Roof

Substrates for extensive
and intensive greening

Green habitats with a view ....

Roofs, roof terraces and carports are often viewed purely from a functional perspective. They seem basic, fatigued and perhaps a little unfinished compared to grandiose architectural and garden designs. Despite this, they harbour an amazing potential to host attractive, green habitats for flora, fauna and indeed humans.

This can lead to significant improvements in the cityscape and landscape. And not only that, they also offer increased sound insulation, effective filtering of dust and pollutants, flood and wind protection, and climate improvement ... all more than convincing arguments to start a roof greening project!

Tropical nights in the city

Thanks to precise climate models, scientists can predict fairly accurately what the climate in Germany will look like in the future and how it will affect cities, rainfall, rainfall distribution, energy supply and health.

Climate impact of tropical cities: A warming of around two degrees means more frequent and longer hot days with 40 degrees in the shade and so-called tropical nights with over 20 degrees. Hot summers like 2018 will be the norm. Densely built-up city centers already have temperatures up to 8 degrees higher than the surrounding rural areas.

Green roofs and façades are building blocks for adapting to these changes - the temperature chart says it all.

Product overview

Extensive greening

Lavadrän®

Blowable, mineral drainage material and mulch.

on page 29

Vulkamineral®

Blowable substrate for extensive single-layer planting.

on page 30

Vulkamineral® easy 1250

Blowable lightweight substrate for extensive single-layer planting.

on page 31

Vulkamineral® easy 1050

Blowable lightweight substrate for extensive single-layer planting.

on page 31

Vulkamineral® light 850

Blowable lightweight substrate for extensive single-layer planting.

on page 31

Vulkaplus® extensive

Blowable substrate for multi-layer extensive greening.

on page 32

Vulkaplus® extensive light 1250

Blowable lightweight substrate for multi-layer extensive greening.

on page 33

Vulkaplus® extensive light 1050

Blowable lightweight substrate for multi-layer extensive greening.

on page 33

VulkaSolar

Blowable substrate for extensive single-layer greening*

on page 35

Vulkamineral® NRW 0.3

Extensive single-layer substrate to reduce peak runoff.

on page 37

Vulkaplus® Retention 1250

Extensive substrates to reduce peak runoff.

on page 38

RegioMix® extensive single layer

Extensive substrates from regional raw materials.

on page 54

RegioMix® extensive multilayer

Extensive substrates from regional raw materials.

on page 54

* Among other things, also as weighting for ballasted elevated solar systems.

Intensive greening

Lavadrän®

Blowable, mineral drainage material and mulch.

on page 41

Vulkamineral®

Blowable, mineral sub-substrate.

on page 42

Vulkamineral® easy 1250

Blowable, lightweight intensive substrate for a wide range of plants

on page 43

Vulkamineral® easy 1050

Blowable, lightweight intensive substrate for a wide range of plants

on page 43

Vulkamineral® light 850

Blowable, lightweight intensive substrate for a wide range of plants

on page 43

Vulkaplus® intensive 0–12

Blowable, intensive substrate for a wide range of plants.

on page 44

Vulkaplus® Intensive light 850

Blowable, lightweight intensive substrate for a wide range of plants

on page 45

Vulkaplant®

Mineral sub-substrate.

on page 46

Vulkaplus® intensive 0–16

Intensive substrate for a wide range of plants.

on page 47

Vulkaterra® Lawn 0-4

Blowable substrate for lawn areas.

on page 48

Vulkaterra® Lawn 0–6

Substrate optimised for laying lawns.

on page 49

Alternating bloom substrate

For planting alternating annuals and blooming plants.

on page 50

Accessories

RegioMix® Substrates

Internal substrate made from regional raw materials.

On pages 52–57

Fleeces

Separating, filtering, protecting.

On page 60

Utility shafts

Coverings made of plastic or aluminium.

On page 61

Sedum shoots and plug plants

On pages 62–63

Extensive Greening

The option of green roofs

Extensively greened roofs are created so that they look close to nature and are mainly created where roof areas are unusable. Since options for nurturing plants are limited due to the inaccessibility of the extensively greened roof, plants must be selected that respect this.

Due to their extreme locations, the plant species used must be undemanding, adaptable and capable of regeneration.

1.

Procedure according to FLL

Extensive mono-layer greening

An example of this structure can be found on product page 30.

2.

Procedure according to FLL

Extensive multi-layer greening

An example of this structure can be found on product page 32.

Lavadrän®

Lavadrän is mineral-based, low in salt, stable to pressure and frost resistant. It can be blown and is suitable for mineral drainage courses,
as a mineral mulch or as a slab substructure. The rough surface ensures a good interlocking of the grains and in this way a secure positioning.

Details:

- High pressure stability: loadable up to 95 MPa in the EV2 plate load test
- Up to 67% pore volume; therefore optimally drained
- Up to 15% water storage
- External monitoring of grain sizes 8–16 as part of the RAL quality assurance
- Available as bulk material, by silo truck or packaged in 1.0 or 1.5 m³ big bags and as a 25 l sacks

Procedure:

Drainage course, slab substrate, mulch layer

Composition:

Natural product (igneous stone mixture) consisting of augite, olivine, magnetite, limonite and biotite

Application areas:

- **Drainage layer in grassland construction, especially in green roofs**
- **Drainable substructure for slabs in foot traffic areas**
- **Effectively draining and resilient filler for building spaces**
- **Soil additive, substrate starting material**
- **Air and water filtration**
- **Mineral mulch**

Additional information:

- Certificates
- Product data sheets

This additional material is available for download at:

www.vulkatec.de

Grain size (ø in mm)	2–8, 2–12, 2–16, 8–16*
Particle size distribution (percentage of total mass in %)	
Blowable components	< 10
Volume weight (t/m³)	
Delivery condition DIN EN 1097-3	0.95–1.10
At max. water capacity, compacted	1.20–1.35
Water/air balance, compacted	
Maximum water capacity	8–15 vol.%
Water permeability mod. K_f	250–500 mm/min
pH value	6.8–7.5
Salinity	0.1–0.5 g/l

Vulkamineral®

Blowable substrate for extensive mono-layer procedure. Open-pored grain mixture with continuous grain distribution, consisting of natural pumice and light lava; on request with fertilizer additive.

Details:

- The grit is surface-rough, open-pored, tread-resistant, stable in terms of structure and storage, and resistant to being blown away
- Good water retention capacity and high water permeability with a large air volume
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- External monitoring for Vulkamineral LB 0-12 as part of the RAL quality assurance
- Optimized for transport by silo truck; also available as bulk material, 1.0 or 1.5 m³ big bags or in a 25 l bag

Procedure according to FLL:

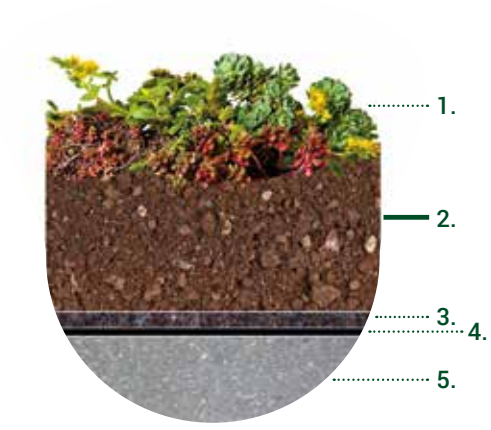
extensive, single-layer structure

Composition:

Natural product (igneous stone mixture) consisting of augite, olivine, magnetite, limonite and biotite

Application areas:

- **Extensive single-layer greening**
- **Basic component for higher quality substrates**
- **Urban tree restoration and transplantation**
- **Suitable as an under substrate**
- **Soil improvement**



Extensive Single-layer greening

1. Vegetation
2. 8 – 15 cm Vulkamineral®
3. Separating and protective layer 300 g/m²
4. Root-proof sealing
5. Building structure

Grain size (ø in mm)	LB 0-12
Particle size distribution (percentage of total mass in %)	
Blowable components	< 10
Proportions of components ≥ 4 mm	30–60
Volume weight (t/m³)	
Delivery condition DIN EN 1097-3, loose	0.90–1.00
At max. water capacity, compacted	1.40–1.60
Runoff curve number C	
Water/air balance, compacted	
Maximum water capacity	20–30 vol. %
Water permeability mod. K_f	60–150 mm/min
pH value	6.5–7.5
Salinity	0.1–0.5 g/l

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Vulkamineral® light

Blowable substrate for extensive mono-layer procedure. Open-pored grain mixture with continuous grain distribution, consisting of natural pumice and light lava; on request with fertilizer additive. Light variant with the addition of expanded clay or expanded slate.

