INSTALLATION INSTRUCTIONS

VEGETATION SUBSTRATES

DEUTSCHLAND

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NOTE

Before using the vegetation substrates, it is essential that you read and understand the installation instructions. This is the only way to ensure proper use. It also prevents damage to the products used and injuries.

Please make these instructions available to the personnel responsible for installation and use in good time and ensure that they have taken note of the information.

If you have any questions, please contact Optigrün international AG.

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Please note:
The information in this brochure is based on our current knowledge and experience. It does not constitute a guarantee in the legal sense. When using the product, the specific conditions of the application must always be taken into account, particularly with regard to building physics, construction technology and building regulations.

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1. Safety instructions

CAUTION!

Warning: falling materials!

Failure to observe this warning may result in injury.

WARNING!

Warning: suspended loads!

Suspended loads pose a risk of injury. Do not stand under suspended loads! Wear a safety helmet!

When handling the components on the construction site, make sure to wear appropriate protective clothing (protective gloves, safety shoes, etc.).

CAUTION!

Warning about injuries

Always exercise caution when handling the components due to the risk of injury.

There is a risk that fingers or other body parts may be crushed or otherwise injured.

Wear protective gloves!

Use the products in accordance with these installation and laying instructions.

Do not use damaged, old, previously used or expired products or materials.

Observe the standards and regulations applicable at the installation site.

In cases not covered by these instructions and the applicable standards and regulations, written agreement with Optigrün international AG is required.

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2. General information

2.1 Description

Vegetation substrates for use in green roofs on surfaces with a roof pitch of 0° - 45°, to be used in accordance with the manufacturer's instructions for the various substrate types.

2.2 Areas of use for Optigrün vegetation substrates

- M: Extensive greenery in single-layer construction
- E: Extensive and simple intensive greening in multi-layer construction and on pitched roofs
- i: Intensive greening in multi-layer construction
- R: Specially designed for intensive greening with lawns in multi-layer construction
- U: Special substrate for building up large layer thicknesses in multi-layer intensive greening
- L: Special lightweight substrate for extensive greening in single-layer construction
- IR: Specially designed for indoor greening in multi-layer construction
- SR: Compactable gravel base course
- SRD: Gravel turf top layer for sowing nutrient-poor grassland

2.3 Determining the order quantity

When calculating the quantity required for a specified layer thickness, in addition to the settlement factors for compaction (found in the respective substrate data sheet), blow losses due to material abrasion and fragmentation in the hose must also be taken into account during inflation. The following percentages should be used to determine the so-called loosening factor:

Losses	M l / s	E light	E heavy	i light	i heavy	lawn
Blow loss in % up to 80 m*	6	7	7	7	7	
Settlement in %	12	15	15	20	20	

Loosening factors	M l / s	E light	E heavy	i light	i heavy	lawn
up to 80 m*	1,22	1,28	1,28	1,37	1,37	1,35
loose	1,14	1,18	1,18	1,25	1,25	1,30

* Max. hose length: approx. 120 m!

Example (E-light with 80 m hose length):

1000 qm	x 0,10 m	= 100 cbm	x 1,28	= 128 cbm
Area size	Average installation thickness		Loosening factor	Order quantity

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2.4 Compliance with weight specifications

It is essential to ensure that the specified maximum loads are not exceeded, taking into account the water-saturated weights of all installed layers.

Conversely, care must be taken to ensure that, in the case of specified weight requirements (e.g. for wind suction protection or fall protection), the minimum load is not exceeded, taking into account the dry weight of all installed layers.

2.5 Notes for users

Any changes to the vegetation substrates or their intended use will result in the loss of warranty and liability by Optigrün international AG.

The information provided in these installation instructions does not exempt the planner, the contractor and the user from checking and evaluating the local conditions and other circumstances themselves, also on the basis of the technical regulations. If there are any doubts about the installation and/or use, Optigrün international AG must be informed.

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3. Transport

To ensure that everything runs as smoothly as possible on the construction site, the installer and the driver work as a team!

