PLANNING GUIDE

System Solutions for Extensive Green Roofs

Life on Roofs

Green Oases for Our Cityscapes

The environmental, urban development and engineering advantages of green roofs:

Protection of the Roof Membrane

- Protects the roof membrane from UV radiation, heat, cold and hail

New Habitat

- Avoids sealing and creates new habitat for plants and animals

Rainwater Retention

- Reduces run-off

Dust Binding

- Enhances the micro-climate by filtering out dust and smog particles

Reduction of Energy Costs

- Thermal protection and reduction in heating and cooling costs

Noise Protection

- Enhances sound insulation

Features

Unlike intensive green roofs, extensive green roofs require little upkeep or maintenance.

The features at a glance:

- **Minimum maintenance**:
  - Inspection and maintenance once or twice per year
  - Water and nutrient supply mostly by natural means

- **Plant communities close to nature**:
  - Undemanding
  - Extensive
  - Self-regenerating

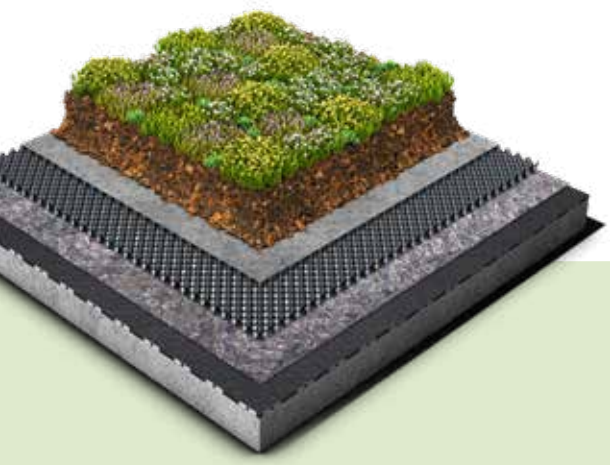
- **Low loads and build-up heights**:
  - Mainly substrates with layer depths of up to about 130 mm
  - Loads about 115–155 kg/m^2

- **Low-cost**:
  - For set-up and maintenance

Biodiversity

- The picture shows build-ups with a uniform height. The range of species in the roof habitat can be expanded by varying the substrate depth or type, by installing shingle, sand or gravel surfaces and/or by introducing deadwood or stones. This also contributes to increased biodiversity. The most important thing is to ensure that this is permitted from a roof structural point of view.

→ More information to be found in our planning guide "**Biodiversity Green Roof**" at *https://zinco-greenroof.co.uk/downloads*



