



- 00 Q37 GREEN ROOFS

To be read with Preliminaries, General Conditions, Contract Conditions and related Architectural Details

- 00.1 GENERAL

- 00.1.0001 STORMWATER MANAGEMENT GREEN ROOF - EXTENSIVE

Roof Type:

ZinCo "Stormwater Management Roof - "Sedum Carpet" with Retention Spacer RS 60 and Floradrain FD 25-E

Manufacturer: ZinCo Green Roof Systems Ltd., St. John's Innovation Centre, Cowley Road, Cambridge, CB4 0WS; phone: 01223 853843

Water Proofing:

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Flow Control Set

- ZinCo Retention Flow Control Set

Root Barrier - optional

- ZinCo Root Barrier WSF 40
 - If the waterproofing is not root resistant, the root barrier ZinCo WSF 40 is required additionally

Protection Layer

- ZinCo Filter Sheet PV

Retention Layer

- Retention Spacer RS 60

Separation and Filter Layer

- ◦ Filter Sheet "PV"

Drainage Layer

- Floradrain®FD 25-E

Filter Layer

- ZinCo Filter Sheet "SF"

Growing Medium

- ZinCo System Substrate "Sedum Carpet"

Vegetation

- ZinCo Precultivated Vegetation Mat "Sedum Carpet"

Irrigation during initial period

- Thorough irrigation after planting and other early irrigations are required depending on the weather and vegetation type.

Fertilization

- ZinCo "Plantfit 4 M"

Gravel Edge

- Roofing pebbles 20/40 mm

Inspection Chamber

- ZinCo Inspection Chamber KS 6

Gravel Retainer

- ZinCo Gravel Retainer "KL 60/80", KL "100/120"

- **00.2 PERFORMANCE**

- 00.2.0010 GENERAL DESIGN

- Green roof and associated features: Complete the detailed design.
- Proposals: Submit drawings, technical information, calculations and manufacturer's literature.
- Performance design: As landscape designer's requirements
- Falls: Precondition for the "Stormwater Management Roof" is a 0° Roof.
- It must be ensured, that the waterproofing covering ensures a continuity to a vertical height of at least 150 mm above the finished roof level at all abutments, parapets etc.

- 00.2.0015 MAXIMUM PERMITTED GREEN ROOF LOADS

- It is the strict responsibility of the building owner or their appointed design professional to make sure that the building structure and the roof can hold the different loads.
- Dead load: Green roof layers: refer to engineer's specification.
- Imposed loads:
 - Activity: refer to engineer's specification
 - Vegetation: refer to engineer's specification
 - Allowance for additional loads during construction: refer to engineer's specification.
- Service loads: refer to engineer's specification.
- Other loads: Allowance for additional loads of stormwater to be retained: refer to engineer's specification.

- **00.3 PRODUCTS**

- 00.3.0002 RETENTION FLOW CONTROL SET

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo Retention Flow Control Set

Materials and properties – flow controller:

- Disc made of stainless steel, adjustment rings made of polystyrene, overflow pipe made of rigid PVC
- Diameter of flow controller: ca. 280 mm, inner diameter of overflow pipe: ca. 75 mm
- Adjustable height of overflow: ca. 20 mm - 85 mm, adjustable flow rate from ca. 0.025 l/s up to ca. 0.75 l/s. A project specific calculation for the setting of the flow controller is performed by the manufacturer according to the requirements given by the customer and/or hydrologic engineer.

Materials and properties – maintenance chamber:

- Made of plastic-coated aluminium with lateral slots for water passage. Detachable and lockable cover made of galvanized, plastic-coated steel.
- Height: ca. 100 mm
- Outer dimension (at transportation): ca. 400 x 400 mm, extended, including flange: ca. 400 x 630 mm
- Aperture dimension: ca. 340 x 340 mm
- Weight of the whole set: ca. 10 kg
- Also available: extension pieces: height 100 mm *include where needed*
- Height including extension pieces: '.....' mm

- 00.3.0003 ROOT BARRIER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo Root Barrier WSF 40

Material and Properties:

- Electronically tested root barrier of high-pressure polyethylene (PE-LD), bitumen resistant, UV-stabilised
- Thickness: ca. 0.34 mm
- Weight: ca. 320 g/m²

- 00.3.0006 PROTECTION LAYER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo Filter Sheet PV

Material and Properties:

- Thermally strengthened, UV-stabilized filter sheet made of 100 % polypropylene, chemically and biologically neutral
- Thickness: ca. 1.60 mm
- Weight: ca. 300 g/m²
- Penetration force according to EN ISO 12236: ca. 4300 N
- Strength class: 5
- Tensile strength (200 mm) according to EN ISO 10319 lengthwise/crosswise: ca. 23.0 kN/m
- Tensile extension lengthwise/crosswise: ca. 50% / 55%
- Flow rate (H50) according to EN ISO 11058: ca. 30 l/(m²·s) (± 0,030 m/s)
- Effective opening width (O₉₀) according to EN ISO 12956: ca. 65 µm

- 00.3.0009 RETENTION LAYER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- Retention Spacer RS 60

Material and Properties:

- Stackable spacer element made of recycled polyolefin, height ca. 60 mm, with multidirectional drainage channel system on the underside and interlocking studs for length- and crosswise connection; suitable as retention element for green roofs;
- Max. retention volume 55 l/m²,
- Pressure resistance according to DIN EN ISO 25619-2: 40 kPa
- Height: ca. 60 mm
- Length x Width: ca. 2.25 x 1.00 m
- Weight: ca. 2.2 kg/m²

