OPTIGRÜN®
ROOF GREENING

ASSEMBLY AND LAYING INSTRUCTIONS

OPTIGRÜN SYSTEM SOLUTIONS

ECONOMY ROOF
Extensive Semi-intensive Intensive

LIGHTWEIGHT ROOF
Extensive Semi-intensive Intensive

NATURE ROOF
Extensive **Semi-intensive** Intensive

TABLE OF CONTENTS

Before installing and using the system solutions ECONOMY ROOF, LIGHTWEIGHT ROOF and NATURE ROOF, it is necessary for you to have read and understood the assembly and laying instructions. Only in this way is proper operation possible. It also prevents damage to the product that is being used as well as injuries.
Provide these instructions to the personnel responsible for installation and use, and ensure that the designated persons are aware of the information.
If you have any further questions, please contact Optigrün international AG.

Please note:
The information in this document is based on our current knowledge and experience. They do not represent an assurance in a legal sense. During use, the particular conditions of the application are to be taken into account, especially with regard to building physics, building technology and building regulations.

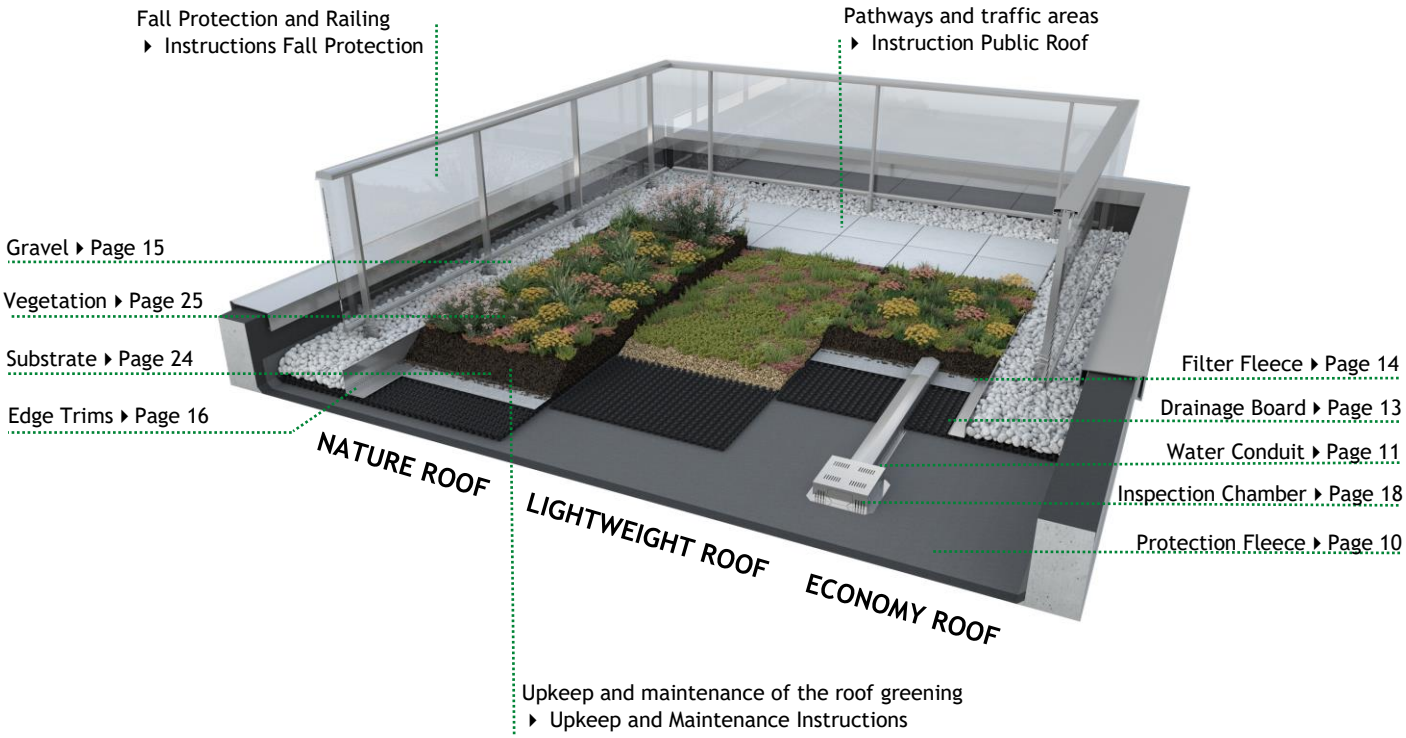
OVERVIEW

Possible components of an ECONOMY ROOF, LIGHTWEIGHT ROOF and NATURE ROOF

Please observe the object-specific planning when installing.
System components and accessories may vary.

For the assembly and laying of other system solutions or system add-ons, be sure to follow the associated installation instructions.

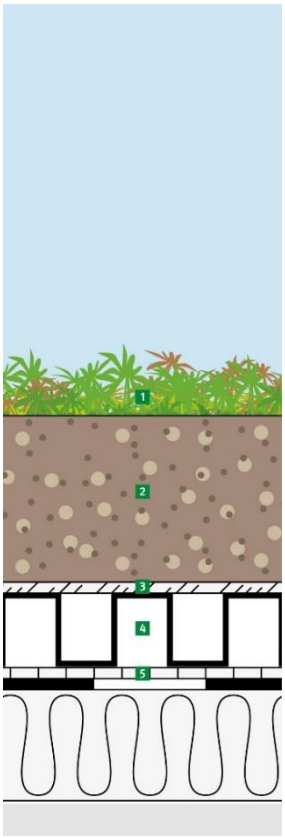
The necessary upkeep and maintenance activities to ensure the permanent functionality of the completed green roof must be carried out in accordance with the upkeep and maintenance instructions.



OVERVIEW

System structure and components

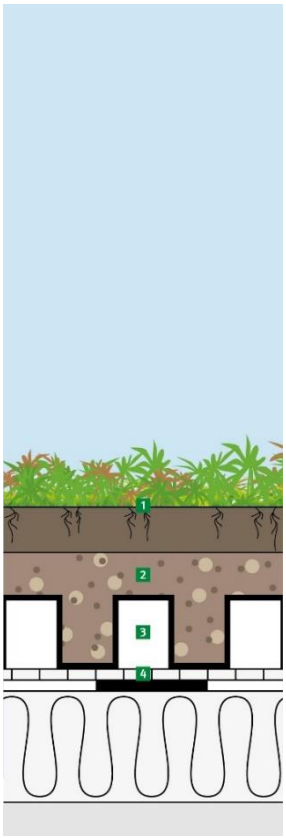
ECONOMY ROOF



System components[1]:

1. Sedum Cuttings and Seed mix
2. Extensive substrate E
3. Filter Fleece FIL 105
4. Drainage and Storage Board FKD 25
5. Protection and Storage Fleece RMS 300