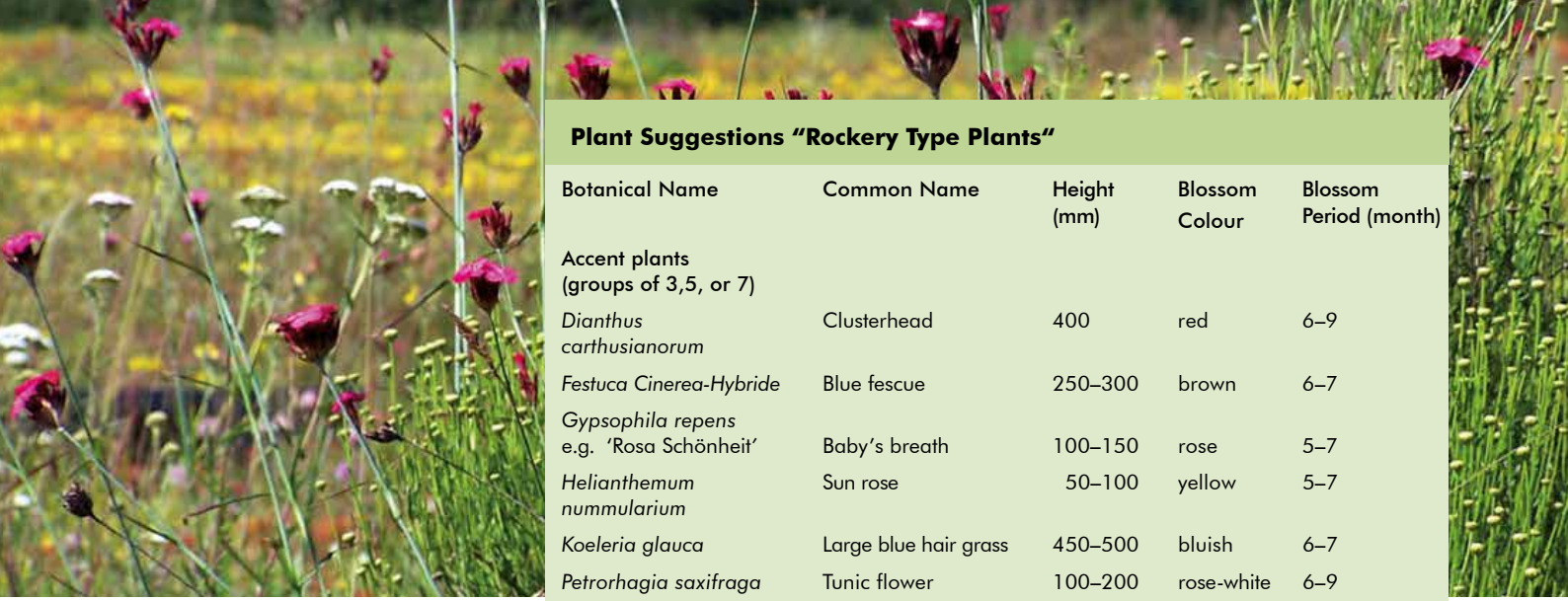
More Options with ZinCo

Please see our Planning Guide “**Systems for Pitched Green Roofs**” for information on pitched and steep pitched green roofs.

System Build-up “Rockery Type Plants“

“Rockery Type Plants“ allows for an extensive green roof with sophisticated design and individual character. The “Rockery Type Plants“ substrate is applied with a minimum of 80 mm in depth. “Rockery Type Plants“ vegetation consists of a wide variety of species which results in a long blooming period and allows for different accents throughout the vegetation period.

Sedum species and other perennials are primarily used as a ground cover. Drought resistant perennials add flowering accents and height to the design, *Dianthus carthusianorum* for example reaches up to 400 mm of height. The build-up is realized by manually planting plug plants. Thus the desired result can be predetermined. Furthermore the colour spectrum is significantly more differentiated in comparison to “Sedum Carpet“.

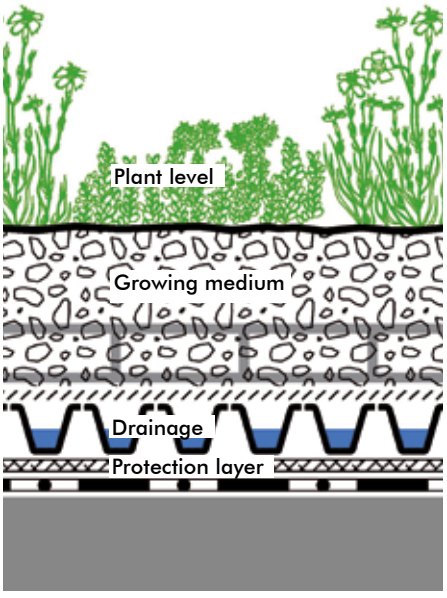


Plant Suggestions "Rockery Type Plants"

Botanical Name	Common Name	Height (mm)	Blossom Colour	Blossom Period (month)
Accent plants (groups of 3,5, or 7)				
Dianthus carthusianorum	Clusterhead	400	red	6–9
Festuca Cinerea-Hybride	Blue fescue	250–300	brown	6–7
Gypsophila repens e.g. 'Rosa Schönheit'	Baby's breath	100–150	rose	5–7
Helianthemum nummularium	Sun rose	50–100	yellow	5–7
Koeleria glauca	Large blue hair grass	450–500	bluish	6–7
Petrorhagia saxifraga	Tunic flower	100–200	rose-white	6–9
Saponaria ocymoides	Rock soapwort	150–200	rose	5–7
Satureja montana ssp. illyrica	Winter savory	100–150	violet	8–9
Saxifraga paniculata	Livelong saxifrage	200–250	white	6–7
Sempervivum-Hybriden	Houseleek hybrids	100–200	red/rose	7–8
Filler Plants (minimum of four different Sedum varieties)				
Cerastium arvense 'Compactum'	Field chickweed	50–100	white	5–6
Hieracium pilosella	Mouseear hawkweed	150–200	yellow	5–7
Potentilla neumanniana	Alpine cinquefoil	100–150	yellow	3–4
Prunella grandiflora	Large self-heat	200	violet	6–8
Thymus doerfleri 'Bressingham Seedling'	Bressingham thyme	60–80	rose	5–7
Thymus serpyllum	Wild thyme	50	violet	5–9

Additional Sedum varieties from the plant community "Sedum Carpet" on page 9.