3.1 Delivery form

- In silo trucks for pneumatic hose conveying to the roof (inflation)
- Loose for installation with a loader
- In big bags (1.0 or 1.5 m^3) for unloading on site (e.g. with a crane, forklift, etc.)
- In plastic bags (40 litres) for manual installation on small areas

3.2 Unloading date

The unloading date is agreed upon at a fixed time. Changes can be made no later than 36 hours before the scheduled date. Appointments are subject to normal traffic and weather conditions (in accordance with §2 (3a) StVO, etc.).
Force majeure of any kind (strikes, lockouts, official obstacles such as smog alerts, etc.) generally release the supplier from the obligation to meet the deadline.
The start of the time calculation is set as the arrival of the vehicle at the construction site.

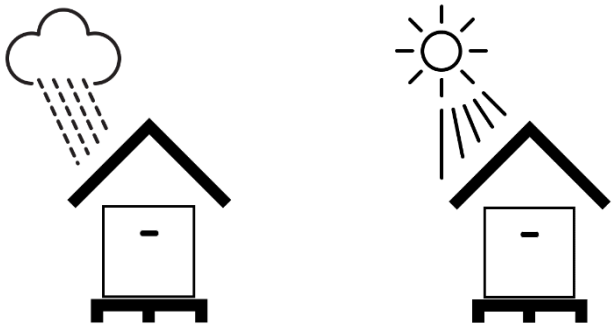
3.3 Access options

Access to the construction site must be guaranteed (please also note night parking).
A stable, load-bearing and level surface is required.

3.4 Parking space

If the location of the silo truck has not yet been determined, a suitable location closest to the unloading point will be selected together with the driver. Here too, it is important to ensure that the ground is sufficiently stable in accordance with point 2.3.

3.5 Storage/interim storage of vegetation substrates



Only loose goods may be stored outdoors. For longer periods, a cover must be provided to protect against seed drift. Goods in big bags and sacks must be protected from mechanical damage, stored in a dry place and must be protected from UV light.

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4. Installation of vegetation substrates

4.1 General installation instructions

Regardless of the application method, substrates must always be installed evenly at the required height, taking into account subsequent settlement due to compaction.
To assist with surface levelling, square timbers of the appropriate thickness can be laid out on the surface as height markers.

Objective:
To simplify the process, we recommend dividing the roof area with coloured spray on the protective fleece or filter fleece so that the substrate quantity per silo discharge is projected onto the area. To do this, the area per silo must first be determined. For example, with a delivery quantity per silo of 28 m^3 of E-substrate and a finished installation height of 8 cm, the quantity must be calculated backwards (calculation: 28 m^3 : 1.28 = 21.875 m^3 : 0.08 m = 273.4 m^2).
This procedure is intended as a rough estimate and does not replace measuring with a metre stick. If you have any questions or need help, please contact the sales representative responsible for your construction site.

After installation, the substrate should be compacted to make it firm underfoot, which can be done, among other things, by thorough watering after sowing. Deeper footprints, which are unavoidable when walking on the substrate during installation, should be levelled out before sowing the seeds.

When blowing in the substrate, the overlap of protective layers and/or filter fleeces should be fixed (e.g. with adhesive tape or careful welding with a hot air gun). Alternatively, the fleeces can be overlapped by more than 10 cm. It is also advisable to install the bulk materials in the direction of the overlaps.
Minimum distances to roof edges, rising components, skylights, etc. must be observed.

4.2 Special case: pitched roof:

When installing vegetation substrates on pitched roofs with shear protection systems, the substrate should first be spread from bottom to top up to half the installation height and evenly distributed over the entire roof area in order to ensure that the shear protection is evenly loaded from the outset. It is then advisable to install the remaining substrate, starting at the highest point of the roof, up to the final layer thickness, levelling it evenly from top to bottom. Ideally, the loosely installed substrate should cover the shear protection systems by just under 1 cm after compaction.