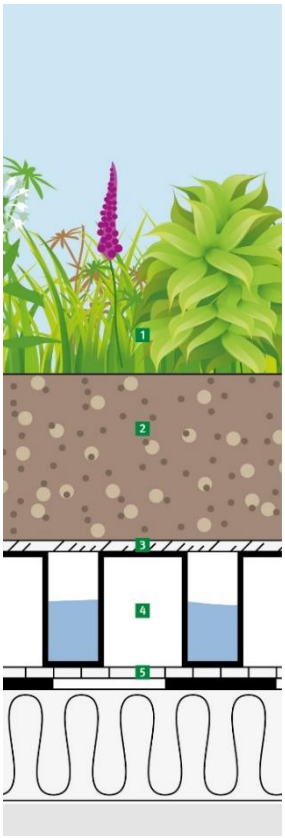
LIGHTWEIGHT ROOF



System components[1]:

1. Vegetation Mat
2. Low Density Substrate L
3. Drainage and Storage Board FKD 25
4. Protection and Storage Fleece RMS 300

NATURE ROOF



System components[1]:

1. Plug Plants and/or Sedum Cuttings combined with Seed Mix
2. Extensive substrate E
3. Filter Fleece FIL 105
4. Drainage and Storage Board FKD 40
5. Protection and Storage Fleece RMS 300

[1]Standard system components

Please note!

Only the complete Optigrün System Structure, consisting of Protection and Storage Fleece, Drainage and Storage Board, Filter Fleece, substrate, vegetation and accessories forms a tested overall system.

For safety reasons, only original system components may be used. The use of damaged, used or already otherwise utilised products or materials is to be refrained from.
Any replacement and any changes to the components or to the intended use lead to the loss of the warranty and liability by Optigrün international AG.

The statements provided in these assembly and laying instructions do not release the planners, the performing company and the user from inspecting and assessing the local conditions and other occurrences themselves under the given technical guidelines.

1.1 Transport

Delivery

Please note!
Access to the construction site must be guaranteed. A stable, load-bearing, level surface and a sufficiently large free parking area are required. The contractor is liable for damage and towing caused by driving on a surface with insufficient load-bearing capacity on the instructions of the contractor.

Please check the completeness and integrity of the delivered goods immediately upon delivery using the parts list on the enclosed delivery note. If (transport) damage is present, report this immediately to the carrier and have it confirmed by signature on the delivery note. Additionally report the damage to Optigrün international AG.

If parts or an installation plan are missing, please report this immediately to the Optigrün head office.
Contact: Phone +49 7576 772-0
Mail info@optigruen.de

Unloading

As the delivering vehicle does not usually have its own lifting device, the client is to provide a suitable method of unloading the components. This must be a forklift or a crane (with fork or loops) with a lifting capacity of at least 1,500 kg. Delivery by HGV with its own lifting device may be possible for an additional charge and on request in advance.

Suitable level, stable storage space is to be provided for the pallets.

Caution!

Warning of falling pallets or elements!

Always check pallets are stable.
Never try to support a falling pallet.

Warning!

Warning of suspended loads!

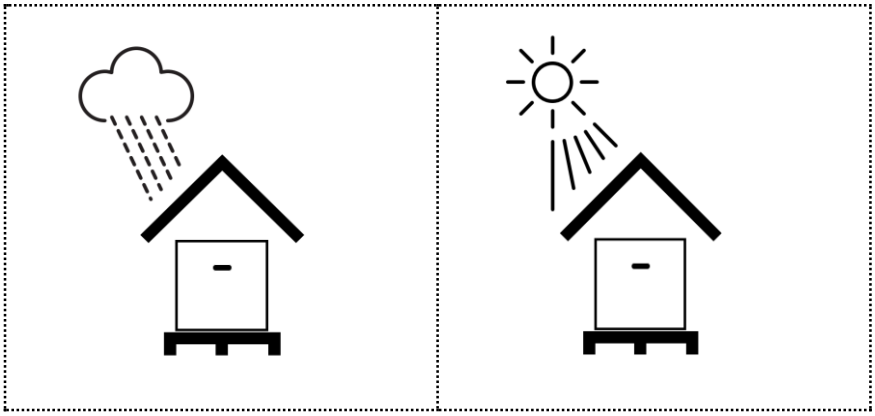
There is a risk of injury due to suspended loads.
Do not go underneath suspended loads!

Wear a safety helmet!

1. INSTALLATION GUIDELINES

Opening and storage of the package units

Storage instructions



Store horizontally and dry.
Avoid storage areas exposed to sunlight and protect from UV radiation during longer storage.
Protect from mechanical damage.

Protect cardboard boxes from moisture penetration by covering them with foil.
Due to the expansion behaviour and the lower compressive strength of plastics at high temperatures, heating of the Drainage and Storage Boards above 40° Celsius must be avoided at all costs.
Store substrates as bagged goods frost-free and protected from UV radiation.

Special transport aspects for substrates and gravel

Please note!
The delivery and unloading time is fixed. Changes are possible up to 36 hours before the appointment at the latest.

Deadline commitments presuppose normal traffic and weather conditions. Force majeure of any kind (strike, lockout, official obstacles, etc.) shall generally release the supplier from the deadline commitment.

Installation of vegetation substrate and gravel
Page **8**

1.2 Handling and safety

Please be sure to note the following information

Non-observance can lead to injuries.

Warning!

Warning of injuries!

Generally take care when handling the components due to the risk of injury. There is the risk that fingers or other body parts may be crushed or otherwise injured.

Wear protective clothing such as safety shoes, cut-resistant gloves, safety goggles and clothing with long sleeves and trousers.

Danger of falling when working on unsecured roof surfaces

Warning!

Warning of danger of falling!

There is a risk of falling when working on unsecured roof surfaces!

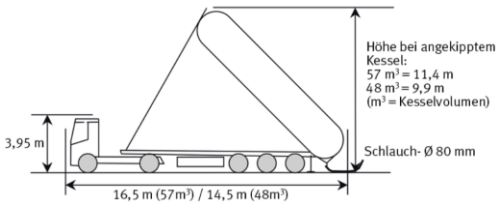
Use personal protective equipment!

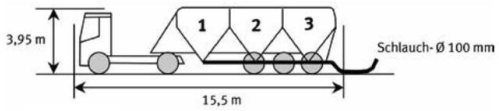
When working on unsecured roof surfaces with a risk of falling, provide temporary fall protection for the installation personnel. Use individual fall protection on the roof or collective fall protection (e.g. temporary guard rails).
The contractor is responsible for protecting the installation personnel from falling.

The legal and normative regulations must be observed.
Before starting the assembly work, prepare a risk assessment and, if necessary, obtain the approval of the fall protection measures from the responsible health and safety coordinator.