Details:

- The grit is surface-rough, open-pored, tread-resistant, stable in terms of structure and storage, and resistant to being blown away
- Good water retention capacity and high water permeability with a large air volume
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- Optimized for transport by silo truck; also available as bulk material, 1.0 or 1.5 m^3 big bags or in a 25 l bag

Procedure according to FLL:

extensive, single-layer structure

Composition:

Natural product (igneous stone mixture) consisting of augite, olivine, magnetite, limonite and biotite
Type Lightweight: enriched with expanded clay or expanded slate

Application areas:

- **Extensive mono-layer greening**
- **Basic component for higher quality substrates**
- **Urban tree restoration and transplantation**
- **Suitable as an under substrate**
- **Soil improvement**

Extensive Single-layer greening

1. Vegetation
2. 8 – 15 cm Vulkamineral®
3. Separating and protective layer 300 g/m^2
4. Root-proof sealing
5. Building structure

Grain size (ø in mm)	light 1250	light 1050	light 850
Particle size distribution (percentage of total mass in %)			
Blowable components	< 10	< 10	< 10
Proportions of components ≥ 4 mm	30–60	30–60	30–60
Volume weight (t/m^3)			
Delivery condition DIN EN 1097-3, loose	0.70–0.80	0.65–0.75	0.45–0.57
At max. water capacity, compacted	1.20–1.25	1.00–1.10	0.80–0.90
Water/air balance, compacted			
Maximum water capacity	20–35 vol. %	20–35 vol. %	20–35 vol. %
Water permeability mod. K_f	60–350 mm/min	60–350 mm/min	150–400 mm/min
pH value	6.0–7.5	6.0–7.5	6.5–7.5
Salinity	0.1–1.0 g/l	0.1–1.0 g/l	0.1–1.0 g/l

Vulkaplus® extensive

Blowable substrate for the extensive multi-layered construction, non-segregating composition from the basic components natural pumice, light lava, green compost and xylitol. Light variant with the expanded clay and expanding slate additives.

Details:

- Open-pored and with a high total pore volume
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- External monitoring for Vulkaplus extensive 0–12 for RAL quality assurance
- Optimised for transport by silo truck; also available as bulk material, 1.0 or 1.5 m³ big bags or in a 25 l bag

Procedure according to FLL:

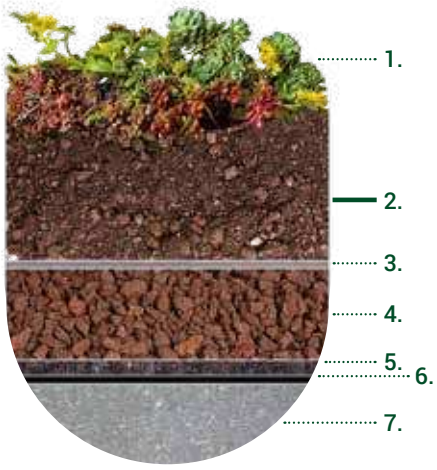
extensive, multi-layer construction

Composition:

Natural product (igneous stone mixture with organic aggregates) consisting of augite, olivine, magnetite, limonite, biotite and organic matter

Application areas:

- **For near-natural forms of vegetation under extreme site conditions**
- **Sloping roof greening**
- **For extensive multi-layer construction methods**
- **For the installation of biodiversity roofs**



Extensive Multi-layer greening

1. Vegetation
2. 6 – 15 cm Vulkaplus® extensive
3. Filter fleece 100 g/m²
4. 3 – 6 cm drainage course Lavadrän®
5. Separating and protective layer 300 g/m²
6. Root resistant seal
7. Building structure

	0–12
Grain size (ø in mm)	
Particle size distribution (percentage of total mass in %)	
Blowable components	6–15
Fine / medium gravel	35–50
Volume weight (t/m³)	
Delivery condition DIN EN 1097-3, loose	0.90–1.00
At max. water capacity, compacted	1.35–1.65
Water/air balance, compacted	
Maximum water capacity	35–45 vol. %
Water permeability mod. K_f	0.6–50 mm/min
pH value	6.5–7.5
Salinity	0.1–1.0 g/l

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Vulkaplus® extensive light

Blowable substrate for the extensive multi-layered construction, non-segregating composition from the basic components natural pumice, light lava, green compost and xylitol. Light variant with the expanded clay and expanding slate additives.

Details:

- Open-pored and with a high total pore volume
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- Optimised for transport by silo truck; also available as bulk material, 1.0 or 1.5 m^3 big bags or in a 25 l bag

Procedure according to FLL:

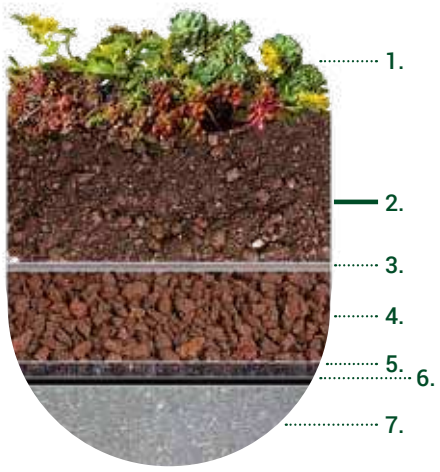
extensive, multi-layer construction

Composition:

Natural product (igneous stone mixture with organic aggregates) consisting of augite, olivine, magnetite, limonite, biotite and organic matter

Application areas:

- **For near-natural forms of vegetation under extreme site conditions**
- **Sloping roof greening**
- **For extensive multi-layer construction methods**
- **For the installation of biodiversity roofs**



Extensive Multi-layer greening

1. Vegetation
2. 6 – 15 cm Vulkaplus® extensive
3. Filter fleece 100 g/m^2
4. 3 – 6 cm drainage course Lavadrän®
5. Separating and protective layer 300 g/m^2
6. Root resistant seal
7. Building structure

Grain size (ø in mm)	**Light 1250**	**Light 1050**
Particle size distribution (percentage of total mass in %)		
Blowable components	6–15	6–15
Fine / medium gravel	30–60	30–60
Volume weight (t/m^3)		
Delivery condition DIN EN 1097-3, loose	0.75–0.85	0.50–0.65
At max. water capacity, compacted	1.20–1.30	1.00–1.10
Water/air balance, compacted		
Maximum water capacity	30–40 vol. %	30–40 vol. %
Water permeability mod. K_f	0.6–50 mm/min	0.6–50 mm/min
pH value	6.5–7.5	6.5–7.5
Salinity	0.1-1.5 g/l	0.1-1.5 g/l

VulkaSolar

A symbiosis of technology and nature

The media report daily on photovoltaic systems and green roofs in connection with the discussions on climate change, sponge cities and biodiversity. But most of them view the matter from a monocausal perspective. There are good reasons to combine photovoltaics and plants on the roof.

We have developed our Vulkasolar PV substrate to optimise this approach for load-bearing systems. With VulkaSolar, the minimum load for securing the PV construction against the effects of wind can be calculated for each individual project. VulkaSolar provides the plants with an ideal vegetation support layer, ensuring that the greening encourages biodiversity. The area around the building is cooled in summer due to shading of the roof cladding and the evaporation of water.

VulkaSolar holds the water on the roof like a sponge and releases it into the environment as water vapour. Up to 55% of the rainwater can be returned to the water cycle, depending on the volume of local precipitation and the thickness of the substrate. This significantly eases the burden on the sewer systems. As a side effect, the lower summer temperature on the roof noticeably improves the efficiency of the PV modules.

Conclusion: PV and green roofs belong together!

Combined utility roof with PV/roof greening
Source: Bauder

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Procedure according to FLL:
extensive, single-layer structure

Composition:
Natural product (igneous rock mixture with organic additives) consisting of augite, olivine, magnetite, limonite, biotite and organic mass, enriched with basalt

A symbiosis of technology and nature

VulkaSolar

A blowable substrate for extensive single-layer construction in conjunction with photovoltaics as a root space for the plants and for fixing the loosely mounted solar panels. Non-segregating, composed of the basic components natural pumice, light lava, basalt, green compost and xylitol.

Details:
- Open-pored and with a high total pore volume
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- High dry weight/storage stability
- Optimised for transport by silo truck; also available as bulk material, 1.0 or 1.5 m^3 big bags or in a 25 l bag

Application areas:

- **For near-natural forms of vegetation under extreme site conditions**
- **For extensive single-layer construction methods**
- **Sloping roof greening**
- **High dry weight for attaching solar mounting systems without roof penetration; e.g. BauderGreen Solar**

Grain size (ø in mm)	**0–12**
Particle size distribution (percentage of total mass in %)	
Blowable components	5–10
Fine / medium gravel	50–75
Volume weight (t/m^3)	
in a dry state	1,2-1,35
At max. water capacity, compacted	1.5–1.7
Water/air balance, compacted	
Maximum water capacity	27–33 % vol
Water permeability mod. K_f	0.6–200 mm/min
pH value	6.5–7.5
Salinity	0.1–1.0 g/l

Runoff curve number C_s

for heavy rainfall events

The runoff curve number C_s is taken from DIN 1986-100 and was also referred to as the peak runoff curve number. It is a dimensionless parameter and represents the ratio of the rainfall yield of a block rainfall to the rain runoff yield of the roof surface.