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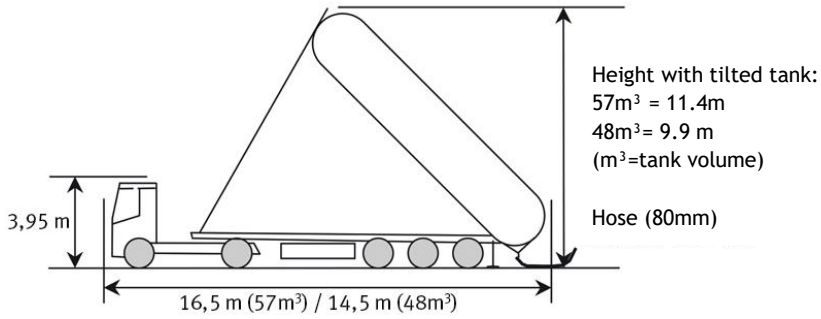
5. Special feature: silo unloading

5.1 Dimensions, loads and other data

Side view of silo truck (normal)



- Tropic: ca. 12 m (Radius for right-angle entry approx. 6 m)
- Total weight: ca. 40,0 to
- Max. axle load: ca. 11,0 to
- Vehicle width: ca. 2,65 m
- Installation area: ca. 19 x 4 m (with extended supports, e.g. for road closures)

The substrate processor is liable for damage and towing measures resulting from driving on a surface with insufficient load-bearing capacity.

Silo trucks are usually equipped with at least 80 m of hose. Experience has shown that no additional unloading times are necessary for these hose lengths. Upon prior consultation, longer lengths of up to 120 m are also possible, depending on the material.

The hose length has a significant influence on the unloading time.:
Short hose = short blow-out time!
Longer hose = longer blow-out time/more abrasion possible

The noise level during unloading by the silo truck is approximately 89 decibels. As a rule, 3.0 hours of unloading are included in the delivery price. Additional unloading times will be charged for each additional half hour or part thereof.

To reduce dust formation when blowing out dry substrate products, it is essential that a water connection is available nearby and that the processor has a sufficient length of water hose on the roof surface.
We recommend positioning between the 1st and 2nd hose on the roof.
(Connection to material hose = GK coupling ¾ inch)

Coupling with water connection

(Source: Vulkatec)

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5.2 Setting up silo unloading

Two to four employees are required to lay the hoses (at least three people for a hose diameter of 100 mm).After consultation with the driver, the hoses are pre-assembled at the bottom in the required length and then pulled up to the edge of the roof. Alternatively, the driver prepares the hose section at the bottom of the vehicle and the installer prepares it at the top of the roof. The two hose sections are then connected piece by piece along the façade from the scaffolding.

Hose reel on attica (Source: Vulkatec)

In principle, the installer is responsible for the safety of the hose installation (suspension and fastening), the protection of the facade and attica from damage, and the distribution of the substrate over the relevant area.

5.3 Blowing process / substrate application

Two to four employees (at least three people for gravel and crushed stone) are required to distribute the vegetation substrate, and these must be provided by the processor.
For dry material, a water supply as described in section 5.1 is recommended.

Safety note for water supply:

When starting or interrupting the blowing process, it is essential for the safety of those working on the roof that the water supply is only started or stopped during or shortly before the end of the blowing process!!!

When starting the blowing process, please do not begin at the edge of the roof or in front of glass surfaces, as stronger backward or sideward impacts are possible until the material flow at the end of the hose is even. This also applies to the end of the blowing process.

Attention!

For technical reasons, the driver must blow air through the hose at the beginning and end of the blowing process. This can cause individual pieces of material to fly out of the hose with great force.

It is in the interest of the processor to ensure that no persons or objects (parts of buildings, windows, skylights, cars, etc.) are damaged in the process.

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5.4 Dismantling of the silo system

The blowing device must be dismantled immediately after the blowing process has been completed. We recommend 2-4 people for this task. If hoses are to remain on the construction site after multiple deliveries, the processor is liable for them. If delivery to the construction site is not continuous (interruption of at least one working day), the supplier reserves the right to charge a rental fee per metre of hose or to request that the hoses be dismantled. In this case, please consult with Optigrün sales staff.

Please note:
Hoses must not be thrown from the roof under any circumstances, as this may cause damage to the hoses and couplings, which will subsequently be charged to the person responsible!

The following applies in principle:

- Never kink the material hose, as this will cause blockages

- Guide the hose over the edge of the roof in a wide arc

- Dry bulk materials must be moistened

- Gravel must always be blown with a water supply

- On long horizontal stretches, the hose must be supported at least 50 cm high every 10 m
(this prevents the air/water/blown material mixture from separating).

Help:

If you have any further technical questions or suggestions for improvement, etc., please speak to the driver or send an email to:

technik@optigruen.de

Thank you for your cooperation,
Your Optigrün team

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