1.3 Guidelines for the installation of substrates/gravel in a silo truck

Dimensions and loads silo truck





Turning radius	approx. 12 m approx. 6 m radius for right-angled entry
Total weight	approx. 40.0 t
Max. axle load	approx. 11.0 t
Vehicle width	approx. 2.65 m
Set-up area	approx. 19 x 4 m with extended supports
Sound pressure level	approx. 89 dB (during unloading)
Hose length	approx. 80 m max. 120 m (after arrangement)
Silo volume	Standard silo: 48 – 57 m³ 3 chamber silo: 2 x 16 m³, 1 x 14 m³

Please note!

3-4 persons are required for assembly, application and disassembly, which must be provided by the installer.
A water connection and a sufficiently long water hose with a ¾ inch GK coupling must be available on the roof surface.

Three hours of unloading time from the arrival of the vehicle at the construction site are usually included in the delivery price, additional unloading times will be charged for each additional half hour or part thereof

Assembly

The hoses are laid by the driver and the contractor in cooperation; the procedure during assembly is agreed with the driver.
Do not fold the material hoses, lead them in a wide curve over the edge of the roof.
The contractor is responsible for the safety of the hose installation (suspension and fastening), the protection of the facade and parapet from damage and the distribution of substrates and gravel.

Application

Safety guidelines for substrate and gravel application

Warning of impacts to the rear and sides!
Warning of flying material components!

Strong rear and side impacts can occur at the beginning and end of the blowing process.
There is a risk of material components flying around.

Do not stay on the edge of the roof or near people and objects (parts of buildings, windows, skylights, vehicles).

Apply gravel and dry substrate products with a water supply. Connect the water hose to the upper end of the hose, never to the silo outlet.
Start the water supply only during the blowing process and stop it immediately if the blowing process is interrupted.

Discharge times vary depending on hose length (longer hose leads to longer discharge time).

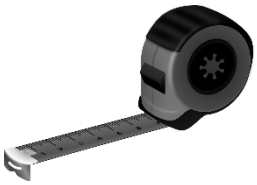
Disassembly

Disassembly takes place immediately after the end of the blowing process by the driver and the processor working together.
Do not throw hoses off the roof.
If hoses remain on the construction site in the case of several deliveries, the processor is liable.

1.4 Tools and materials

Tools required for assembly

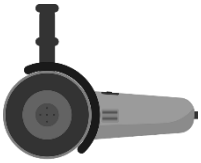
- Scissors



- Measuring tape / metre rule

- Broom

- Screwdriver

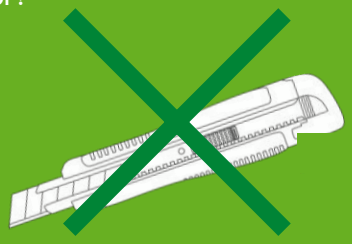


- Angle grinder

- Rrake and shovel

Correct use of cutting tools on the roof

STOP!



Do not use knives or cutter blades.
Do not cut directly on the waterproofing.

To avoid damage to the waterproofing and cuts.

Suitable cutting tools:

Fleece and thin foils	All-purpose scissors with angled cutting edge, foil knife
FKD, thick foils and fleeces Edge trim	Angle grinder, special shears with angled cutting edge

Keep a sufficient distance from the waterproofing and use a cut-resistant base.
Use pointed objects carefully.

2.1 Preparation of the roof surface

Protection and Storage Fleece RMS 300

ECONOMY ROOF

LIGHTWEIGHT ROOF

NATURE ROOF

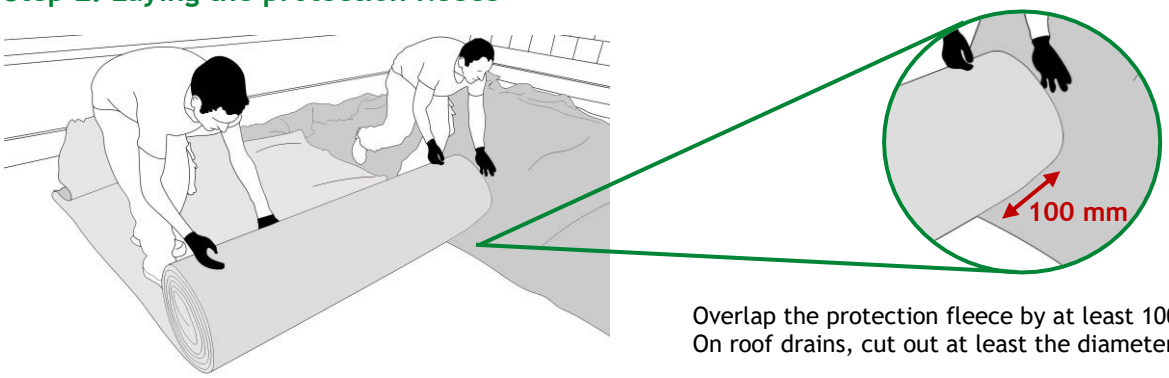
STOP!

Only lay under vegetation!
Install RMS 300 only under vegetation areas, for pathways and traffic areas
- Instruction Public Roof

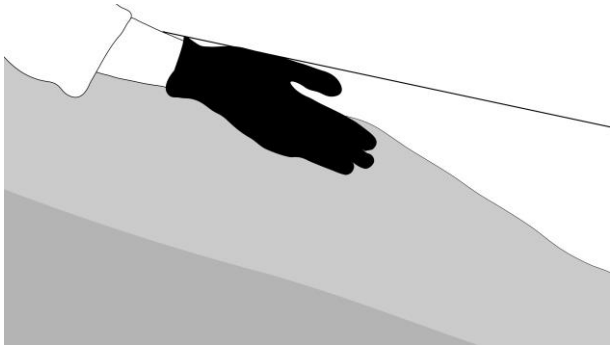
Inverted roof
Do not use a protection fleece, but separation layer to insulation manufacturer's specification

Step 1: Cleaning the roof surface

Step 2: Laying the protection fleece



Overlap the protection fleece by at least 100 mm.
On roof drains, cut out at least the diameter of the drain.



Apply protective layer to elevated components and roof penetrations and raise the protection fleece at least so far, that the planned structure height of the finished green roof is reached.
If separately cut fleece strips are used for this purpose, provide a 300 mm overlap into the horizontal roof surface.

If needed

2.2 Assembly and laying of Water Conduction Channels

Water Conduction Channel WKK

ECONOMY ROOF

LIGHTWEIGHT ROOF

NATURE ROOF

According to planning

Water Conduction Channel WKA

ECONOMY ROOF

LIGHTWEIGHT ROOF

NATURE ROOF

According to planning

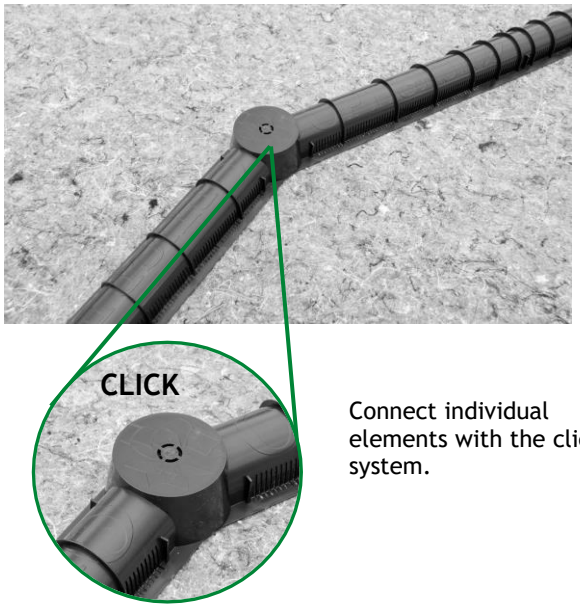
Please note!