The aim is to ease the strain on the sewer system during heavy rainfall and to delay the rain runoff from the roof so that it occurs when the sewer capacity to accommodate the water is restored. This prevents damage caused by flooding.
If no individual examination/test certificate is available, the specifications of the FLL green roof guidelines apply, which show the ratio of the installation thickness of the substrate and the resulting runoff curve number C_s in a tabular form under point 9.3.4.

For Vulkaplus Retention 1250, the runoff curve number C_s is determined in accordance with the specifications described in Annex B.4: Determination of the runoff curve number C_s according to the current FLL Green Roof Guidelines. The rainfall event used as a basis corresponds to 27L/m² in a period of 15 minutes (corresponds to 300L/s/ha).

Current edition of the Green Roof Guidelines – Guidelines for the planning, construction and maintenance of green roofs 2018 (brochure) available at **www.fll.de**.

Vulkamineral® NRW 0.3

Blowable substrate for extensive mono-layer procedure. Open-pored grain mixture with continuous grain distribution, consisting of natural pumice and light lava; on request with fertilizer additive.

Details:

- The grit is surface-rough, open-pored, tread-resistant, stable in terms of structure and storage, and resistant to being blown away
- Good water retention capacity and high water permeability with a large air volume
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- External monitoring for Vulkamineral LB 0-12 as part of the RAL quality assurance
- Optimized for transport by silo truck; also available as bulk material, 1.0 or 1.5 m^3 big bags or in a 25 l bag

Procedure according to FLL:

extensive, single-layer structure

Composition:

Natural product (igneous stone mixture) consisting of augite, olivine, magnetite, limonite and biotite

Application areas:

- **Extensive single-layer greening**
- **Basic component for higher quality substrates**
- **Urban tree restoration and transplantation**
- **As 2–12 mm screening for interior greening**
- **Suitable as an under substrate**
- **Soil improvement**

Grain size (ø in mm)	**NRW 0.3**
Particle size distribution (percentage of total mass in %)	
Blowable components	< 10
Proportions of components ≥ 4 mm	30–60
Volume weight (t/m^3)	
Delivery condition DIN EN 1097-3, loose	0.90–1.00
At max. water capacity, compacted	1.40–1.60
Runoff curve number C	At 6 cm: 0.25 at 8 cm: 0.16 at 10 cm: 0.13
Water/air balance, compacted	
Maximum water capacity	20–30 vol. %
Water permeability mod. K_f	60–150 mm/min
pH value	6.5–7.5
Salinity	0.1–0.5 g/l

Procedure according to FLL:

extensive, multi-layer construction

Composition:

Natural product (igneous rock mixture with organic additives) consisting of augite, olivine, magnetite, limonite, biotite and organic mass: enriched with expanded clay

Vulkaplus® Retention 1250

A breathable substrate for extensive multi-layer construction, non-segregating, composed of the basic components natural pumice, lava, green compost and xylitol. Light variant with the expanded clay and expanding slate additives. Optimised to reduce the peak runoff factor C_s.

Details:

- Open-pored and with a high total pore volume
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- with defined peak runoff factor C_s, in conjunction with drainage panels available on the market, for optimisation of the peak runoff factor
- Optimised for transport by silo truck; also available as bulk material, 1.0 or 1.5 m^3 big bags or in a 25 l bag

Application areas:

- **For near-natural forms of vegetation under extreme site conditions**
- **For extensive multi-layer construction methods**

Grain size (ø in mm)	Retention 1250
Particle size distribution (percentage of total mass in %)	
Blowable components	6–15
Fine / medium gravel	30–50
Volume weight (t/m^3)	
Delivery condition DIN EN 1097-3, loose	0.72–0.80
At max. water capacity, compacted	1.20–1.30
Water/air balance, compacted	
Maximum water capacity	35–45 vol. %
Water permeability mod. K_f	0.6–50 mm/min
pH value	6.5–7.5
Salinity	0.1-1.5 g/l

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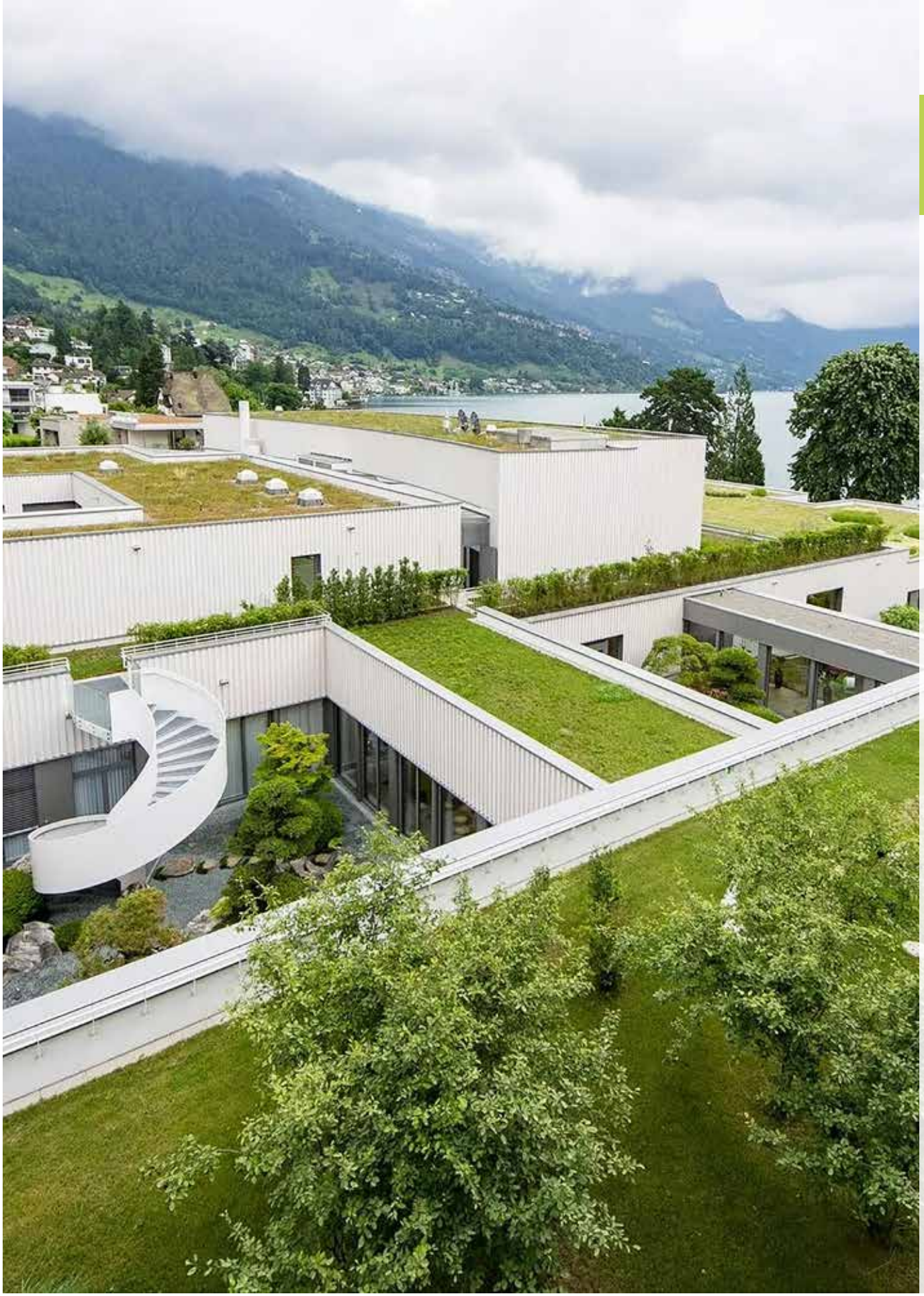


Source: Paul Bauder GmbH & Co. KG

Chenot Palace, Weggis (Switzerland)
Extensive green roof combined with intensive lawn and tree planting

Intensive Greening

The option of green roofs

In contrast to extensive greening, intensive greening offers an almost unlimited variety of plants. Due to its variety of vegetation, there is a high care requirement for the plants where intensive greening is involved. However, because of the usual regular use of the roof surface it is also comparable with a ground-based green or garden area.

1.

FLL procedure

Intensive greening

An example of this structure can be found on product page 44.

2.

FLL procedure

Intensive greening with top and bottom substrate

An example of this structure can be found on product page 47.

Lavadrän®

Lavadrän is mineral-based, low in salt, stable to pressure and frost resistant. It can be blown and is suitable for mineral drainage courses, as a mineral mulch or as a slab substructure. The rough surface ensures a good interlocking of the grains and in this way a secure positioning.

