and biodiverse living roof systems. Manufactured using UV stabilised polypropylene, it provides high tensile properties and excellent durability. Its high density and strength, resulting from re-orientation of the molecules within the fibres during manufacturing, increase its environmental resistance and mechanical properties. It is resistant to root penetration and to chemicals.

The filter layer should be covered within one month of installation.

Expected durable service life of the material is up to 50 years in soils with $4 \leq \text{pH} \leq 9$ and soil temperatures $\leq 25^\circ\text{C}$, based on a durability assessment.



Physical properties	
Composition	Non-woven geotextile made from 100% virgin polypropylene high tenacity fibres, heat treated, needle punched, containing UV inhibitor
Weight (g/m ²)	123
Colour	White
Unit supplied	Rolls: Unit width (Im) 1.13 x Unit length (Im) 100
Roll weight (kg)	14
Thickness @ 2kPa (mm)	0.8

Technical properties	Value	Standard
Tensile strength (kN/m) – MD/CMD	9.0 – 9.8	EN ISO 10319
Elongation at max load (%) MD/CMD	60 / 65	EN ISO 10319
CBR static puncture (kN)	1.4	EN ISO 12236
Cone drop penetration (mm)	32	EN ISO 13433
Apparent opening size (µm)	80	EN ISO 12956
Water permeability (l/m ² .s)	100	EN ISO 11058
Weathering 50 MJ/m ² (1 month)	>90% retained strength	EN SIO 12224

Substrate layer (80mm)

Moisture retentive, low nutrient substrate, free draining when saturated. Made from 100% recycled certifiable waste products from the building industry. Suitable for use on extensive wildflower and biodiverse roof systems. Allows root penetration. Green waste meeting PAS 100 standards.

Physical properties	
Composition	Recycled crushed brick/mineral and composted green waste (certified PAS 100)
Brick grading	Various grading of brick suitable for extensive green roofs
Colour	Dark brown
Suggested depth	80 - 150 mm
Sizes	25 litre sacks and bulk bags

Technical properties	
Weight (dry)	790 kg/m ³
Weight (saturated)	970 kg/m ³
Compaction	Approx 15% (+/-3%)
pH	7.5 – 8.5

Recommended minimum substrate depth is 80mm.
Hydroseed Mixed Seed with 80mm substrate is 110kg/m² wet.

Mixed Seed

Our London Wildflower Seed Mix* contains 36 species of native wildflowers and sedums and is designed to encourage biodiversity on extensive, intensive and podium living roofs. The mix has been created to combine natural plant life found in London in particular and the South East of England in general. The plants provide a variety of colour and habitat to attract pollinators and a long flowering season from Spring to late Autumn.

They are also wind, frost and drought tolerant and will gradually provide an even cover of vegetation across the roof area.

Seed is cast at 3g/m² on to contoured 75-150mm biodiverse growing medium. The seeds are best sown in late Autumn or early Spring when optimum germination conditions occur.

*Other seed mixes are available to suit ecological requirements; please contact Axter for more information.

Physical properties	
Material	Seeds as described above. Best sown in late Autumn or early Spring months, to benefit from optimum warmth and moisture.
Unit size	Seed size depends on species/genus.
Substrate depth	75-150mm contoured, sufficient depth to support the established plant.
Density	3g / m ²
Colour	Seasonal variation

Wildflower species – London Seed Mix

36 wildflower species native to the UK are sown (subject to seasonal variations):