Observe object-specific planning!
Completely cover Water Conduits with substrate or gravel, when using the WLP Plus, apply at least 80 mm of substrate or gravel!

Step 1: Laying Water Conduction Channels

Place the Water Conduction Channels directly on the protective layer.

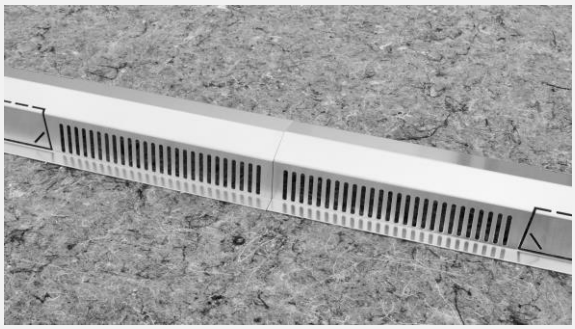
Laying the Water Conduction Channel WKK:



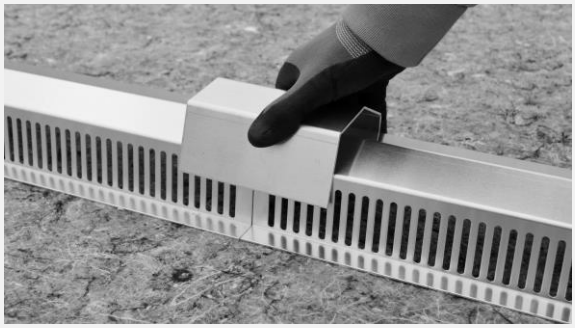
Connect individual elements with the click system.

Seal the strands at the high point with filter fleece.

Laying the Water Conduction Channel WKA:



Place single elements next to each other.

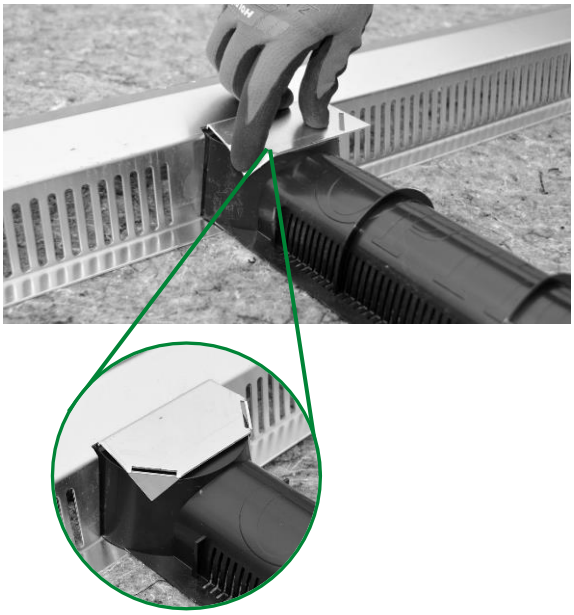


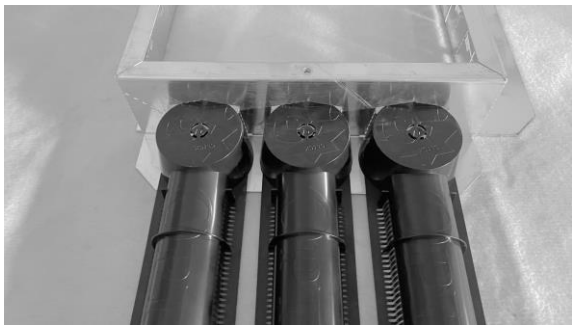
Push on the connectors, angles or endpieces according to the planning.

2. ASSEMBLY AND LAYING

Step 2: Attaching Water Conduction Channels

Water Conduction Channels can be connected to inspection chambers, channels and edge trims.





2.3 Laying of Drainage Boards

Drainage and Storage Board FKD 25

ECONOMY ROOF

LIGHTWEIGHT ROOF

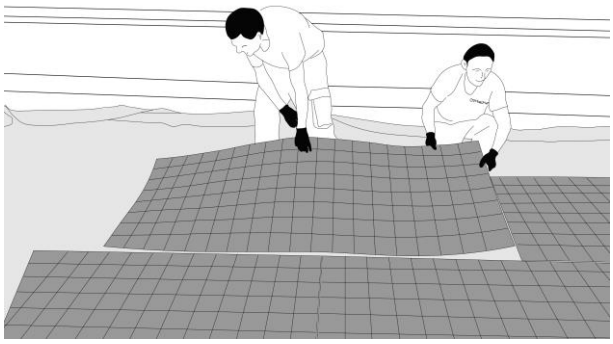
Laying with large naps facing upwards

Drainage and Storage Board FKD 40

NATURE ROOF

Laying with small naps facing upwards

Step 1: Laying FKD



Stop!

Only lay under vegetation!
For pathways and traffic areas ▸ Instruction Public Roof

Place single elements next to each other.

Please note!
For Lightweight Roof, install with one row of naps overlapping.
Avoid cross joints

Step 2: Cutting the Drainage Boards

If necessary, cut drainage elements to size using an angle grinder.
At roof drains, cut out the inside dimension of the inspection chamber.
Do not cut on the waterproofing.

Angle grinder safety notice

Warning of injuries!

- Wear safety googles and hearing and respiratory protection.
- Wear close-fitting protective clothing.
- Remove fire-sensitive materials.
- Before using the angle grinder, read the instruction manual.

Please note!
Immediately after installation, weigh down the elements temporarily or by building up the other system components to prevent drifting. The elements can also be filled with water, which counteracts unwanted expansion of the panel when exposed to high temperatures.

