Green Roofs
Roof Terraces
Constructions

Green Up The Roof!

Planning Guide

DIADEM®

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1b Reinforced Concrete Roof Slab
1c Screed to Falls
1d Timber Roof Board
1e Eaves Profile Retention Support Bracket

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2b Vapour Control Layer (FLW)
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2e Root Resistant Membrane
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9a FK Cross Spacers
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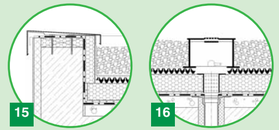
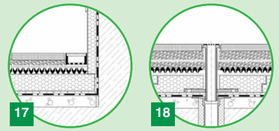
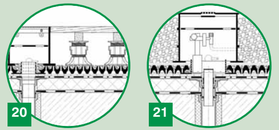
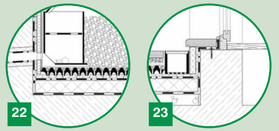
Safety Systems
10a DRS Safety Railing System
10b FLG Fall Arrest System



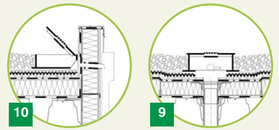


DIADEM350
Perennials, lawn
30 cm SIM intensive growing media
VLF-200 intensive filter fleece
4cm DiaDrain-40 drainage and reservoir board
VLR-130 separation fleece for inverted roofs
10 cm XPS foam insulation
VLT-100 separation fleece
Root resistant single ply membrane
VLU-300 extensive protection fleece
3-6 cm fall forming layer
Concrete deck

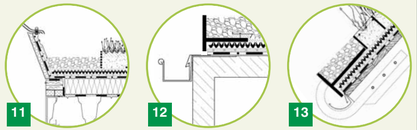


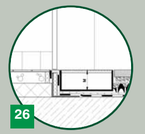
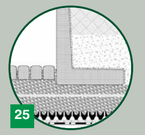
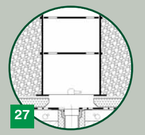


DIADEM750
Perennials, Shrubs
50 cm SIM intensive growing media
VLF-200 intensive filter fleece
6 cm DiaDrain-60 drainage and reservoir board
VLU-500 intensive protection fleece
Root resistant membrane
Waterproofing layer
15 cm EPS insulation
Vapour control layer (FLW)
3-6 cm fall forming layer
Reinforced concrete deck



DIADEM150
Drought-resistant, herbaceous perennials
12 cm SEM extensive growing media
VLF-150 extensive filter fleece
3 cm DiaDrain-25 drainage and reservoir board
VLU-300 extensive protection fleece
Root resistant single ply membrane
15 cm thermal insulation
FLW-400 vapour control layer
Steel deck



DIADEM1200
Small trees, bushes
80 cm SIM intensive growing media
VLF-200 intensive filter fleece
6 cm DiaDrain-60 drainage and reservoir board
VLU-500 protection fleece
Root resistant membrane
Waterproofing layer
3-6 cm fall forming layer
Reinforced concrete deck

MY GARAGE
CARPORT GREEN ROOF

DIADEM®350
SEMI-INTENSIVE GREEN ROOF

DIADEM®750
ROOF GARDEN SYSTEM

DIADEM®150
EXTENSIVE GREEN ROOF

DIADEM®1200
INTENSIVE ROOF GARDEN

GREEN UP THE ROOF!

Our vision is a city filled with gardens. We firmly believe that good intentions are not good enough, but must be followed by good deeds if we are to have a greener, friendlier and healthier environment. Our DIADEM® products and services are carefully designed to bring a little bit of nature into our increasingly urban lifestyles.

GREEN ROOF SYSTEMS

Drainage / Reservoir Boards
Geotextiles
Growing Mediums

LAYER COMPONENTS

Inspection Boxes
Irrigation Systems
Channels and Grilles

HYDRO TECHNOLOGY

Gravel Boards
Recycled Plastic Kerbs
Concrete Kerbs

EDGING

Terrace Pedestals
Cross Spacers
Plant Containers

TERRACES

Our company is engaged in the development, component production and marketing of DIADEM® green roof systems and accessories. Our products are widely used in all of Europe especially by customers who emphasize safety and quality.

SAFETY TECHNOLOGY

CONTENT

ADVANTAGES OF A GREEN ROOF

ECONOMIC ADVANTAGES

A Green Roof gives instant increase to the value of a property without increasing its size. Adding a green area improves living and working surroundings.

A reduction is possible on drain diameter and sewage charges because much of the rainwater is recycled into the irrigation system of a Green Roof.

The excellent insulating properties of a Green Roof keep buildings warmer in winter and cooler in summer, cutting heating and air conditioning costs.

Noise and particle pollution is cut. The building stucture and its conventional insulation gains a longer life span.

A green roof indicates the building owners concern for the environment.

ENVIRONMENTAL ADVANTAGES

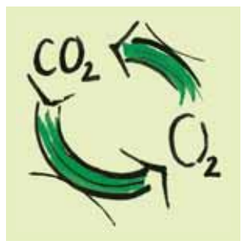
A new and friendly environment is created for people, plants and animals to lessen the impact of todays concrete jungles. In no time at all plants start to colonise the roof, and birds, butterfies and other insects appear.

Green Roofs retain and recycle water and so free the sewage system from overloading. It is a balanced way of water management.

The air contains more moisture and is healthier to breathe. Temperature extremes are reduced, and so are the urban hot spots.

Many pollutants are absorbed by a Green Roof, making the air safer to breathe. Even light pollution is reduced to some degree.

The photosynthesis of plants is the most efficient method known to man to utilise solar energy to best advantage.



TYPICAL BUILD UP

Planting options
The type of plants used depends on whether a low maintenance extensive Green Roof is chosen or an intensive one with the more formal features expected from gardens. The former is limited to succulents, grasses and herbs, while the latter can be planted in accordance with the wishes of the gardener.

SEM / SIM Growing Medium
The depth of soil mix to use depends on whether the roof is the extensive or the intensive type. Soil depth can start from 40 mm upwards. The content and ratio of organic and mineral material in the mixture depends on the types of plants used.

VLF Filter Layer
A filtering sheet to stop leaching of the soil particles. It is made of rot-proof geotextile.

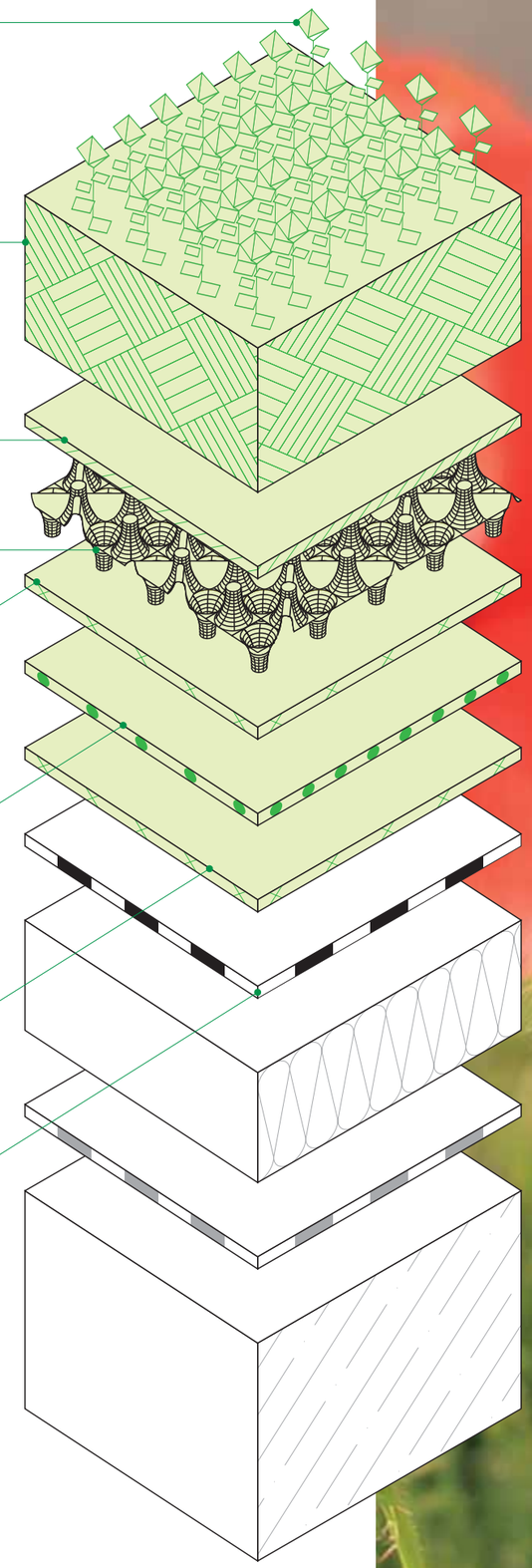
DiaDrain Drainage and Reservoir Boards
Draining excess water from the roof, aeration of roots, suppling water and nourishment to plants - all solved by form-pressed drainage boards.

VLU Protection Layer
This sheet is for the mechanical protection of the water insulating layer during construction work. It retains moisture and allows roots to grow through, thus enhancing cohesion of the layers above. At least 300 g/m^2 weight should be used of this material.

FLW Root Protection Layer
This sheet protects the waterproofing and the building structure itself from damage from roots in situations where the waterproofing is not root resistant. A pre-requisite of this sheet is to have less resistance to moisture than the water proofing below.

VLT Separation Layer
The purpose of this layer is to separate waterproofing from incompatible root protection layer, or to separate any other incompatible materials.

Waterproofing Layer



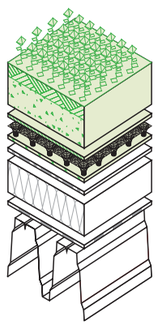
DIADEM® SYSTEMS

DIADEM®150

EXTENSIVE GREEN ROOF

An ecologically sound and economic green roof system that provides a meadow effect, which requires only low maintenance.

MEADOW



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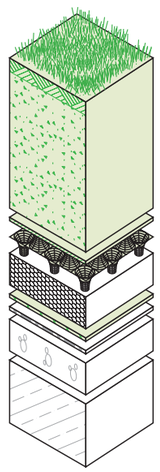
DIADEM®350

SEMI INTENSIVE GREEN ROOF

Ideal for the creation of an outdoor living space. This garden roof system utilises basic plant types, which require more maintenance than the extensive roof.

LIVING SPACE



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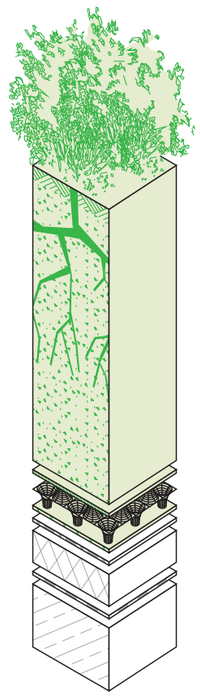
DIADEM®750

INTENSIVE GREEN ROOF

An intensive green roof system, which may include an irrigation system. Opens up practically all the possibilities of normal ground-level gardening.

LANDSCAPED ROOF GARDEN



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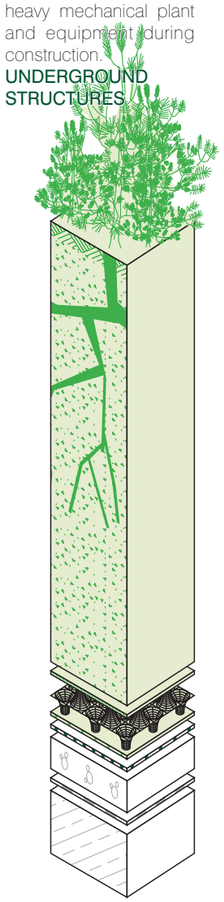
DIADEM®1200

GROUND LEVEL GREEN ROOF

DIADEM®1200 is used in circumstances, where substantial planting is realised by the use of heavy mechanical plant and equipment during construction.

UNDERGROUND STRUCTURES



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DIADEM® SYSTEMS

■ Thickness of system: **~120 mm**
■ Saturated weight: **~150 kg/m²** (without vegetation)
■ Related pages: 9 10 11 12 13 71

■ Product Description

DIADEM® 150 is a multi-layer green roof system, comprising protection fleece, drainage layer, filter fleece and mineral-rich plant growing media suitable for drought-resistant plants.

■ Function

To provide an ecologically sound protection layer to the roof with all the advantages listed below.

■ Application

Application of the product is recommended for building structures with limited load bearing capacity and in areas with no or minimal regularity of use.

■ Advantages

Improved thermal insulating ability.
Rainwater retention capability, helping to reduce the extent of flash floods.
Living space for nature
Suitable for most lightweight roof structures

■ Frequently Asked Questions

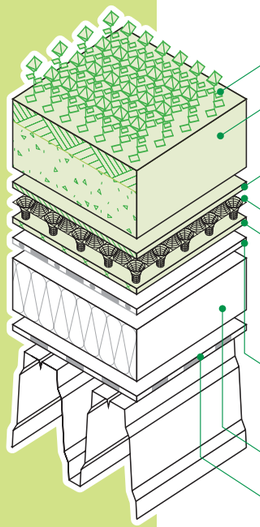
Do we need to irrigate vegetation?
No, the vegetation of Diadem®150 consists of drought-resistant herbaceous, perennial plants which grow in their natural habitat under very harsh conditions.

What maintenance does the vegetation require?
Once established, these plants are extremely sturdy and consequently require only minimal maintenance, limited to occasional weeding.

How long does it take for the vegetation to become established?
This depends on the planting method and the conditions at the time of planting.

What type of planting is possible?
The sedum/wildflower mix is selected to suit the local conditions.

■ Typical build up



■ Drought resistant perennial plants.

■ SEM growing medium, possessing low organic material content made of mostly mineral components and with good water permeability characteristics.

■ The VLF-150 Filter Layer is a superior geotextile, with excellent strength and pressure resistance properties. Made of polypropylene, it is capable of high vapour and water pemeability.

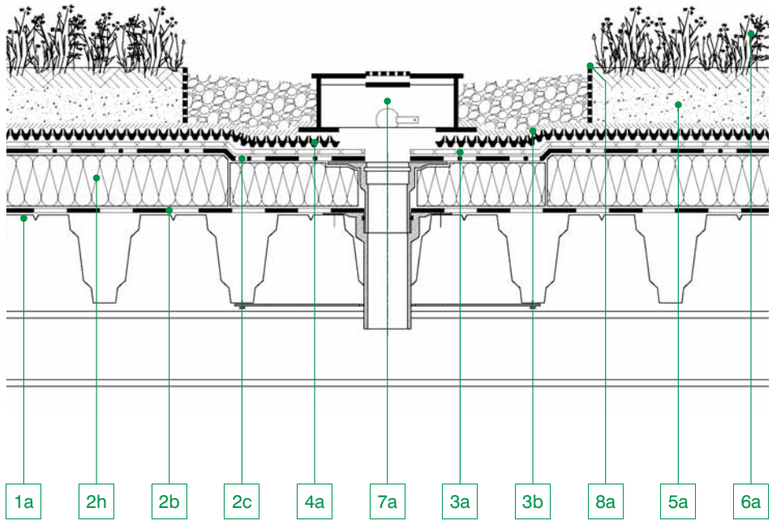
■ Diadrain-25 Light Weight Drainage / Reservoir Board. It has good load bearing capabalities and provides for excellent drainage, reservoir and aeration properties.

■ The VLU-300 Mechanical Protection Layer is a specially formulated Polypropylene sheet which has a hard upper and soft under side making it ideal for the protection of the waterproofing membrane.

☐ Root resistant waterproofing membrane.
NOTE: Non root resistant waterproofing membranes require a separate root resistant layer eg. FLW-400.

☐ Compatible thermal insulation layer.

☐ Vapour control layer



Roof Deck
1a Typically Steel, Timber or Concrete Deck ☐

Waterproofing and Insulation
2b Vapour Control Layer (FLW)..... 38
2c Waterproofing / Root Resistant Membrane ☐
2h Compatible Thermal Insulation ☐

Geotextile Layers
3a VLU-300 Mechanical Protection Layer 36
3b VLF-150 Filter Layer..... 36

Drainage / Reservoir Layer
4a DiaDrain-25 Drainage /..... 32 Reservoir Board

Growing Media
5a SEM Extensive growing media..... 30

Vegetation
6a Drought-resistant, Herbaceous Perennials 28

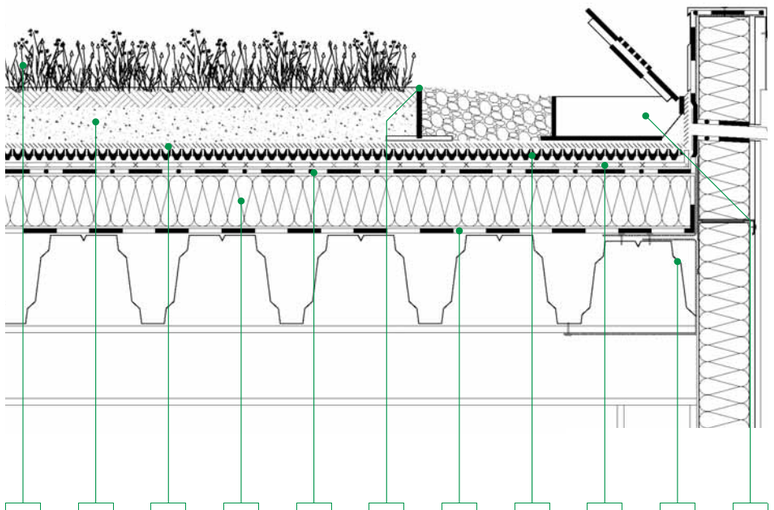
Water Management
7a KSE Inspection Box 50-300 mm height.. 40

Edge Profile
8a KLR Gravel Board..... 52

■ Good practice requires that rainwater outlets are designed to remain free from obstructions, for example gravel or vegetation. These outlets should be accessible at all times. A 300-500 mm wide gravel border should be installed around all roof penetrations to the thickness of the growing medium. Separation of the materials is achieved by means of a gravel board such as KLS. This board also allows rainwater to drain easily to the outlets.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 150 ■ PERIMETER WALL DRAINAGE OR OVERFLOW / KSA PERIMETER INSPECTION BOX



Roof Deck
- 1a Typically Steel, Timber or Concrete Deck ☐

Waterproofing and Insulation
- 2b Vapour Control Layer (FLW) 38
- 2c Waterproofing / Root Resistant Membrane ☐
- 2h Compatible Thermal Insulation ☐

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36

Drainage / Reservoir Layer
- 4a DiaDrain-25 Drainage / Reservoir Board 32

Growing Media
- 5a SEM Extensive growing media 30

Vegetation
- 6b Perennials, lawn 28

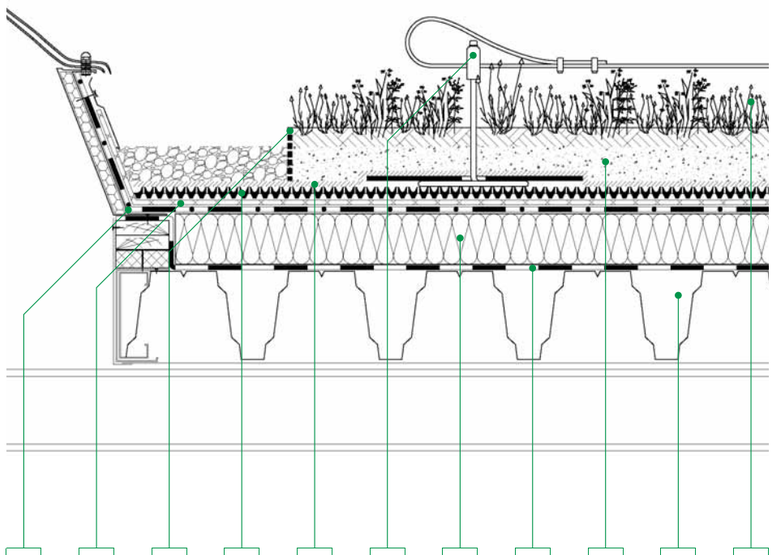
Water Management
- 7c KSA Inspection Box 100-300 mm 43

Edge Profile
- 8a KLR Gravel Board 52

■ Good practice requires that each roof area has a minimum of two drainage points. Local conditions determine where these are located and may also indicate an additional requirement for the installation of an overflow. It is important that these drainage points remain free from any obstruction, therefore access should be provided for maintenance purposes.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 150 ■ ROOF MAINTENANCE/ FLG SAFETY SYSTEM



Roof Deck
- 1a Typically Steel, Timber or Concrete ☐

Waterproofing and Insulation
- 2b Vapour Control Layer (FLW) 38
- 2c Waterproofing / Root Resistant Membrane ☐
- 2h Compatible Thermal Insulation ☐

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36

Drainage / Reservoir Layer
- 4a DiaDrain-25 Drainage and Reservoir Board 32

Growing Media
- 5a SEM Extensive growing media 30
  min 80 kg dry weight growing media required to support FLG Fall Arrest System

Vegetation
- 6a Drought-resistant, herbaceous perennials 28

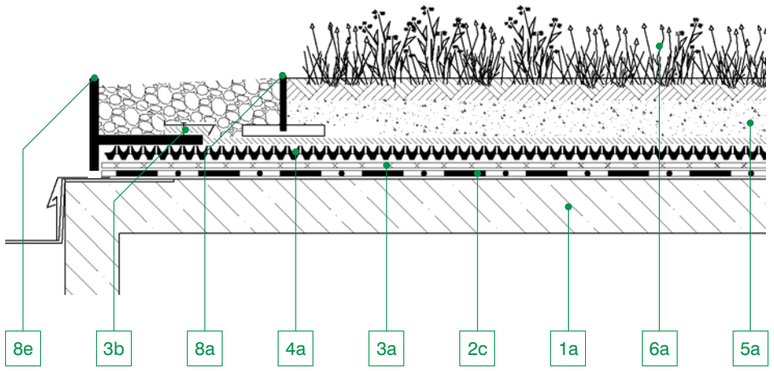
Edge Profile
- 8a KLR Gravel Board 52

Safety System
- 10b FLG Fall Arrest System 66

■ Good practice dictates that roof areas should be properly maintained including ensuring that rainwater outlets are kept clear and free of any obstruction. Complementary to this requirement is the need to ensure maintenance personnel remain safe on the roof. The FLG-30 fall arrest system provides this safety element without the need to penetrate the waterproofing layer. EN 795 and EN 795/A1 the European norms are fully complied with. The line system can also be used as an independent lightning protection system.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 150 ■ TABLE TOP ROOF EDGE / RDT EDGE PROFILE



Roof Deck
- 1a Typically Steel, Timber or Concrete Deck ☐

Waterproofing and Insulation
- 2c Waterproofing / Root Resistant Membrane ☐

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36

Drainage/Reservoir Layer
- 4a DiaDrain-25 Drainage / Reservoir Board 32

Growing Media
- 5a SEM Extensive Growing media 30

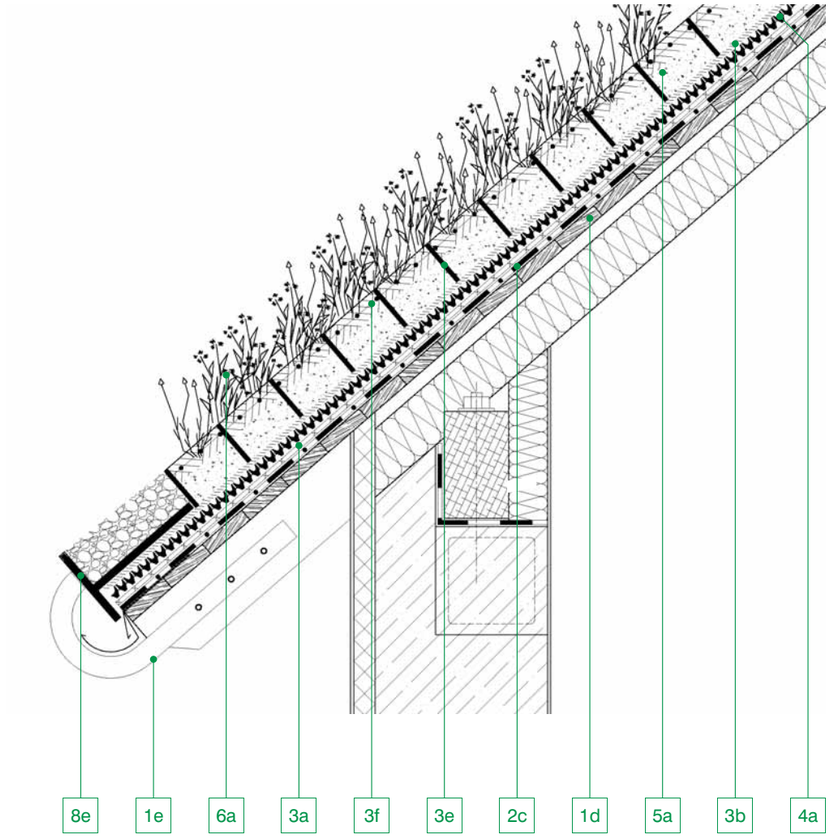
Vegetation
- 6a Drought-resistant, herbaceous perennials 28

Edge Profiles
- 8a KLR Gravel Board 52
- 8e RDT Edge Profile 54

■ Where the roof does not have a perimeter parapet wall, the RDT Edge Profile provides one possible solution to the problem of how to retain the garden elements, whilst still allowing the free flow of rainwater to the drainage areas. In addition, this profile ensures the edge of the roof garden build up is obscured from view. The required gravel border around the perimeter is achieved by means of separating the planted area by the use of the KLR gravel board. The boards also prevent the spread of plants into the gravel border, thereby keeping maintenance to a minimum.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 150 ■ PITCHED ROOF / RDT EDGE PROFILE AND DIADOMINO



Roof Deck
- 1d Timber Roof Board ☐
- 1e Eaves Profile Retention Support Bracket ☐

Waterproofing and Insulation
- 2c Waterproofing / Root Resistant Membrane ☐

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36

Erosion Control Layer
- 3e DiaDomino ■
- 3f Jute Netting ☐

Drainage / Reservoir Layer
- 4a DiaDrain-25 Drainage Reservoir Board 32

Growing Media
- 5a SEM Extensive Growing media 30

Vegetation
- 6a Drought-resistant, herbaceous perennials 28

Edge Profiles
- 8e RDT Edge Profile 54

■ In the case of sloping roof structures between 10 and 20 degree incline, the use of Diadrain-25 in conjunction with jute netting provides sufficient erosion protection. However, careful consideration should still be given to the roof edge finish. All sloping roofs require the careful choice of growing medium and vegetation and expert advice should be sought. In the case of steeper roof designs >20 degrees it is essential that a permanent Geocell soil erosion prevention layer is installed. This layer should act independently of the waterproofing membrane to avoid the transfer of shearing forces. The roof edge finish has to be designed to withstand the downward forces present. The use of the RDT's profile will satisfy this requirment. A sloping sedum roof construction should not require any special irrigation system however a grass roof will.