Details:

- High pressure stability: loadable up to 95 MPa in the EV2 plate load test
- Up to 67% pore volume; therefore optimally drained
- Up to 15% water storage
- External monitoring of grain sizes 8–16 as part of the RAL quality assurance
- Available as bulk material, by silo truck or packaged in 1.0 or 1.5 m3 big bags and as 25 l sacks

Procedure:

Drainage course, slab substrate, mulch layer

Composition:

Natural product (igneous stone mixture) consisting of augite, olivine, magnetite, limonite and biotite

Application areas:

- **Drainage layer in grassland construction, especially for green roofs**
- **Drainable substructure for slabs in foot traffic areas**
- **Effectively draining and resilient filler for building spaces**
- **Soil additive, substrate starting material**
- **Air and water filtration**
- **Mineral mulch**

Additional information:

- Certificates
- Product data sheets

This additional material is available for download at:

www.vulkatec.de

Grain size
(ø in mm)

2–8 | 2–12 | 2–16 | 8–16*

Particle size distribution (percentage of total mass in %)	
Blowable components	< 10
Volume weight (t/m^3)	
Delivery condition DIN EN 1097-3	0.95–1.10
At max. water capacity, compacted	1.20–1.35
Water/air balance, compacted	
Maximum water capacity	8–15 vol.%
Water permeability mod. K_f	250–500 mm/min
pH value	6.8–7.5
Salinity	0.1–0.5 g/l

Vulkamineral®

Blowable substrate for extensive mono-layer procedure. Open-pored grain mixture with continuous grain distribution, consisting of natural pumice and light lava; on request with fertilizer additive.

Details:

- The grit is surface-rough, open-pored, tread-resistant, stable in terms of structure and storage, and resistant to being blown away
- Good water retention capacity and high water permeability with a large air volume
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- External monitoring for Vulkamineral LB 0-12 as part of the RAL quality assurance
- Optimized for transport by silo truck; also available as bulk material, 1.0 or 1.5 m³ big bags or in a 25 l bag

Procedure according to FLL:

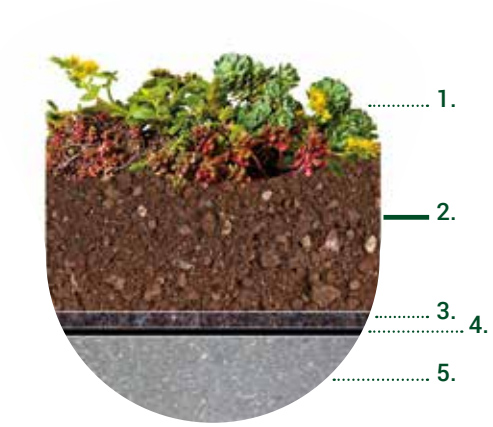
extensive, single-layer structure

Composition:

Natural product (igneous stone mixture) consisting of augite, olivine, magnetite, limonite and biotite

Application areas:

- **Extensive single-layer greening**
- **Basic component for higher quality substrates**
- **Urban tree restoration and transplantation**
- **Suitable as an under substrate**
- **Soil improvement**



Extensive Single-layer greening

1. Vegetation
2. 8 – 15 cm Vulkamineral®
3. Separating and protective layer 300 g/m²
4. Root-proof sealing
5. Building structure

Grain size (ø in mm)	**LB 0-12**
Particle size distribution (percentage of total mass in %)	
Blowable components	< 10
Proportions of components ≥ 4 mm	30–60
Volume weight (t/m³)	
Delivery condition DIN EN 1097-3, loose	0.90–1.00
At max. water capacity, compacted	1.40–1.60
Runoff curve number C	
Water/air balance, compacted	
Maximum water capacity	20–30 vol. %
Water permeability mod. K_f	60–150 mm/min
pH value	6.5–7.5
Salinity	0.1–0.5 g/l

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Vulkamineral® light

Blowable substrate for extensive mono-layer procedure. Open-pored grain mixture with continuous grain distribution, consisting of natural pumice and light lava; on request with fertilizer additive. Light variant with the addition of expanded clay or expanded slate.

Details:

- The grit is surface-rough, open-pored, tread-resistant, stable in terms of structure and storage, and resistant to being blown away
- Good water retention capacity and high water permeability with a large air volume
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- Optimized for transport by silo truck; also available as bulk material, 1.0 or 1.5 m³ big bags or in a 25 l bag

Procedure according to FLL:

extensive, single-layer structure

Composition:

Natural product (igneous stone mixture) consisting of augite, olivine, magnetite, limonite and biotite
Type Lightweight: enriched with expanded clay or expanded slate

Application areas:

- **Extensive mono-layer greening**
- **Basic component for higher quality substrates**
- **Urban tree restoration and transplantation**
- **Suitable as an under substrate**
- **Soil improvement**

Extensive Single-layer greening

1. Vegetation
2. 8 – 15 cm Vulkamineral®
3. Separating and protective layer 300 g/m²
4. Root-proof sealing
5. Building structure

Grain size (ø in mm)	light 1250	light 1050	light 850
Particle size distribution (percentage of total mass in %)			
Blowable components	< 10	< 10	< 10
Proportions of components ≥ 4 mm	30–60	30–60	30–60
Volume weight (t/m³)			
Delivery condition DIN EN 1097-3, loose	0.70–0.80	0.65–0.75	0.45–0.57
At max. water capacity, compacted	1.20–1.25	1.00–1.10	0.80–0.90
Water/air balance, compacted			
Maximum water capacity	20–35 vol. %	20–35 vol. %	20–35 vol. %
Water permeability mod. K_f	60–350 mm/min	60–350 mm/min	150–400 mm/min
pH value	6.0–7.5	6.0–7.5	6.5–7.5
Salinity	0.1–1.0 g/l	0.1–1.0 g/l	0.1–1.0 g/l

Vulkaplus® intensive 0–12

Blowable substrate for intensive greening with a wide range of plants, non-segregating composition from the basic components natural pumice, light lava, green compost and xylitol. Light variant with the addition of expanded clay.

Details:

- Open-pored and with a high total pore volume
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- External monitoring for Vulkaplus® intensive 0–12 as part of RAL quality assurance
- Optimised for transport by silo truck; also available as bulk material, 1.0 or 1.5 m³ big bags or in a 25 l bag

Procedure according to FLL:

intensive, multi-layered construction

Composition:

Natural product (igneous rock mixture with organic aggregates) consisting of augite, olivine, magnetite, limonite, biotite and organic matter,

Application areas:

- **Vegetation substrate for demanding vegetation types**
- **Coordinated with the planned vegetation**
- **Tree plantings and tree renovations on roof surfaces**
- **Noise barriers, plant rings, tub planting**
- **urban farming**

Intensive Greening

1. Vegetation
2. > 15 cm: Vulkaplus® intensive
3. Filter fleece 100 g/m²
4. 3 – 6 cm Drainage course of Lavadrän®
   (with waterlogging up to 15 cm)
5. Separating and protective layer 300 g/m²
6. Root resistant seal
7. Building structure

Grain size (ø in mm)	0–12
Particle size distribution (percentage of total mass in %)	
Blowable components	8–15
Fine / medium gravel	25–40
Volume weight (t/m³)	
Delivery condition DIN EN 1097-3, loose	0.90–1.00
At max. water capacity, compacted	1.40–1.65
Water/air balance, compacted	
Maximum water capacity	45–50 vol. %
Water permeability mod. K_f	0.3–15 mm/min
pH value	6.9–7.5
Salinity	0.1–1.0 g/l

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Vulkaplus® intensive light 1250

Expandable substrate for intensive greening with a wide range of plants, non-segregating, composed of the basic components expanded clay, natural pumice, light lava, green compost and xylitol.

Details:

- Open-pored and with a high total pore volume
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Meets the requirements of the current FLL guideline and the fertilizer ordinance
- Optimised for transport by silo truck; also available as bulk material, 1.0 or 1.5 m³ big bags or in a 25 l bag

Procedure according to FLL:

intensive, multi-layered construction

Composition:

Natural product (igneous rock mixture with organic additives) consisting of augite, olivine, magnetite, limonite, biotite and organic mass, enriched with expanded clay.

Application areas:

- **Vegetation substrate for demanding vegetation types**
- **Optionally with different pH values**
- **Coordinated with the planned vegetation**
- **Tree plantings and tree renovations on roof surfaces**
- **Noise barriers, plant rings, tub planting**
- **Interior greening**

Intensive Greening

1. Vegetation
2. > 15 cm: Vulkaplus® intensive light 1250
3. Filter fleece 100 g/m²
4. 3 – 6 cm Drainage course of Lavadrän®
   (with waterlogging up to 15 cm)
5. Separating and protective layer 300 g/m²
6. Root-tight sealing
7. Building structure

Grain size (ø in mm)	**Light 1250**
Particle size distribution (percentage of total mass in %)	
Blowable components	8–15
Fine / medium gravel	30–40
Volume weight (t/m³)	
Delivery condition DIN EN 1097-3, loose	0.75–0.90
At max. water capacity, compacted	1.20–1.30
Water/air balance, compacted	
Maximum water capacity	43–50 vol. %
Water permeability mod. K_f	0.3–45 mm/min
pH value	6.7–7.5
Salinity	0.1-1.5 g/l

Vulkaplant®

Mineral sub-substrate for intensive multi-layer greening. Low salt, non-segregating composed of the basic components loess, lava, pumice and sand.