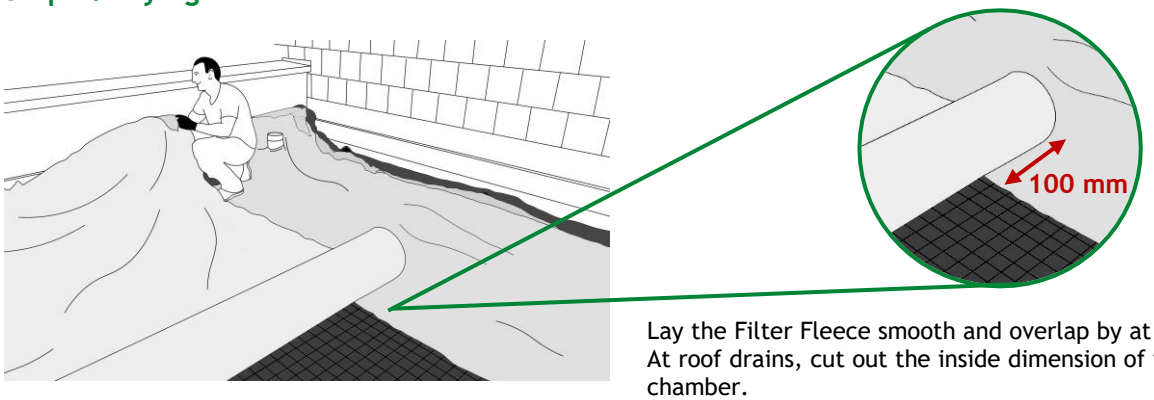
2.4 Laying of Filter Fleece

Filter Fleece FIL 105

ECONOMY ROOF

NATURE ROOF

Step 1: Laying Filter Fleece



Lay the Filter Fleece smooth and overlap by at least 100 mm. At roof drains, cut out the inside dimension of the inspection chamber.

2.5 Installation of gravel

Gravel

According to planning

Please note!

During installation, no gravel may get under or behind the protective layer or the filter fleece.

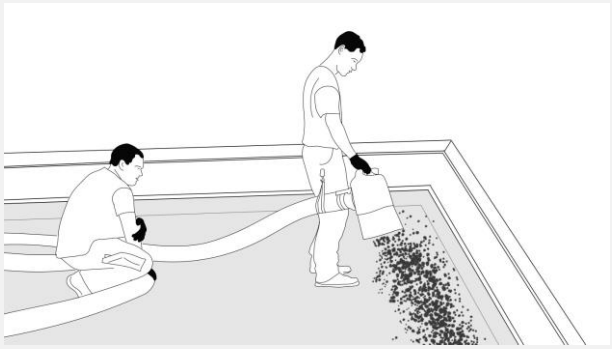
Observe minimum and maximum loads.

Installation of gravel

Pour gravel in the intended areas of use.

Do not recompact.
Do not build up piles on the roof surface.

Installation of gravel blown in silo truck:



Blow gravel as a strip.

Guidelines for the installation of substrates/gravel in a silo truck
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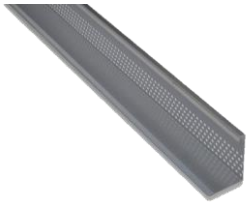
2.6 Installation of Edge Trim

Edge Trim made of aluminium



According to planning

System Edge Trim SKL

According to planning
(Not suitable for LIGHTWEIGHT ROOF)

ECONOMY ROOF
NATURE ROOF

- Place Edge Trim on Filter Fleece

LEICHTDACH

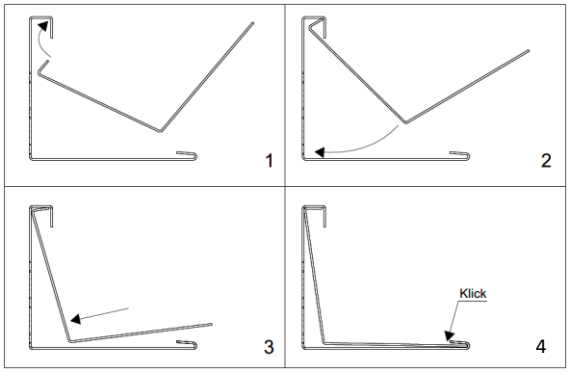
- Place Edge Trim on Drainage Boards

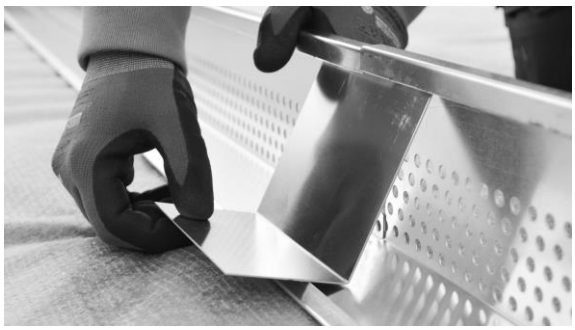
Please note!

Do not place Edge Trim on the waterproofing.
Place the horizontal leg under the substrate.

Installation of Edge Trimm made of aluminium:

Step 1: Install Connectors





Connect individual Edge Trims lengthwise by using Connectors.

Installation of System Edge Trim SKL

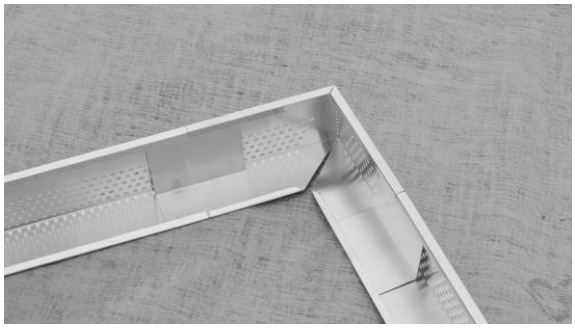
Step 1: Connection with click system

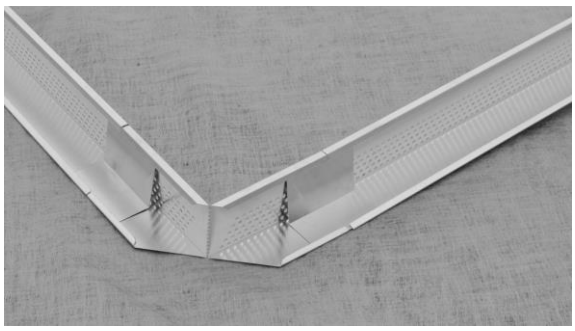
Connect individual Edge Trims by using the click system.

After 10 elements, create a 3-4 cm wide expansion joint by using a Connector (supplied).

2. ASSEMBLY AND LAYING

Step 2: Forming corners



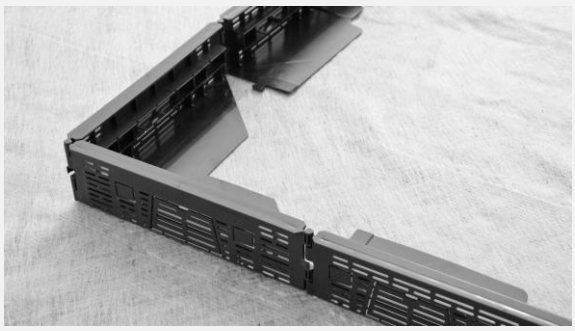


Form inner or outer corners using corner elements.