- Thickness of system: **~ 300 mm**
- Saturated weight: **~ 350 kg/m²** (without vegetation)
- Related pages: 15 16 17 18 72

Product Description

DIADEM® 350 is a semi intensive type of green roof, generally covered with grasses, perennials and shrubs, offering different finishes and uses.

Function

In addition to the usual ecologically benefits this type of construction has the added value of providing additional valuable space for recreational use.

Application

This type of installation is recommended where there is the desire to create a pleasant enviroment that can be used by those working or living at the location.

Advantages

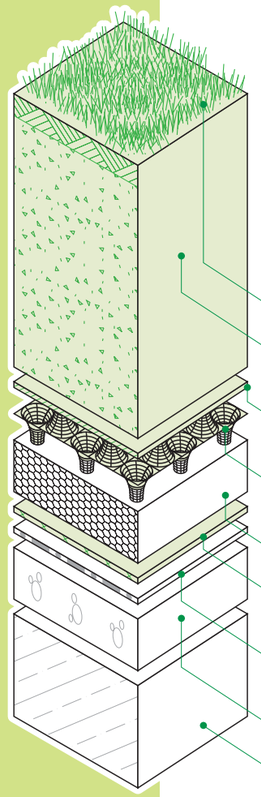
Suitable for every day use
Property value increases
Better use made of available space
Wide range of designs are possible
Relatively low investment cost
Technically sound
Improved thermal efficiency
Enhanced enviromental benefits
Good rainwater retention
Installation is more economical than that of a fully landscaped roof garden.
Ideal for an inverted roof construction as it provides the advantage of additional roof membrane protection.

Frequently Asked Questions

• Why semi-intensive?
It may be that the roof structure cannot support the weight of a more elaborate fully landscaped roof garden design.

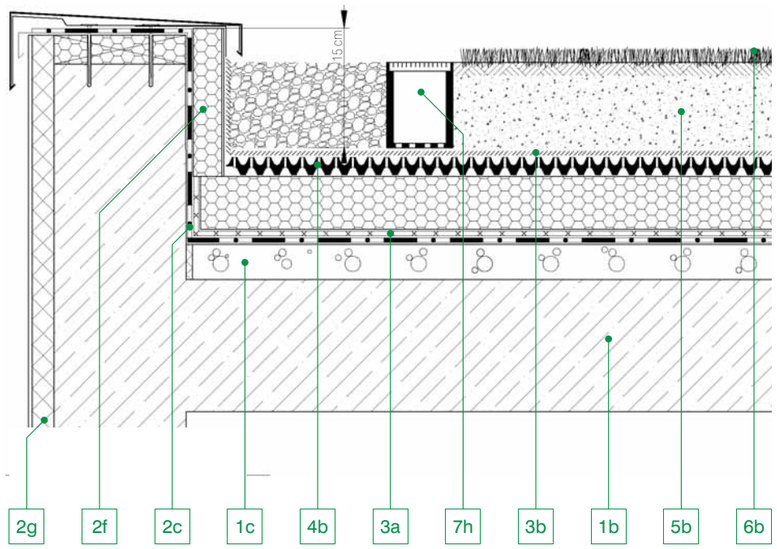
• What about maintenance?
This should be considered at the early planning stages and should include such matters as providing suitable access, irrigation and a maintenance program.

• What about lawn maintenance?
A lawn should be cut often and regularly in order to ensure that the cuttings remain short and therefore do not need to be collected. Indeed, these cuttings provide beneficial nutrients for the lawn.



Typical build up

- Soil-covering plants with grass types, perennials and shrubs.
- SRM-30 is a nutrient rich soil mix consisting of lava, pumice, recycled crushed clay based products and enriched with compost. SRM is ideal for lawns.
- VLF-200 is a superior geotextile, with excellent strength and pressure resistence properties. Made of polypropylene, it is capable of high vapour and water permeability.
- DiaDrain-40 is a light drainage/reservoir board. It has good load bearing capabilities and provides for excellent drainage, reservoir and aeration.
- ☐ Extruded polystyrene thermal insulation boards suitable for inverted roof construction.
- Optional: VLU-300 protection and separation fleece. Note: This layer must be installed where compatibility problems exist between the different layers.
- ☐ Root resistant waterproofing membrane. NOTE: Non root resistant waterproofing membranes require a separate root resistant layer eg. FLW-400.
- ☐ Screed to falls.
- ☐ Reinforced concrete roof deck.



Roof deck
- 1b Reinforced concrete roof slab ☐
- 1c Screed to falls ☐

Waterproofing and Insulation
- 2c Waterproofing / Root Resistant Membrane ☐
- 2f Extruded Polystyrene Thermal Insulation ☐
- 2g Expanded Polystyrene Thermal Insulation ☐

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36

Drainage / Reservoir Layer
- 4b DiaDrain-40 Drainage / Reservoir Board 32

Growing Media
- 5b SRM Intensive Lawn growing media 30

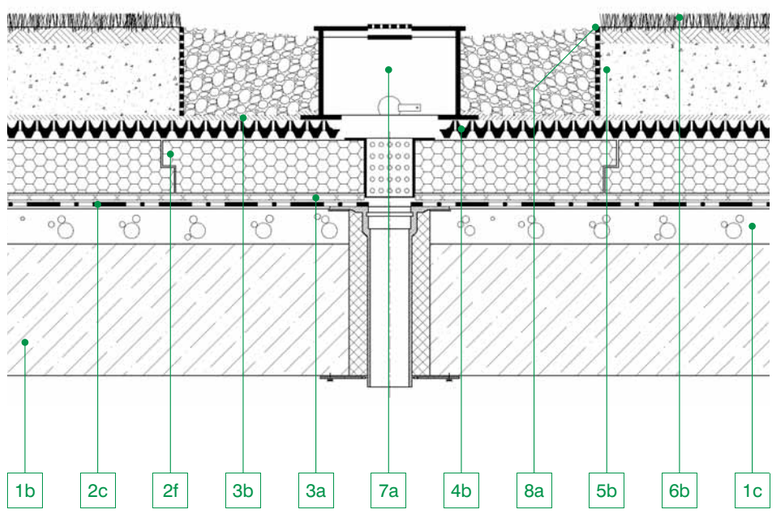
Vegetation
- 6b Perennials, lawn 29

Drainage Products
- 7h RNF Channel with steel grating 44

■ An inverted roof installation can be an efficient method of retro fitting insulation in order to bring the building up to current thermal requirements. A limiting factor may be the height of the existing upstands. To help alleviate this problem the RNS Drainage Channel can be installed and the required upstand height can be measured from the base.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 350 ■ OUTLET/KSE INSPECTION BOX



Roof deck
- 1b Reinforced concrete roof slab
- 1c Screed to falls

Waterproofing and Insulation
- 2c Waterproofing / Root Resistant Membrane
- 2f Extruded Polystyrene Thermal Insulation

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36

Drainage / Reservoir Layer
- 4b DiaDrain-40 Drainage ..... 32 and Reservoir Board

Growing Media
- 5b SRM Intensive Lawn growing media ... 30

Vegetation
- 6b Perennials, Lawn 29

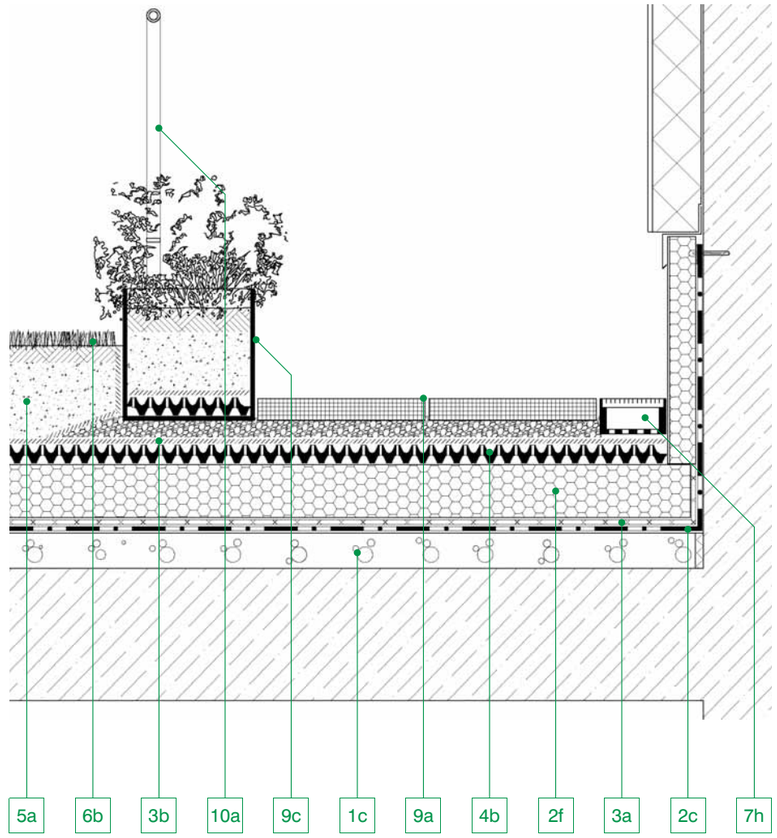
Water Management
- 7a KSE Inspection Box 50-300 mm height .. 40

Edge Profile
- 8a KLR Gravel Board 52

■ It is important that the rainwater is able to flow freely to the drainage points. This is achieved by cutting a hole in the drainage layer and insulation around the outlet and to the same diameter. A KSE Inspection Box is then placed above the opening and supported on the drainage layer. The KSE Inspection Box in conjunction with the KLR Gravel Board and DiaDrain Drainage Layer ensures that the water reaching the outlet is clear of any material that may cause an obstruction.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 350 ■ ROOF DETAILING / DRS PLANTER AND RNF CHANNEL



Roof deck
- 1c Screed to falls

Waterproofing and Insulation
- 2c Waterproofing / Root Resistant Membrane
- 2f Extruded Polystyrene Thermal Insulation

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36

Drainage / Reservoir Layer
- 4b DiaDrain-40 Drainage and ..... 32 Reservoir Board

Growing Media
- 5a SRM Intensive Lawn growing media ... 30

Vegetation
- 6b Perennials, Lawn, Shrubs 29

Drainage Products
- 7h RNF channel with steel grating 44

Materials of Terrace Construction
- 9a FK Cross Spacers 60
- 9c PGE Plant Containers 62

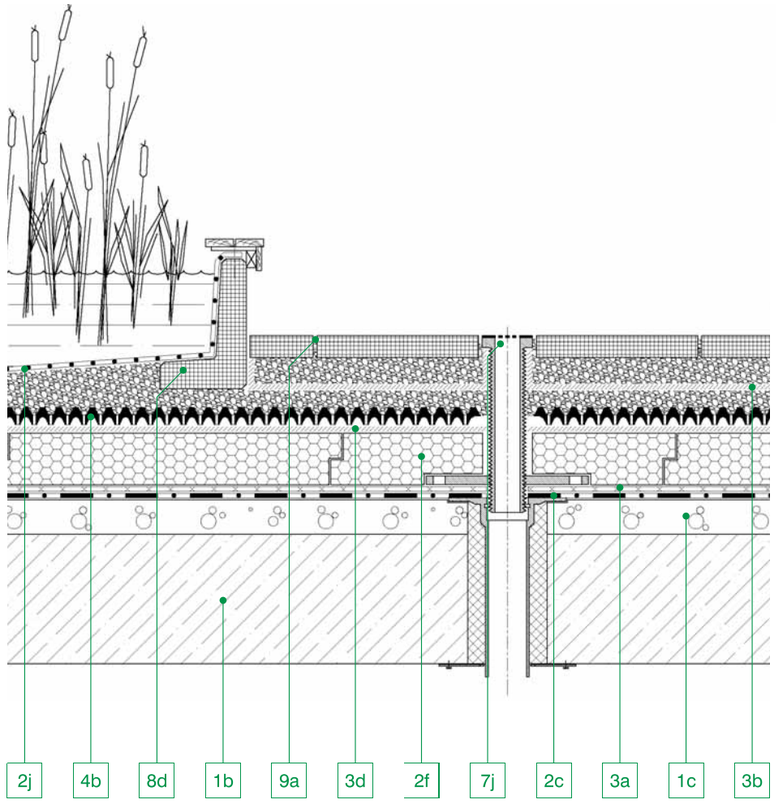
Roof Safety
- 10a DRS Safety Railing System 62

■ Rainwater running down the wall can often be as much as that accumulating from the horizontal roof surface. It is therefore crucial that at the junction of these planes water is prevented from building up to levels which are likely to cause problems. The RNF Drainage Channel provides a perfect solution. Paving slabs should be laid with open joints and kept permanently separated by the use of FK Cross Spacers. The DRS Safety Railing System is a practical, yet aesthetically pleasing means of providing protection and creating demarcated areas. Maintenance personnel can also use the DRS as an anchor point for safety equipment.

SEMI INTENSIVE GREEN ROOF DIADEM® 350

TYPICAL SYSTEM SOLUTIONS

DIADEM® 350 ■ TERRACES/ BLH OUTLET AND BW KERB



Roof deck
- 1b Reinforced concrete roof slab
- 1c Screed to falls

Waterproofing and Insulation
- 2c Waterproofing / Root Resistant Membrane
- 2f Extruded Polystyrene Thermal Insulation
- 2j Pond Liner sandwiched between two VLU-300 fleece protection layers

Geotextile Layers
- 3a VLU-300 Mechanical Protection Layer 36
- 3b VLF-150 Filter Layer 36
- 3d VLR-130 Filter Separating Layer 36

Drainage Layer
- 4b DiaDrain-40 Drainage / Reservoir Board filled with chippings 32

Water Management
- 7j BLH adjustable 72-300 mm height terrace outlet 49

Edge Kerb
- 8d BW Concrete Edge Kerb 56

Materials of Terrace Construction
- 9a FK Cross Spacers 60

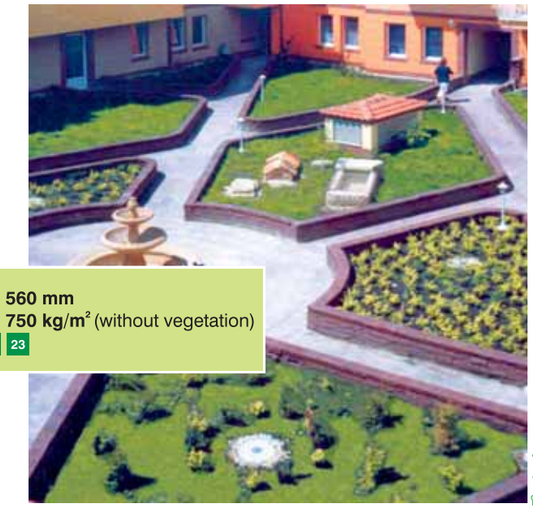
■ It is possible to create a simple pond construction on the roof using the BW concrete edge pieces to form the perimeter. This structure would then be lined with a sandwich construction formed of an underlayer of VLU-300 Protective Fleece, pond liner and a further upper layer of VLU-300 Protective Fleece. It is important that the pond liner is not used as the primary waterproofing layer. Dual drainage can be achieved by means of the BLH Terrace Outlet. An important feature of this product is that it can be adjusted between 60 and 300 mm, giving greater freedom in the design of the terrace build up.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 750

■ Product description

DIADEM® 750 is an intensive roof garden, comparable with a ground level natural garden in that its design and planting are similar. By use of a sophisticated yet simple water management system it is possible to plant and grow more demanding vegetation, even trees.



■ Thickness of system: **~ 560 mm**
■ Saturated weight: **~ 750 kg/m²** (without vegetation)
■ Related pages: 20 21 22 23

■ Function

To create a landscaped garden on the roof.

■ Application

This system is ideal, where a suitable strong load bearing structure is available.

■ Advantages

- Suitable for every day use
- Property value increases
- Best use made of available space
- Wide range of designs are possible
- Technically sound
- Improved thermal efficiency
- Excellent enviromental benefits
- Better rainwater retention

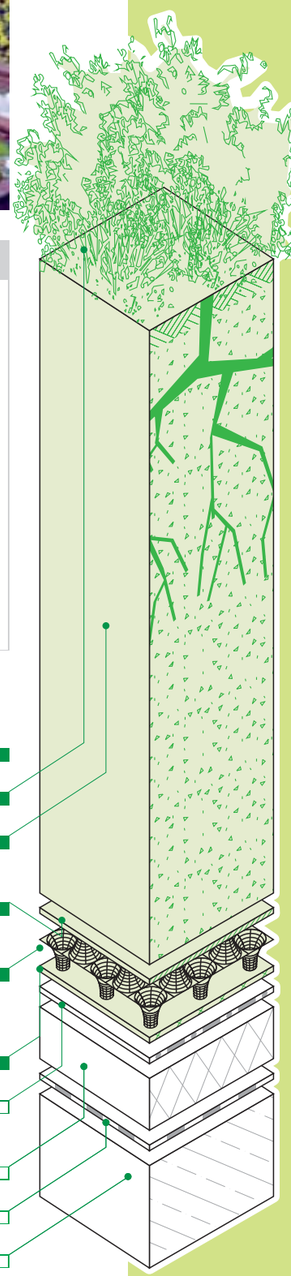
■ Frequently Asked Questions

• Can plant roots cause any damage?
Modern, root resistant waterproofing membranes prevent root penetration. With some membranes it will be necessary to install a separate root resistant layer such as FLW-400.

• Can I grow large trees on my roof garden?
Yes, by applying our root-ball fixing sets.

• Is it possible to construct a pond on the roof?
Yes, see page 18 for instructions.

• Who should design my intensive roof garden?
The creative aspect can be shared but we recommend that you seek professional assistance from an experienced landscape architect or qualified horticulturist.



■ Typical build up

Ground cover plants, shrubs, some trees, grasses, etc...

SIM-56 is a nutrient rich soil mix consisting of lava, pumice, recycled crushed clay based products and enriched with compost. SIM is ideal for intensive vegetation

VLF-200 is a superior geotextile, with excellent strength and pressure resistence properties. Made of polypropylene, it is capable of high vapour and water pemeability.

DiaDrain-60 is a heavy duty, dimensionally stable drainage/reservoir board. It has both good water retention and drainage properties and can be used in conjunction with the DIADEM® irrigation system.

VLU-500 protection and separation fleece.

Root resistant waterproofing membrane. NOTE: Non root resistant waterproofing membranes require a separate root resistant layer eg. FLW-400.

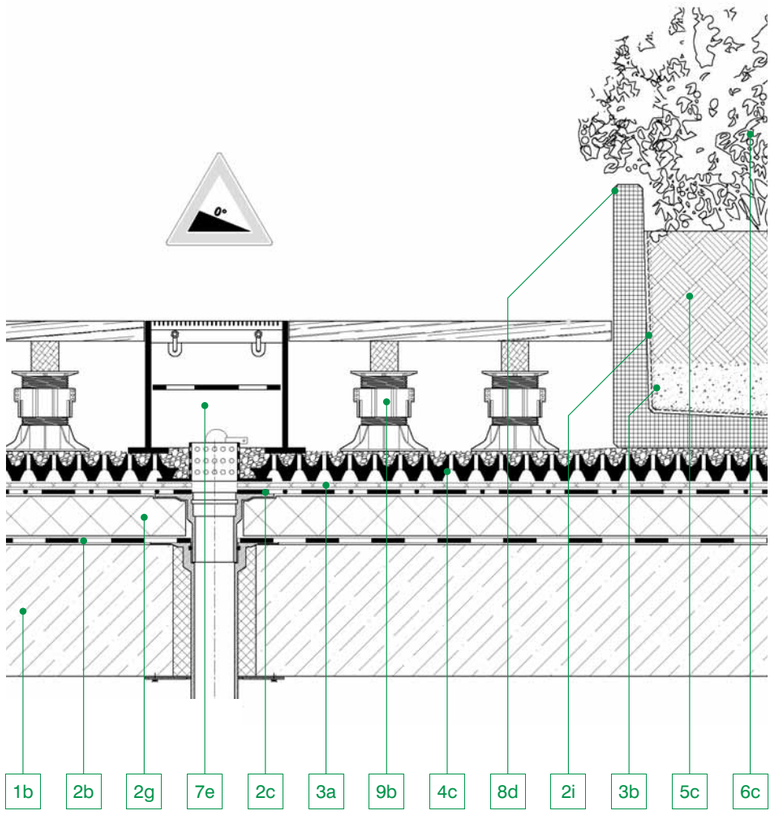
Insulation.

Vapour control layer.

Reinforced concrete roof deck.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 750 ■ TIMBER DECKED TERRACE / SLH, TRF, BW



Roof deck
- 1b Reinforced concrete roof slab (Zero falls)

Waterproofing and Insulation
- 2b Vapour Control Layer (FLW) 38
- 2c Waterproofing / Root Resistant Membrane
- 2g Insulation
- 2i Bituminous self adheseve tape

Geotextile Layers
- 3a VLU-500 Mechanical Protection Layer 36
- 3b VLF-200 Filter Layer 36

Drainage Layer
- 4c DiaDrain-60 Drainage / Reservoir ..... 32 Board filled with chippings

Growing Media
- 5c SIM Intensive Growing media 31

Vegetation
- 6c Perennials, Lawn, Shrubs, small Trees, etc... 29

Water Management
- 7e TRH Terrace Grille height adjustable.... 46

Edge
- 8d BW Concrete Edge Kerb 56

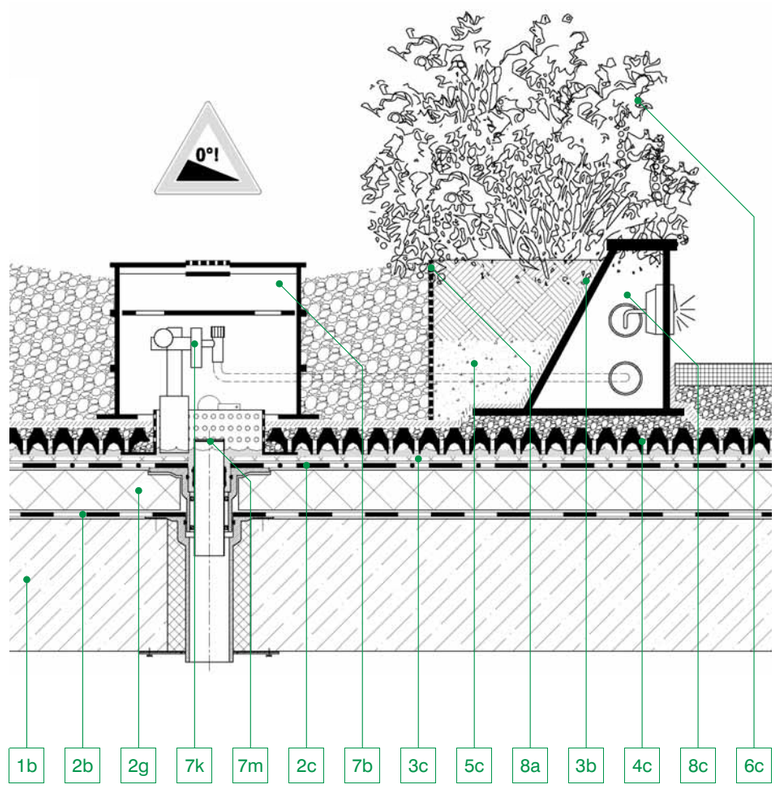
Terrace Building
- 9b SLH height adjustable decking / paving support 58

■ In some instances it may be neccessary to place decking over the rainwater outlets. Access to these outlets is still essential and is easily achieved by means of the TRH Terrace Grating. In this case there is no need for water retention. The DiaDrain Drainage Board is installed with the venting holes face down. The DiaDrain is then filled with chippings. This gives added fire protection to the system whilst drainage remains unimpeded. Finally the joints of the BW Concrete Kerb are sealed with a self adhesive bitumen strip.