Weight kg/m²		Height mm
dry	at water capacity max.	
80	112	80
2	10	30
82	122	



Plant level as per plant suggestions "Rockery Type Plants"

System Substrate "Rockery Type Plants"

Safety Device "Fallnet®", if required (attention to load requirements)
Filter Sheet SF
Floradrain® FD 25-E
Protection Mat SSM 45
Root Barrier WSF 40, if waterproofing is not root-resistant

Build-up height:	ca. 110 mm
Weight, saturated:	ca. 122 kg/m²
Water retention capacity:	ca. 40 l/m²

European Technical Assessment "Kits for Green Roofs" CE ETA-13/0668

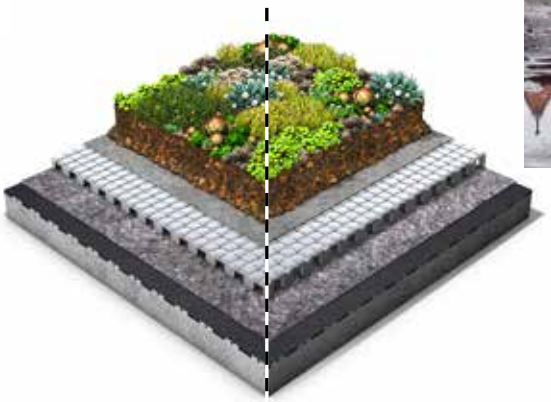
System Build-ups with European Technical Assessment. Details on Page 13.

THIRD-PARTY VERIFIED EPD ISO 14025 and EN 15804 Institut Bauen und Umwelt e.V.

System Build-up with EPD verification. Details on Page 13.

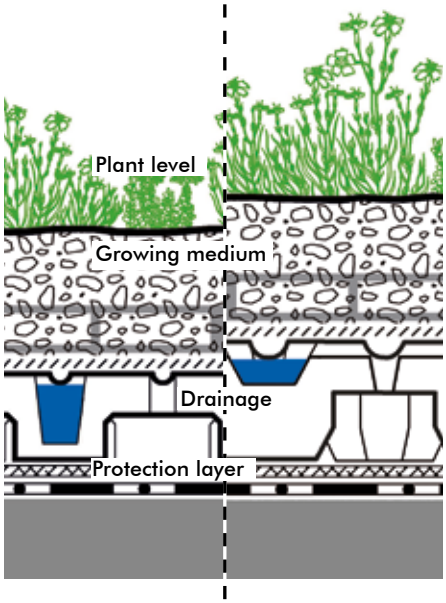
System Build-up “Rockery Type Plants“ on 0°-Roofs

On 0°-roofs where deeper puddles might remain, the standard System Build-up “Rockery Type Plants“ is to be modified.
By installing higher Floraset® elements (50 or 75 mm) the necessary distance to the water level is ensured. The green roof build-up will be somewhat higher but not heavier as these elements are made of extruded polystyrene hard foam and therefore have a negligible weight. The Protection Mat TSM 32 with its lower retention capacity is sufficient, as water from the puddles is made available to the plants.



System Build-up with EPD verification.
Details on Page 13.

Weight kg/m²		Height mm FS 50	Height mm FS 75
FS 50/FS 75			
dry	at water capacity max.		
80	112	80	80
2	7	50	80
82	119		



Plant level “Rockery Type Plants”

System Substrate “Rockery Type Plants”

Safety Device “Fallnet®”, if required (attention to load requirements)
Filter Sheet SF

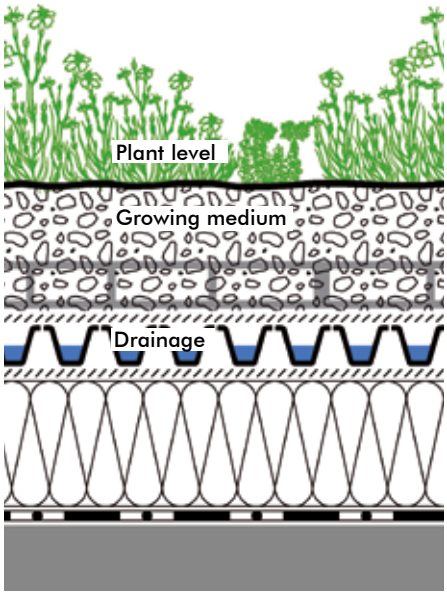
Floraset® FS 50 or FS 75

Protection Mat TSM 32
Root Barrier WSF 40,
if waterproofing is not root-resistant