Step 3: Making cuts

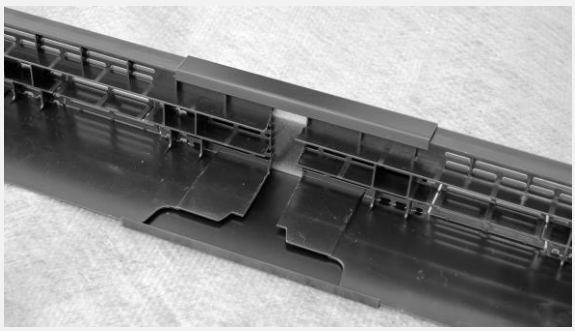
Cut and process the Edge Trims with tin snips, metal hacksaw or angle grinder.
Do not cut on the waterproofing.

Step 2: Forming corners



Form corners from two System Edge Trim SKL with a length of 300 mm.

Step 3: Making cuts



Make cuts centrally between two corners and join elements together using a connector.
Cut and process the Edge Trims with an angle grinder or hand saw.
Do not cut on the waterproofing.

Please note!
Always fill System Edge Trim SKL on both sides up to the top edge. Exposed Edge Trims made of plastic may deform due to heating by sunlight.
The Edge Trim must not be exposed to higher temperatures during storage, processing (especially during cutting processes) or when installed.

2.7 Installation and assembly of Inspection Chambers

Inspection Chamber FSK 37

ECONOMY ROOF

NATURE ROOF

According to planning

Lightweight Roof Inspection Chamber FSA 40L

LIGHTWEIGHT ROOF

According to planning

Inspection Chamber FSA 40

According to planning

Edge Inspection Chamber RSA 25

According to planning

ECONOMY ROOF
NATURE ROOF

- Place Inspection Chamber on Filter Fleece

LEICHTDACH

- Place Inspection Chamber on Drainage Boards

Step 1: Building Inspection Chambers

- Building Inspection Chamber FSK 37
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- Building of Inspection Chambers made of aluminium
  Page **22**

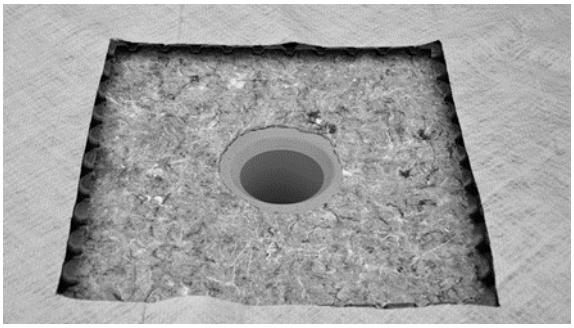
2. ASSEMBLY AND LAYING

Please note!

Do not place Inspection Chambers on the waterproofing.

The functionality of emergency drains must not be impaired by Inspection Chambers.

Step 2: Placing Inspection Chambers

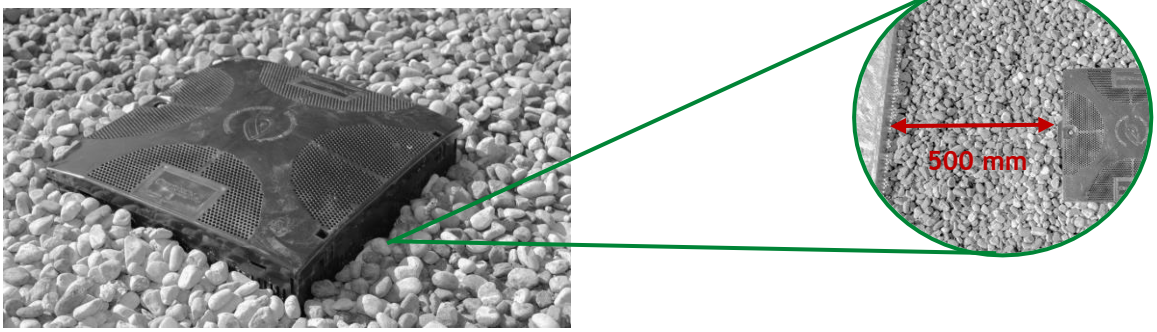


The cut-outs in the protective layer, filter fleece and drainage board must allow unhindered drainage of the excess water.

Place the Inspection Chambers centrally above the roof drain. Place edge Inspection Chambers as close as possible to the elevated components. If necessary, connect Water Conduits.

▸ 2.2 Assembly and laying of Water Conduits

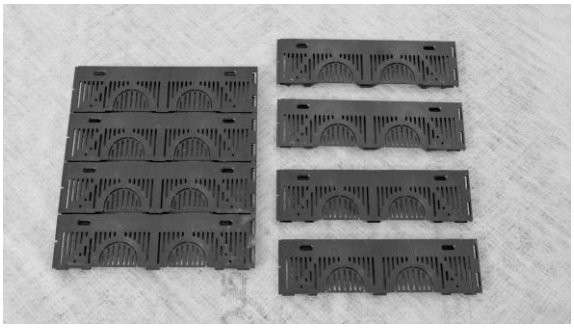
Step 3: Arranging gravel border



2. ASSEMBLY AND LAYING

Building Inspection Chamber FSK 37

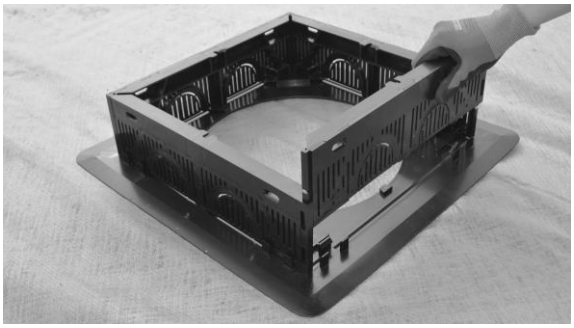
(1) Breaking the moulded part into the side parts



Place the moulded part with the smooth side down and break it into 4 individual side parts over one edge.

(2) Snapping the side parts into place

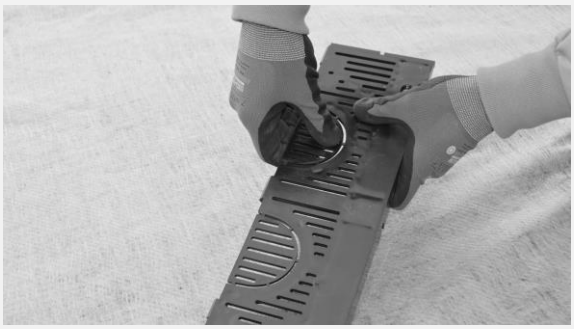
Assembly without Water Conduction Channels:



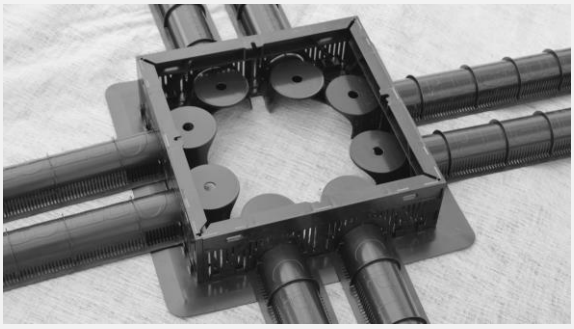
Insert the side parts with the smooth side facing outwards into the brackets of the base and snap them into place with firm pressure.