LANDSCAPED ROOF GARDEN DIADEM® 750

TYPICAL SYSTEM SOLUTIONS

DIADEM® 750 ■ IRRIGATION UNIT / BKS, RDA



Roof deck
- 1b Reinforced concrete roof slab (Zero falls)

Waterproofing and Insulation
- 2b Vapour Control Layer (FLW) 38
- 2c Waterproofing / Root Resistant Membrane
- 2g Insulation

Geotextile Layers
- 3b VLF-200 Filter Layer 36
- 3c VLS-500 Water Retention and Protection Layer 36

Drainage Layer
- 4c DiaDrain-60 Drainage / Reservoir ..... 32 Board filled with chippings

Growing Media
- 5b SIM Intensive growing media 31

Vegetation
- 6c Perennials, Lawn, Shrubs, small Trees, etc... 29

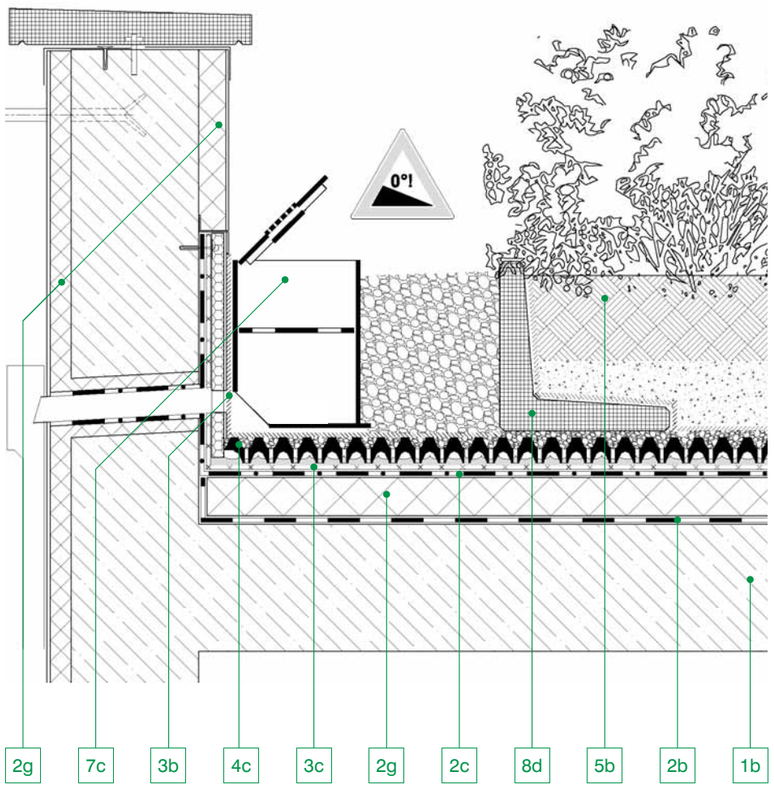
Water Management
- 7b KSR Inspection Box 350-800 mm height . 42
- 7k Water Level Regulator 50
- 7m Roof Outlet 50

Edge
- 8a KLR Gravel Board 52
- 8c RDA Terrace Kerb 250-400 mm height 55

■ The BKS Irrigation System works on the principle of a uniform level of water being maintained on the roof surface. This is achieved by constructing the roof to zero falls. As the water level drops this is replenished from a separate rainwater harvesting tank, which in turn is connected to the water mains via a double check valve. This rainwater harvesting tank is constructed specifically for each project. The water level on the roof is maintained at a predetermined level by means of an extension piece attached to each outlet. The RDA is a cleverly designed lightweight alternative to the traditional heavy garden wall construction. In addition to providing separation of the garden and terrace elements, it also provides a decorative finish which can be used for the location of cables, pipes, etc. and lighting.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 750 ■ KSA PARAPET OVERFLOW INSPECTION BOX



Roof deck
- 1b Reinforced concrete roof slab (Zero falls) ☐

Waterproofing and Insulation
- 2b Vapour Control Layer (FLW) 38
- 2c Waterproofing/Root Resistant Membrane ☐
- 2g Insulation ☐

Geotextile Layers
- 3b VLF-200 filter layer 36
- 3c VLS-500 Water Retention and Protection Layer 36

Drainage Layer
- 4c DiaDrain-60 Drainage / Reservoir Board filled with chippings 32

Growing Media
- 5b SIM Intensive growing media 31

Water Management
- 7c KSA Inspection Box 100-300 mm 43

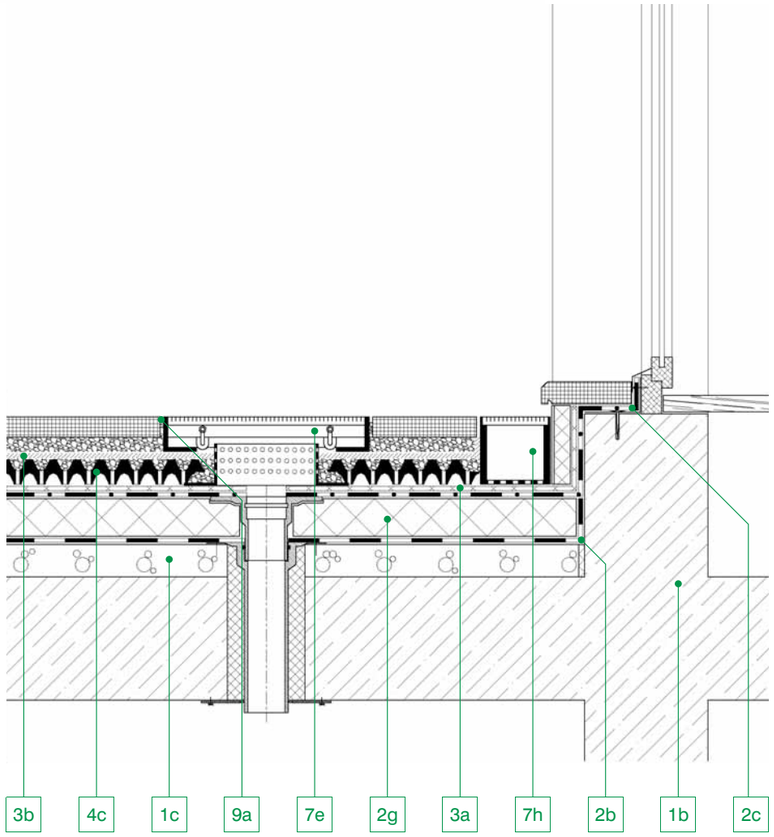
Edge
- 8d BW Concrete Edge Kerb 56

■ It is good practice to protect the overflow from any obstructions. The KSA Overflow Inspection Box achieves this whilst also providing access for maintenance and inspection. A hinged lid ensures that the unit remains intact even in high winds. The required river stone border around the perimeter is separated from the planted area by the BW Concrete Kerb. The kerbs also prevent the spread of plants into the river stone border, thereby keeping maintenance to a minimum.

LANDSCAPED ROOF GARDEN DIADEM® 750

TYPICAL SYSTEM SOLUTIONS

DIADEM® 750 ■ TERRACE ACCESS/ RNF RAINWATER CHANNEL AND TRH OUTLET COVER HATCH4



Roof deck
- 1b Reinforced concrete roof slab ☐
- 1c Screed to falls ☐

Waterproofing and Insulation
- 2b Vapour Control Layer (FLW) 38
- 2c Waterproofing/Root Resistant Membrane ☐
- 2g Insulation ☐

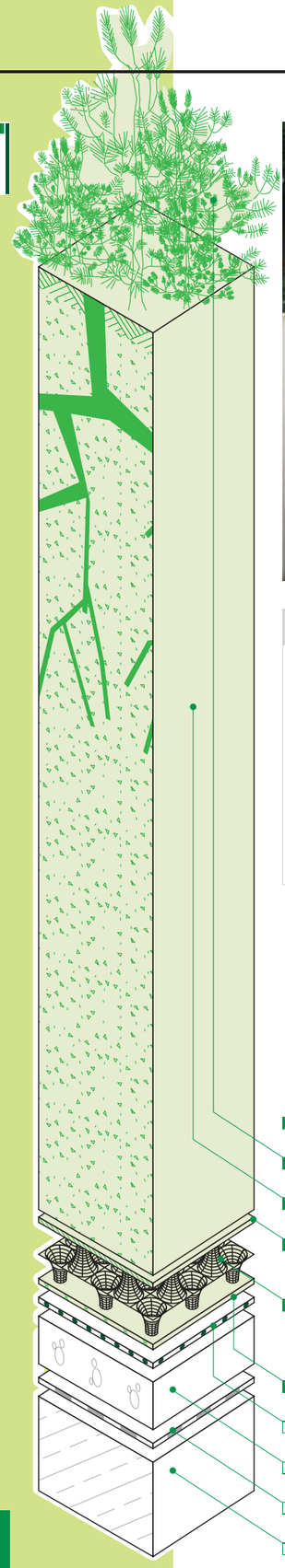
Geotextile Layers
- 3a VLU-500 Mechanical Protection Layer 36
- 3b VLF-200 Filter Layer 36

Drainage Layer
- 4c DiaDrain-60 Drainage / Reservoir Board laid up side down and filled with chippings 32

Water Management
- 7e TRH Terrace Grille height adjustable 46
- 7h RNF Channel with steel grating 44

Terrace Building
- 9a FK Cross Spacers 60

■ Rainwater from the vertical face of a wall or door etc.can often be as much as that accumulating from the horizontal roof surface. It is therefore crucial that at the junction of these planes water is prevented from building up to levels which are likely to cause problems to the building structure or even water ingress. The RNF Drainage Channel provides a perfect solution. Paving slabs should be laid with open joints and kept permanently separated by the use of FK Cross Spacers. The TRH provides a cover for the rainwater outlet and is height adjustable in order to accomodate tolerances in the laid paving.



- Thickness of system: ~ **800 mm**
- Saturated weight: ~ **1200 kg/m²** (without vegetation)
- See: 25 26 27 34 35

Product Description
DIADEM® 1200 is an elaborate, park-like intensive roof garden at ground level.

Function
To provide, park-like recreational areas at ground level.

Application
Suitable for ground level structures such as underground car parks.

Advantages
Quick installation.
Use of heavy machinery possible.
Drainage layer made from recycled material.

Frequently Asked Questions

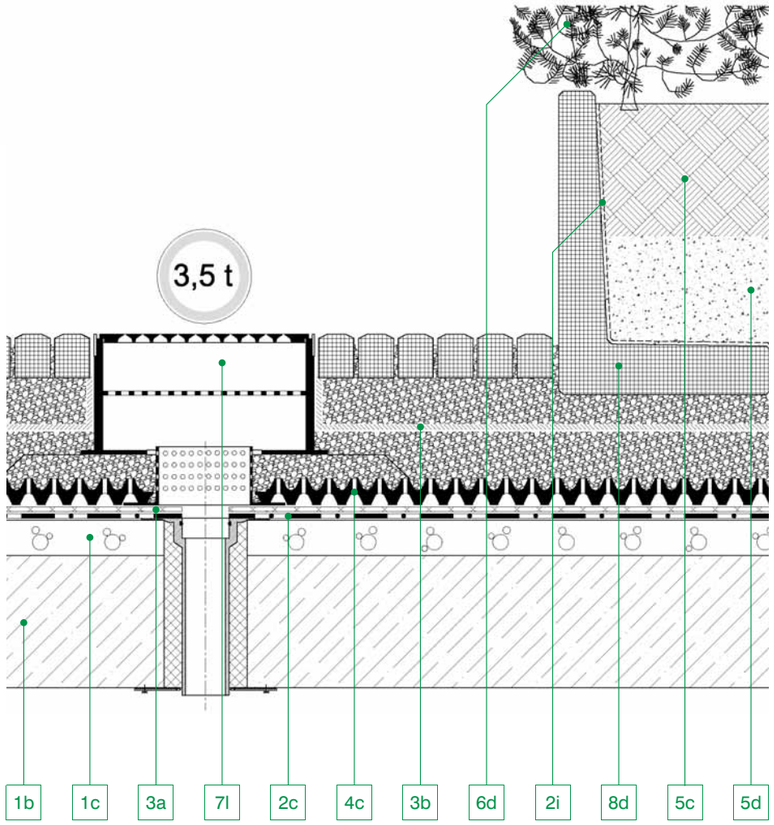
Is the product suitable for public areas?
DIADEM® 1200 is ideal for creating park-like recreational areas above underground garages, walkways and tunnels, etc.

Is it suitable for emergency vehicle access?
No, in this case we have another solution using MDE-60 Drainage Board. Please seek our advice.

What is the likely lifespan of the vegetation?
The lifespan is as for plants found in their natural habitat, providing they receive proper maintenance.

Typical build up

- Ground covering plans, perennials, shrubs and trees
- SUM and SIM are the respective base and top layer soil growing media. See page 31
- VLF-200 is a superior geotextile, with excellent strength and pressure resistence properties. Made of polypropylene, it is capable of high vapour and water pemeability.
- DiaDrain-60 is a heavy duty, dimensionally stable drainage/reservoir board. It has both good water retention and drainage properties and can be used in conjunction with the DIADEM® irrigation system.
- VLU-500 protection and separation fleece.
- ☐ Waterproofing.
- ☐ Screed to falls.
- ☐ Vapour control layer.
- ☐ Reinforced concrete roof deck.



Roof Deck
- 1b Reinforced Concrete Roof Slab ☐
- 1c Screed to Falls ☐

Waterproofing and Insulation
- 2c Waterproofing/Root Resistant Membrane ☐
- 2i Bituminous Self-adhesive Tape ☐

Geotextile Layers
- 3a VLU-500 Mechanical Protection Layer 36
- 3b VLF-200 Filter Layer 36

Drainage Layer
- 4c DiaDrain-60 Drainage / Reservoir Board 32 filled with chippings

Growing Media
- 5c SIM Intensive growing media 31
- 5d SUM Intensive growing media..... 31

Vegetation
- 6d Perennials, Lawn, Shrubs, small Trees, etc. 29

Water Management
- 7l TGS Heavy Duty Inspection Box 46

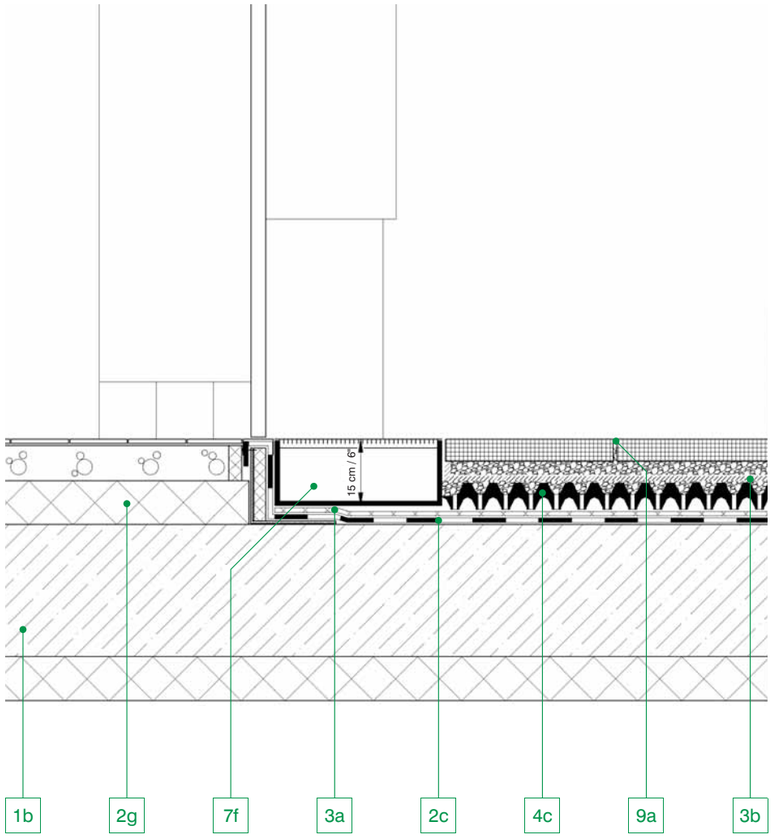
Edge
- 8d BW Concrete Edge Kerb 56

■ Use of the DiaDrain-60 or MDE-60 drainage board in this construction allows for continuous uninterrupted drainage of rainwater beneath the various building elements. The TGS Heavy Duty Inspection Box permits both pedestrian and vehicular traffic to pass over without the need for additional protection. The TGS cover is removable to allow inspection and on completion can be locked for security.

HEAVY PLANTING BY MECHANICAL MEANS DIADEM® 1200

TYPICAL SYSTEM SOLUTIONS

DIADEM® 1200 ■ LEVEL ACCESS/ TRS DOOR ACCESS GRILLE



Roof Deck
- 1b Reinforced Concrete Roof Slab

Waterproofing and Insulation
- 2c Waterproofing/Root Resistant Membrane
- 2g Insulation

Geotextile Layers
- 3a VLU-500 Mechanical Protection Layer 36
- 3b VLF-200 Filter Layer 36

Drainage Layer
- 4c DiaDrain-60 Drainage Board laid up ... 32 side down and filled with chippings

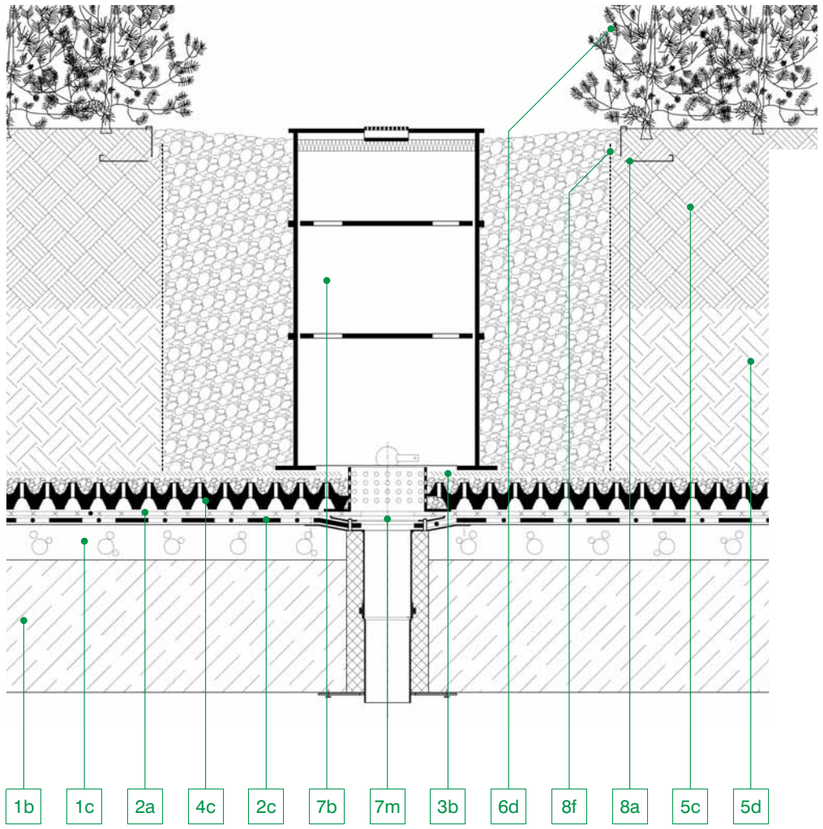
Water Management
- 7f TRS Door Access Grille 48

Terrace Building
- 9a FK Cross spacers 60

■ It is increasingly common for clients to demand level access from their building to the adjoining terrace. This creates detailing difficulties with regard to ensuring there is no water ingress. One possible solution is to use the TRS Door Access Grille, which, by the nature of it's extended size and open structure removes the danger of any build up in this crucial area by feeding the rainwater directly into the drainage system. It is essential that proper falls are designed to ensure that rainwater is directed away from the building. In some locations a canopy should be installed above the door.

TYPICAL SYSTEM SOLUTIONS

DIADEM® 1200 ■ DEEP INSPECTION UNIT / KSR EXTENDED INSPECTION BOX AND POP-UP SEPARATION MEMBRANE



Roof Deck
- 1b Reinforced Concrete Roof Slab
- 1c Screed to Falls

Waterproofing and Insulation
- 2a VLT Separation Layer 36
- 2c Waterproofing/Root Resistant Membrane

Geotextile Layers
- 3b VLF-200 Filter Layer 36

Drainage Layer
- 4c DiaDrain-60 Drainage Board laid up ... 32 side down and filled with chippings

Growing Media
- 5c SIM Intensive growing media 31
- 5d SUM Intensive growing media 31

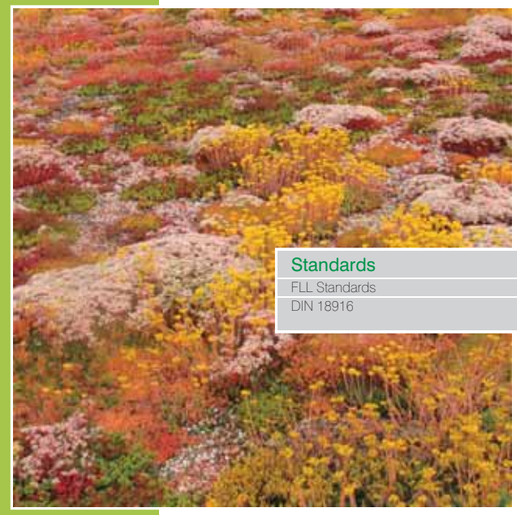
Vegetation
- 6d Perennials, Lawn, Shrubs, small Trees, etc. 29

Water Management
- 7b KSR Inspection Box 350-800 mm height.. 42
- 7m DHA-110-D Roof Outlet 50

Edge
- 8a KLR Gravel Board 52
- 8f Perforated Capping Sheet

■ Locating Perforated Capping Sheet around the extended KSR Inspection Box solves the problem of how to build up the required gravel border. For additional security the KSR unit has integral perforated protection plates which prevent leaf blockage and also add structural strength to the unit.

EXTENSIVE PLANTS



■ Extensive plant recommendations

The plants of DIADEM® 150 are mainly succulents, grasses and herbaceous perennials. These plants can live together in a stable partnership when started off with about 16 specimens per m^2.

Standards

FLL Standards

DIN 18916 Plant Technology in Landscaping

■ Dianthus deltoides
15 cm, VI-VIII,
❀ bright pink

☐ Thymus serpyllum
15 cm, V-VIII,
❀ purple

☐ Sedum hybridum
10 cm, VI-VIII,
❀ Gold

Cerastium tomentosum ■
10 cm, V-VI,
❀ white

Dianthus pontederae ☐
15 cm, VI-VIII,
❀ pink

Achillea tomentosa ☐
20 cm, VI-VII,
❀ yellow

■ Geranium x magnificum
50 cm, VI-VII,
❀ violet-blue

☐ Sedum sexangulare
15 cm, VI-VIII,
❀ yellow

☐ Sempervivum ssp.
10 cm, VI-VII,
❀ white / rose

Sedum floriferum ■
15 cm, VI-VIII,
❀ yellow

Campanula carpatica ☐
20 cm, VI-VIII,
❀ blue

Gypsophila repens ☐
20 cm, VI-VII,
❀ white

■ Sedum album
15 cm, VI-VII,
❀ white

☐ Sedum spurium
15 cm, VII-VIII,
❀ white

☐ Origanum vulgare
15 cm, VI-VIII,
❀ pink

Festuca glauca ■
20 cm, V-VI, blue foliage,
blooms of green with purple tinge

Koeleria glauca ☐
40 cm, VI-VII,
blueish green

Phlox douglasii ☐
10 cm, IV-V,
❀ pink

■ Iberis sempervirens
30 cm, IV-VII,
❀ white

☐ Allium sphaerocephalon
30-70 cm, VI-VIII,
❀ red

☐ Alyssum saxatile
30 cm, IV-V,
❀ yellow

Sedum reflexum ■
20 cm, VII-VIII,
❀ yellow

Potentilla verna ☐
20 cm, III-VIII,
❀ yellow

Saponaria ocymoides ☐
15 cm, V-VII,
❀ rose

INTENSIVE PLANTS

■ Intensive plants

Intensive plants are a selection of flora and foliage, which are most suitable to live on a roof environment without endangering the structure of the building. Selecting woody stems create the feeling of a ground level garden. Making our selection we considered not only the habits of each species but also their resistence to damage by wind, frost and sun. When choosing the growth medium, plants with similar soil needs should be placed together. Below is a small sample of the plants available for intensive roof gardens.

Pinus Mugo „Mops” ■
Mugo pine
40 - 80 cm, dark green foliage

■ Pinus leucodermis „Compact Gem”
50 cm, dark green foliage

☐ Pinus sylvestris „Argentea Compacta”
2.0 m, silver

☐ Cytisus purpureus
30-60 cm, VI-VII,
❀ purple stems, yellow bloom

Forsythia suspensa ■
0.5-1.5 m IV-V,
❀ Cadmium yellow

Prunus tenella ☐
0.6-1.0 m, IV-V,
❀ rose

Berberis thunbergii ☐
1.5-2.5 m, IV-V,
❀ yellow

■ Juniperus sabina „Tamariscifolia”
3-40 cm, blue-green foliage

☐ Ononis repens
20-40 cm, VI-VII,
❀ lilac

☐ Microbiota decussata
20-40 cm,
green foliage

Erica carnea ■
0.2 m ,III-IV,
❀ rose

Ligustrum vulgare ☐
0.5-0.7 m,
dark green foliage

Potentilla fruticosa ☐
0.3-1.5 m, V-IX,
❀ yellow

■ Cotoneaster tomentosus
1.5 m, V-VI,
❀ rose

☐ Acer palmatum
3.0-4.0 m, V-VI, ❀ from green to yellow, bronze, purple and red

☐ Caragana aurantiaca
1.0 m, V,
❀ yellow

Euonymus fortunei ■
0.2-5.0 m, VI-VII,
❀ lightgreen

Spirea albiflora ☐
0.3-1.,5 m, V-VI,
❀ white

Cotinus coggygria ☐
2.0-4.0 m, III-IV,
❀ pink

■ Buxus sempervirens
1.0-3.0 m, IV-V,
❀ yellow

☐ Ilex aquifolium
0.3-0.8 m,
darkgreen foliage

☐ Buddleia davidii
2.0-4.0 m, VII-VIII,
❀ blue lilac

Viburnum bodantense ■
2.5-3.0 m, XI-III,
❀ rose

Cornus mas ☐
3.0-5.0 m, III-IV,
❀ yellow

Anemone hupehensis ☐
0.7-1.0 m, VII-X,
❀ white

EXTENSIVE GROWING MEDIA

SEM Growing media for DIADEM® 150

A loose, mainly mineral growing media with good drainage properties and low organic content for use on extensive green roofs.

SRM Growing media for DIADEM® 350

A loose mix made up especially for turfs. It has good aerating and drainage qualities, resists compression and contains the starting amount of lawn fertilzer.

Technical data	SEM	SRM
Volume weight	in case of WS_{max} <1200 kg/m³ *	in case of WS_{max} <1200 kg/m³
Sediment (<0,0063)	< 15 m%	< 20 m%
Air content	> 70 Vol.%	> 70 Vol.%
Max. water capacity	15 - 25 Vol. %	45 - 65 Vol. %
Water soluble minerals	< 3,5 g/l	< 2,5 g/l
Organic material content	1,0 - 3,0 m%	6,0 - 12,0 m%
pH ($CaCl_2$)	6,5 - 8,0	5,5 - 7,0
Absorption capacity	-	> 120 mmol/l
Nutrient NPK	80-200-700 mg/l	-
*Should be established also for dry condition.		