Build-up height:	ca. 130 resp.160 mm
Weight, saturated:	ca. 119 kg/m²
Water retention capacity:	ca. 38 l/m²

System Build-up “Rockery Type Plants” on Inverted Roofs

Weight kg/m²		Height mm
dry	at water capacity max.	
80	112	80
2	6	30
82	118	



Plant level “Rockery Type Plants”

System Substrate “Rockery Type Plants”

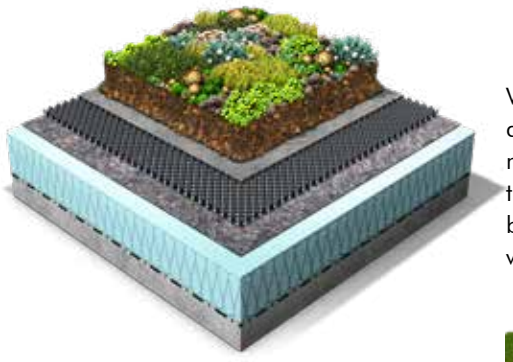
Safety Device “Fallnet®”, if required (attention to load requirements)
Filter Sheet SF
Floradrain® FD 25-E
Separation Membrane TGV 21
Roof construction with XPS thermal insulation

Root Barrier WSF 40,
if waterproofing is not root-resistant (beneath the thermal insulation layer).

Build-up height:	ca. 110 mm
Weight, saturated:	ca. 120 kg/m²
Water retention capacity:	ca. 36 l/m²

European Technical Assessment
"Kits for Green Roofs"
CE ETA-13/0668

System Build-ups with European Technical Assessment. Details on Page 15.

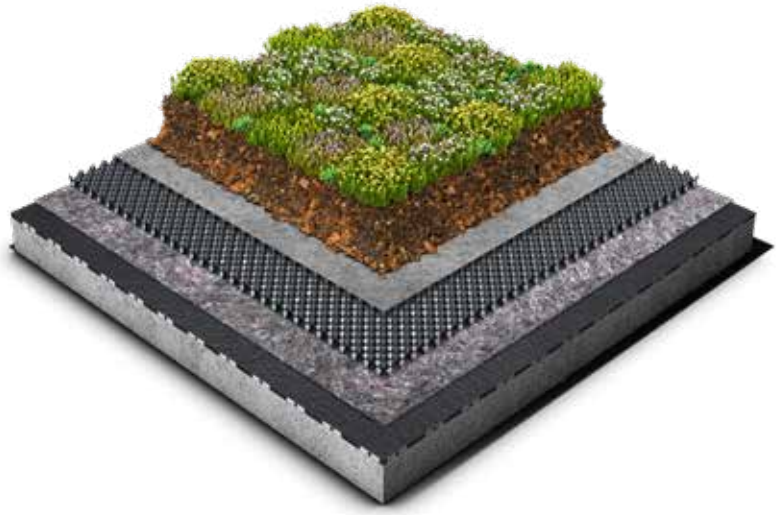


With inverted roofs, layers that prevent the diffusion of damp must not be installed above the XPS thermal insulation boards. Therefore, the water retaining protection mat must be replaced by the diffusion permitting Separation Membrane TGV 21. In the case, that root barriers are necessary they have to be placed below the insulation boards directly onto the waterproofing. A deeper substrate layer compensates for the water retention capacity of the protection mat.

THIRD-PARTY VERIFIED EPD ISO 14025 and EN 15804 Institut Bauen und Umwelt e.V.