If needed

Assembly with Water Conduction Channels:



Break out the required number of insertion openings from the side parts.



Place the Water Conduction Channels on the base, place the side parts over them and snap them into place.

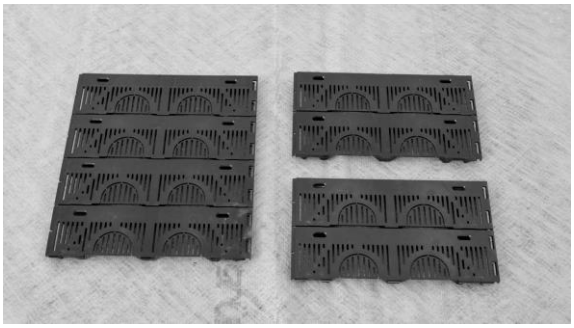
In the case of drains with strainer bells, cut off the end pieces of the Water Conduction Channels WKK at the rounding. Leave the plastic bar on the Water Conduction Channel and place it inside the Inspection Chamber to fix it in place.

Please note!

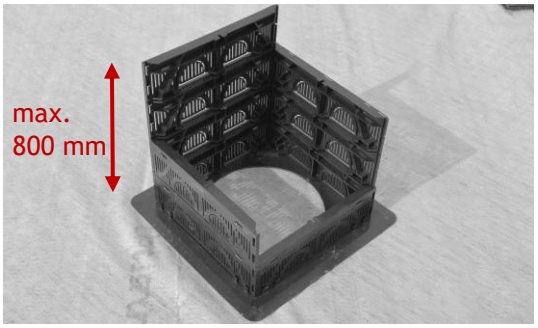
For structure heights over 120 mm, construct the Inspection Chamber with Extension Elements.

If needed

(3) Mounting the Extension Elements

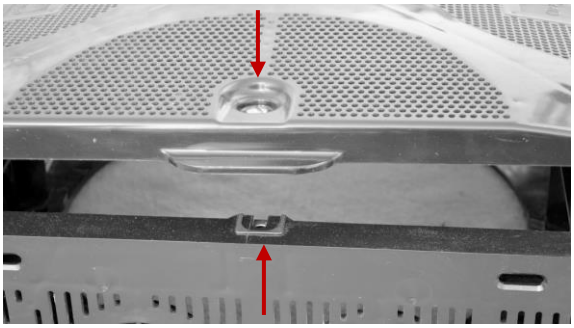


Break the moulded part in the centre into 2 side parts or insert it completely as a side part.

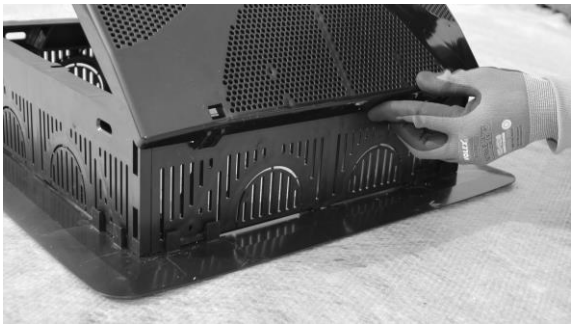


Alternate components of different heights on the base to create the greatest possible stability of the composite. Insert the side panel with pre-assembled locking mechanism in the last row.
The maximum height of the Inspection Chamber is 800 mm.

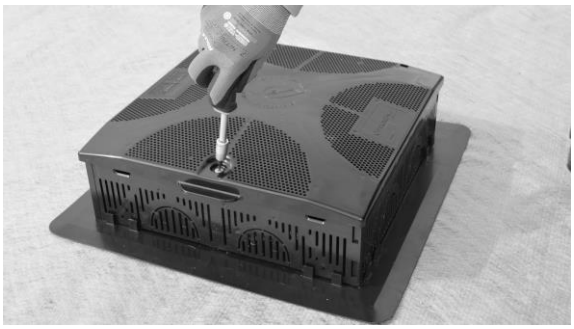
(4) Mounting the cover



Put on the cover of the Inspection Chamber, align the closing mechanisms one above the other.



On the opposite side, insert the fastening hooks into the side wall in a slightly open position.



Insert the locking pin of the lid into the counterpart and engage by slightly turning the screw head. Complete closure by turning 180°.

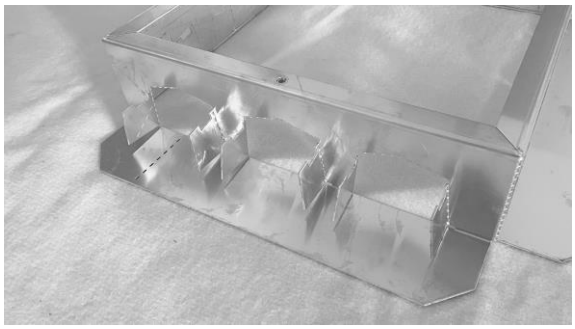
2. ASSEMBLY AND LAYING

Building of Inspection Chambers made of aluminium

If needed

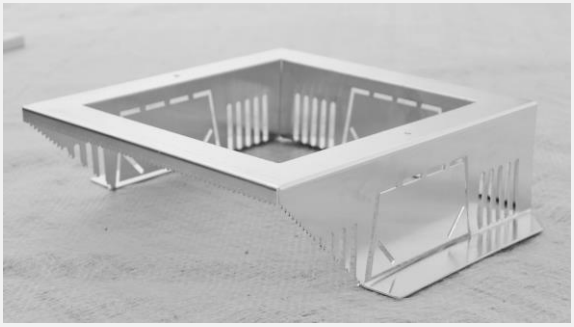
(1) Prepare cut-outs for Water Conduction Channels / insulation wedge profile

Inspection Chambers for the area



If necessary, bend open perforations for Water Conduction Channels WKK and/or for Water Conduction Channels WKA.

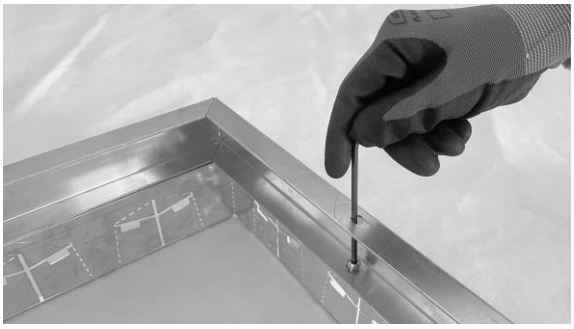
Edge Inspection Chamber



If necessary, bend open the perforations for the Water Conduction Channels.
In the case of over-sealed insulation wedges, break out or cut out the insulation wedge profile from the Inspection chamber. Process the Inspection Chamber with tin snips.