Details:

- Open-pored, with a high total pore volume, pressure-resistant
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Free of root-forming weeds
- Processable in the wet and in light frost
- Unlimited installation strength
- Produced in accordance with the FLL guideline and the latest version of the Fertilizer Ordinance
- Available as bulk material, in a 1.0 or 1.5 m^3 big bag, or as a 25 l bag
- Not blowable

Procedure according to FLL:

Under substrate, intensive, multi-layer construction

Composition:

Natural product (igneous stone mixture, top / bottom soil of different classes) consisting of augite, olivine, magnetite, limonite, biotite and clays of different types

Application areas:

- **Greening with perennials and woody plants in wild-grown locations (e.g.prairie perennials)**
- **Underground parking greening**
- **As a sub-substrate with higher layer structure**
- **Plant pot substrate for permanent planting with woody plants**
- **Greening of noise barriers / walls**
- **Replacement of unsuitable soils**

Additional information:

- Certificates
- Product data sheets

This additional material is available for download at:

www.vulkatec.de

Grain size (ø in mm)	**0–16**
Particle size distribution (percentage of total mass in %)	
Blowable components	10–20
Fine / medium gravel	30–45
Volume weight (t/m^3)	
Delivery condition DIN EN 1097-3	1.05–1.15
At max. water capacity, compacted	1.60–1.80
Water/air balance, compacted	
Maximum water capacity	20–35 vol. %
Water permeability mod. K_f	0.3–15 mm/min
pH value	6.9–7.5
Salinity	10–50 mg/100 g

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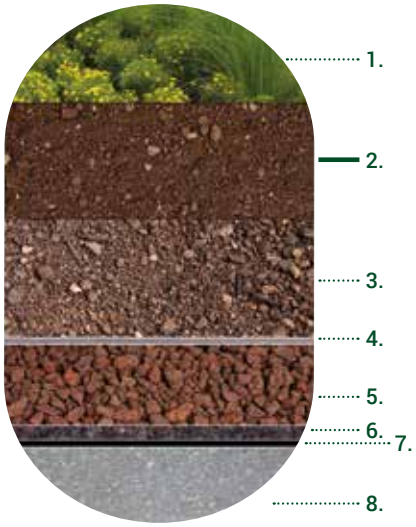
Procedure according to FLL:

Upper substrate, intensive, multi-layer construction

Composition:

Natural product (igneous stone mixture, top / bottom soil of different classes) consisting of augite, olivine, magnetite, limonite, biotite and clays of various types enriched with compost



Intensive greening with sub-substrate

1. Vegetation
2. Upper substrate: Vulkaplus® intensive 0–12, 60 cm, blown in the silo 0–16, 45 cm, loosely poured
3. Under substrate: Vulkaplant® 0–16 Vulkamineral® LB 0–12
4. Filter fleece 100 g/m²
5. 3 – 6 cm Drainage course Lavadrän®
6. Separating and protection layer 300 g/m²
7. Root resistant seal
8. Building structure

Vulkaplus® intensive 0–16

Mineral-organic substrate, non-segregating and composed of the basic components loess, lava, pumice, sand and compost. Suitable for intensive greening with a broad spectrum of plants.

Details:

- Open-pored, with a high total pore volume, pressure-resistant
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Free of root-forming weeds
- Processable in the wet and in light frost
- Usable up to 45 cm layer thickness
- Produced in accordance with the requirements of the FLL guideline and the Fertilizer Ordinance in its current version
- Available as bulk material, in 1.0 or 1.5 m³ big bags, or as 25 l bag
- Not blowable
- **Optionally with different pH values**

Application areas:

- **Underground parking greening**
- **Plant pot substrate for permanent planting with perennials and shrubs**
- **Greening of noise barriers / walls**
- **Greening**
- **Replacement of unsuitable soils**
- **urban farming**

Grain size (ø in mm)	**0–16**
Particle size distribution (percentage of total mass in %)	
Blowable components	10–20
Fine / medium gravel	30–40
Volume weight (t/m³)	
Delivery condition DIN EN 1097-3	1.00–1.10
At max. water capacity, compacted	1.50–1.85
Water/air balance, compacted	
Maximum water capacity	40–50 vol. %
Water permeability mod. K_f	0.3–20 mm/min
pH value	6.9–7.5
Salinity	0.2–1.0 g/l

Vulkaterra®
Lawn 0–4 blowable

Mineral-organic substrate, low–salt, non-segregating composed of the basic components lava, pumice, expanded clay, compost and xylitol. For intensive greening, optimised for the creation of lawns.

Details:

- Open-pored, with a high total pore volume, pressure-resistant, long-term stable
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Free from seeding and root weeds
- Due to storage under roof it can be processed in wet conditions and in light frost
- Pneumatically transportable by silo truck over distances of up to 150 m
- Can also be used after a short time even after prolonged or heavy rainfall
- Preferably greened using turf grass and to be planned up to approx. 40 cm thickness with permanent additional irrigation

Procedure compliant with FLL:

Landscaping lawn substrate, roof / underground garage roof substrate

Composition:

Natural product; Eruptive stone mixture, consisting of augite, olivine, magnetite, limonite, biotite, enriched with expanded clay, xylitol and compost

Application areas:

- **Grass seeding for green areas, courtyards and roof areas**
- **Restoration and new laying of commercial and ornamental turf areas**
- **As a substitute for topsoil, for the planting of perennials and woody plants**
- **Permanent tub planting with shrubs and perennials**

Additional information:

- **Certificates**
- **Product Data Sheets**
- **Installation instructions**

This additional material is available for download at:

www.vulkatec.de

Grain size (ø in mm)	**0–4**
Particle size distribution (percentage of total mass in %)	
Blowable components	10–20
Fine / medium gravel	20–30
Volume weight (t/m^3)	
Delivery condition DIN EN 1097-3	0.80–0.85
At max. water capacity, compacted	1.20–1.40
Water/air balance, compacted	
Maximum water capacity	45–55 vol. %
Water permeability mod. K_f	0.3–20 mm/min
pH value	6.5–7.2
Salinity	0.5–1.0 g/l

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Vulkaterra® Lawn 0–6

Mineral-organic substrate, low-salt, non-segregating, composed of the basic components lava, pumice, sand and compost. For intensive greening, optimised for the creation of lawns.

Details:

- Open-pored, with a high total pore volume, pressure-resistant, long-term stable
- Good nutrient buffering, pH-stable, germination and growth-promoting
- Free of root-forming weeds
- Processable in the wet and in light frost
- Can also be used after a short time even after prolonged or heavy rainfall
- Preferably greened with turf grass and to be planned up to approx. 40 cm thickness with permanent additional irrigation
- Available as bulk material, in 1.0 or 1.5 m^3 big bag, or as 25 l bag

Procedure according to FLL:

Landscaping lawn substrate, roof / underground garage roof substrate

Composition:

Natural product (igneous rock mixture, consisting of augite, olivine, magnetite, limonite, biotite, clays of various types, enriched with compost)

Application areas:

- **Grass seeding for green areas, courtyards and roof areas**
- **Restoration and new laying of commercial and ornamental turf areas**
- **As a substitute for topsoil, for the planting of perennials and woody plants**
- **Permanent tub planting with shrubs and perennials**

Additional information:

- Certificates
- Product data sheets
- Installation instructions

This additional material is available for download at:

www.vulkatec.de

Grain size (ø in mm)	**0–6**
Particle size distribution (percentage of total mass in %)	
Blowable components	10–20
Fine / medium gravel	20–40
Volume weight (t/m^3)	
Delivery condition DIN EN 1097-3	1.00–1.10
At max. water capacity, compacted	1.60–1.85
Water/air balance, compacted	
Maximum water capacity	40–50 vol. %
Water permeability mod. K_f	0.6–20 mm/min
pH value	6.8–7.5
Salinity	0.5–1.5 g/l

0–6

Alternating bloom substrate

Mineral-organic perennial substrate; especially for flowering perennials in alternate planting, low-salt, non-segregating composition. Basic components of the standard variant are loess, lava, pumice, sand, compost. In the acidic variant there is also peat in the mixture. Upon request, both variants are available with long-term fertilizer enrichment.