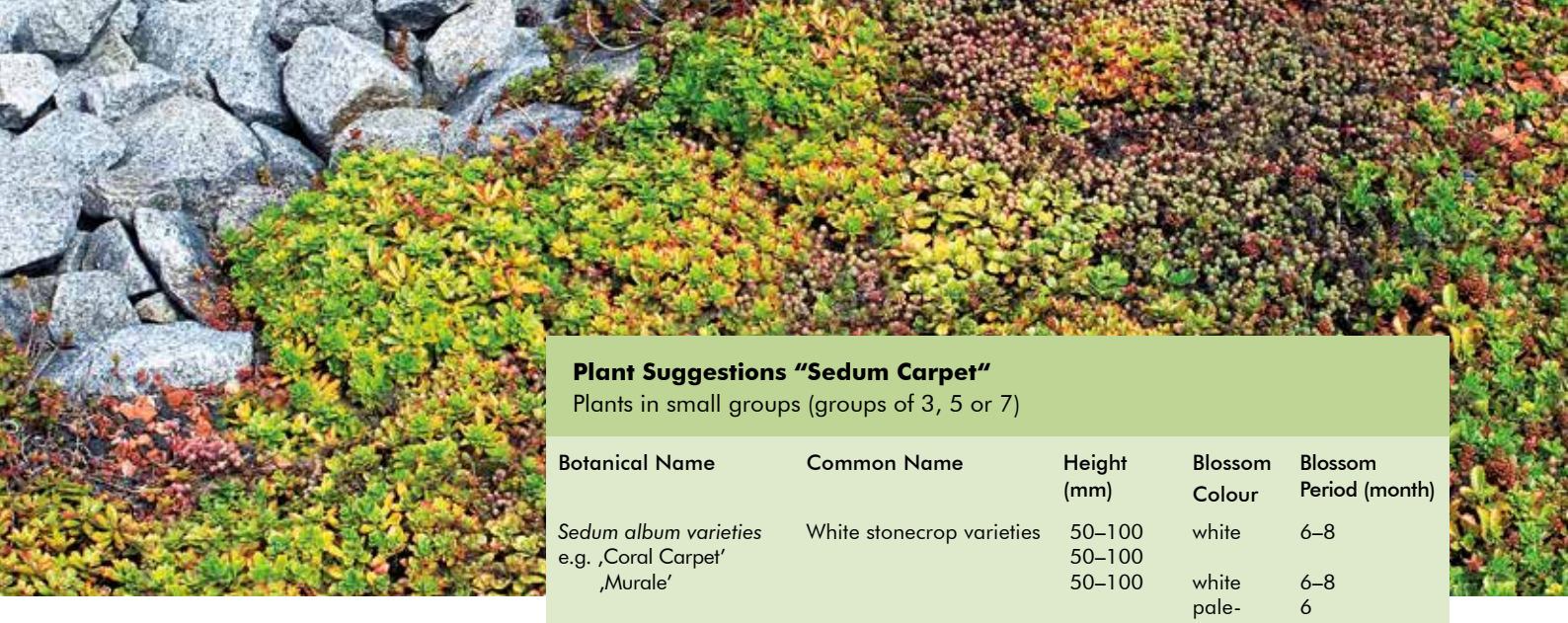
System Build-up with EPD verification.
Details on Page 13.

System Build-up “Sedum Carpet”



“Sedum Carpet“ is a shallow, ground-covering extensive green roof type. In moderate climates, it gets along with approx. 80 mm of “Sedum Carpet“ System Substrate.
“Sedum Carpet“ is applied, especially if both, the load often bearing capacity of the roof and the expenses for maintenance, are restrictive.

Proven sedum species, in combination with the appropriate system build-up, guarantee a long-lasting low maintenance green roof. The plant community “Sedum Carpet“ contains various low-growing sedum species. The main blooming time is in early summer, with yellow or red and white flowers dominating at different times. Throughout the year, “Sedum Carpet“ is represented in various shades of green. Red shades, particulary in autumn, are a pleasant change in the visual appearance. “Sedum Carpet“ is installed by sedum cuttings, plug plants or precultivated Sedum mats.

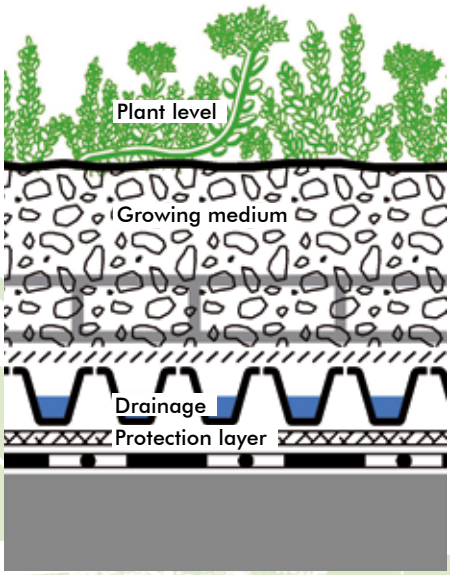


Plant Suggestions "Sedum Carpet"
Plants in small groups (groups of 3, 5 or 7)