INTENSIVE GROWING MEDIA

SIM Growing media for DIADEM® 750

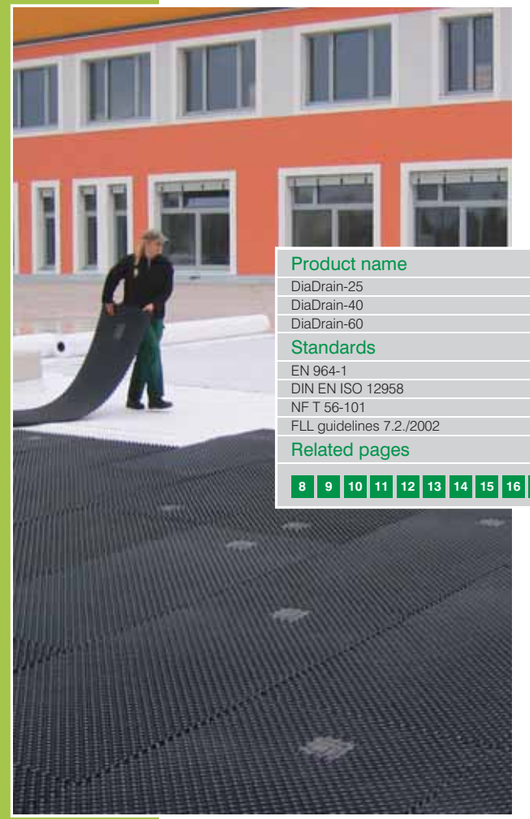
A loose mix for intensive green roofs for a wide variety of plants, with good water draining and aerating properties.

SUM DIADEM® 1200 "subsoil"

A sterilised mix of deep growing media used as a base layer to provide for excellent drainage and aeration to roofs.

Technical data	SIM	SUM
Volume weight	in case of WS_{max} <1200 kg/m³	in case of WS_{max} <1500 kg/m³ *
Sediment (<0,0063)	< 20 m%	< 20 m%
Air content	> 60 Vol.%	> 55 Vol.%
Max. water capacity	40 Vol. %	35 - 55 Vol. %
Water soluble minerals	< 2,0 g/l	< 3,5 g/l
Organic material content	3,0 - 8,0 m%	3 m%
pH ($CaCl_2$)	5,5 - 7,0	5,5 - 7,0
Absorption capacity	> 140 mmol/l	> 60 mmol/l
Nutrient NPK	-	-
*Should be established also for dry condition.		

DIADRAIN 25/40/60



■ Product description

The DiaDrain a water drainage and reservoir board made from heavy duty polystyrene. The surface is shaped on both sides and perforated on the top.

Product name	Product number
DiaDrain-25	310125
DiaDrain-40	310115
DiaDrain-60	310159
Standards	
EN 964-1	Sizing
DIN EN ISO 12958	Water draining capacity
NF T 56-101	Load bearing strength
FLL guidelines 7.2./2002	
Related pages	

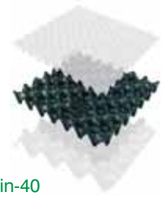
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 25 26

■ Application

The DiaDrain product family is formulated for continuous drainage of green roofs. Depending on the product choosen it can take the weight of pedestrian or even heavy vehicle traffic (such as fire engines or furniture vans). The boards can be filled with various materials to enhance the load-bearing capacity of the product.

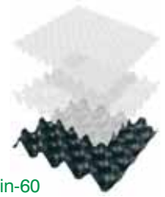
■ DiaDrain-25

25 mm high drainage/reservoir boards for extensive roof gardens.



■ DiaDrain-40

40 mm high drainage/reservoir board for extensive and semi intensive green roof gardens.



■ DiaDrain-60

60 mm high heavy duty large capacity reservoir and draining boards suitable even for flooded green roofs. The boards provide a sound framework to support roads and kerbs, while giving continuous drainage.

CE

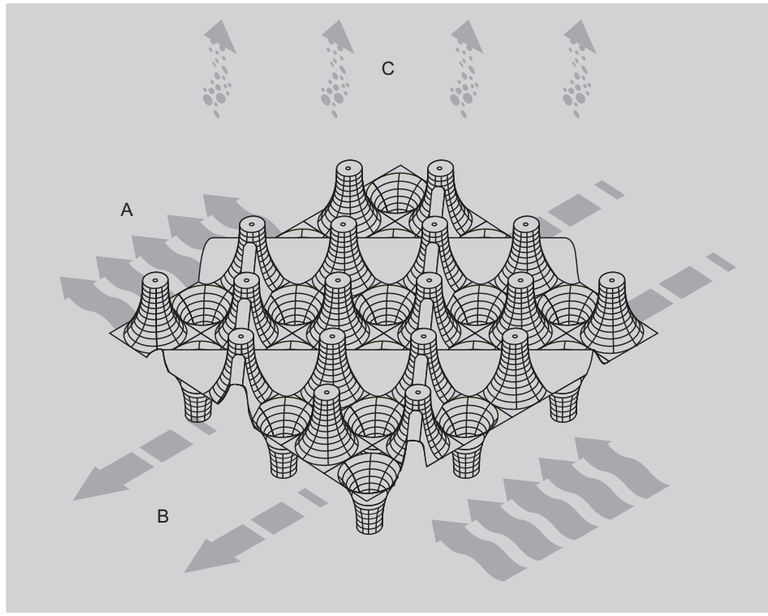
What does the CE marking mean?

- The CE marking (an acronym for the French "Conformite Europeenne") certifies that a product has met EU health, safety, and environmental requirements, which ensure consumer safety.
- Manufacturers in the European Union (EU) and abroad must meet CE marking requirements where applicable in order to market their products in Europe.
- By affixing or having affixed the CE marking, the manufacturer indicates that he takes responsibility for the conformity of the product with all applicable requirements set out in the relevant Community harmonisation legislation providing for its affixing.
- The DiaDrain drainage boards are CE certified.

Technical data	Dim	DiaDrain-25	DiaDrain-40	DiaDrain-60
Product Number		310125	310115	310159
Height	[mm]	25	40	60
Width	[mm]	900 ± 5	900 ± 5	900 ± 5
Length	[mm]	1960 ± 5	1960 ± 5	1960 ± 5
Fill up volume	[l/m²]	10,1	14,3	24,3
Weight	[kg/m²]	1,30	1,42	2,15
Compressive strength	[kN/m²]	442,8	256,2	439,6
Water retention capacity	[l/m²]	7,0	10,3	16,1
Water draining capacity DIN 4095	[l/min/m]	243	392	486
Water draining capacity DIN 4095	[l/m×s]	4,0	6,5	8,1
Water draining capacity i=1	[l/m/s]	0,8	1,31	1,62
Material		recycled polystyrene	recycled polystyrene	recycled polystyrene
Colour		black	black	black
Number in packaging	[m²/pallet]	529,2	441	352,8
Laying at 2-3° incline		overlapping	overlapping	overlapping

In accordance with DIN 4095 Guidelines. (0.3 l/m² in front of walls; 0.03 l/m²×s on roofs; 0.003 l/m²×s below paving)
All technical data are averages of results which the various examining bodies have measured.
We reserve the right to change technical data.

DIADRAIN 25/40/60



■ Operational diagram

The primary function of flat roof drainage/ reservoir boards is to drain the excess of sudden torrents into the drainage system (A). A secondary function is to allow air to access the roots (B). Finally, while having good water retaining and load bearing qualities, to supply water to plants by diffusion (C) in the dry periods.

■ Advantages

- Simple and quick installation
- Low structural weight
- Excellent load bearing capacity
- Increased water-draining and venting capacity
- Good stability in retaining its form
- Economical storage and transport
- Continuous aeration
- Extends the lifespan of green roofs
- Made of recycled polystyrene material and can be recycled
- DIN EN 12225 Certification for microbiological resistance

■ Installation instructions

When not using them on an inverted roof, the boards should be laid on a protection fleece type VLU-300. It is advised to have an overlap of 1 or 2 rows. Above the position of drain pipes the board should be cut away to enable inspection. It is necessary to weigh down the boards if roof installation is made in stages.

■ Tools needed for installation

A sharp knife will cut the boards but care must be taken not to damage any waterproofing below.

■ Packing, Transport and Storage instructions

The product is to be protected from protracted sunlight.

■ Frequently asked questions

• Why do you recommend a draining layer shaped on both sides?

A double moulded layer ensures that there are two ways for air to get in and water to get out enhancing the efficiency of drainage and ventilation.

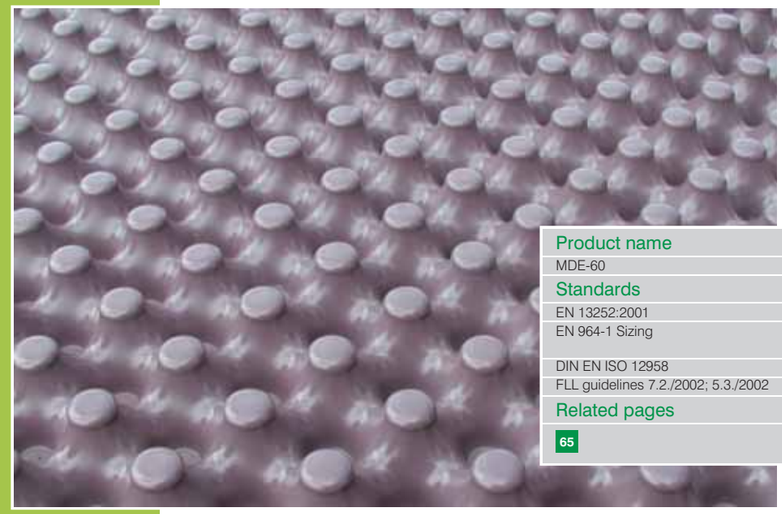
• Why polystyrene?

Polystyrene retains its shape well in high summer temperatures and tests support the view that even after 50 years of use it will not alter its form substantially.

• Which side up should the boards be installed?

At planted areas the diffusion holes should point upwards. Under paved or boarded areas the holes should be pointing downwards.

MDE60



■ Product description

These water drainage and reservoir boards are made of ABS material and shaped on both sides. In spite of the minimal weight the product is suitable to fix roof fittings without breaking through the roof structure.

Product name	Product number
MDE-60	310117
Standards	
EN 13252:2001	drainage systems
EN 964-1 Sizing	determination of thickness at specified pressures
DIN EN ISO 12958	water flow capacity
FLL guidelines 7.2./2002; 5.3./2002	drainage layers
Related pages	
65	

■ Application

One of the main functions of the MDE-60 board is to act as a receiving layer onto which additional roof structure can be attached to without drilling through the water-proofing layer (such as trees, solar panels or air conditioning equipment). In spite of their low weight they provide suitable secure anchorage together with the weight of the green roof for distribution of both pulling or pushing weight. Under very heavily loaded roads (e.g. fire protection roads, furniture delivery roads), this built in layer ensures the continuous drainage.

■ Installation instructions

When not using them on an inverted roof, the boards should be laid on a protection fleece type VLU-300. It is advised to have an overlap of one to two rows. Above the position of drain pipes the board should be cut away to enable continuous water flow. It is necessary to weigh down the boards temporarily if roof installation is made in stages.

■ Packaging, transport and storage instructions

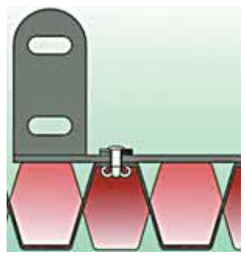
The product must be protected from strong sunlight.

■ Advantages

- Simple and quick installation
- Low structural weight
- Very high load bearing capacity
- Exceptional water drainage and storage capacity
- Continuous aeration
- Good stability, maintains shape very well
- Economical storage and transport

■ Tools needed for installation

A sharp snap-off knife will cut the boards, but care must be taken not to damage any waterproofing below.



Technical data	Dim	MDE-60
Product Number		310117
Height	[mm]	60
Width	[mm]	900 ± 5
Length	[mm]	1960 ± 5
Volume	[l/m²]	28,5
Weight	[kg/m²]	2,70
Compressive strength	[kN/m²]	560
Water draining capacity DIN 4095	[l/min/m]	486
Water draining capacity DIN 4095	[l/m×s]	8,1
Water draining capacity i=1	[l/m/s]	1,62
Material		ABS
Number in packaging	[m²/pallet]	264,6
Laying at 2-3° incline		overlapping

In accordance with DIN 4095 Guidelines. (0.3 l/m² in front of walls; 0.03 l/m²×s on roofs; 0.003 l/m²×s below paving) All technical data are averages of results which the various examining bodies have measured.
We reserve the right to change technical data.

DIABOLO40

■ Product description

Diabolo is a drainage channel at the level of the water flow, into which water is able to enter from three directions. It ensures unobstructed water drainage and continuous aeration.The product is made of polystyrene drain board with large load bearing capacity in the middle and it is covered with geotextile.

Product name	Product number
Diabolo-40	310146
Standards	
DIN EN ISO 12959	water drainage capability
DIN 4095	drainage layers
DIN EN ISO 12958	water flow capacity
FLL guidelines	drainage layers

■ Application

- The water collection area is enlarged around the drainage channels, inspection boxes and ensures the unobstructed water flow even in long distance.
- Installing under pebble / grave layer it accelerates the water flow and makes water drainage lengths possible to calculate.
- For terraces Diabolo acts as water drain channel between the watershed area and water drainage area. The water drainage areas in case of terraces are usually the drainage channels, terrace grills, outlet covers.
- Diabolo can also act as water drainage and reservoir on metal roofing. In such case the Diabolo's width should be determined according to the width between two folds of the metal roof, so it snugly fits in it.

■ Installation instructions

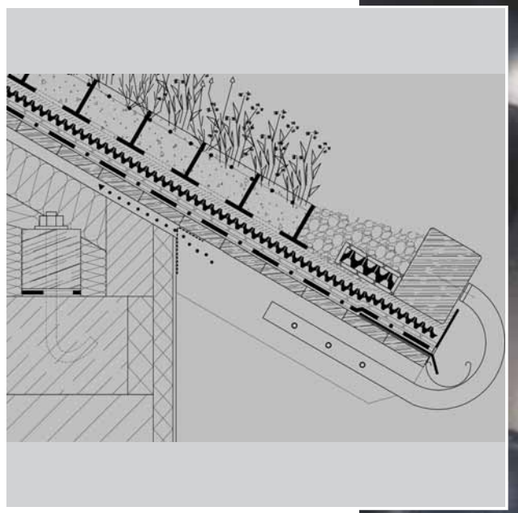
The drainage boards covered in VLU-300 protective geotextile are used under terrace drainage channels, to connect linear water drain channels to single outlets in order to help water flow into the drain pipes. They are placed adjacent to each other to connect.

■ Tools needed for installation

A sharp snap-off knife will cut the boards, but care must be taken not to damage any waterproofing below.

■ Advantages

- Simple installation
- Low structural weight
- Large load bearing capacity
- Exceptional water drainage and storage capacity
- Good stability, maintains shape very well



Technical data	Dim	Diabolo-40
Product Number		310146
Height	[mm]	40
Width	[mm]	150 ± 5
Length	[mm]	1960 ± 5
Water retaining capacity	[l/m²]	18,0
Weight	[kg/m]	0,34
Compressive strength	[kN/m²]	330
Water draining capacity DIN 4095	[l/min/m]	3,92
Water draining capacity DIN 4095	[l/m×s]	6,5
Water draining capacity i=1	[l/m/s]	1,31
Material		rec. polystyrene covered with geotextile
Colour		black

■ Product description

The VL fleeces are geotextiles made of polypropylene thread using a needle felting method.

Product name	Product number
VLT-100	320101
VLR-130	320601
VLF-150	320201
VLF-200	320202
VLU-300	320416
VLU-500	320302
VLS-300	320405
VLS-500	320402
Standards	
EN ISO 11058	Water permeability
EN ISO 10319	Tensile strength
EN ISO 12236	Elasticity
EN 918	Resistence to penetration
EN ISO 12956	Opening width
FLL guidelines 5.3/2002; 8.2./2002	Protecting and filter layers

Related pages

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

■ Application

VL geotextiles have many different uses on green roofs but their main functions are filtering and mechanical protection.

VLT geotextiles are made for separating incompatible materials. Lighter weights are suitable between manufactured layers and heavier weights for incompatible growing mediums.

VLR geotextiles are suitable for inverted roofs above the thermal insulation layer, for both protection and filtering. Approx. weight 130 g/m^2.

Technical data	Dim	VLT-100	VLR-130	VLF-150	VLF-200	VLU-300	VLU-500	VLS-300	VLS-500
Product number		320101	320601	320201	320202	320416	320302	320405	320402
Surface weight	[g/m^2]	100	130	150	200	300	500	300	500
Thickness	[mm]	1,3	1,5	2,0	2,2	1,8	2,5	3,0	4,0
Tensile strength length ways	[kN/m]	5,0	7,0	8,5	10,5	2,7	5,4	2,6	4,4
Tensile strength across	[kN/m]	5,0	7,0	8,5	10,5	3,7	7,2	3,6	6,0
Elasticity	[%]	70 / 85	60 / 75	75 / 80	75 / 80	75 / 65	75 / 65	100 / 95	100 / 95
CBR-test	N	1000	1300	1500	2000	1000	2300	1000	3300
Durability classification	GRK	2	2	3	3	2	3	2	4
Opening size	[mm]	0,12	0,10	0,10	0,10	0,13	0,09	0,12	0,09
Water-permeability	[mm/s]	100	100	90	90	95	48	90	50
Material		PP	PP	PP	PP	100% synthetic thread			
Thickness	[g/cm^3]	0,9	0,9	0,9	0,9	0,9-1,38	0,9-1,38	0,9-1,38	0,9-1,38
Melting point	[°C]	165	165	165	165	110-260	110-260	110-260	110-260
Method of production		one side heat treated	both sides heat treated	not treated	not treated	both sides heat treated		not treated	not treated
Roll width	[m]	2	2	2	2	2	2	2	2
Roll length	[m]	100	100	100	100	50	50	50	50
Roll size	[m^2]	200	200	200	200	100	100	100	100
Roll weight	[kg]	20	26	30	40	30	50	30	50
Roll diameter	ca. [mm]	300	350	400	450	370	450	400	500
Colour		black	black	black	black	multicolour	multicolour	multicolour	multicolour

VLF geotextiles enable good drainage and are efficient filters without getting blocked. Approx. weight 150-200 g/m^2.

VLU geotextiles are thermally hardened and are used for mechanical protection and to retain water to a degree. Approx. weight 300-500 g/m^2.

VLS geotextiles are water retentive and protect too. Manufactured from a mixture of threads, without thermal treatment. Approx. weight 300-500 g/m^2.

■ Advantages

- Resistant to both acidic and basic substances
- Due to its elasticity withstands heavy weights on points
- Excellent water permeability
- Easy to cut

■ Installation instructions

Remove debris and check that the surface is clean and sound. Roll out the geotextile and leave at least 100 mm overlap at the ends and 300 mm at sides. These sheets should be weighted if left exposed. Wetting the sheets provides a degree of weight but if left for longer periods sandbags or paving slabs should be used.

■ Tools needed for installation

Sharp blade, cutter.

■ Packing, Transport and Storage Instructions

Geotextile rolls are delivered on spools of cardboard, protected by black polyethylene bags, secured by a cap. Transport the rolls laying down. Move the rolls with a forklift truck or thread a wire through the spools and lift with a crane.

■ Frequently asked questions

• Are VL geotextiles root-resistant?

Roots were meant to grow through the VL layers and by intertwining, strengthen the entire system. Mature root growth is therefore more desirable than fresh planting.

• Does a VL layer have to be joined to the layer below it?

No, but it should be weighted against wind uplift if left exposed.

• How long can the products be stored in open air?

UV stabilized products, in general, can be exposed to direct sunlight for about 4 weeks.

• Up to what height should this protective layer be drawn over the waterproofing?

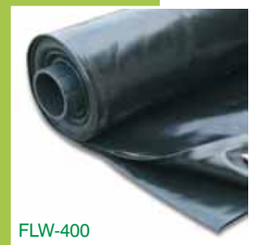
It should fully cover and protect the waterproofing layer.

FLW 400/800

■ Product description
FLW, a root resistant layer made from either PVC or Polyethylene.

Product	Product number
FLW-400	340101
FLW-800	340102
Standards	
FLL guidelines 5.3/2002 8.2/2002	Protector- and Filtering Layers

FLW-800



FLW-400

■ FLW-800 Installation instructions

Cold welding:
- Both hot and cold welding is suitable for joining the seams.
- Apply the welding agent with a brush
- Press the seam together and roll at once with a silicon roller

Hot welding:
- At least a 20 mm clean and dry overlap is necessary
- Allow the material to warm up
- Lead the welding nozzle over the 20 mm overlap and pay particular attention to theedge of the upper layer. (The nozzle must also travel 2-3 mm beyond the edges to be joined)
- Pressing surfaces together at once, roll over with a silicone roller using even pressure

■ FLW-800 Advantages
- Root resistant
- Easily installed

■ FLW-400 Applications
The product is particularly recommended for additional protection against water and root breakthrough on extensive roofs. Ideal when renovating smaller garage roofs or outbuildings and a perfect answer for lining planting beds.

■ FLW-400 Installation instructions
Ensure a 1.5 m overlap at all seams.

■ FLW-400 Advantages
- Polystyrene- tar- and oil resistant
- Suitable for heavy duty use as slip layer
- Root resistant
- Large, 6 × 25 m pieces

Technical data	Dim	FLW-400	FLW-800
Product number		340101	340102
Approx. thickness	[mm]	0,4	0,8
Material		PE-LD	PVC-P
Colour		black	brown
Weight	[kg/m²]	0,37	1,03
Tensile strength weft	N / mm²	>20	24,3
Tensile strength warp	N / mm²	>18	23,0
Elasticity weft	%	>600	359
Elasticity warp	%	>500	365
Tear resistance weft	%	>75	95
Tear resistance warp	%	>85	90
Cold folding	-	without cracking	
Diffusion resistance		8506	
Test for root breakthrough		8506	
Test reports to Standards		DIN 16938	DIN 16938
Quality standard		ISO 9001, ISO 9014	
Other observations		rolled 4-ply	not UV or bitumen resistant
Width of roll	[m]	1,5	1,3
Length of roll	[m]	25	35
Surface area of roll	[m²]	150	45,5
Weight of roll	[kg]	56	47
Diameter of roll	approx.[mm]	330	210
Pallet units	roll / pallet	10	22

■ Frequently Asked Questions

- **Does the root protection layer need to be protected in turn?**

Yes, with protection fleece.

- **How can one be sure about the protection a product offers against roots growing through?**

The FLL carries out tests after a 2 year, and a 4 year period for root penetration. Certificates are given only after these tests are completed.

- **What are the recommended uses for the FLW-400 layer?**

The use of FLW-400 is recommended on roofs where conventional waterproofing is applied for instance on green roofs that are installed on garage decks. Due to its excellent vapour resistance properties and its high tensile strength qualities, it may also act as a vapour control layer on the warm side of any thermal insulation.

OSMOCOTE EXACT

■ Product description
OSMOCOTE Exact is a regulated release NPK fertilizer granulate, which ensures even growth of plants due to its biological activity and gradual nutrient release.

Product name	Product number
OSMOCOTE Exact	500110
Standards	
FLL 11.5./2002	Delivery, upkeep
Related pages	
6 7 68	

■ Applications
Special attention should be paid to the provision of nutrients to the roof garden substrate. The release rate of nutrients of these resin-encased fertiliser granules only depend on soil temperatures and the thickness of the covering resin. At above 0 C° the osmotic pressure builds and the granules start releasing the nutrients through the semi-permeable resin wall. The thicker the resin coating, the slower the nutrient release. Nutrient release is not influenced by water content, PH or bacterial activity and remains constant in changeable environmental conditions.

■ Product accessories
Hand driven fertiliser spreader

■ Advantages
- Nutrient release meets plant genus requirements
- Better colour of foliage and blooms
- Suitable both for soft stem and woody stem perennials
- Even nutrient release for entire growth period
- Environmentally friendly
- One annual application

■ Application guide
Application depends on current levels of nutrients in the soil, as well as the type and purpose of the green roof installed. At the start and during subsequent applications 60 g/m², Osmocote Exact Standard fertiliser should be used for intensive green roofs and 35 g/m², for the extensive types. Best time for fertilisation is March, the beginning of the growing season. Using the hand driven spreader, an even distribution of fertiliser can be ensured with 2-3 light applications.

■ Tools needed
- Hand driven fertiliser spreader
- Weighing scales

■ Frequently asked questions

- **For how long will the fertiliser have an effect?**

We suggest a fertiliser with a release phase of 8-9 months, as this corresponds with the growing season.

- **What are the signs of lack of nutrients?**

Shortening flowering periods are an indication. Eventually blooming could stop altogether and a strong moss build up could appear.

- **Could damage be caused by overdosing?**

Even a 20-30% overfeed of Osmocote Exact fertiliser causes no demonstrable damage.

KSE 10/15/20/30

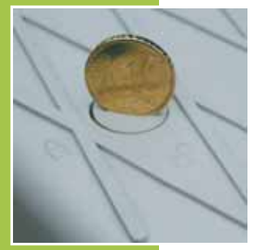
■ Product description

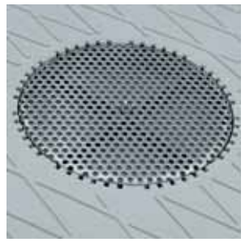
The KSE inspection box is manufactured from UV resistant plastic.

Product name	Product number
KSE 10	110111
KSE 15	110112
KSE 20	110113
KSE 30	110114
Standards	
EN 124:1999	load bearing
FLL guidelines 5.5./2002	gutter system
Related pages	
9 16	

■ Applications

The KSE products ensure the draining of green roofs and the maintenance and inspection of the water outlet is unhindered. These products are suitable for installing an irrigation system, positioning a water level regulator and storing accessories. By using a 100 mm extension ring, the depth of the growing medium can be matched.