Details:

- Open-pore, with a high total pore volume, stable
- It is therefore safe from waterlogging since it also features high water retention
- Very good nutrient buffering, pH-stable, germination and growth-promoting
- Free of root-forming weeds

Procedure according to FLL:

intensive multi-layer greening

Composition:

Natural product; Eruptive stone mixture, consisting of augite, olivine, magnetite, limonite, biotite, clays of various types, enriched with compost and / or peat

Application areas:

- **Particularly suitable for alternating planting with flowering plants in municipal flower beds, state and national garden shows**
- **Any form of intensive greening, especially for demanding perennials**

Additional information:

- Certificates
- Product data sheets

This additional material is available for download at:

www.vulkatec.de

Grain size (ø in mm)	0–6
Particle size distribution (percentage of total mass in %)	
Blowable components	10–20
Fine / medium gravel	20–30
Volume weight (t/m^3)	
Delivery condition DIN EN 1097-3	0.95–1.05
At max. water capacity, compacted	1.50–1.85
Water/air balance, compacted	
Maximum water capacity	45–55 vol. %
Water permeability mod. K_f	0.3–20 mm/min
pH value	5.5–7.0
Salinity	0.5–1.0 g/l

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References

eBus Port, Nuremberg
Extensive green roof with solar system

Haus der Astronomie, Heidelberg
Extensive green roof with sedum plants

RegioMix®

from the region for the region

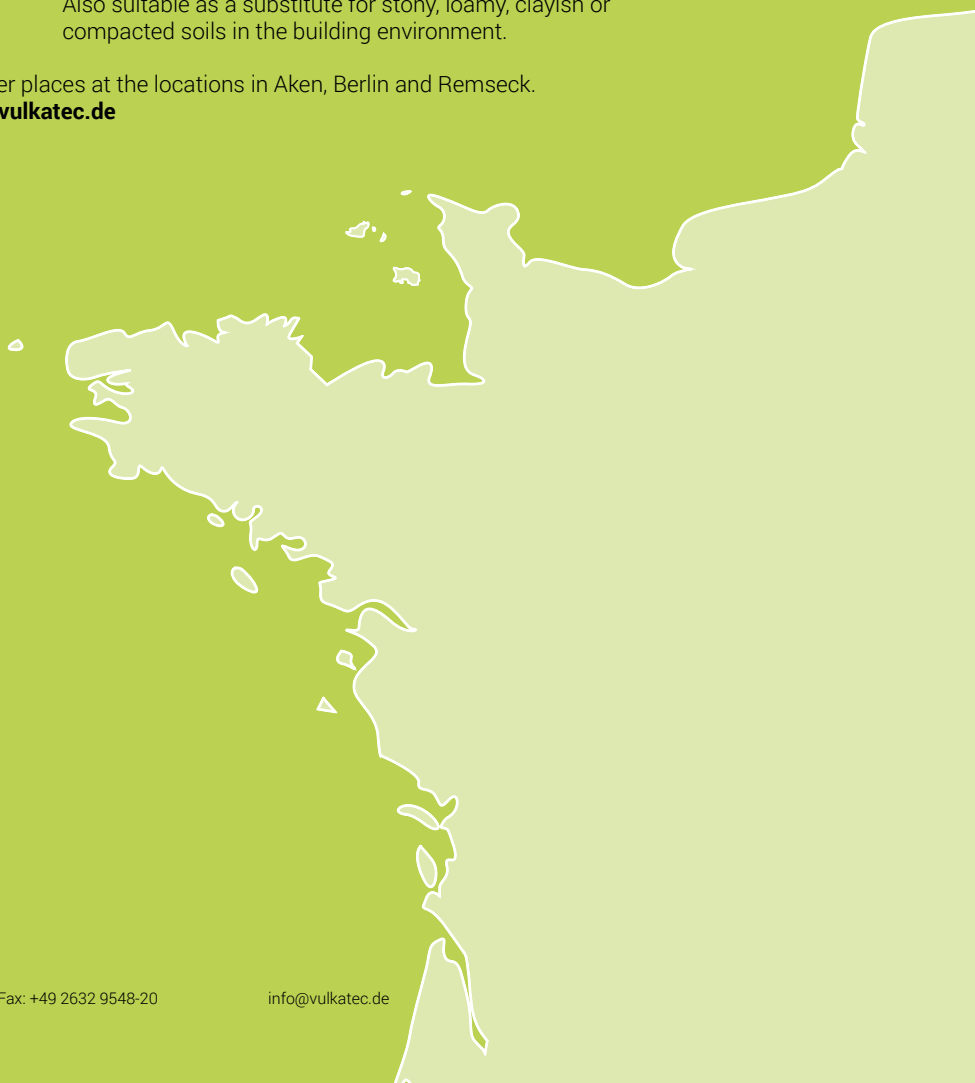
RegioMix® extensive, RegioMix® intensive and RegioMix® lawn;
three powerful, ecological products for your benefit from Vulkatec.

Regionality is on everyone's lips today. People are increasingly buying vegetables, potatoes, eggs and meat from the farmer around the corner or at least from suppliers who guarantee that their products are sourced from the region. The purpose here is to improve the ecological balance and quality of our food.
Picking up on this trend, we have given some thought to the regionalisation of our substrates. We have developed the new RegioMix® substrates after extensive research into and laboratory analysis of the local raw material situation on site. We took these steps from the perspective of environmental relevance, the requirements of the Fertilizer Ordinance and others enshrined in the relevant regulations for horticulture/landscaping, in particular the FLL guidelines and recommendations.
RegioMix® combines ecology, vegetation technology and economics into a single package.

RegioMix® extensive: Basis underlying the simple, easy-to-handle roofing of roofs.

RegioMix® intensive: Intensive roof greening with shrubs and woody plants. Also suitable as a substitute for stony, loamy, clayish or compacted soils in the building environment.

Available amongst other places at the locations in Aken, Berlin and Remseck.
Current status at**www.vulkatec.de**



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Sande
Volkstorf
Berlin
Fürstenwalde
Stadthagen
Utrecht
Parensen
Aken (Elbe)
Papendrecht
Lünen
Puurs
Immenhausen
Leisnig
Duisburg
Deinze
Kretz (Andernach)
Remseck (Stuttgart)
Garching
Landsberg
Huningue

RegioMix® extensive

from the region, for the region

Regionality is on everyone's lips today. People are increasingly buying vegetables, potatoes, eggs, meat from the farmer around the corner, or at least from suppliers who can guarantee a regionality of the products in order to improve the ecological balance as well as the quality of our food.
Picking up on this trend, we have given some thought to the regionalisation of our substrates. After extensive research into local raw materials and the analysis of the same in the laboratory from the perspective of environmental relevance, the requirements of the Fertilizer Ordinance and those of the relevant GalaBau regulations, in particular the FLL guidelines and recommendations, we have developed our novel RegioMix® substrates.
RegioMix® combines ecology, vegetation technology and economics into a single package.

RegioMix® extensive single layer:
Basis for simple, low-maintenance green roofs without an additional drainage layer

RegioMix® extensive:
Basis for simple, easily manageable roof greening.

Available at the following locations, among others:

Location	Post code	State / Province
Remseck	71686	Baden-Württemberg
Garching	85748	Bavaria
Landsberg	86899	Bavaria
Immenhausen	34376	Hesse
Parensen	37176	Lower Saxony
Stadthagen	31655	Lower Saxony
Volkstorf	21397	Lower Saxony
Duisburg	47051-47279	North Rhine-Westphalia
Leisnig	04703	Saxony
Aken / Elbe	06385	Saxony-Anhalt
Utrecht	3450-3455, 3500-3599	Utrecht
Papendrecht	3351-3356	Zuid-Holland
Puurs	2870	Antwerp
Deinze	9800	East Flanders

Current status at **www.vulkatec.de**

RegioMix® extensive

Mineral (RegioMix ® mineral) or mineral-organic (RegioMix ® extensive) substrate for extensive greening. The fundamental components are regionally sourced brick chippings, pumice, and compost.

Details:

- Open-pored, with a high total pore volume, pressure-resistant, long-term stable
- Very good nutrient buffering, pH-stable, germination and growth-promoting
- Free from weeds
- Good processability
- Produced in accordance with the requirements of the FLL guideline and the Fertilizer Ordinance in its current version
- Can be delivered with turbolift trucks and blown via hoses up to 150 m in length

Application areas:

- **Extensive greening of building ceilings with sedum, herbs and drought tolerant grasses**

Additional information:

- Certificates
- Product data sheets

This additional material is available for download at:

www.vulkatec.de

	RegioMix® extensive	RegioMix® extensive single-layer
Particle size distribution (percentage of total mass in %)		
Blowable components	<- 15	<- 10
Fine / medium gravel	<- 50	<- 75
Volume weight (t/m^3)		
at max. water capacity	Please request the value from the competent sales employee at the specific location	
Water/air balance		
Max. water capacity	35–65 vol. %	20–65 vol. %
Air capacity at max. water capacity	10–25 vol. %	10–25 vol. %
Air capacity at pF 1.8	20–35 vol. %	
Water permeability mod. K_f	0.6–70 mm/min	60–400 mm/min
pH value	6.5–7.6	6.5–7.6
Salt content (water extract)	<- 3.5	<- 3.5

RegioMix® intensive

from the region, for the region

Regionality is on everyone's lips today. People are increasingly buying vegetables, potatoes, eggs, meat from the farmer around the corner, or at least from suppliers who can guarantee a regionality of the products in order to improve the ecological balance as well as the quality of our food.
Picking up on this trend, we have given some thought to the regionalisation of our substrates. After extensive research into local raw materials and the analysis of the same in the laboratory from the perspective of environmental relevance, the requirements of the Fertilizer Ordinance and those of the relevant GalaBau regulations, in particular the FLL guidelines and recommendations, we have developed our novel RegioMix® substrates.
RegioMix® combines ecology, vegetation technology and economics into a single package.