Botanical Name	Common Name	Height (mm)	Blossom Colour	Blossom Period (month)
Sedum album varieties	White stonecrop varieties	50–100	white	6–8
e.g. ‚Coral Carpet'		50–100		
‚Murale'		50–100	white pale-rose	6–8 6
Sedum cauticolum	Nettle-leaved goosefoot	100–150	rose	8–9
Sedum floriferum ‚Weihenstep. Gold'	Gold sedum	100–150	yellow	6–7
Sedum hybridum ‚Immergrünchen'	Hybrid stonecrop	100–150	yellow	7–8
Sedum reflexum	Crooked yellow stonecrop	200–250	yellow	6–7
Sedum sexangulare	Tasteless yellow stonecrop	50–100	yellow	6–7
Sedum spurium in varieties.	Dragon`s blood			
e.g. ‚Album Superbum'		100–150	white**	7–8
‚Fuldaglut'		100–150		7–8
‚Roseum Superbum'		100–150		7–8
‚Splendens'		100–150		7–8
‚Variegatum'		100–150		7–8

** infrequent blooming

Weight kg/m²		Height mm
dry	at water capacity max.	
90	112	80
2	10	30
92	122	



Sedum cuttings or plug plants according to plant suggestions "Sedum Carpet"

System Substrate "Sedum Carpet"

Safety Device "Fallnet®", if required (attention to load requirements)

Filter Sheet SF

Floradrain® FD 25-E

Protection Mat SSM 45

Root Barrier WSF 40,
if waterproofing is not root-resistant

Build-up height:	ca. 110 mm
Weight, saturated:	ca. 122 kg/m²
Water retention capacity:	ca. 30 l/m²

European Technical Assessment "Kits for Green Roofs" ETA-13/0668

System Build-ups with European Technical Assessment. Details on Page 13.

THIRD-PARTY VERIFIED EPD ISO 14025 and EN 15804 Institut Bauen and Umwelt e.V.

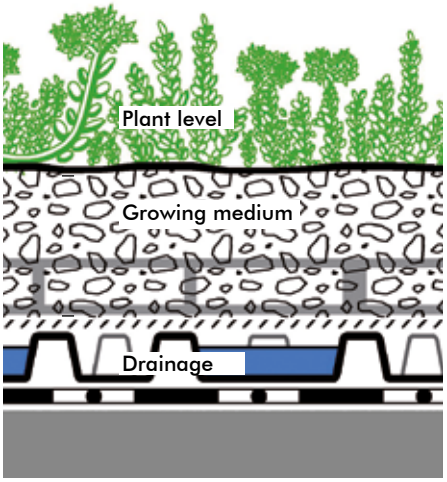
System Build-up with EPD verification. Details on Page 13.

System Build-up “Industrial Green Roofs”

The bigger the roof area, the higher the costs. You can avoid this by omitting certain layers. However, this could be dangerous as certain functions that are important for the long-term proper performance of the green roof are no longer available.

ZinCo, therefore, has combined a number of functional layers in one product. Fixodrain® XD 20 can be installed without an additional protection layer, due to its extremely large contact surface and bonding over a large area. The filter sheet is laminated directly onto it and it is installed in one pass.
The elements are attached to each other by means of studs down the long side and the filter sheet overlaps along both the long and the top sides.

Weight kg/m²		Height mm
dry	at water capacity max.	
90	112	80
1	4	20
91	116	



Hydroseeding or Sedum Cuttings
as per “Sedum Carpet” plant suggestions

System Substrate “Sedum Carpet”

Safety Device “Fallnet®”, if required
(attention to load requirements)

Fixodrain® XD 20

Root Barrier WSF 40 and Filter Sheet PV,
if waterproofing is not root-resistant

Build-up height:	ca. 100 mm
Weight, saturated:	ca. 116 kg/m²
Water retention capacity:	ca. 25 l/m²

European Technical Assessment
"Kits for Green Roofs"
CE ETA-13/0668

System Build-ups with European Technical Assessment. Details on page 13.

THIRD-PARTY VERIFIED EPD
ISO 14025 and EN 15804
Institut Bauen und Umwelt e.V.

System Build-up with EPD verification. Details on Page 13.

ZinCo Fallnet® – non-roof penetrating fall arrest system

Suitable equipment must be available in order to ensure safe working conditions on flat roofs. Single anchor points are possible as are rail solutions and railings. Any decision when choosing a system should not be made solely in consideration of cost but must also consider the type and scope of the works that are to be carried out on the roof.