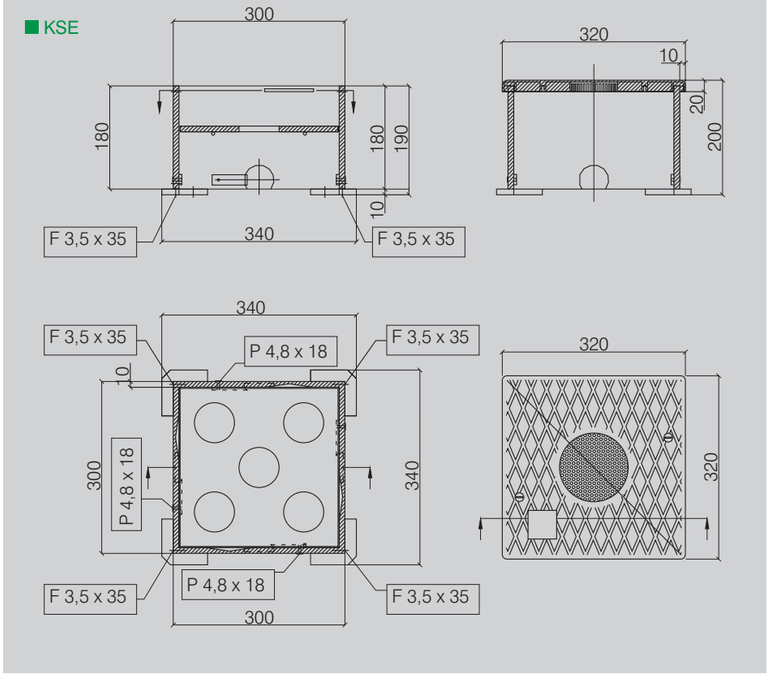




Technical data	Dim	KSE-10 / 15 / 20 / 30	KSE+extension element
Product number		110111/110112/110113/110114	100211
Width	[mm]	300	300
Length	[mm]	300	300
Height with cover	[mm]	100 / 150 / 200 / 300	100
Outlet surface area	[mm²]	900	-
Weight	[kg]	1,64 / 2,19 / 3,47 / 4,85	
Fixing quality standard		DIN 7505 A2	DIN 7505 A2
Drain pipe connection		4 pieces, d=52 mm	-
Drain pipe clamp		part of construction	-
Heat-insulated cover		can be ordered (30 mm extruded PS)	-
Extension element		can be ordered (height 100 mm)	-
Transport packaging		on pallets: 2 items of KSE-10/box	in cardboard boxes
Material		UV resistant PP	UV resistant PP
Colour		RAL 7032	RAL 7032

KSE 10/15/20/30

■ KSE



■ Advantages

- Chip and UV resistant material
- Can be used with various water-draining systems, including drainpipes
- Lockable
- Filters water entering the system
- Keeps sunlight out of the drains
- Suitable for all types of green roof outlets
- Extension element available for easy height adjustment

■ Installation instructions

- Warm roof: The inspection boxes are simply placed over the rainwater outlet.
- Inverted roof: The inspection boxes in this case can be placed on the top of insulation.
- General: The drainage boards and fleeces should be taken to the edge of the inspection box.

■ Tools needed for installation

No special tools required.

■ Product accessories

- Thermal cover
- KSE extension element
- Cast iron cover for heavy traffic areas

■ Frequently asked questions

• Why is the use of inspection boxes recommended for green roofs?
The most ideal conditions for plants on a green roof are near the water outlets and this product enables both inspection and maintenance without dismantling any parts.

• Why is a gravel strip needed around the manhole?
By constructing a gravel strip vegetation can be kept at a distance from the outlet which greatly helps draining surface water.

• What should determine the chosen height of the product?
The uppermost point of the inspection box should be 10-20 mm above the surrounding area with or without a cover plate, to prevent blocking the interior with debris.

KSR 35/45/55/65

■ Product description

The KSR inspection box is manufactured from UV resistant plastic.

Product name	Product number
KSR 35	120111
KSR 45	120112
KSR 55	120113
KSR 65	120114
KSA 10	110211
KSA 15	110212
KSA 20	110213
KSA30	110214
Standards	
EN 1433:2002	
DIN 19580	
FLL guidelines 5.5./2002	gutter system
Related pages	

21 27

■ Applications

The KSR inspection unit enable unobstructed water drainage, inspection and easy cleaning of rainwater outlets. These products are also suitable for installing an irrigation system by positioning a water level regulator and storage accessories. By using extension rings, the depth of the growing media can be matched.

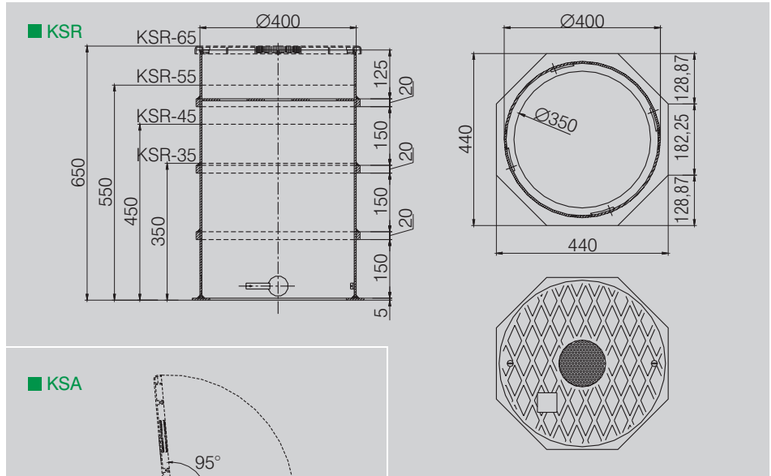
■ Advantages

- Can be used on any type of green roof with any type of outlet
- UV resistant
- Lockable
- Accepts fittings for irrigation systems
- Filters entering surface water
- Stops sunlight getting into the outlet

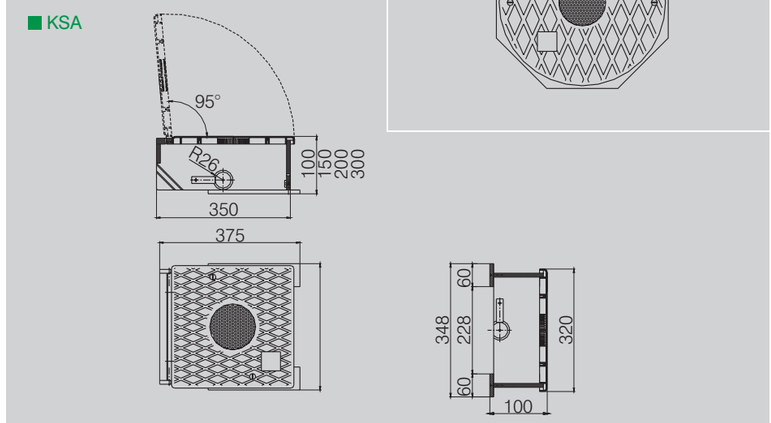
Technical data	Dim	KSR-35 / 45 / 55 / 65	KSR+ext. element	KSA-10 / 15 / 20 / 30
Product number		120111 / 120112 / 120113 / 120114	100201	110211 / 110212 / 110213 / 110214
Width	[mm]	d=400	d=400	300
Length	[mm]	-	-	350
Height with cover	[mm]	350 / 450 / 550 / 650	50 / 100	100 / 150 / 200 / 300
Outlet surface area	[mm²]	900	-	900
Fixing quality standard		DIN 7505 A2	DIN 7505 A2	DIN 7505 A2
Drain pipe connection		4 pieces, d=52 mm	-	3 pieces, d=52 mm
Drain pipe clamp		part of construction	-	part of construction
Thermal cover		can be ordered (30 mm extruded PS)	-	can be ordered (30 mm extruded PS)
Extension element		can be ordered (KSR+)	-	-
Material		UV resistant PP	UV resistant PP	UV resistant PP
Colour	RAL	7032	7032	7032

KSA 10/15/20/30

■ KSR



■ KSA



■ Product description

The KSA inspection box is manufactured from UV resistant plastic. Lid is permanently attached to the structure on one side (see illustration above).

■ Application

KSA products are especially designed inspection boxes for simple intensive and also for extensive green roofs with external down pipes located at the parapet. They ensure clear access to the drainage system.

■ Frequently asked questions

• KSE or KSR inspection boxes?

KSE products are manufactured for up to 300 mm total layer thickness. Above this thickness the use of KSR is advised because of the product's superior ability to withstand pressure to the sides.

• Why is a gravel strip needed around the manhole?

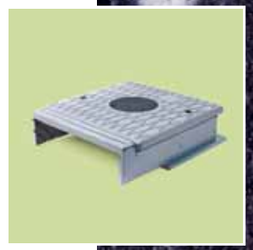
By constructing a gravel strip because vegetation can be kept at a distance from the outlet and this also greatly helps the draining of surface water.

• What should determine the chosen height of the product?

The uppermost point of the inspection box should be 10-20 mm above the surrounding area with or without a cover plate, to prevent blocking the interior with debris.

■ Installation instructions

Inspection boxes can be positioned directly above the drainage boards when they have enough capacity. Using fill up systems however, they must be positioned on the mechanical protector layer. In the latter instance drainage can be hastened by placing looped drainpipes in the immediate vicinity of the manholes. On inverted roofs the inspection boxes are placed on the thermal insulation layer and a separating layer is used to create the gravel division pocket around it. Care must be taken with the filtering layers around the manhole and it is advisable to bring up all geotextiles right to the edge of the manholes.



■ Tools needed for installation

No tools are needed to put this product in position.

■ Product accessories

- Thermal cover
- Extension element (KSR+)
- Cast iron cover for heavily trafficked areas (KSR)

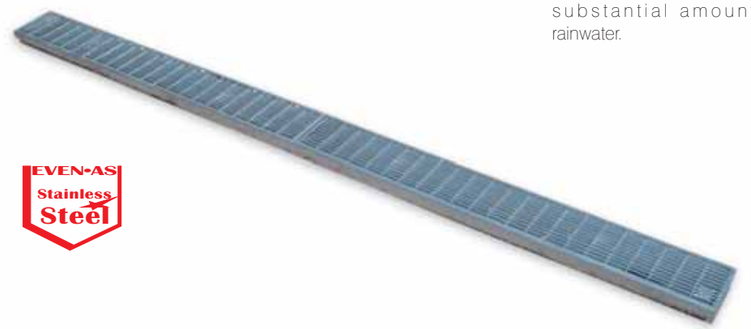
■ Product description

The RNH drainage channels are manufactured from UV resistant plastic with galvanized steel or stainless steel grille cover.

Product name	Product number
RNH 8-12	210201
RNS-03	210305
RNS-05	210301
RNS-08	210302
RNF-05	210101
RNF-08	210102
RNF-10	210103
Related specifications	
EN 1433:2002	technical components of surface water draining
DIN 19580	drainage
FLL guidlines 5.5./2002	gutter system
Related pages	
15 17 23	

■ Applications

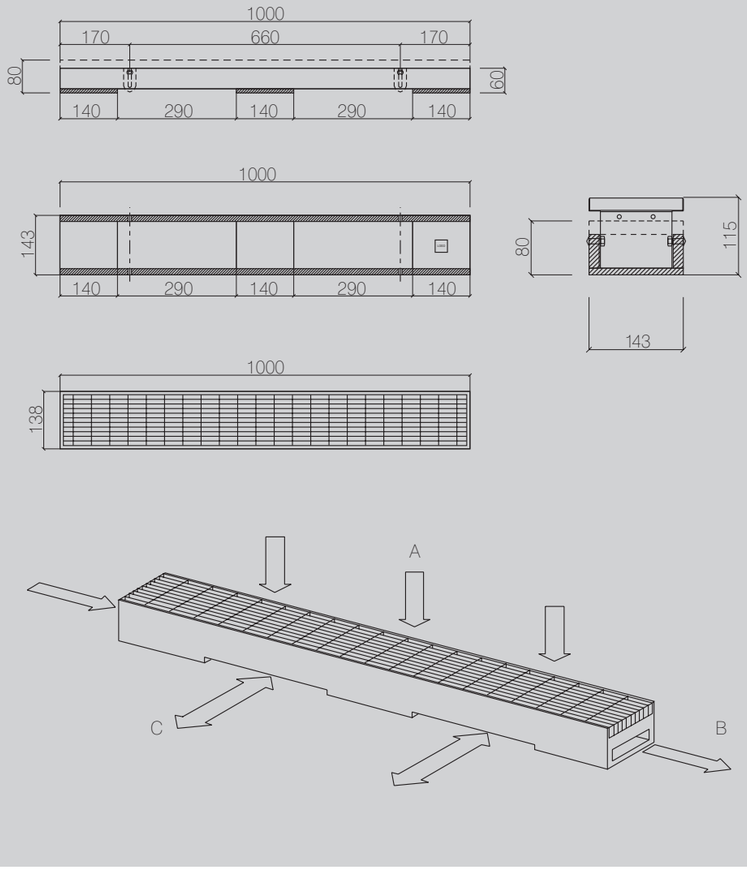
The RNH drainage channels should be positioned along terrace doors, low windows and at terrace-wall junctions. Their use should particularly be considered, where there are large vertical surface areas as these also transfer a substantial amount of rainwater.



EVEN-AS Stainless Steel

Technical data	Dim	RNH 8-12	RNS-03 / 05 / 08	RNF-05 / 08 / 10
Product number		210201	210305 / 210301 / 210302	210101 / 210102 / 210103
Height	[mm]	80-115 adjustable	30 / 50 / 80	50 / 80 / 100
Width	[mm]	145	135	150
Length	[mm]	1000	1000	1000
Type of grate		mesh (size: 40×10 mm)	die-stamped grating	mesh (size: 40×10 mm)
Type of channel casing		UV resistant PP, RAL colour: 7032	UV resistant PP, RAL colour: 7032	UV resistant PP, RAL colour: 7032
Durability classification		A15	A15	A15
Stainless steel finish		optional	optional	optional
Weight	[kg]	5,92	3,07 / 3,52 / 4,55	3,75 / 4,57 / 5,40
Products include 2 end pieces and 2 connecting pieces.				

■ RNH



■ Operational diagram

The casing of RN drainage channels is made of polypropylene with an open underside to ensure great durability and good drainage properties. Rain (A) entering the channel passes along not only lengthways (B) but also sideways (C) toward the drainage layers and the down pipes.

■ Advantages

- Low installation profile
- Easy to clean
- Strong polypropylene housing
- Adjustable height
- Two way drainage

■ Product accessories

- Corner piece
- End piece
- Connecting piece
- Half meter sized channel
- Metal leaf and dirt collection mesh
- Lockable variety
- Closed bottom variety
- Custom made sizes as required

■ Installation instructions

The channel can be laid beside or on the top of the drainage board. Channels are strengthened and stabilized by overlapping the top grille to connect the channel. Additional stability can be achieved by fixing channels together if necessary. Care should be taken to ensure any cut galvanized steel sections are sprayed to prevent corrosion.

■ Tools needed for installation

- Screwdriver
- Rubber mallet
- Metal cutter

■ Frequently asked questions

• Why is the underside of RNH products left open?

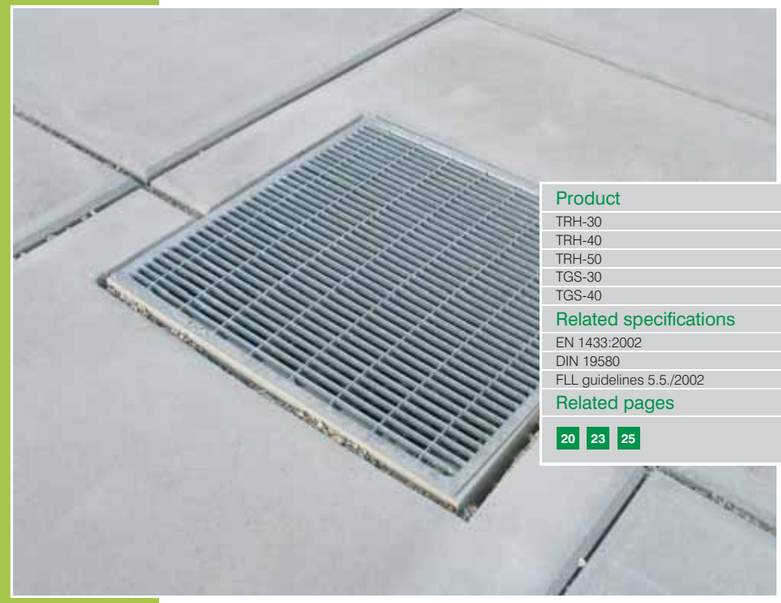
An open underside to these products ensures fast water drainage both lengthways to a drainage pipe and sideways to the drainage boards.

• Steel or polypropylene channel housing is best?

The advantage of polypropylene channel housing is good stability, durability and low heat conduction. The latter protects the watercourse from thermal damage. Steel housing could be used when only very small height is available for installation.

• Which type of grate to choose?

The mesh-type grate is most suitable for places with high splash back of rain, and the ribbed grate type is most suitable where low overall height is a problem. The cast iron grate has the best load bearing characteristics.



■ Product description

The TRH terrace outlet cover is manufactured from a UV resistant plastic base with optional steel height adjustable element and grille cover.

Product	Product number
TRH-30	210601
TRH-40	210602
TRH-50	210603
TGS-30	140301
TGS-40	140302

Related specifications

EN 1433:2002
DIN 19580
FLL guidelines 5.5./2002

Related pages

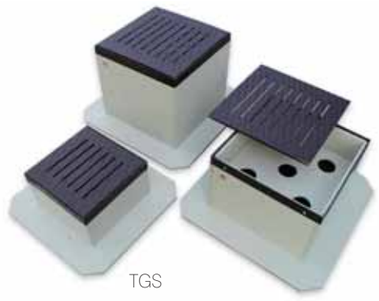
20 23 25

■ Application

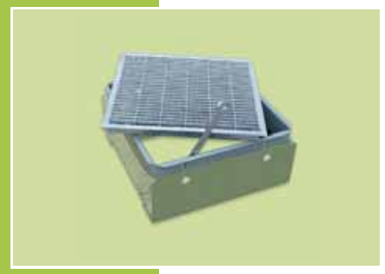
TRH grated outlet profiles enable the multiple-plane water-draining of roof terraces. Access for inspection and cleaning of roof outlets is made simple.

EVEN-AS Stainless Steel

TRH



TGS

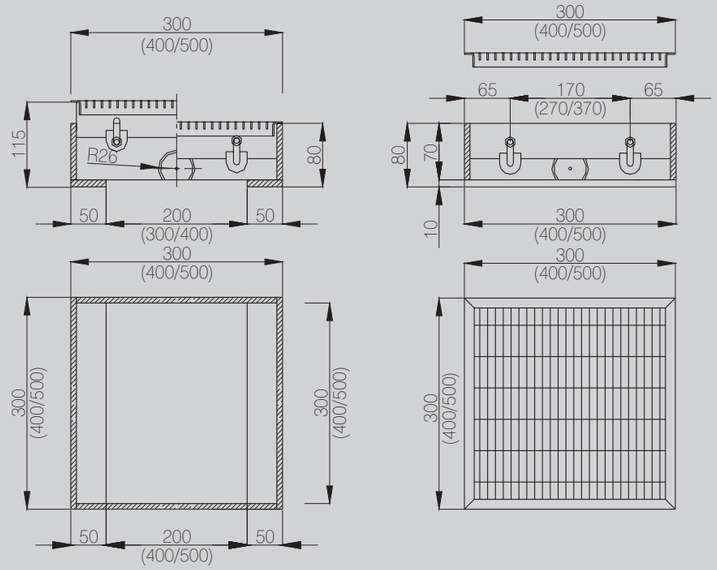


■ The vandalism resistant solution

TGS is used to ensure unobstucted water drainage as well as professional maintenance of the water outlets. TGS also protects the outlets from severe external effects. TGS products can be used on both public places and places where there are a heavy traffic of lighter vehicles.

Technical data	Dim	TRH-30	TRH-40	TRH-50	TGS-30	TGS-40
Product number		210601	210602	210603	140301	140302
Height	[mm]	80-125 (variable height)			300	300
Width	[mm]	300	400	500	300	400
Length	[mm]	300	400	500	300	400
Type of grate		hot-dip galvanised steel grill			iron cover grate	iron cover grate
Grid grating	[mm]	40×10			5×200	5×300
Grid body		UV-resistant PP				
Drain pipe connection		4 db, d=52mm (only above 5 cm height)				
Adjustability		hot-dip galvanised slipper insert, steplessly adjustable in 4 cm zones				
Colour		RAL 7032				
Weight	[kg]	3,5	6,2	9,7	11	22,3
Durability classification		A15	A15	A15		

■ TRH



■ Advantages

- Suitable for all terrace outlets
- Safe for pedestrian traffic
- Sturdy plastic frame
- Fits flexibly to local height conditions
- Can be ordered in stainless steel

■ Installation instructions

Place the terrace grille centrally over the rainwater outlet on the top of the drainage layer. The grille should be placed prior to the laying of the paving. Cutting should be kept to the minimum.

■ Tools needed for installation

- Spanner
- Rubber hammer
- Steel saw
- Leveller

■ Product accessories

- Stainless steel construction

■ Frequently Asked Questions

• What is the load-carrying capacity of cover plates?
TRF covers can be used on terrace surfaces with pedestrian traffic. They conform to loadability class A15.

• Can they be ordered in stainless steel?
Yes, the grids can be ordered in hot-dip galvanized or stainless steel.

• What tool is needed for setting the height?
A leveling board and a fork wrench are needed for the task.

TRS 60/75/100

■ Product description

The TRS doorstep grille is manufactured from UV resistant plastic with a choice of steel grille cover. The TRS terrace grille is available in three different sizes each of which can be ordered in individual heights. The grilles can be supplied with or without a welded collection tray. Drainage can be direct to the outlet or into the drainage layers. The product ensures no slipping no soiling and less splash marks near doorways.

Product name	Product number
TRS-60	210403
TRS-75	210404
TRS-100	210405
Related specifications	
DIN EN 1433:2002	
DIN 19580	Drainage
FLL Guidlines 5.5:2002	Drainage facilities
Further pages	
26	

■ Applications

External door entrances.

■ Installation instructions

The grille should be placed on the top of the drainage layer. Removal of the four small circular pre-cut sections at the base of the grille will allow drainage directly into drainage layer. Alternatively the large central pre-cut circular section can be removed and the grille located directly above the rainwater outlet.

■ Accessories

- Drainage outlet pipe
- Custom made sizes
- Metal leaf, dirt collection mat
- Lockable variety

■ Advantages

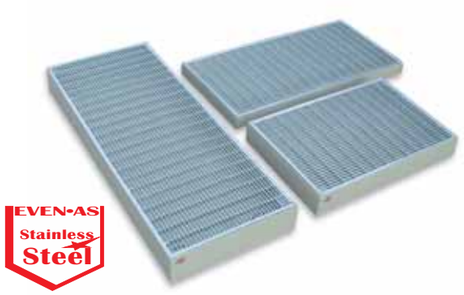
- Three heights available
- The version without a bottom tray enables drainage into a water drainage layer
- Changeable mud brushes for shoe cleaning
- Easy to clean
- Long lasting hard plastic housing
- Mesh available also in stainless steel

■ Frequently Asked Questions

• Where should the large grilles be used and where the smaller ones?
In front of terrace doorways a small grille is insufficient in a downpour and generally speaking one should always use the large sizes for safety. Any grilles with trays which need to be plumbed in must also be the larger type. The smaller ones should only be used where space is limited.

• Are shoe cleaning brushes replaceable?
Grille inserts are attached by steel clips. The cleaning brushes are exchangeable by releasing the clips and repositioning them after replacement.

• Can I order stainless steel grilles?
Grilles are made of galvanised steel but can also be ordered in stainless steel versions.



Technical data	Dim	TRS-60	TRS-75	TRS-100
Product number		210403	210404	210405
Length	[mm]	600	750	1000
Width	[mm]	400	500	500
Height	[mm]	50	50	50
Grille mesh size	[mm]	40 × 10	40 × 10	40 × 10
Material of housing		UV-resistant PP		
Material of grille		hot-dip galvanised steel		
Durability class		A15		
Weight	[kg]	6,67	10,35	14,00

BLH 30

■ Product description

Height-adjustable, hard plastic outflow pipe with stainless steel grille.

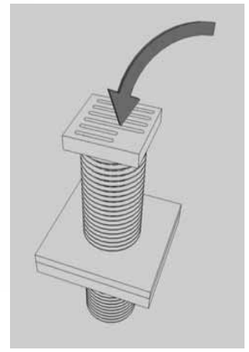
Product name	Product number
BLH-30	220106
Related specifications	
DIN EN 1433:2002	
DIN 19580	Drainage
FLL Guidlines 5.5:2002	Drainage facilities
Further pages	
18	

■ Applications

These units are suitable for collecting surface water into the main draining system even on those roof terraces, which are built of many layers.

■ Installation instructions

After laying a protection fleece upon the waterproofing, the adjustable terrace grille should be placed over the rainwater outlet. Care should be taken to ensure that the adjustable element does not block the outlet. Once final height adjustment has been made the paving can be laid and should form a tight butt joint to the unit.



■ Diagram

The excess surface water will drain through the stainless steel grille.

■ Advantages

- Robust stainless steel 150 × 150 mm grille
- Quick and easy installation and maintenance
- Suitable for connecting drainage network to main drainage
- Can be set flush with paving
- Evenly adjustable height between 72 and 300 mm
- Prevents birds nesting in drains

■ Frequently Asked Questions

• When should the Terrace Grille Unit be used?
Wherever positive surface drainage is required on a multi layer build up.

• How can the height adjustable element be shortened?
This can be shortened by simply cutting to size with a hacksaw.

• Can one inspect the state of the drain below the grille?
Yes, the grille is kept in place by four stainless steel screws in the corners, in the pre-drilled holes. These can be unscrewed and replaced after inspection.