Agrimony (<i>Agrimonia Eupatoria</i>),	Field Scabious (<i>Knautia arvensis</i>)
Bird's Foot Trefoil (<i>Lotus Corniculatus</i>)	Horseshoe Vetch (<i>Hippocrepis comosa</i>)
Bladder Campion (<i>Silene Vulgaris</i>)	Wild Marjoram (<i>Origanum vulgare</i>)
Common Toadflax (<i>Linaria Vulgaris</i>)	Bulbous Buttercup (<i>Ranunculus bulbosus</i>)
Cowslip (<i>Primula Veris</i>)	Autumn Hawkbit (<i>Leontodon autumnalis</i>)
Hoary Plantain (<i>Plantago Media</i>)	Musk Mallow (<i>Malva Moschata</i>)
Kidney Vetch (<i>Anthyllis vulneraria</i>)	Meadow Buttercup (<i>Ranunculus acris</i>)
Lady's Bedstraw (<i>Galium Verum</i>)	Wild Mignonette (<i>Reseda lutea</i>)
Ox-Eye Daisy (<i>Leucanthemum Vulgare</i>)	Biting Stonecrop (<i>Sedum acre</i>)
Perforate St John's Wort (<i>Hypericum Perforatum</i>)	White Stonecrop (<i>Sedum album</i>)
Salad Burnett (<i>Sanguisorba minor</i>)	Red Valerian (<i>Centranthus ruber</i>)
Self Heal (<i>Prunella vulgaris</i>)	Pheasant's Eye (<i>Adonis annua</i>)
Vipers Bugloss (<i>Echium vulgare</i>)	Corn Cockle (<i>Agrostemma githago</i>)
Common Poppy (<i>Papaver rhoeas</i>)	Scarlet Pimpernel (<i>Anagallis arvensis</i>)
Cluster Bellflower (<i>Campanula glomerata</i>)	Corn Chamomile (<i>Anthemisis arvensis</i>)
Common Knapweed (<i>Centaurea nigra</i>)	Corn Mayweed (<i>Matricaria recutita</i>)
Corn Buttercup (<i>Ranunculus arvensis</i>)	Common Forget-me-not (<i>Mysotis arvensis</i>)
Cornflower (<i>Centaurea cyanus</i>)	
Corn Marigold (<i>Chrysanthemum segetum</i>)	

Sedum shoots are also available, planted at 150g/m², as follows:

Sedum acre, *Sedum album*, *Sedum ellacombianum*, *Sedum floriferum*, *Sedum forsterianum*, *Sedum hybridum*, *Sedum kamtschaticum*, *Sedum montanum*, *Sedum reflexum*, *Sedum selskianum*, *Sedum sexangulare*, *Sedum spirium*, *Sedum Oreganum*, *Sedum acre octoberfest*, *Sedum Pulchellu*.

Maintenance

An annual maintenance programme for wildflower living roofs is recommended, to include two visits per year, one in the Spring (remedial, weeding) and one in the Autumn (cutting), when vegetation should be trimmed after flowers have seeded.

The substrate must be watered before and after seed is sown and irrigate during establishment and as weather conditions require for best results. Further information is available in the Axter Living Roof Maintenance Guide.

Design Considerations

A living roof calls for a robust waterproofing system able to withstand the increased loads and suitable for the building structure.

Axter has an extensive choice of BBA / ETA certified, tried and test, high performance waterproofing systems designed to fulfil this function (Cityflor, Wilotekt-Plus, Force 3000 Trafic, Force 4000 Dalle Trafic and Starcoat PMMA).

Each living roof is different, so we design bespoke solutions drawing on our many waterproofing options and including in the specification the planting selections best suited to the environment to ensure all roof and surrounding area criteria are met.

The following points must be included in the living roof design:

- Roof to be capable of supporting the design load
- Adequate provision to drain excess rainwater
- Safe access for maintenance
- Robust and durable roof waterproofing
- Root resistant membranes must be considered

For further assistance with living roof design, specification, installation and maintenance, contact Axter.

Axter Ltd reserves the right to make changes without notice at any time to the above products. The values given are indicative and correspond to nominal results obtained in laboratories and testing institutes. Any additional installations must be discussed with Axter prior to their implementation.

Final determination of the suitability of any information is the sole responsibility of the user. Consult Axter to discuss the use of this or any other product but responsibility for selection of a material and its application in any specific project remains with the user.