RegioMix® intensive: Intensive roof greening with shrubs and woody plants.
Also suitable as a substitute for stony, loamy, clayish or compacted soils in the building environment.

Available at the following locations, among others:

Location	Post code	State / Province
Remseck	71686	Baden-Württemberg
Garching	85748	Bavaria
Landsberg	86899	Bavaria
Immenhausen	34376	Hesse
Parensen	37176	Lower Saxony
Stadthagen	31655	Lower Saxony
Volkstorf	21397	Lower Saxony
Duisburg	47051-47279	North Rhine-Westphalia
Leisnig	04703	Saxony
Aken / Elbe	06385	Saxony-Anhalt
Utrecht	3450-3455, 3500-3599	Utrecht
Papendrecht	3351-3356	Zuid-Holland
Puurs	2870	Antwerp
Deinze	9800	East Flanders

Current status at **www.vulkatec.de**

RegioMix® intensive

RegioMix® intensive is a roof / underground garage substrate / floor replacement. Mineral-organic substrate, with a non-segregating composition. The basic components are regionally sourced raw materials.

Details:

- Open-pored, with a high total pore volume, pressure-resistant, long-term stable
- Very good nutrient buffering, pH-stable, germination and growth-promoting
- Free of root-forming weeds
- Good processability
- Produced in accordance with the stipulations of the FLL guideline and the Fertilizer Ordinance in its current version

Application areas:

- **Planting building ceilings with perennials and small shrubs**
- **Permanent tub planting with shrubs and perennials**
- **As a substitute for topsoil, for the planting of perennials and woody plants**

Additional information:

- Certificates
- Product data sheets

This additional material is available for download at:

www.vulkatec.de

	RegioMix® intensive
Particle size distribution (percentage of total mass in %)	
Blowable components	<- 20
Fine / medium gravel	<- 40
Volume weight (t/m^3)	
at max. water capacity	Please request the value from the competent sales employee at the specific location
Water/air balance	
Max. water capacity	45–65 vol. %
Air capacity at max. water capacity	10–25 vol. %
Air capacity at pF 1.8	20–35 vol. %
Water permeability mod. K_f	0.3–30 mm/min
pH value	6.5–7.6
Salt content (water extract)	<- 2.5
Content of organic matter	<- 90

Roof greening Equipment

For an optimal construction of your substrates

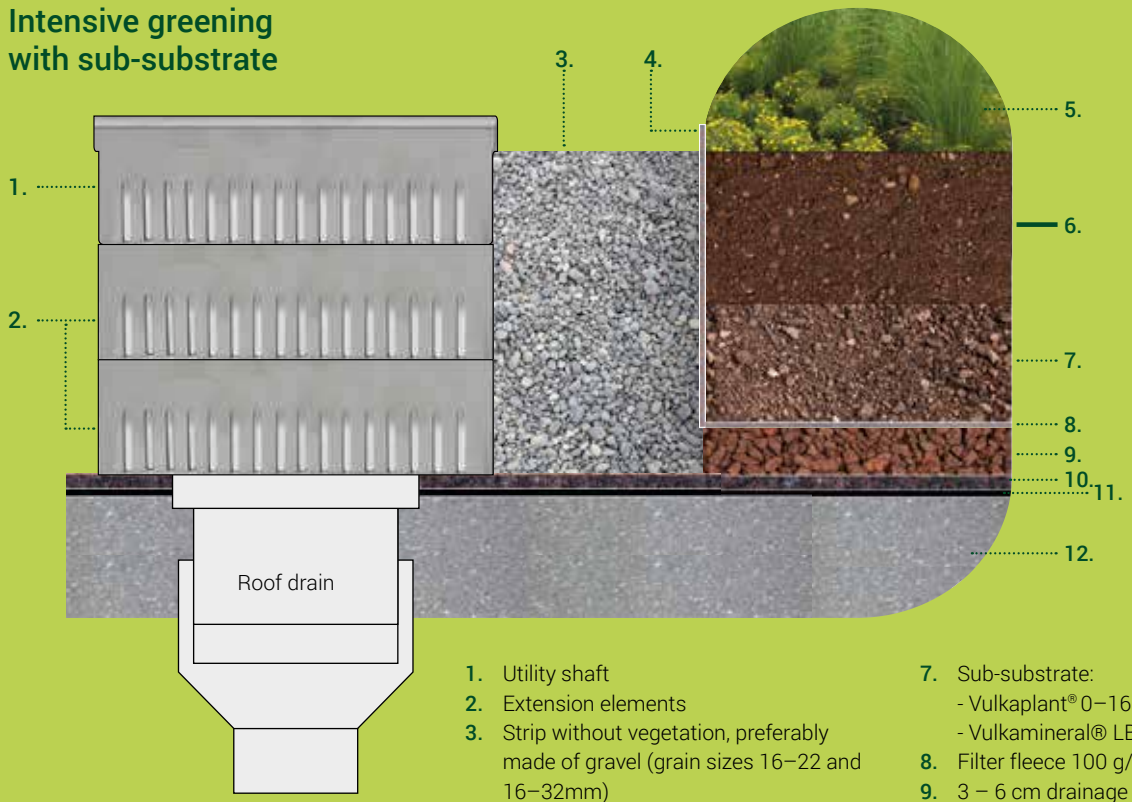
More than a substrate
With over 30 years of experience, Vulkatec is one of the pioneers of roof greening. As the market leader for substrates in Germany, Vulkatec guarantees optimum product quality and outstanding service. We thoroughly think through the topic of green roofs. That's why we offer all accessories in addition to the tried-and-tested plant substrates and drainage layer materials.

Separating, protecting and filter fleeces
For protecting the roof covering from mechanical damage and for separating materials of differing grain sizes (e.g. maintenance of the function of the drainage layer).
On page 60

Utility shafts
From standard plastic inspection shafts for checking roof drains to special aluminium inspection shafts for use above roof drains at the edges of insulating wedges.
On page 61

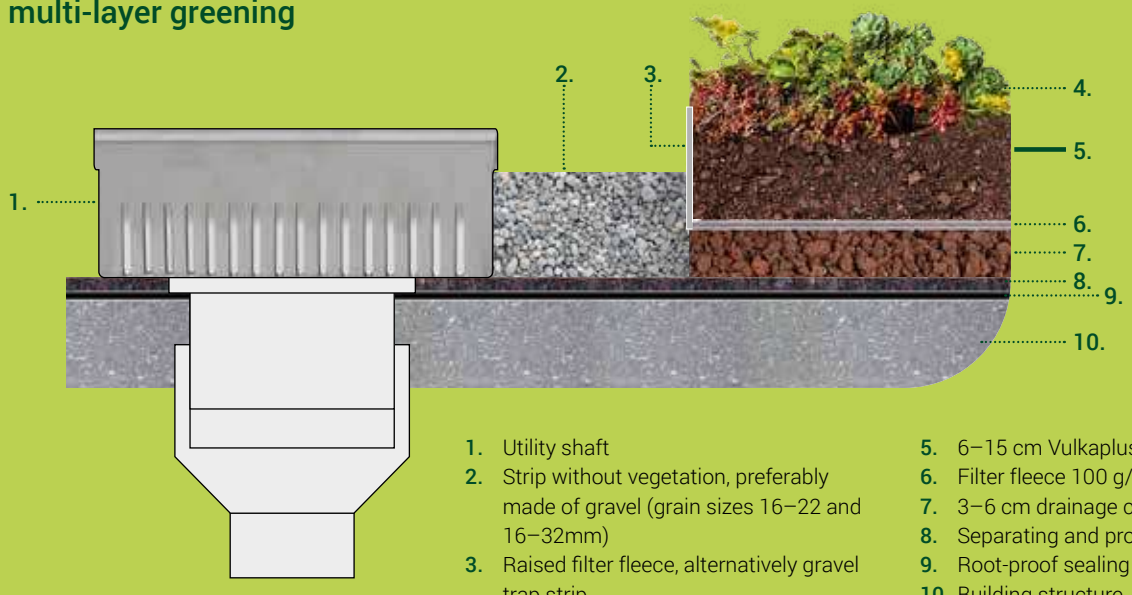
Sedum and plug plants
The ideal solution for cost-effective and diverse green roofs. The enormous labour and cost savings are also noticeable especially with large areas.
On pages 62–63

Intensive greening with sub-substrate



1. Utility shaft
2. Extension elements
3. Strip without vegetation, preferably made of gravel (grain sizes 16–22 and 16–32mm)
4. Raised filter fleece, alternatively gravel trap strip
5. Vegetation
6. Top substrate:
   - Vulkaplus® intensive
   - 0–12, 60 cm, blown in the silo
   - 0–16, 45 cm, loose fill
7. Sub-substrate:
   - Vulkaplant® 0–16
   - Vulkamineral® LB 0–12
8. Filter fleece 100 g/m²
9. 3 – 6 cm drainage course Lavadrän®
10. Separation and protection layer 300 g/m²
11. Root-proof sealing
12. Building structure