Technical data	Dim	BLH-30
Product number		220106
Height	[mm]	72-300 infinitely variable
Grille size	[mm]	150 × 150
Supporting base plate size	[mm]	250 × 250
Grille material		stainless steel
Base plate material		UV-resistant PP
Outer diameter of threaded pipe	[mm]	125
Color		RAL 7032
Weight	[kg]	3,08

Product description

This Complete Rainwater Management System provides an economical and convenient solution for irrigating green roofs in an ecological way.

Product	Product number
Mechanical water-level controller	040301
Overflow element	100138

Related specifications	
FLL guidelines 4.8/2002	draining
FLL guidelines 4.9/2002	watering
FLL guidelines 6.4/2002	water storage and additional watering

Related pages

21

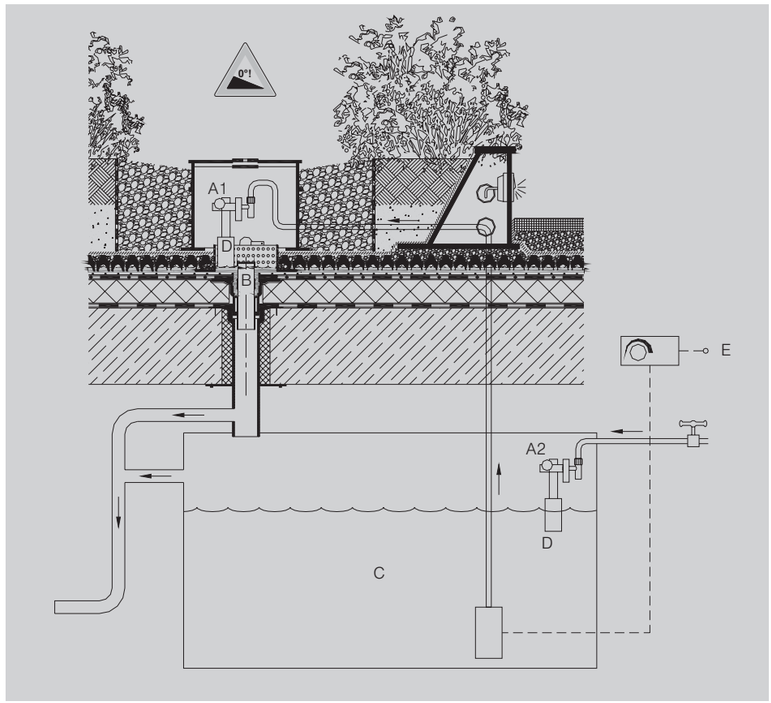
Application

The BKS Irrigation System works on the principle of a uniform level of water being maintained on the roof surface. This is achieved by constructing the roof to zero falls. As the water level drops this is replenished from a separate rainwater harvesting tank connected to the water mains via a double check valve. This rainwater harvesting tank is constructed specifically for each project. The water level on the roof is maintained at a predetermined level by means of an extension piece attached to each outlet. This system is not suitable for inverted roofs.

Related Products

- KSR-35 / 45 / 55 / 65
- KSE-30

DHA-110-D Roof Outlet with height adjustable water level control



Operational skeleton diagram

The operating features of the system is the water-level controll valve (A), which in case of lower water level permits the floating on the roof from the pipelines, or from the reserving tanks (C). The task of the lock cap (B) is to adjust the water level, by assuring the drain of the excess.

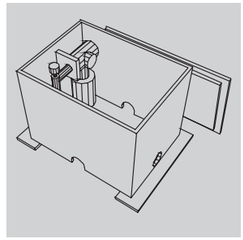
System components

- DHA-110-D Gully with height adjustable cylinder
- DHA + Extension elemnent
- ASG40-PVC-93 Gully for various roof outlets with 93 mm diameter
- ASG40-PVC-140 Gully for various roof outlets with 140mm diameter
- Corner valve
- Run through valve
- Inspection box
- Drainage and reservoir board DiaDrain 60
- Growing media

Advantages

- Saving on screed to falls costs
- Frees the sewig system from overloading
- Simple and quick installation
- The most eficient way of utilizing rainwater both economically and ecologically
- Irrigation without polluting the facade
- Reduction of airborne particles
- Easy operating and maintanance
- Does not contain expensive elements

- Exemplary rainwater management



Frequently Asked Questions

• What quantity of water is held?

There is standard rule, that the third part of the drainage layer should leave clear from the floating.

• Could the system be used for refurbishment?

If the falls are connected to zero falls.

• Should operation continue during winter?

At the end of the vegetation period it is recommended to stop the waterflow for the winter and restart the operation at spring.

KLR GRAVEL BOARDS

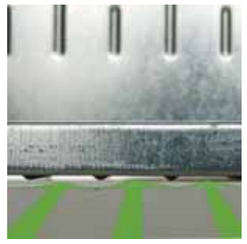
■ Product description

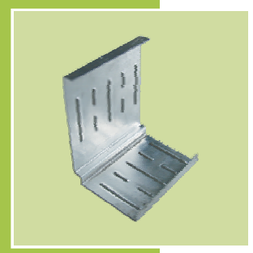
The KLR gravel boards are lightweight edge profile elements made of aluminium or stainless steel. The product size is flexible in order to create a height of 8 or 12cm.

Product	Product number
KLR-ES-8/12	163009
KLR-AL-8/12	162023
Related specification	
DIN 4095	water-draining of buildings
FLL guidelines 5.6./2002	
Related pages	
9 10 11 12 16 21 27	

■ Application

The gravel boards create a vertical separation of the roof garden elements and act as a support at exposed edges.

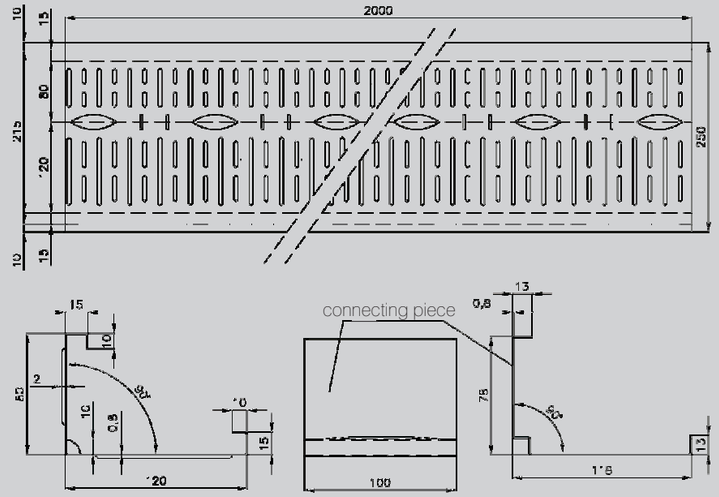




Technical data	Dim	KLR-ES-8/12	KLR-AL-8/12
Product number		163009	162023
Element length	[mm]	2000	
Foot size/element width	[mm]	80	
Height	[mm]	120	
Material thickness	[mm]	0,8	
Mass	[kg/m]	1,40	1,0
Material		stainless steel	aluminium
Accessories		binding elements (1 pc/2 r. meter)	

KLR GRAVEL BOARDS

■ KLR



■ Advantages

- No need for bedding
- Can be quickly constructed
- Does not prevent water draining
- Long-lasting

■ Instalation instuctions

The separating profile elements are laid butt jointed and butt straps used for connecting one piece to another.

■ Tools needed for installation

Tin-ware handtools for cutting.

■ Product accessories

- Joining element
- Corner element

■ Frequently Asked Questions

• Which side is to be built in?
This will depend on the height required, 8 cm or 12 cm.

• How can they be fastened?
The weight of the substrate provides sufficient stability against the movement of the product.

• Corner formation?
Formation of 90° corners can be created with special corner pieces or by cutting on site.

■ Product description

The RD product range of edge kerbs are manufactured from recycled plastic with a variety of finishes available.

Product	Product number
RDL-12	160201
RDL-19	160202
RDA-25	160301
RDA-40	160302
RDT-12	160401
Standard	
FLL guidelines 5.11./2002	edging
Related pages	
12 13	

■ Application

RDL and RDA edge pieces can be used, in the edging of terraces and green roofs. They are important distinctive pieces in the development of a garden layout. In addition these units can be used to house, trunking for electrical cabling. For decorative purposes lighting can be installed.

■ Related products

- RDL-UNI (12)
- Corner unit
- Curved and other tailor-made shapes available.

■ Installation instructions

To secure the continuity of water drainage, a level and compacted base made up of mineral rubble is made on a heavy duty DiaDrain layer on to which the RDL kerb is then placed. Preformed corner pieces are available. For stability metal capping profiles are slipped on to the top of the kerb. This also allows continuous jointing of the pieces.

■ Advantages

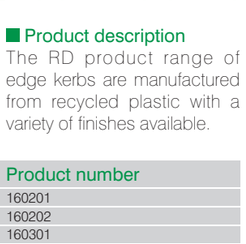
- No local concreting needed
- Quickly constructed
- Long-lasting

■ Tools needed for installation

- General garden-building tools
- Screwdriver

■ Product accessories

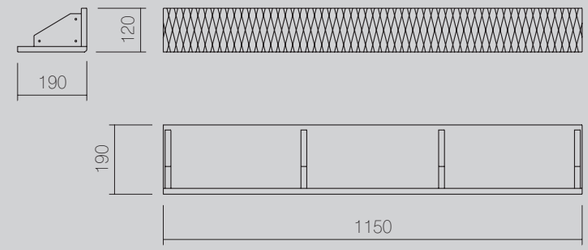
- Stainless steel connecting screw
- Front-piece coloured according to RAL colour



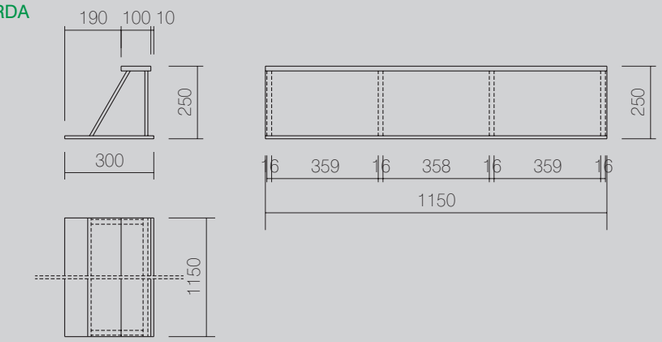
RDL

Technical data	Dim	RDL-12	RDL-19	RDA-25	RDA-40	RDT-12
Product number		160201	160202	160301	160302	160401
Element length	[mm]			1150		
Width	[mm]	190	240	300	480	190
Height	[mm]	120	190	250	400	180
Weight	[kg]	6,10	8,14	11,30	20,27	7,10
Outside corner (L × W × H)	[mm]	1150 × 190 × 120	1150 × 240 × 190	300 × 300 × 250	480 × 480 × 400	1150×190×180
Inside corner (L × W × H)	[mm]	1150 × 190 × 120	1150 × 240 × 190	600 × 600 × 250	960 × 960 × 400	1150×190×180
Colour				black (anthracite)		
Material				recycled PS		
Outside surface				rhombus pattern		
Frost resistance				yes		

■ RDL



■ RDA



RDA

RDA

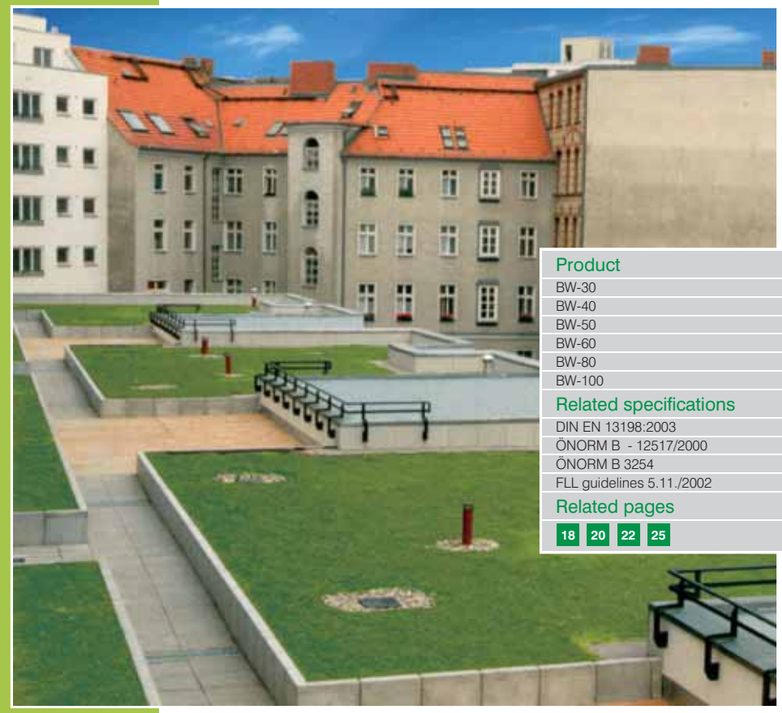
RDB

■ Frequently Asked Questions

- **What provides product stability?**
A properly prepared base as described in Installation Instructions will provide the necessary stability. This can be enhanced by screw fixing one kerb to another.
- **Can the product be ordered in different finishes?**
Yes, simply specify the RAL colour and finish required.
- **What is the purpose of the metal profile on the upper edge of the product?**
The profile, allows connection of neighbouring kerbs.
- **Corner-forming?**
For the forming of 90° corners RDL-UNI products are available to form internal or external corners.
- **Local cutting?**
With traditional woodworking tools pieces can be cut to the required size.

DIADEM

BW 30/40/50/60/80/100



■ Product definition

BW, edge kerbs are manufactured from precast concrete.

Product	Product number
BW-30	161002
BW-40	161006
BW-50	161013
BW-60	161003
BW-80	161004
BW-100	161005

Related specifications

DIN EN 13198:2003	Frost resistance
ÖNORM B - 12517/2000	Load-bearing capacity
ÖNORM B 3254	Experts' opinion on stability
FLL guidelines 5.11./2002	Edging

Related pages

18 20 22 25

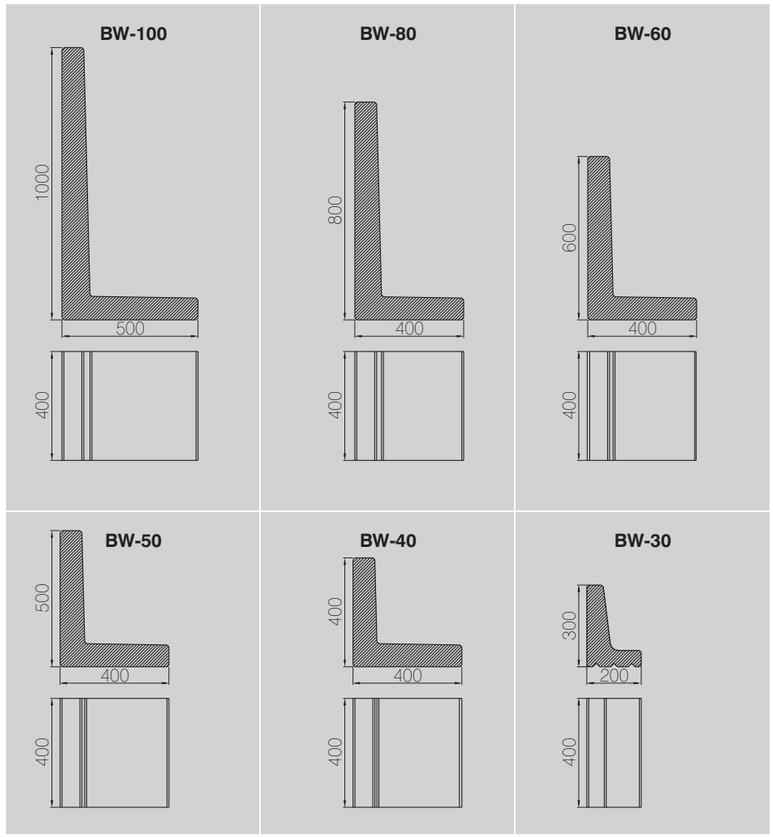
■ Application

BW edge pieces can be used for separating areas with varying thicknesses, for supporting higher superstructures and for the formation of separate garden areas.

BW-30

Photos for illustration purposes only.

Technical data	Dim	BW 30	BW 40	BW 50	BW 60	BW 80	BW 100
Product number		161002	161006	161013	161003	161004	161005
Element length (A)	[mm]	400	400	400	400	400	400
Foot width (B)	[mm]	300 / 200	400	400	400	400	500
Height (C)	[mm]	200 / 300	400	500	600	800	1000
Thickness	[mm]	60–90	80–100	80–100	80–100	100	100
Weight	[kg]	29	55	64	72	96	126
Concrete quality		C20–C25					
Frost resistance		yes					
Requirement	[pc/rm]	2,5					
Feature		concrete product manufactured with pressed technology					
Loadings		recommended for gardening applications					
External corner		can be ordered					
Colour		grey	grey	grey	grey	grey	grey
Packaging	pc / pallet	48	24	24	24	12	6



■ Advantages

- No local concreting needed
- Can be constructed quickly
- Long-lasting
- Frost resistant

■ Installation instructions

To secure the continuity of water draining, a bedding made up of mineral gravel with a thickness of min. 5 cm and with grain sizes of 4-8 mm is to be made on a heavy-duty drain layer on which the elements can be placed directly after leveling and compating. For forming of corners separate corner pieces are also available. In case of direct edging of covers, joints between the pieces are to be sealed with a long-lasting self-adhesive sealing tape, thus discolouring of the cover can be avoided.

■ Frequently Asked Questions

?

- **Which side is up?**

According to stability experts, the product can be laid on either side.

- **How are the concrete kerbs fixed?**

Concrete kerbs do not need to be fixed when both sides are supported e.g. where paths adjoin planted terraces or where you have on one side the vegetation and on the other, gravel, or other material. In this situation the gritted bedding and the weight of the growing media on the kerbs provides sufficient stability against the movement of the kerbs.

- **Construction of corners?**

It is simple to construct 90 degree corners by using combinations of interior and exterior corner elements.

- **How can the elements be protected from discolouring?**

Special sealing tapes are a simple and effective way to seal the joining lines on the inside, therefore any growing media wash through and discolouring can be avoided.

■ Tools needed for installation

General garden-building tools

■ Related product

Self-adhesive joint sealing tape

SLH 60-600

■ Product description

SLH, height adjustable pedestals are manufactured from polypropylene.

Product	Product number
SLH-60	610131
SLH-75	610105
SLH-120	610104
SLH-200	610106
SLH-270	610109
SLH-310	610110
SLH-400	610111
SLH-500	610112
SLH-600	610113
Related standards	
FLL guidelines 5.12./2002	Forming of walkable covers
Related pages	
20	

■ Application

Ideally suited for situations where varying degrees of height adjustment is required in order to achieve a level deck.

Product name	Product number	Adjustable height (mm)	Base element		Height adjustment element		Base support	
SLH-60	610131	42-60	B1	1	-	-	T1	1
SLH-75	610105	50-75	B2	1	-	-	T2	1
SLH-120	610104	75-120	B3	1	-	-	T3	1
SLH-200	610106	120-200	B4	1	-	-	T4	1
SLH-270	610109	190-270	B4	1	C1	1	T3	1
SLH-300	610110	240-300	B4	1	C1	1	T4	1
SLH-400	610111	300-400	B4	1	C1	2	T4	1
SLH-500	610112	350-500	B4	1	C1	3	T4	1
SLH-600	610113	420-600	B4	1	C1	4	T4	1

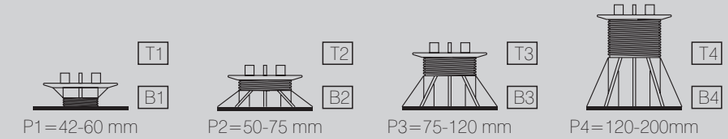
All pedestals are available with a cross spacer on top.

PRODUCTS
TERRACE BUILDING ■ ADJUSTABLE-HEIGHT PEDESTALS

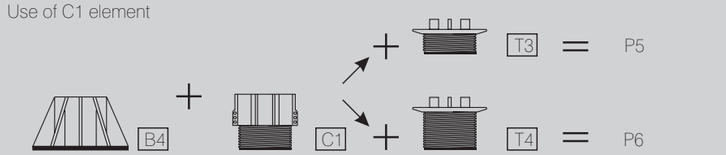
SLH 60-600

■ SLH 60-600 FK assembly

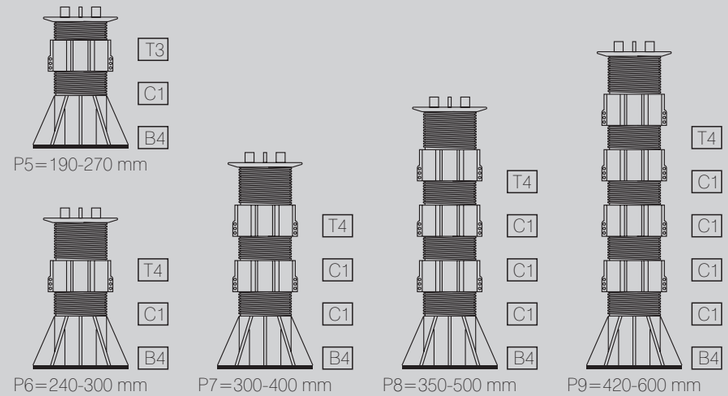
P1-P4



Use of C1 element



Special heights with the lining of C1 element



■ Advantages

- Easily assembled
- Good load bearing capacity (1000kg/pedestal)
- Minimal additional weight
- Eases rainwater runoff
- Resist chemicals

■ Installation instructions

First, from the feet with pre-set heights one should place one in every corner point of the set area, then prescribed height is to be set with a level board. Pieces in-between can be divided, for example, along a tightened string and also set the height at the same time. After placing the pillows there is still a possibility for fine adjustments, then the level can be set with the help of a chipboard screw.

■ Tools needed for installation

Level board and tools necessary for making of covers.

■ Frequently Asked Questions

• At what distances should feet be placed?

Statical measurements can give exact data in connection with needed supports, on plank terraces with private traffic pillows are sufficient to be supported, in general, at every 70 cm.

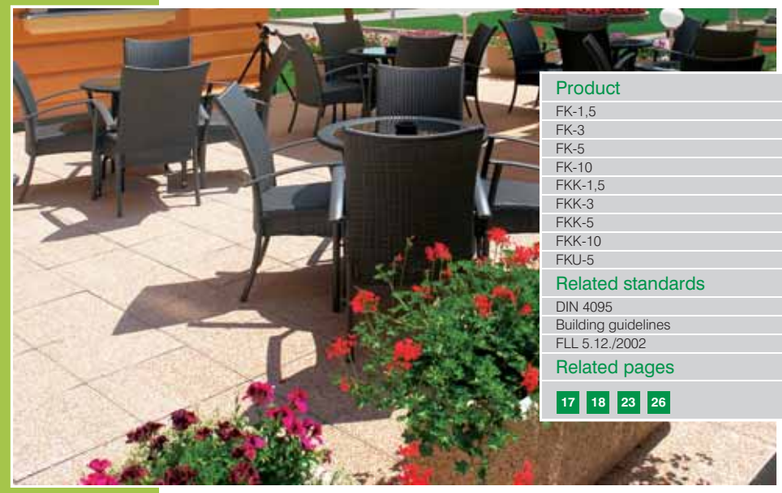
• Should the supports be fastened to structures?

Not necessary, but it can happen in special cases. In these cases it is better to fasten the head piece instead of the foot base.

• With modular covers how can the support of points different from the raster be solved?

This question appears with modular terrace covers and difficult-to-solve situations can arise.

Ask your dealer for a detailed construction guidelines booklet.



Product	Product Number
FK-1,5	610114
FK-3	610102
FK-5	610101
FK-10	610103
FKK-1,5	610116
FKK-3	610117
FKK-5	610118
FKK-10	610119
FKU-5	610121
Related standards	
DIN 4095	water-draining of buildings
Building guidelines	
FLL 5.12./2002	Formation of walkable covers
Related pages	
17 18 23 26	

■ FK / FKK Product description

The FK cross spacers family speeds up the process of laying down pavement slabs and secures the permanent spacing between the paving slabs, thereby increasing the aesthetic appearance of the terrace and encouraging better surface water drainage.

■ FK / FKK Advantages

- Can be used as cross and T-joint spacers
- Purposely broken spacers can be reused
- Available in 4 joint sizes
- Available in transparent and black colours
- Future slab repairs can be carried out more easily

■ FK / FKK Application

Paving slabs for terraces on building structures must be loose laid with permanent spacing between the slabs. Providing a permanent space between slabs enhances drainage properties even on natural soil or substrate, ensuring equal spacing between the slab and increasing the aesthetic value of the overall paving layout by forming a distinctively clear and even pattern.

FK Black Spacers

■ FK / FKK Replacement

Since the DIADEM® joint crosses are wedge between designed, it is easy to reinsert the concrete slabs. Always install the joint crosses, with the wedge on the top.

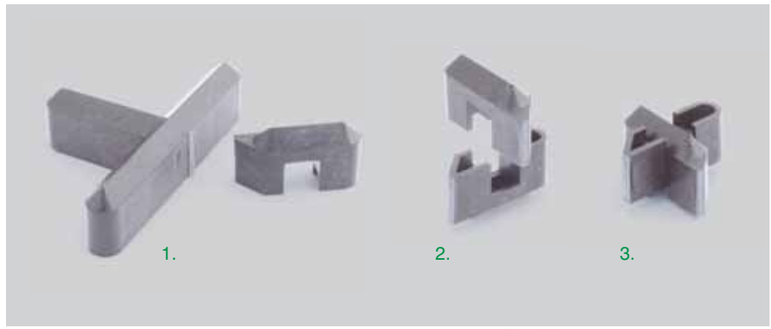
■ FK / FKK Installation

The cross spacers should be installed as the paving progresses with the wedge shape uppermost. The quantity of spacers needed will depend upon the layout pattern of the paving and the size of the slabs.