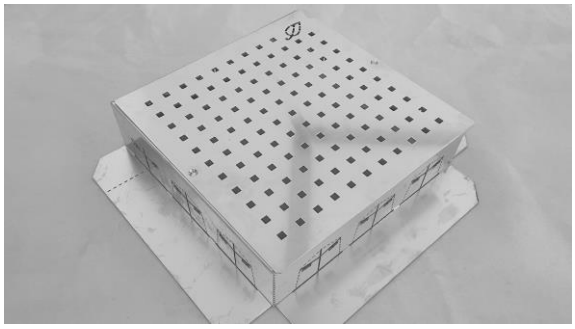
If needed

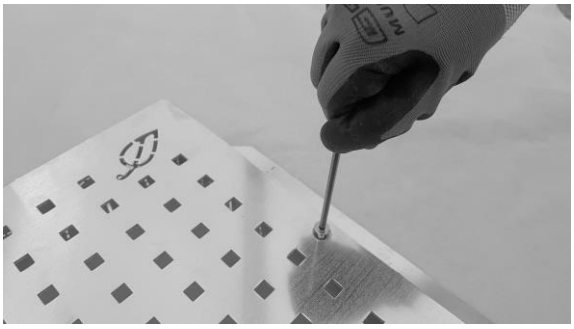
(2) Mounting the Extension Elements



Depending on the height of the structure, mount extension elements.

(4) Mounting the Cover





2.8 Installation of vegetation substrate

Extensive Substrate E

ECONOMY ROOF

NATURE ROOF

According to planning

Low Density Substrate L

LIGHTWEIGHT ROOF

According to planning

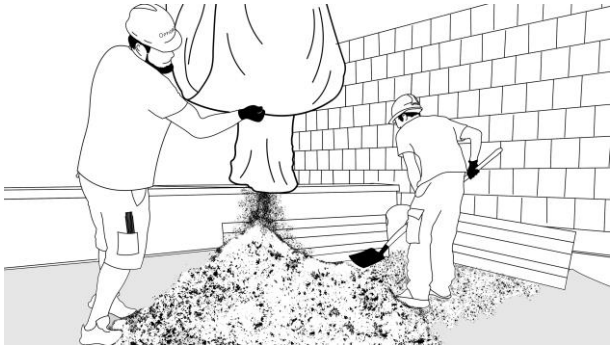
The substrates shown are examples that may vary visually depending on the production site

Please note!

During installation, no substrate may get under or behind the protective layer or the filter fleece.
Avoid mixing substrates and gravel.

Observe minimum and maximum loads.

Installation of substrate



Example: delivery in Big Bag
Evenly place the substrate at the required height, taking into account settlement due to subsequent compaction.
Measure and document the height of the substrate.
Compact step-resistantly.

Installation of substrate blown in silo truck

Guidelines for the installation of substrates/gravel in a silo truck
Page **8**

After installing the substrate, spread gravel evenly up to the Edge Trim.

2.9 Applying the vegetation

Sedum-Cuttings

ECONOMY ROOF

NATURE ROOF

Vegetation Mat

LIGHTWEIGHT ROOF

Seed Mix

ECONOMY ROOF

NATURE ROOF

Please note!

Unpack Sedum Cuttings immediately after delivery and spread thinly on a dry surface.
Unprocessed Cuttings can be stored without damage for 1 to 2 days in a cool and dry climate.

Install Vegetation Mats immediately after delivery.
Unprocessed Vegetation Mats can only be stored for a short time when rolled out, even with professional horticultural care.

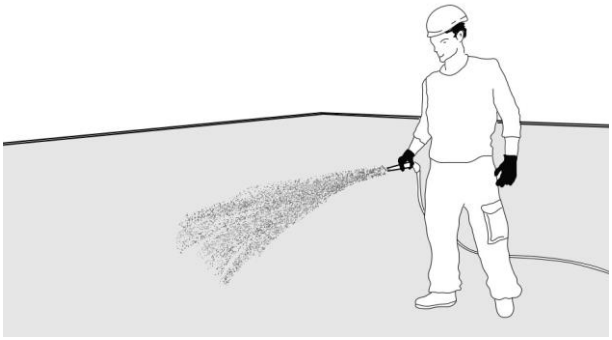
Seasonal specifics for installation

To ensure that Sedum Cuttings and Vegetation Mats will root, an outdoor temperature of at least 8-10 °C is required during the day for at least 3 weeks. If rooting does not take place before the end of the vegetation period (which varies from region to region), dry damage and drifts can occur and may make reseeding necessary.

Seed Mix can be sown all year round, but best results are achieved when sown between the end of March and the beginning of May.

2. ASSEMBLY AND LAYING

Step 1: Preparing the substrate



Moisten substrate well and loosen slightly. Apply initial fertilisation with approx. 20-30 g/m² Optigrün Fertiliser Plus.

Step 2: Vegetation

Dry seeding:

Quantity Sedum Cutting	pure Sedum Cutting seeding: approx. 80 g/m² in combination with Seed Mix: approx. 50 g/m²

Quantity Seed Mix	Herbs: approx. 0,5 g/m2 Grasses: approx. 0,1 g/m2

Distribute the cuttings evenly over the roof surface.

Mix the seeds before spreading to eliminate segregation caused by transport.
Sprinkle the seed mixed with dry filler (sand, sawdust) for better distribution.

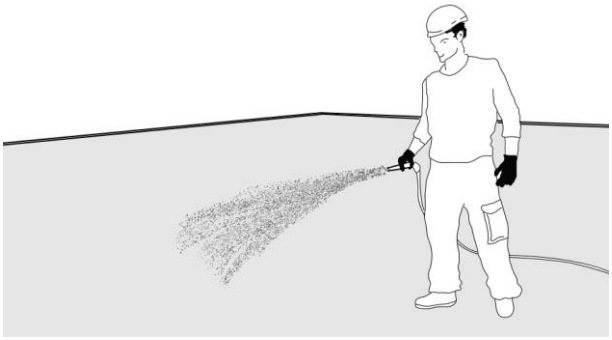
Vegetation Mats:

Lay the mats **flush but not overlapping** and without tension.

Lay the mats in a staggered pattern.
Avoid hollow spaces between Vegetation Mats and substrate.
Fill bare spots and gaps between the Vegetation Mats with substrate and sow with Sedum Cuttings.

2. ASSEMBLY AND LAYING

Step 3: Watering with at least 30 l/m²



During the rooting phase (approx. 4-6 weeks), avoid the drying out of the greening structure.
If necessary, water additionally on a temporary basis.
A finishing care according to the FLL green roof guidelines is usually necessary to achieve a condition suitable for acceptance.

Please note!

Necessary upkeep and maintenance activities to ensure the permanent functionality of the completed green roof
- Upkeep and maintenance instructions