

Product Data Sheet

HYDRO-BIODIVERSE SEED LIVING ROOF

Comprising a water retention and drainage layer with bonded filter fleece, contoured growing medium and biodiverse seed mix

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



Biodiverse living roofs are designed to create a habitat for a specific requirement of flora and fauna and are generally designed as part of an extensive green roof. Also referred to as brown roofs sometimes, they are often designed to replicate the original footprint of the building or are created to enhance the pre-development habitat with additional plant species. The growing medium is purposely selected to allow indigenous plant species to cover the roof over time.

Key benefits

- Landscaped areas with different contour levels attract different wildlife
- Increases indigenous biodiversity of the development site
- Logs provide habitat for invertebrates
- Wetland areas and ponds provide ecosystems for wildlife
- Using seeds or plug plants of species that are indigenous to the locality
- Reclaimed or recycled materials from the building site itself can be used

Axter supplies specialist growing medium to suit the requirements of the planting regime but in many cases soil and spoil from the development site can be recycled and used on the roof. Various habitats can be created by contouring the soil, providing different substrates, soil, rocks, sand, gravel, crushed concrete and by adding features such as rotting wood and ponds. The aim is to develop a number of different environments on the roof, each favouring different species and increasing biodiversity.

Hydro-biodiverse Living Roof options:

HYDRO-BIODIVERSE WILDFLOWER

HYDRO-BIODIVERSE SEED

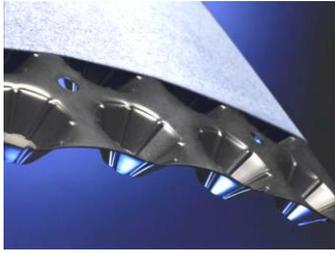
HYDRO-BIODIVERSE PLUG PLANT

HYDRO-BIODIVERSE SEED LIVING ROOF

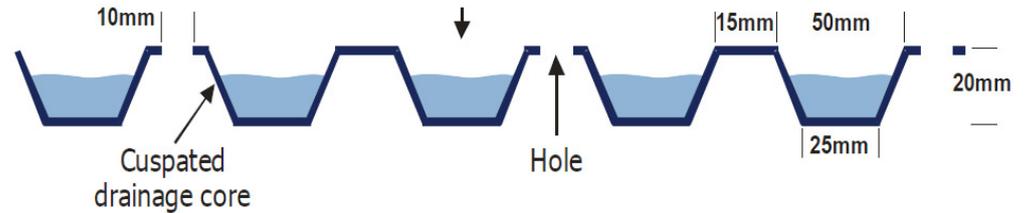
- Water retention and drainage layer (20mm)
- Filter layer (1mm)
- Biodiverse substrate layer 100mm (substrate surface contour +/- 20mm) fauna biodiversity
- Biodiverse seed (broadcast rate 2–3 g/m²) for biodiverse extensive living roof system
- Microhabitat creation



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 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		
Cusplate 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 (lm) 1.13 x Unit length (lm) 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 ISO 12224

Substrate layer (100mm)

Moisture retentive, low nutrient, free draining when saturated, allows root penetration. A special mix of organic material with clean and screened aggregates recycled from certifiable building industry waste products. Suitable for use on extensive wildflower and biodiverse roof systems. Green waste meets PAS 100 standards.

Physical properties	
Composition	Recycled crushed brick/mineral and composted green waste (certified PAS 100)
Brick grading	Various sizes of graded brick to promote a more biodiverse environment
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 100mm.
Hydro-Biodiverse Seed with 100mm substrate is 125kg/m² wet.

Biodiverse Seed

Our London Wildflower Seed Mix* contains 36 species of native wildflowers and sedums (no grasses) 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 local ecological requirements; 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	Approx. 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>Anthemis 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>)	

Microhabitat Creation

Seasoned logs, rocks and a variety of substrates (sand, gravel, crushed concrete, etc) used to create different roof top environments each supporting a different species, to maximise biodiversity.

Maintenance

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

The substrate must be watered before and after planting and the system kept moist for at least three months after installation and as weather conditions require. 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.

The waterproofing for biodiverse and brown roofs can be either of a warm or inverted construction. Recommended Axter BBA / ETA certified, high performance waterproofing systems designed to fulfil this function are Cityflor and Wilotekt-Plus.

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 installation.

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.