FKK Transparent Spacers

Technical data	Dim	FK-1,5	FKK-1,5	FK-3	FKK-3	FK-5	FKK-5	FK-10	FKK-10	FKU-5
Product number		610114	610116	610102	610117	610101	610118	610103	610119	610121
Size (L × W × H)	[mm]	50×50×18	50×50×18	50×50×18	50×50×18	70×70×20	70×70×20	80×80×20	80×80×20	Ø 142×30
Thickness of legs	[mm]	1,5	1,5	3	3	5	5	10	10	5
Unit	[pcs / pack]	100	100	100	100	100	100	100	100	200
Packaging	[pcs / box]	4000	4000	3000	3000	1600	1600	1000	1000	200
Weight	[kg / box]	13	13	17,5	17,5	23,4	23,4	15	15	26
Material need *	[pcs / m²]	4–10	4–10	4–10	4–10	4–10	4–10	4–10	4–10	4–10
Material need **	[pcs / m²]	6,25–15	6,25–15	6,25–15	6,25–15	6,25–15	6,25–15	6,25–15	6,25–15	6,25–15
Material need ***	[pcs / m²]	11,10–26	11,10–26	11,10–26	11,10–26	11,10–26	11,10–26	11,10–26	11,10–26	11,10–26
Base material		recycled PS	PS	recycled PS	PS	recycled PS	PS	recycled PS	PS	recycled PS
Colour		black	transparent	black	transparent	black	transparent	black	transparent	black

* for a slab size of 50×50 cm | ** for a slab size of 40×40 cm | *** for a slab size of 30×30 cm • Required quantity depends on the patterns applied.



FKU-5 Spacer with Base Plate

■ FKU-5 Product Description

The FKU-5 cross spacer with base plate consists of a Ø 142 mm, 10 mm thick black recycled polystyrene round plate and a 5 mm thick 70×70×20 mm cross spacer. There is a 69 mm straight cut on one side of the base plate (see photo above).

■ FKU-5 Application

Whether terraces are formed on built structures or on natural ground, FKU-5 cross spacers with a base plate ensure the necessary gaps for water drainage in between and under the paving slabs. They also help to provide an aesthetic and even appearance for the surface paving. On even surfaces with only a few millimetres of difference in the level of the ground, laying the slabs is made easy and very quick.

■ FKU-5 Advantages

- May be used as a cross- or T-shaped spacer, so the FKU-5 cross spacers allow for any kind of paving design
- The base plate provides firm support for the paving slabs
- It is economical: there is no need for a gravel layer underneath
- Eliminates small differences in uneven surfaces and even in the height of the slabs through the use of the self-adhesive leveling mat

■ FKU-5 Accessories

Self-adhesive leveling mat

■ T-joint use

A distinctive feature of the DIADEM® FK cross spacer family is that one leg has a notch cut into it. When you need a T-joint spacer, the weakened leg with the notch can be easily snapped off, creating a T-joint. T-joint spacers can be used along edges and at corners. The snapped legs can also be reused to create new, smaller cross spacers if required.

■ FK / FKK Frequently Asked Questions ?

- **Should the spacers be removed after the paving is laid?**

When paving slabs are loose laid, without mortar or grout filling the joints, the open gaps facilitate better and faster drainage. Cross spacers will also secure the slabs against movement that might narrow the drainage gaps. Consequently, spacers should not be removed after paving slabs are laid down.

- **What quantity should be ordered?**

The quantity of spacers needed depends upon the layout and dimensions of the paving. However, when laid in a diamond pattern, calculate on one spacer per slab.

- **Can cross spacers be installed between paving slabs laid on a natural substrate?**

The use of cross spacers between slabs on natural substrates is recommended because they help speed up the installation and enhance the aesthetic value of the paving.

■ FKU-5 Frequently Asked Questions ?

- **Do I need a gravel layer for outdoor tiling with FKU-5 cross spacers?**

The greatest advantage of the cross spacer with base plate is that it does not require a gravel underlayer. Therefore you can save on the cost of material and labour of a gravel layer.

- **Can I use the base plate by the wall?**

Its special design easily enables you to use them by the wall. Simply break off the weakened leg of the cross spacer and reattach the remaining T-shaped cross to the edge of the plate. It can now be placed by the wall for firm support. When used in a corner, use the base plate under the slab without a cross spacer.

- **Where can I use the self-adhesive leveling mat?**

To raise the level of an uneven slab, affix a piece of the mat onto the top of the base plate (the smooth side) in the required place. To level out uneven surfaces underneath the outdoor paving tiles or stones (e.g. overlapping water insulation or protection textile layer), affix the required sized mat onto the bottom of the base plate. The leveling mat may be used in several layers on top of each other.

DRS LIGHT

■ Product description

The DIADEM® DRS-Light is a safety cordon system for fencing off parts of a roof. It consists of modular elements, the weighting of which provide its stability. As a result, installation takes place without dismantling or penetrating the roof sealing layer. The two main elements the Fencing Panels and the Planting Containers, which provide the necessary weighting can be erected on the spot. The choice of interchangeable modules and the variable length spacing elements (0-12 cm) enable the cover of many different shapes and sizes of roof garden. If the installation is more than 2.5 m from the perimeter of the roof, the product is also suitable for the prevention of falls.

Product	Product number
DRS-Light	710501
Related specifications	
IBC 1607.7.1.1/2003	Fencing systems
EN 795/1997 EN 795/A1	Fall-guard
Further pages	
17	

■ Application

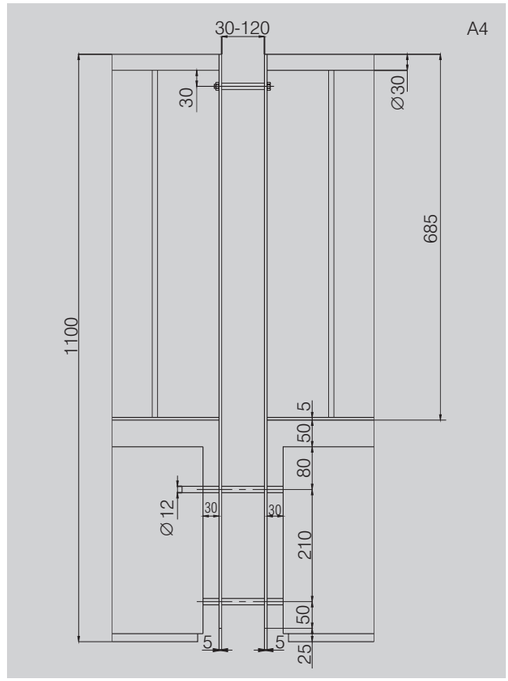
The DRS-Light product serves diverse safety fencing needs of terraces and other roof areas used by people, without the need for penetrating the sealed roof. However, at the starting and finishing points it must be fixed securely to existing masonry.

Technical data	Dim	DRS-Light
Product Number		710501
Test certificate		EC Certificate of Safety Technology
Components		Fencing Panels, Planting Containers, Corner Fence Panels, Spacers, Tie Elements, Fixing Screws
Anchorage to masonry		Necessary
Length of Planting Container	[mm]	900
Width of Planting Container	[mm]	350
Height of Planting Container	[mm]	365
Length of Module	[mm]	1000
Width of Module	[mm]	350
Height of Fencing Panel	[mm]	1100
Fencing Panel materiall		hot-dip galvanised steel (also available in stainless steel)
Planting Container material		recycled polystyrene
Colour		anthracite (also available in a choice of RAL colours)

DRS LIGHT

■ Advantages

- Installation without disturbing sealed roof layers
- Simultaneous fall-guard provision
- Easy and quick installation
- Great adaptability

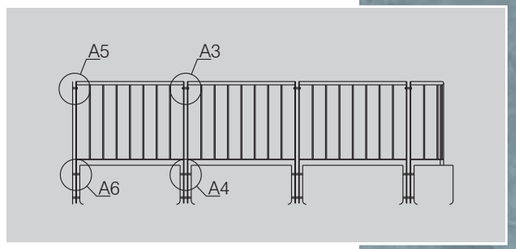


■ Installation instructions

Before installation, the Manufacturer must approve customer plans for the new DRS-Light System. Excess water must be prevented from accumulating on the load-bearing surface by spreading a layer of at least 5 cm gritting of a strong mineral base of grain size 4-8 mm, followed by the necessary levelling and compressing before the elements can be erected. Next the Planting Modules should be positioned according to the plans. Then using the appropriate spacers of the Fencing Modules, the Planting Containers should be joined together. To make corners, Corner Modules are available. The System can only be used as safety barrier. The Planting Containers are filled with compost.

■ Tools needed for installation

- Spirit level
- Tape measure
- Bolt wrench



■ Frequently Asked Questions

• How is the System stabilised?

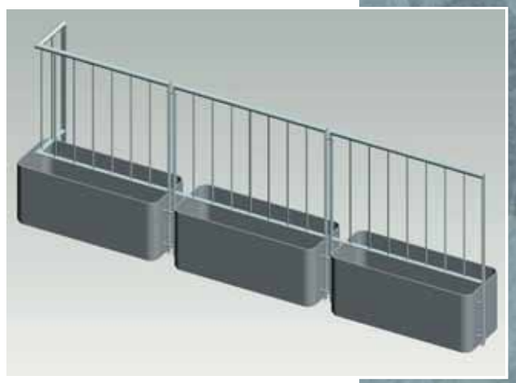
The Planting Containers stabilise the System by their weight, and by securing the fence at starting and finishing point to masonry.

• How can individual designs be achieved?

By choosing the appropriate length (0-12 cm) of stainless steel spacer elements between the Planting Containers, arbitrary shapes and forms of garden or paths are achievable. The spacer elements can be cut to size on the spot, all at once.

• Are there special heights of Fencing Panels available?

Yes, special height panels are available on demand.



DRS STANDARD

■ Product description

The DRS safety barriers come in two main types: DRS Standard, which comprises the railings and a base framework onto which ballast is placed and DRS light which combines the railings with planters which when filled provide the necessary ballast for stability.

Product name	Product number
DRS-Standard	710503
Standars reference	
EN 795, EN 795/A1	Fall-guard

■ Installation instructions

DRS standard: (see brochure)
DRS light: Where the system is used as safety barriers the plans and design should be approved by the Manufacturer. (see brochure p.63)
NOTE: In both cases the system should be set 2-5 meters from the roof edge.

■ Application of technology when used especially for safety anchorage

This product is licensed as suitable anchorage when used according to regulations EN 795 and EN 795/A1. This necessitates that the snap-link of personal safety equipment is attached directly to the upright rods of the barrier to avoid falls. If the system is used not only for fencing but also to provide secure anchorage points, regulations of EN 975 must be followed in usage. E.g. minimum distance from the perimeter of the roof, use of warning boards and annual checks by authorised personnel.

■ Applications

DRS-Standard is suitable for all flat roofs of up to 5° gradient, for marking off an area and for fall prevention. Both types act as full prevention barriers and or lines of separation.

■ Advantages

- Installation without disturbing sealed roof layers
- May be used as safety anchorage point
- Easy and quick installation
- Various ways to arrange
- Available in stainless steel

■ Frequently Asked Questions

- **Does the Fencing system need to be fixed to the building?**
No, the complete system is self supporting by the weight.

- **Can the system be placed directly onto the upper roof layer?**
In most cases the System needs to be placed upon grit-filled Drainage Trays. It is necessary to have a drainage layer below the System.

- **Should the Containers have a drainage layer below them?**
Yes, the Containers should be placed on 40 mm high polystyrene Drainage Trays positioned over a filtering fleece.

- **Do the Containers have factory made overflow holes?**
No, the Containers are watertight. The customer can drill holes on the side of the Container or on its base for invisibility. Alternatively the Manufacturer will make a small surcharge for this work.

- **Can gates be built into the System?**
Yes, it is often the wish of our clients to supply gates when the railings are not erected directly at the roof's perimeter.

Technical data	Dim	DRS-Standard
Product number		710503
Test certificate		EN 795 / EN 795/A1
Components		Support Plates, Frames, Fencing Panels, Special Screws. The Plant Containers and Concrete Slabs will be charged additionally.
Anchorage to masonry		not necessary
Container size	[mm]	500 × 500 × 365
Approx. lenght of module	[mm]	1000
Approx width of module	[mm]	1000
Height of fencing panel	[mm]	1100
Fencing panel material		hot-dip galvanised steel
Container material		polystyrene
Colour		anthracite (also available in a choice of RAL colours)

ADZ ROOF SAFETY FENCING

■ Product description

The DIADEM® ADZ is a safety fencing system comprising the fencing MDE 60 H.D.P.E. base and fixing brackets.

■ Applications

The fencing is suitable for cordoning off secure areas, can be used to prevent falls and act as a anchorage point for personal safety.

■ Advantages

- Installation without disturbing sealed layers
- Simultaneous fall-guard provision
- Easy and quick installation
- Great freedom of movement on both sides of barrier
- Large installation units, fast repositioning

■ Tools needed for installation

- Bolt wrench
- Drill
- Spirit level
- Tape measure
- Rivet gun

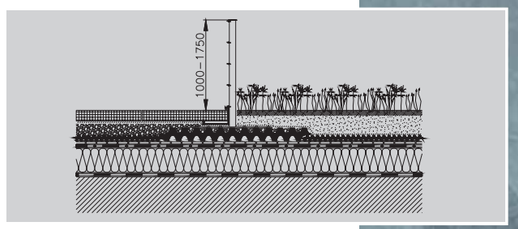
■ Installation instructions

The System must be installed onto a sealant-protected surface. First place the MDE 60 drainage trays along the line of the planned fence and fill any gaps with grit. Next, measure and mark the distance between posts. The post supporting plates can now be attached with several rivets to the MDE trays. The rivet holes should be pre-drilled. The fence posts should be bolted into position without tightening the nuts. The fencing panels can be bolted onto the posts at this stage. Only after making the finer adjustments to the System should the bolts be finally tightened.

Product name	Product number
ADZ	710601
Standars reference	
EN 795, EN 795/A1	Fall-guard

■ Application of technology when used especially for safety anchorage

This product is licensed as suitable anchorage when used according to regulations EN 795 and EN 795/A1. This necessitates that the snap-link of personal safety equipment is attached directly to the safety fencing to avoid falls. If the system is used not only for fencing but also to provide secure anchorage points, regulations of EN 975 must be followed in usage. E.g. employment of warning boards and annual checks by authorised personnel.



■ Frequently Asked Questions

- **Does the Fencing system need to be fixed to the building?**
No, the complete system is self supporting the ballast weight.

Technical data	Dim	ADZ
Product number		710601
Test certificate		EN 795 / EN 795/A1
Components		MDE 60 Drainage Trays, Post Supporting Plates, Fencing Posts, Fencing element, Round headed, self-spreading, blind Rivets
Anchorage to masonry		not necessary
Approx. length of module	[mm]	2510
Approx. depth of module	[mm]	60
Fencing height	[mm]	1230
Wire mesh grid	[mm]	50 × 200
Wire gauge horizontal/vertical	[mm]	8 / 6
Post size	[mm]	60 × 40 × 1800
Post support	[mm]	408 × 140 × 110
Fencing material		hot-dip galvanised steel

FLG 30/50

■ Product description

The FLG is a combined Fall Arrest and Lighting Protection system relying purely on ballast for its installation.

Product	Product number
FLG-30 Line System	130085
FLG-50 Line System	130082
FLG-30 Single Point System	130083
FLG-50 Single Point System	130080
Related specifications	
DIN EN 795 /1997	protection from falling
Related pages	
11	

■ Application

The system is suitable for use on flat roofs with up to 5 degrees slope and having suitable ballast with a dry weight of not less than 80 kg/sqm.

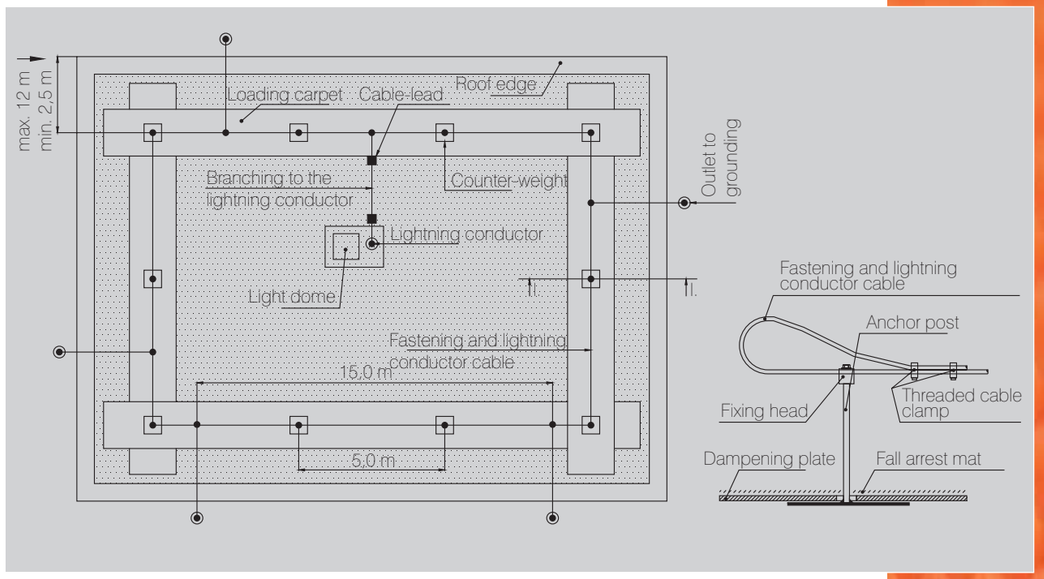
■ Flash and Life Guard

The FLG Line System is the only lightning-protection installation which simultaneously serves as a fall-prevention system. Installation of the system does not require either penetration of the roof insulation or mechanical fixing to the fabric of the roof. The FLG Line System is held in place by its own weight and may be used on green, gritted, or paved roofs with up to 5° inclination. The Flash and Life Guard has been tested against relevant standards for safety on most types of superstructures and roof installations. The system is suitable for roofs with a minimum load of bulk goods of 80 kg/m2. The advantages of the combined fall and lightning conduction protection system are used to full advantage when they are included in the initial design stage of the roof garden. There is no maximum length for the system. The "Single" system, on the other hand, permits for one or several independent attachment points to be placed at particular points across the roof. In this case, the minimum requirements for the roof are dimensions of 5m × 8m. All system components are corrosion-proof and rot-proof. APP's Flash and Life Guard System: Fall Prevention, Lightning Protection and Kinetic Energy Absorption System has been approved to Class E standard according to DIN EN 795 and 795/A1 and has been patented as a registered design. The system must be installed to an approved design and plan provided by the manufacturer.

Part of the system		Dim	FLG-30 Line System	FLG-50 Line System	FLG-30 Single Point System	FLG-50 Single Point System
Product Number			130085	130082	130083	130080
Anchor post	Material	-	stainless steel	stainless steel	stainless steel	stainless steel
	Supporting area	[mm]	Ø250	Ø250	Ø250	Ø250
	Height	[mm]	300	500	300	500
Locking head	Material	-	stainless steel	stainless steel	stainless steel	stainless steel
Fastening and lightning conductor cable	Material	-	stainless steel	stainless steel	stainless steel	stainless steel
	Measure (diameter)	[mm]	8	8	8	8
Threaded cable clamp	Material	-	stainless steel	stainless steel	stainless steel	stainless steel
	Measure (diameter)	[mm]	8,5	8,5	8,5	8,5
Fall arrest mat	Width	[m]	5	5	5	5
	Lenght	[m]	50	50	8	8
	Tensile strenght weft	[kN/m]	11,5	11,5	11,5	11,5
	Tensile strenght warp	[kN/m]	11,5	11,5	11,5	11,5
	Water permeability	[l/m²×s]	105	105	105	105
Dampening plate	Material	-	recycled plastic	recycled plastic	recycled plastic	recycled plastic
	Measure	[mm]	1200 × 1000	1200 × 1000	1200 × 1000	1200 × 1000
	Thickness	[mm]	10	10	10	10

PRODUCTS
SAFETY TECHNOLOGY ■ FALL ARREST SYSTEM

FLG 30/50



■ Advantages

- Simple construction
- No need to break through roof weathering
- No "heat bridge" developing
- Able to take on forces /stress from any direction
- Integrated with lightning conductor system

■ Installation instructions

The FLG installation requires the connect build up of the various layers and elements of the system to a plan that must first be approved by the manufacturer.

■ Product accessories

- Anchor post
- Locking head
- Fall arrest mat
- Dampening plate
- Fastening and lightning conductor steel cable
- Fastening ring
- Threaded cable clamp
- Inspection tag
- Carabiner
- Documentation

■ Tools needed for installation

- Hammer
- 18 mm puncher scissors
- Underlay plank fork wrench no. 10
- Pulling nail with internal keying no. 8

■ Frequently Asked Questions

• Should the system be fastened to the building structure?
System stability is secured by loading of the roof.

• How should the system be connected to the lightning conductor?
The system perfectly integrates the fall-prevention function and the lightning conductor tasks. After construction the system is to be tied to the lightning conductor and earthing/grounding - keeping to prescribed specifications -.

• What type of maintenance is needed?
The FLG fall-protection system is to be checked by a qualified contractor every 12 months who records the inspection results.

Wind load

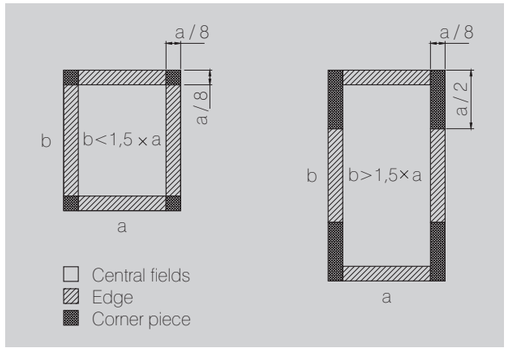
Because of the wind, buildings are exposed to pushing, sucking and frictional/shear forces and their intensity depend on the speed of the wind, its flow direction, as well as the height and shape of the building. Layers of green roofs are to be formed that during construction and in the finished stage they will be resistant to wind loads.

Resistance of the surface of green roofs is increasing with the capability of intensive rooting of plants. We can list 3 areas according to various strengths of wind loads:

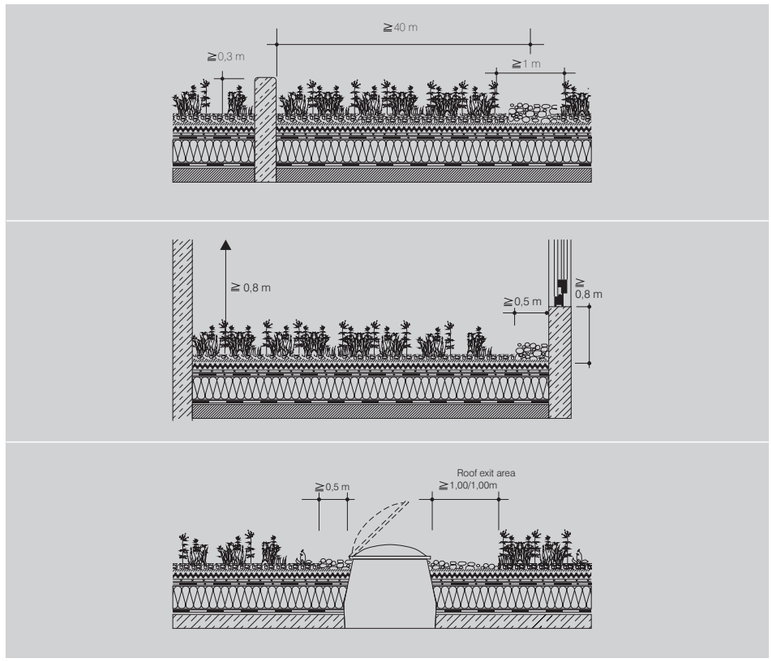
- corner areas with very high loads
- edge and border areas with heavy loads
- central fields with lesser loads (here proper measures are to be executed).

Accident prevention

Any work done at height requires vigilance and strict adherence to Health and Safety procedures. This applies equally to the installation of a Roof Garden. Relevant 'Work at Height' guidelines should be followed at all times and only operatives with appropriate certification / training should be used.



Technical data	Dim			
Building height	[m]	height < 8	8 < height < 20	20 < height
Central fields	[kg/m²]	45	75	special solution needed
Edge	[kg/m²]	130	210	
Corner piece	[kg/m²]	225	360	



Fire protection

Green roofs are to be resistant to wild fire and radiant heat. We consider - from the point of view of fire protection - those surfaces resistant or hard-covered which fulfill the following requirements:

Those intensive roof gardens which are watered and maintained regularly or were made with a thicker soil layer, are resistant to wild fire and are considered hard-covered roofs.

Those extensive green roofs which are covered mostly by low-growth plants (Sedum, Festuca,...) can be qualified only in case if they fulfill the following requirements:

- growth medium, min. 3 cm thick, having organic content of not higher than 20 m%,
- building parts separated by fire walls where the length of one area does not exceed 40 m, and material of the separating structure is not flammable, its height is 30 cm, or its width is at least 1 m,

in front of openings looking to roof surfaces and around fanglights a protecting strip of 0,5 m wide is to be built out of coule gravel or out of concrete tables,

in buildings constructed with a partition-wall to each other, a strip is to be built out of non-flammable material, at least 1 m wide according to a horizontal projection which will not be now or subsequently filled with plants.

■ On extensive green roofs, after final cultivation and handing-over, the natural development dynamics of plants begin. We can influence this only to a small extent with the help of cultivating interferences such as clear-cutting or with the elimination of certain plants. Certain species, newcomers, tall-growing ones, the ones which stifle domesticated plants, for example, some papilionaceous plants (Fabaceae) should be eliminated at an early stage.

■ In case of extensive green roofs caring after the planting lasts up to a limited time after handover, until reaching 90% of the predetermined soil covering level. This can stretch for longer than 2 years depending on the vegetation planting method and on the state of development. In this period the securing of nutrients' supply is important primarily for the growth medium of one-layer green roofs. Checking once or twice a year usually is sufficient to ascertain what steps are needed to do the upkeep work.