All ZinCo fall arrest systems are anchored to the roof by the weight of the green roof build-up, therefore, roof membrane penetration is not necessary.

The Fallnet® systems can be integrated into any ZinCo system build-up, provided there are sufficient load reserves available. We will be pleased to draw up a plan specifically for your building.

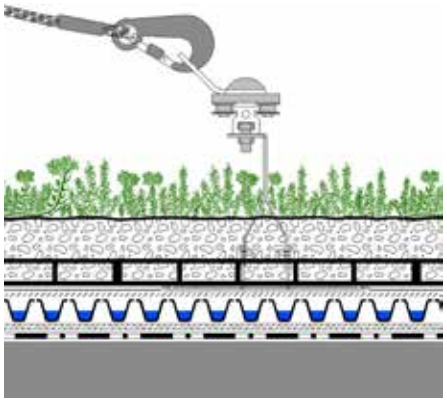
For further information, please see https://zinco-greenroof.co.uk/fall-protection

ZinCo Railing Solutions – attractive, functional and installed on the roof without penetration of the waterproofing.

The horizontally installed rail allows for the use of the whole radius surrounding the gliding runner, which is an ideal and efficient application on narrow roofs.

A collective fall protection solution such as Fallnet® ASG has the advantage that each person working on the roof is at the same time protected from falling off the roof. The ASG Maintenance Guardrail can be installed either vertically or at an angle. The Fallnet® ASG is Dekra-certified.

Every Fallnet® SR is delivered with an identification label securely attached at the anchor eye. On this label you will find information about the product type, standard testing method, date of manufacture and serial number. If required, this information allows to document, even after decades, the contractor and the planning for this protect.



Runner on fixing rail

Rail support

Plant level
System Substrate, depth in line with the required load
Grid with Fallnet® base plate
System build-up with Floradrain®
Root Barrier WSF 40,
if waterproofing is not root-resistant

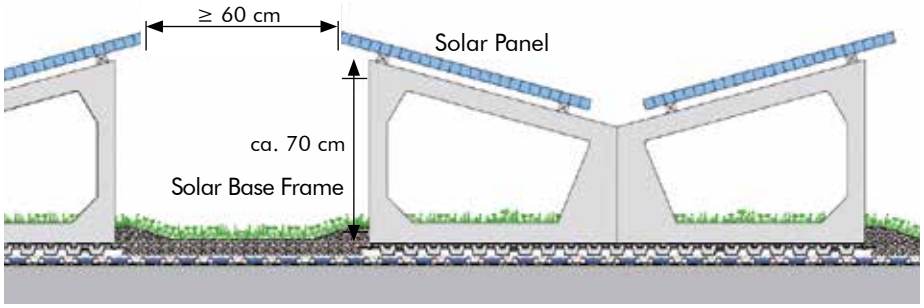
System Build-up “SolarVert®”

The development of the Solar Base has enabled ZinCo to add yet another benefit to the list of advantages of a green roof: the integration of solar energy use into the green roof build-up. With the ZinCo Solar Base which is integrated into the SolarVert® System Build-up, the performance of the green roof as an ecological compensation area is fully preserved.

Either a solar energy system or a green roof? That was the past!
With the System Build-up SolarVert® (Fixodrain® XD 20, ZinCo Solar Base® and Base Frame), the combination of solar panels and green roof achieve even greater efficiency. And, there is no need to penetrate the roof membrane as the load required to hold the system permanently in place is provided by the green roof itself. The Solar Bases can be placed wherever they are required on the Fixodrain® layer.

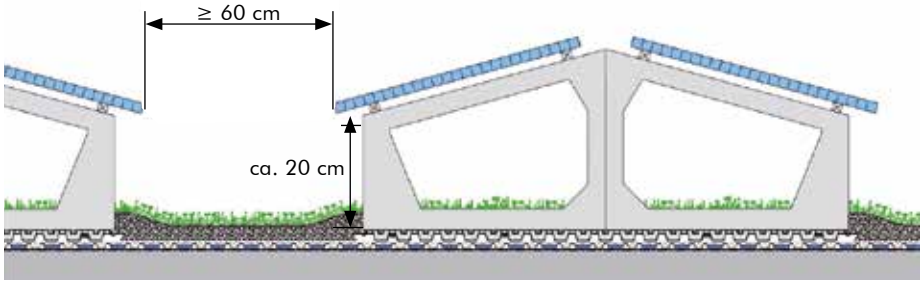
→ *For further information, please download our planning guide “***Solar Energy and Green Roofs***” at* **https://zinco-greenroof.co.uk/downloads**