Extensive multi-layer greening



1. Utility shaft
2. Strip without vegetation, preferably made of gravel (grain sizes 16–22 and 16–32mm)
3. Raised filter fleece, alternatively gravel trap strip
4. Vegetation
5. 6–15 cm Vulkaplus® extensive
6. Filter fleece 100 g/m²
7. 3–6 cm drainage course Lavadrän®
8. Separating and protective layer 300 g/m²
9. Root-proof sealing
10. Building structure

Separating and protective fleece

Advantages:

- Increases load-bearing capacity and stability
- Has an even load-distributing effect
- Prevents damage to the root protection and roof membrane
- Removes rough surfaces e.g. shotcrete
- Increases the service life of the roofs and maintains the waterproofing properties

Product information:

- **Hardening method: needled + thermally solidified staple fibres**
- **min. 15 cm overlap**
- **Is laid over the entire surface and trailed along the roof edge min. up to the top edge of the substrate – also for roof penetrations, e.g. roof domes, skylights or air conditioning systems**
- **Area weight: 300 g/m²**
- **At least georobustness class (GRK) 2**
- **Dimensions (per roll): 50 m x 2 m (100 m²)**

Filter fleece

Advantages:

- Separates the substrate from the drainage layer and thus prevents clogging of the drainage layer
- Prevents waterlogging by ensuring a rapid, even discharge of rainwater

Product information:

- **Hardening method: mechanically solidified**
- **min. 15 cm overlap**
- **Is pulled up between the gravel and top edge of the gravel / substrate**
- **Area weight: 100 g/m²**
- **Dimensions (per roll): 100 m x 2 m (200 m²)**

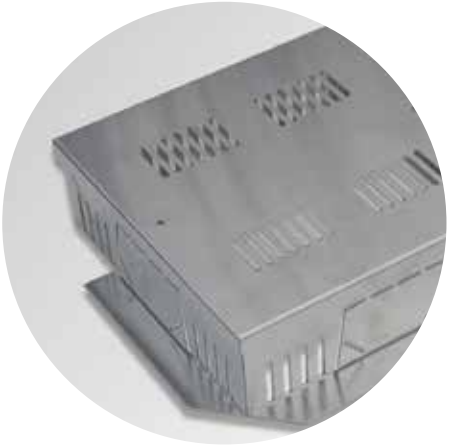
Utility shafts

Consisting of bottom part, side part and lockable cover for use in green roofs for servicing roof drains.

Special features:
- UV resistant, insensitive to humic acids
- Manhole opening Ø 30 cm
- Compressive strength plastic lid approx. 150 kg
- Shaft walls and lids with inlet slots
- Can be extended in increments of 100 cm
- Suitable for freestanding drainage systems
- Also available with slotted aluminium diamond plate lids
- Special accessories: Base plate with a level regulator for ebb and flow irrigation

Product information:

- **Material: Plastic**
- **Dimensions:**
  Cross section shaft: 37.0 x 37.0 cm
  Supporting surface base: 47.0 x 47.0 cm
  Height: at least 11.0 cm
  (can be increased in 10.0 cm increments)



Marginal utility shaft

Special utility shaft for use above roof drains Marginal areas in front of pitched components, especially when an insulation wedge is found in the corner.

Special features:
- Shaft cover with inlet slots,
  pressure resistance approx. 150 kg.
- Insensitive to humic acids.
- The insulating wedge profile can be unlatched on the back
- Drainage capacity 3.72 l/s
  (for three-sided connected water course profiles
  and 2% gradient)
- Accessories: Extension units in increments of 10.0 cm
- Manhole walls and cover with inlet slots, rear wall can be removed at an angle, can be extended in increments of 10.0 cm

Product information:

- **Material: Metal**
- **Dimensions:**
  Length/breadth: 25.0 x 25.0 cm
  Support surfaces for soils: 31.0 x 28.0 cm
  Height: 8.0 cm (extension units available in 10.0 cm)

Sedum flat baled plants

Multi-pot trays with 50 plants per tray. These are single-variety trays; the minimum order quantity is therefore 50 pieces per variety. Weight/tray including packaging is approx. 8.5 kg, depending on the season, vegetation thickness and variety. The bales have a diameter of approx. 6 cm and a height of 5 cm.

Quantity of plants required:
The recommended planting density is 12–15 plants/m².

1. Storage options

Unpacked from the wooden crates or cardboard boxes, the plants can be placed next to each other in the multi-pot trays for 2-3 weeks and kept outdoors in daylight on a flat surface from which the water can be extracted. Water regularly as required.

2. Planting instructions

The plants should be evenly distributed over the cultivation area, then placed plant by plant in the substrate and pressed down. Water thoroughly. Keep moist as required by the weather until the plants have grown.

3. Care instructions after completion

In the event that the developer has not issued care instructions, watering should continue as described above. Once a year, we recommend applying a nitrogen-rich depot fertilizer with an action term of 6–9 months. Ideal time: March–April.

The roof must be checked for foreign growth, which must then be removed. If there are gaps, replanting or reseeding shoots the following year is recommended to prevent unwanted growth. For further details, refer to the current FLL green roof guidelines.

Sedum shoots

The ideal solution for cost-effective and versatile green roofs. The enormous labour and cost savings are also noticeable especially with large areas. The mixture consists of 5–7 varieties/species of sedum plants (depending on the season)

Application quantity: 60–150 g/m²

1. Storage options

As the shoots are freshly cut plant parts without roots, they cannot be stored but should be used immediately if possible. If this is not possible, the shoots can be kept in a cool, dry and wind-protected place for a maximum of 24 hours. Please do not place in the refrigerator, as the low temperatures damage the plant parts. The shoots should also not be watered during storage, as this can lead to rotting. Immediately before taking out, however, it is advisable to dip the bag with the sedum shoots in a bucket of water so that the shoots can then take up water properly again.

If it is possible to spread the shoots out in a cool, shady place, you can store them at a height of 2–3 cm on cardboard or newspaper for several days.

2. Planting instructions

Sedum shoots are cut shoots of the sedum plant that are scattered evenly over the substrate for extensive green roofs. This is sufficient in most cases. If the roofs or roof areas are exposed to wind, it may be expedient to improve the tessellation of the shoots by staggering or pulling them inwards or gluing them with cellulose adhesive. A vegetation mat can be used alternatively in this case. Then water the substrate thoroughly and make sure that the shoots are supplied with the moisture they need to take root. This occurs after 2-4 weeks, depending on the season and weather conditions. A new sedum plant will then develop. Irrigation is usually unnecessary from this point.

3. Care instructions after completion

In the event that the developer has not issued care instructions, watering should continue as described above. Once a year, we recommend applying a nitrogen-rich depot fertilizer with an action term of 6–9 months. Ideal time: March–April.

The roof must be checked for foreign growth, which must then be removed. If there are gaps, reseeding in the following year is recommended to prevent unwanted growth. For further details, refer to the current FLL green roof guidelines.

Flat bale plants

Sedum or herb pallet:

- 50 pcs. in one pallet
- 10–20 plants/m²
- Delivery is in mixed varieties (also single-variety on request)

Sedum shoots

The ideal solution for cost-effective and versatile green roofs. The enormous labour and cost savings are also noticeable especially with large areas.

Sedum shoots:

- Min. 5–7 different species
- (depending on the season)
- Yield quantity: 60–150 g/m²
- Flowering time: May–August

Integration:
Shoots must be processed immediately. If this is not possible, the shoots can be kept for a maximum of 24 hours in a cool, dry and sheltered place (on no account refrigerate). The shoots should not be watered during storage. Immediately before taking out, however, it is advisable to dip the bag with the sedum shoots in a bucket of water so that the shoots can then take up water properly again.
On roofs exposed to high winds, it is recommended that the shoots be lightly hooked into the substrate by only a few millimetres, so that they are not blown off the roof.

Care:
Immediately after spreading, the whole roof should be watered thoroughly. After this the shoots must be supplied with moisture regularly. Depending on the season, the shoots form roots after 2–4 weeks and start to grow in length. From this point on, you can start reducing the regular watering. On average, a green roof planted with sedum shoots takes six months longer to reach full maturity than a green roof planted with rooted plants.

References

KÖ-Bogen Düsseldorf
Large-scale project involves extensive and intensive greening as well as tubbed and tree planting

Depot Frankfurt
Extensive greening on a barrel roof

References

Corda Campus, Hasselt (Belgium)
Intensive roof greening with grass on a pitched roof

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Source: Optigrün International AG

Source: Optigrün International AG

Dortmunder-U

Intensive roof greening with tree and tub planting

LVM Münster

Extensive and intensive greening with trees

Source: Optigrün International AG

Roof
Lawn
Tree
Farm
Tub
Interior
Pond
Building