■ Measures in connection with upkeep and post-planting works of extensive green roofs can be:

- nutrients' supply,
- elimination of tree shoots and other non-desirable plants,
- cut-backs for rejuvenation,
- re-sowing on larger-sized barren areas,
- addition of plants on larger-sized barren areas,
- addition of growth medium in case of erosion,
- clearing of technical installations of vegetation,
- clearing of safety paths and of covered surfaces of leaves and of vegetation which obstruct their function.

Activities listed in the above column are always to be coordinated.

■ In case of extensive roofs, the supply of nutrients is done during cultivation after planting for a predetermined time period. The use of long-lasting, covered artificial fertilizers is recommended, for example, NPK, in doses of 5 g N/m2 per year. In case of green roofs which have few nutrients, for example, possessing only one layer or with a thin order of layers, it can be very important to do the supplementary fertilizing in every 2-3 years in order to maintain the predetermined vegetation picture and the blossoming aspect.

■ At the time of post-planting and upkeep works, maintenance of technical installations is also to be performed. In connection with these, the following especially should be taken into consideration:

- operating capability of irrigation and/or water draining installations located in the roof run-offs or in inspection manholes,
- elimination of dirt and deposits in inspection manholes, on irrigation equipment with drainpipes and in run-offs,
- stability of edges, of surface fixings and of other architectural elements.

Plant parts and deposits blocking the functioning of gravel fills around technical installations, of separating gravel paths and of connections and closings are to be eliminated in 2-3 year cycles.

■ The institution got some breathing space. Succulents and excitement in the cultural center.

■ Mr. Zsolt Takács, director of the Pet fi Sándor Cultural Center in Gy r, belongs to those who not only heard of a green roof but could experience in real life as an operator of a green-roofed house, how is it. How did it fit in? Do you love it or hate it?

Zsolt Takács: After a long digestion period we got to a point that we considered green roofs at all. Our 35 years old building was due for renovation and of all possibilities we finally selected this solution. Our financial means did not produce for us an entire green roof, only on about 60% of it. It also helped our determination that parallel with the renovation, with the purpose of eliminating obstacles, an elevator was also installed which we had built in a way that later it could be extended also up to the roof. There we will build a roof terrace and first step of this is this extensive green roof. Another important consideration was to lighten the burden on the rain-water draining system of the former building, most of the rain-water to remain on the roof, thus we could avoid the expensive changing or expansion of internal drains. Based on our experience on the planted part of the roof, these problems disappeared.

■ So, between the two sides does the green roof perform better?

Zs. T.: Yes, and this is to be emphasized since it was an important part of the decision. Further advantage was that also in cooling during the summer, in heat-conservation during winter the structure is better, we can feel that the climate is better in the green roof portion of the building.

■ With the solving of old problems, did not old ones come up? How expensive is upkeep?

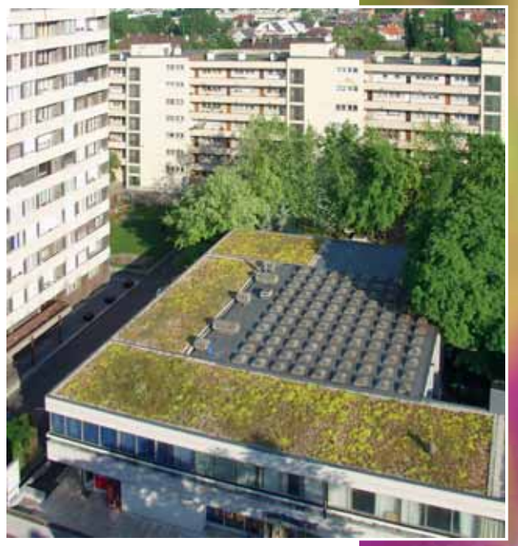
Zs. T.: We got some extra work that mainly in the initial period some weeds grew out of flying seeds but that was solved easily. Now vegetation is saturated and fewer such jobs come up. Planted seedlings are becoming stronger.

■ Was the roof planted with buds of succulent plants?

Zs. T.: Yes, we did not have money for seedlings, buds are cheaper, but grow slower, still in about 2 years the roof was ready.

■ How much chaos was created by the construction? Was the institution in operation during construction?

Zs. T.: Of course, it was in operation, and there was no stoppage of any kind. There was no need for stopping or reorganizing programs. Only once we had to fit in the program the lifting of materials in large quantities to the roof but that was only a day or two. Construction was not a problem.



■ You are, users of the building, satisfied with the planted roof. How did your visitors react?

Zs. T.: The people visiting us did not really notice it. Our plan of us able to go on to the roof did not get fulfilled yet. One can not see on to the roof. It is more interesting that the cultural center is surrounded by buildings with 6-10 stories from where people indicated to us: their view improved. It has a certain positive radiation. We also organized a conference on green roofs in our center. Among the institutions in Gy r many are interested in this example, some of the managers of kindergardens come back regularly to see what happens.

■ Are you planning to plant the remainder 40%, too?

Zs. T.: We would like to transform the remainder to be an intensive roof, a roof garden. We believe in the realization of this, we would like to build there a cafe shop with an outside terrace. If we find a willing investor, this can also be realized.

■ We got used to the fact that green roofs are built mainly on larger real estate investments, on office buildings.
Tamás Lukácsi architect in Mosonmagyaróvár.

■ Do you have opportunities to try this structure on medium-sized projects, on family houses, on collective housing projects?

Tamás Lukácsi: Fortunately not only to try it but to use it quite frequently. The start of a planning process is getting to know the builder-owner and for a joint effort it is indispensible to build a trustful relationship. This is the stage when the builder-owner can be made open and sensitive to new things since green roofs are still considered novelties. Sometimes the first mass sketch, conception plan brings with it the possibility of using green roofs, thus it is important to familiarize the builder-owner with green roofs in the first stage of planning with presentation of plans and of reference buildings. I am happy to say on this that I am able to work with more and more builder-owners where there is possibility to plan-in green roofs.

■ In the Lajta Housing Garden Community how did it happen that a green roof was constructed?

T. L.: We have been working together with the investor of the collective apartment complex in the Lajta Housing Garden Community for a long time with much success. He understands and accepts such technical solutions which do not help the quick, direct return on investment but improve quality and create new value. Thus, also in this project we could plan in larger units of a higher standard in addition to sellable standard apartments. One of such apartments is a second-storey apartment with nearly 100 m^2 to which a roof garden of 70 m^2 is attached. The investor was sceptical about selling it but the market contradicted the initial pessimism. The apartment was quickly sold and thanks to this the owner also could participate in the planning, forming of a roof garden, then with the participation of Mr. Gábor Varga (APP) a very nice solution was created.

■ Are there also other, practical, even planning-technological advantages of a mass closing with a green roof?

T. L.: In the process of planning needs of not only the customer and builder/owners are to be met but have to comply with city regulations and building standards, too. One such a standard condition is the average building height. OTÉK source describes more or less exactly the method of its computation. Since we are talking of average building height, some facades of the building can be planned higher, some lower, thus connecting points of higher and lower masses give us excellent opportunities to form roof gardens. That is something we can call planning-technological advantage. As a practical advantage, I would mention its excellent architectural-physical characteristics.

■ Thus, on these surfaces we do not have to think of some kind of "shelling". If the architect decides for the green roof, how much trouble does he/she take on in solving of detailed problems?

T. L.: Fortunately, the profession got specialized in Hungary, too, so there are professional specialists who know about green roofs. In planning of all green roofs, we coordinate with professionals of the manufacturer which might even involve a sketch plan. With their help we can decide which surface we have to build extensive, on which intensive or flooded roof, and what solutions for parts or material we should consider.

■ Flooded sounds a bit frightening. What does it mean?

T. L.: We design flat roofs where in the water-holding layer a water surface of 2-3 cm high, can continuously be maintained, what secures water re-supply in dry weather, in the frost-free period, in the winter one should drain the water with a safety valve. This solution was developed to satisfy special needs with the needed outlets, valves and with ready-made details. There are typical junctions, but there are system solutions for individual problems, too.

■ If the system is that complete, how flexible is it, how can it follow changing needs?

T. L.: Manufacturers continuously develop their products, thus, for example, APP too, widens its product range with several new system parts every year. This year, for example, with a lightning rod fastening piece which makes fastening possible without a break-through of membranes. During the regular designer consultations, which help development, new problems always come up, a need for re-developing a junction,which the manufacturer maximally considers in detail.

■ Can we hope that the system will be more and more handy and complex?

T. L.: Certainly. We are noticing a widening of a circle of customers who are open for new things. We expect that more and more horizontal surfaces of family houses, of smaller housing projects will be used this way, thus green roofs will become more and more a part of architectural design. In my latest plan, we will use the system not only on horizontal surfaces, but also on a half-saddle roof with a steeper-slope, a system supplemented with special elements developed for this purpose.

SYSTEMS

	Part no	Page
DIADEM® 150 Extensive roof garden	810101	8
DIADEM® 350 UK Simple Intensive Roof Garden Inverted Roof	810202	14
DIADEM® 750 Intensive roof garden with water level adjustement	810103	19
DIADEM® 1200 Roof garden on top of underground garage	810104	24
DIADEM® My Garage	130091	

ORGANIC MATERIALS

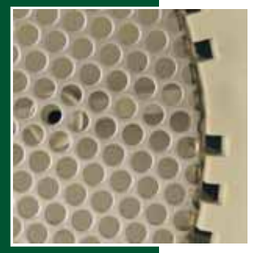
	[kg]/unit	Part no.	Page
Plants, plant layers, artif. fertilizer			
Seed grain mix		500101	
Sedum sprouts		500103	28
Sedum with root ball		500108	28
Sedum pre-cultivated mat		500109	
Growing-media			
SEM extensive growing media	1200 / m^3	410501	30
SRM intensive growing media for lawn and small bushes	1200 / m^3	410601	30
SIM intensive growing media	1200 / m^3	410701	31
SUM sublayer of intensive growing media	1500 / m^3	410801	31
Nutrient supply			
Osmocote Exact standard artif. fertilizer /effective period: 8-9 months/	25.00 / bag	500110	39

LAYER COMPONENTS

	L×W×H [cm]	[kg]/unit	Part no.	Page
Drainage and reservoir boards				
DiaDrain-25 drainage board form-pressed on 2 sides	196 × 90 × 2,5	1.30 / m^2	310125	32
DiaDrain-40 drainage board form-pressed on 2 sides	196 × 90 × 4,0	1.42 / m^2	310115	32
DiaDrain-60 drainage board form-pressed on 2 sides	196 × 90 × 6,0	2.15 / m^2	310159	32
MDE-60 mounting and drainage board	196 × 90 × 6,0	2.70 / m^2	310117	34
Diabolo-40 drainage channel	196 × 15 × 4,0	0.34 / m	310146	35

	L×W [cm]			
Geotextiles				
VLT-100 separation layer	10000 × 200	0.10 / m^2	320101	36
VLR-130 separation layer for inverted roof	10000 × 200	0.13 / m^2	320601	36
VLF-150 filter layer for extensive green roof	10000 × 200	0.15 / m^2	320201	36
VLF-200 filter layer for intensive green roof	10000 × 200	0.20 / m^2	320202	36
VLU-300 protection layer for extensive green roof	5000 × 200	0.30 / m^2	320416	36
VLU-500 protection layer for intensive green roof	5000 × 200	0.50 / m^2	320302	36
VLS-300 protection and water retention layer (extensive)	5000 × 200	0.30 / m^2	320405	36
VLS-500 protection and water retention layer (intensive)	5000 × 200	0.50 / m^2	320402	36

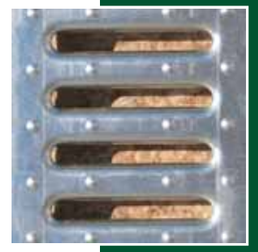
Root resistant membrane				
FLW-800 (thickness 0,8 mm)	3500 × 130	1.03 / m^2	340102	38
FLW-400 root-resistant, vapour-closing foil	2500 × 600	0.37 / m^2	340101	38



HYDROTECHNOLOGY

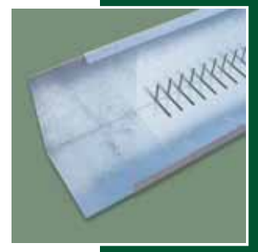
	L×W×H [cm]	[kg]/unit	Part no.	Page
Inspection boxes for extensive roof gardens				
KSE-10	30 × 30 × 10	1.64 / pc	110111	40
KSE-15	30 × 30 × 15	2.19 / pc	110112	40
KSE-20	30 × 30 × 20	3.47 / pc	110113	40
KSE-30	30 × 30 × 30	4.85 / pc	110114	40
Accessories:				
KSE+ extention element, height 10 cm	30 × 30 × 10	1.20 / pc	100211	40
Fascia inspection boxes with lid cover				
KSA-10	35 × 30 × 10	1.65 / pc	110211	43
KSA-15	35 × 30 × 15	2.25 / pc	110212	43
KSA-20	35 × 30 × 20	3.85 / pc	110213	43
KSA-30	35 × 30 × 30	4.45 / pc	110214	43
Inspection boxes for intensive roof gardens				
KSR-35	⌀40 × 35	4.61 / pc	120111	42
KSR-45	⌀40 × 45	5.48 / pc	120112	42
KSR-55	⌀40 × 55	6.06 / pc	120113	42
KSR-65	⌀40 × 65	6.92 / pc	120114	42
Accessories				
KSR+ extention element, height 10 cm	⌀40 × 10	0.80 / pc	100202	42
Inspection box cover, cast iron	⌀40	11.00 / pc	040401	42
Inspection and underground garage boxes, heavy duty (square)				
TGS-30	30 × 30 × 30	11.00 / pc	140301	46
TGS-40	40 × 40 × 30	22.30 / pc	140302	46

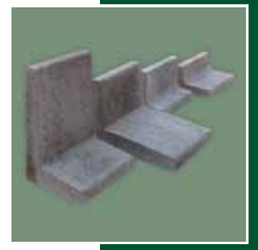
	L×W×H [cm]	[kg]/unit	Part no.	Page
Terrace channels (plastic channel-base with hot galvanised steel or cast iron channel grating)				
RNS-03 /fixed height, with die-stamped grating/	100 × 13.5 × 03	3.07 / rm	210305	44
RNS-05 /fixed height, with die-stamped grating/	100 × 13.5 × 05	3.52 / rm	210301	44
RNS-08 /fixed height, with die-stamped grating/	100 × 13.5 × 08	4.55 / rm	210302	44
RNF-05 /fixed height, with mesh/	100 × 15 × 05	3.75 / rm	210101	44
RNF-08 /fixed height, with mesh/	100 × 15 × 08	4.57 / rm	210102	44
RNF-10 /fixed height, with mesh/	100 × 15 × 10	5.40 / rm	210103	44
Viennese Rigole /extra wide channel/	100 × 25 × 05	5.60 / rm	210109	
RNH-8-11,5 /adjustable height, with mesh/	100 × 14.5 × 8-11.5	5.92 / rm	210201	44
Accessories:				
Half-meter long channel				44
Connecting screw				44
Channel wall end-piece with screws		0.10 / pc		44
Full channel base		1.50 / pc		44
Surcharge of stainless steel (mesh)	100 × 14	2.80 / pc	030601	44
Surcharge of stainless steel (die-stamped grating)	100 × 13,5	1.80 / pc	030611	44
Cast iron grid	100 × 15	12.00 / pc		44
Balcony outlet • adjustable height				
BLH-30, stainless steel	15 × 15 × 7-30	3.08 / pc	220106	49
Doorstep grilles with, hot-dip galvanized steel or stainless steel meshed grating				
TRS-60 (fixed-height, with mesh)	60 × 40 × 5	6.67 / pc	210403	48
TRS-75 (fixed-height, with mesh)	75 × 50 × 5	10.35 / pc	210404	48
TRS-100 (fixed-height, with mesh)	100 × 50 × 5	14.00 / pc	210405	48
Terrace grilles, hot-dip galvanized steel or stainless steel (fixed height)				
TRF-30 (fixed-height, with mesh)	30 × 30 × 05	2.35 / pc	210501	
TRF-40 (fixed-height, with mesh)	40 × 40 × 05	3.79 / pc	210502	
TRF-50 (fixed-height, with mesh)	50 × 50 × 05	5.24 / pc	210503	
Terrace grilles, hot-dip galvanized steel or stainless steel (adjustable height)				
TRH-30 (adjustable height, with mesh)	30 × 30 × 08-11.5	3,50 / pc	210601	46
TRH-40 (adjustable height, with mesh)	40 × 40 × 08-11.5	6,20 / pc	210602	46
TRH-50 (adjustable height, with mesh)	50 × 50 × 08-11.5	9,70 / pc	210603	46
Irrigation systems				
Water level adjustment made of plastic	30 ×15	0.66 kg/pc	040301	50
Water level adjustment made of steel	D=23 × 65	2.56 kg/pc	040304	50
DHA-110-D	37.5 × 21	5.10 kg/pc	100193	50
DHA-110+	D=11 × 15	017 kg/pc	100196	50



EDGING

	L×W×H [cm]	[kg]/unit	Part no.	Page
Gravel boards				
KLR-ES-8/12 stainless steel	200 × 8 × 12	1.40 / rm	163009	52
KLR-AL-8/12 aluminium	200 × 8 × 12	1.00 / rm	162023	52
Edge pieces				
RDL-12	115 × 19 × 12	6.10 / rm	160201	54
RDL-19	115 × 24 × 19	8.14 / rm	160202	54
RDT-12	115 × 19 × 18	7.10 / rm	160401	54
RDA-25	115 × 30 × 25	11.30 / rm	160301	55
RDA-40	115 × 48 × 40	20.27 / rm	160302	55
RDA-25-AE /outside corner/	30 × 30 × 25	4.59 / pc	160303	55
RDA-25-IE /inside corner/	60 × 60 × 25	9.71 / pc	160304	55
RDA-40-AE /outside corner/	48 × 48 × 40	12.67 / pc	160305	55
RDA-40-IE /inside corner/	96 × 96 × 40	24.57 / pc	160306	55
Accessories:				
Stainless Steel Screws			020204	55
Coloured coating (RAL)			190102	55
Concrete edge kerbs				
BW-30	40 × 20 × 30	29.00 / pc	161002	56
BW-40	40 × 40 × 40	55.00 / pc	161006	56
BW-50	40 × 40 × 50	64.00 / pc	161013	56
BW-60	40 × 40 × 60	72.00 / pc	161003	56
BW-80	40 × 40 × 80	96.00 / pc	161004	56
BW-100	40 × 50 × 100	126.00 / pc	161005	56
Corner pieces of concrete edge kerbs				
BW-30 AE /outside corner/	40 × 40 × 30	45.00 / pc	161008	56
BW-40 AE /outside corner/	40 × 40 × 40	75.00 / pc	161012	56
BW-50 AE /outside corner/	40 × 40 × 50	85.00 / pc	161015	56
BW-60 AE /outside corner/	40 × 40 × 60	95.00 / pc	161014	56
BW-80 AE /outside corner/	40 × 40 × 80	127.00 / pc	161016	56
BW-100 AE /outside corner/	40 × 40 × 100	170.00 / pc	161017	56





PRODUCT LIST

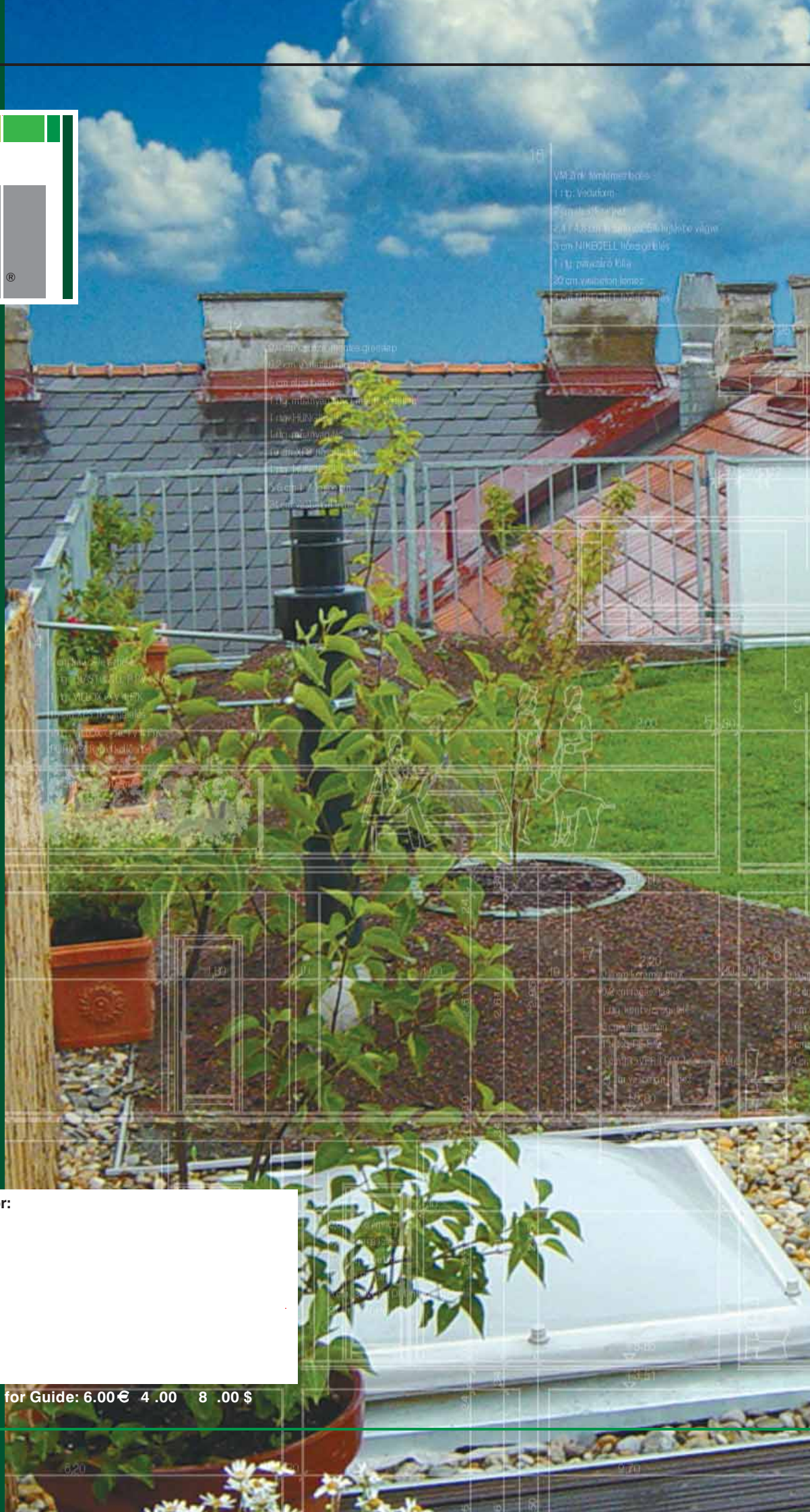
SUMMARY TABLE

TERRACE BUILDING	L×W×H [cm]	[kg]/unit	Part No.	Page
Terrace pedestals • adjustable height, heavy-duty, made of recycled plastic				
SLH-60	⌀200 × 42-60	0.25 / pc	610131	58
SLH-75	⌀200 × 50-75	0.33 / pc	610105	58
SLH-120	⌀200 × 75-120	0.45 / pc	610104	58
SLH-200	⌀200 × 120-200	0.63 / pc	610106	58
SLH-270	⌀200 × 190-270	0.79 / pc	610109	58
SLH-300	⌀200 × 240-300	0.89 / pc	610110	58
SLH-400	⌀200 × 300-400	1.16 / pc	610111	58
SLH-500	⌀200 × 350-500	1.43 / pc	610112	58
SLH-600	⌀200 × 420-600	1.69 / pc	610113	58
Cross spacers				
FK-1.5	50 × 50 × 18 × 1,5	0.32 / 100 pc	610114	60
FK-3	50 × 50 × 18 × 3	0.55 / 100 pc	610102	60
FK-5	70 × 70 × 20 × 5	1.40 / 100 pc	610101	60
FK-10	80 × 80 × 20 × 10	1.40 / 100 pc	610103	60
FKU-5	⌀142×30	13.00 / 100 pc	610121	60
FKK-1.5	50 × 50 × 18 × 1,5	0.32 / 100 pc	610116	60
FKK-3	50 × 50 × 18 × 3	0.55 / 100 pc	610117	60
FKK-5	70 × 70 × 20 × 5	1.40 / 100 pc	610118	60
FKK-10	80 × 80 × 20 × 10	1.40 / 100 pc	610119	60
Flower containers				
PGE-68 /round/	⌀50 × 35	5.25 / pc	170201	
PGE-86 /square/	70 × 35 × 35	7.40 / pc	170202	
PGE-88 /square/	50 × 50 × 35	6.40 / pc	170203	
PGE-110 /square/	90 × 35 × 35	10.35 / pc	170204	
PGE-111 /hexagon/	⌀70 × 35	7.45 / pc	170205	
Accessories:				
Water level regulating equipment		0.66 / pc	040301	
Water level indicator		0.12 / pc	170002	
Spill-valve			170003	
Coloured acc. to RAL			190102	
Caster wheels for planting containers		0.05 / pc	170004	

SAFETY TECHNOLOGY	L×W×H [cm]	[kg]/unit	Part No.	Page
Safety railing system				
DRS-Standard	100 × 100 × 110	45.00 / rm	710503	64
DRS-Light	100 × 35 × 110	17.20 / rm	710501	62
DRS-Light-ES stainless steel	100 × 35 × 110	17.35 / rm	710701	62
ADZ	250 × 6 × 123	25.68 / rm	710601	65
Accessories:				
Corner surcharge for 90° corners				
Corner surcharge for individual corners				
Coloured coating (RAL)			190102	
Lighting protection and fall arrest system				
FLG-30 Line System			130085	66
FLG-50 Line System			130082	66
FLG-30 Single Point System			130083	66
FLG-50 Single Point System			130080	66
Accessories:				
Wall anchor	20 × 6.2 × 20	0.40 / pc	130216	66
Boxed personal protection equipment	40 × 28.5 × 19	7.30 / pc	100161	66
Tools for professional installation	32 × 23 × 9	1.90 / pc	130087	66

NOTES

DIADEM®



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