Solar Substructure Type “Butterfly“



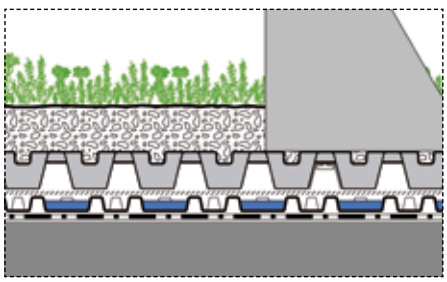
For an assembly of type “Butterfly”, the two Solar Base Frames meet with their lower sides. Rainwater is directed to the middle of the Solar Base SB 200 and distributed from there in both directions. In this case, a rather lush vegetation can be expected under the solar panels. The plants are relatively easy to access from the walkways between the panels because the panels have their maximum distance of approx. 70 cm to the substrate surface there.

Solar Substructure Type “Saddle“



For an assembly of type “Saddle”, two Solar Base Frames are mounted onto a Solar Base SB 200 in a way that their higher ends meet in the middle. The front edge of the solar panels has a sufficient distance to the substrate surface so that plants can still grow under the panels. The slope of the panels directs more rainwater to the walkways between the solar panel rows, so that an increased plant growth can be expected there.

	Weight kg/m²		Height mm
	dry	at water capacity max.	
from	108	134	80
	4	8	60
from	112	142	



Plug Plants “Sedum Carpet” or Sedum Cuttings
System Substrate, depth depends on the superimposed load required
ZinCo Solar Base® SB 200
Fixodrain® XD 20
Root Barrier WSF 40, if waterproofing is not root-resistant

ZinCo Green Roofing Systems now with European Technical Assessment

In 2013 ZinCo received European Technical Approval ETA with the number 13/0668 for a wide range of proven green roof systems. Since June 2018, the European Technical Approval has been replaced by the European Technical Assessment.

On the one hand, this is a prerequisite for unrestricted access to the European market and its contracting states and, on the other hand, it reassures architects, contractors and owners that the relevant systems and products have passed the mandatory proof procedures and are in accordance with the assessment requirements.

At the moment, the following two build-ups in the EXTENSIVE application range have European technical assessment:

	Extensive green roof "Sedum Carpet"	Extensive green roof "Rockery Type Plants"
Root Barrier (optional)	(Root Barrier WSB 100-PO)	(Root Barrier WSB 100-PO)
Protection Mat	Protection Mat TSM 32 / Protection Mat SSM 45	Protection Mat TSM 32 Protection Mat SSM 45
Drainage Element	Floradrain FD 25-E Fixodrain® XD 20	Floradrain FD 25-E
Filter sheet	Filter Sheet SF	Filter Sheet SF
Substrate layer	System Substrate Sedum Carpet	System Substrate Rockery Type Plants

The number of European-approved products and systems will be expanded gradually.

ENVIRONMENTAL PRODUCT DECLARATION (EPD)

The Environmental Product Declaration (EPD) has been created as an instrument which reliably shows the environmental impact of construction products throughout their complete life cycle and describes their functional and technical properties.

Transparent environmental information has always been of major relevance to ZinCo. For that reason ZinCo has created an EPD for the Green Roof System "Heather with Lavender" which has now been verified and published. It is a so-called "Core EPD". The life cycle assessment data of most extensive or intensive ZinCo Green Roof Systems can be provided by means of its tested and verified annex.

The internationally recognized EPDs form an essential cornerstone of the building certification systems of e.g. DGNB, BREEAM or LEED. They allow for comparisons of products or services with the same function and provide an important basis for the sustainability assessment of buildings.

Details can be found here:
https://zinco-greenroof.co.uk/epd

An Environmental Product Declaration (EPD) includes comprehensive life cycle assessment data and gives information about the environmental impact of construction products. © Institut Bauen und Umwelt e. V.

Ecological Protection Layers with System!

This Planning Guide aims to give you a general overview of the technology involved in the various extensive green roof options.

Our technical experts will be pleased to advise you on specific solutions for your own individual building projects: from the planning phase right through to creating your specification texts.

Download our planning guides and brochures for detailed information:
https://zinco-greenroof.co.uk/downloads

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