- 00.3.0010 SEPARATION AND FILTER LAYER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo Filter Sheet "PV"

Material and Properties:

- Thermally strengthened, UV-stabilized filter sheet made of 100 % polypropylene, chemically and biologically neutral
- Thickness: ca. 1.60 mm
- Weight: ca. 300 g/m²
- Penetration force according to EN ISO 12236: ca. 4300 N

- Strength class: 5
- Tensile strength (200 mm) according to EN ISO 10319 lengthwise/crosswise: ca. 23.0 kN/m
- Tensile extension lengthwise/crosswise: ca. 50% / 55%
- Flow rate (H₅₀) according to EN ISO 11058: ca. 30 l/(m²·s) (≅ 0,030 m/s)
- Effective opening width (O₉₀) according to EN ISO 12956: ca. 65 µm

- 00.3.0012 DRAINAGE LAYER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- Floradrain®FD 25-E

Material and Properties:

- Drainage and water storage element made of thermoformed recycled polyolefin, water storage cells and openings for aeration and evaporation as well as multidirectional drainage channel system on underside.
- Height: ca. 25 mm
- Water storage capacity: 3 l/m²
- Filling volume: 10 l/m²
- Max. compressive strength: > 270 kN/m²
- In-plane water flow capacity tested according to EN ISO 12958

- 00.3.0015 FILTER LAYER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo Filter Sheet "SF"

Material and Properties:

- Thermally strengthened sheet of polypropylene
- Weight: ca. 100 g/m²
- Penetration force according to EN ISO12236: ca. 1100 N
- Strength class: 2
- Flow rate (H₅₀) according to EN ISO 11058: ca. 70 l/(m²·s)
- Effective opening width (O₉₀) according to EN ISO12956: ca. 95 µm

- 00.3.0021 GROWING MEDIUM

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo System Substrate "Sedum Carpet"

Material and Properties:

- Substrate for extensive green roof applications consisting of Zincolit® Plus (sorted high quality crushed brick) and other selected mineral aggregates, enriched with Zincohum® (substrate compost enriched with fibre and clay materials), non-flammable, stable in structure and frost resistant, suitable for pumping. All chemical and physical properties meet the requirements of the FLL Guidelines for the Planning, Construction and Maintenance of Green Roofing - Green Roofing Guideline, 2008
- Volume weight dry (compacted): ca 1120 kg/m³
- Volume weight at max. water capacity (compacted): 1400 kg/m³
- Maximum water capacity: ca. 30 vol %
- Compaction factor: ca. 1.12

- Required depth (after compaction): averagemm, according to plan.

Supply:

- 1.2 m³ bulk bags, loose or 25 litre bags

- 00.3.0023 VEGETATION

Precultivated Vegetation Mat

Manufacturer:

ZinCo Green Roof Systems Ltd

Product reference:

ZinCo Pre-cultivated Vegetation Mat "Sedum Carpet"

Material and Properties:

- Mats with firmly rooted vegetation, plant species suitable for extensive green roofs, outdoor pre-cultivated over one growing season, with decomposable carrier, including thorough irrigation of the complete build-up.
- Delivery weight: ca. 16–20 kg/m²
- Height: ca. 30–40 mm
- Vegetation coverage: at least 75%.
- Plant types:
Minimum 4–5 adapted Sedum types, e.g. Sedum album, Sedum sexangulare, Sedum spurium, Sedum floriferum and Sedum hybridum.
- Also available: ZinCo Precultivated Vegetation Mats with non-decomposable carrier.

- 00.3.0024 IRRIGATION

- Thorough irrigation after planting.
- Other early irrigations as required depending on the weather. Vegetation has to be watered and kept moist for minimum of 4 to 5 weeks.

- 00.3.0025 FERTILIZER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo "Plantfit 4 M"

Material and properties:

- Slow release fertilizer NPK 23-5-10, granulated and compacted, with at least 80% coated particles, applied evenly onto the substrate layer after planting.
- The recommended period to fertilize: March to Mid-June.
- Amount to be spread: ca. 25 g/m²
- Development and maintenance fertilization as needed every 2–3 years: 25 g/m²

- 00.3.0027 GRAVEL EDGE

Material and Properties:

- Roofing pebbles 20/40 mm
at roof perimeters, in areas of upstands, around penetrations, inspection chambers, fixing devices (Ø ca. 50 cm) and similar, according to roof plan

- 00.3.0040 ACCESSORIES - INSPECTION CHAMBERS

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo Inspection Chamber KS 6

Material and Properties:

- Inspection chamber made of plastic-coated aluminium, detachable and walkable cover made of galvanized and plastic-coated steel or alternatively with galvanized grill, with pull out flange at two opposite sides.
- Lateral drainage slots according to DIN 1986
- Load bearing capacity: Class H, according to DIN 19599
- Outer dimension of the Chamber: ca. 300 x 300 mm, including flange: ca. 300 x 530 mm
- Aperture dimension: ca. 240 x 240 mm
- Height: ca. 60 mm
- Also available: extension pieces KSA 8 (height 80 mm) / KSA 20 (height 200 mm) - *include where needed*
- With or without set of interlocks (*please delete as appropriate*)
- Cover:
- Height including extension pieces:..... mm

- 00.3.0047 ACCESSORIES - GRAVEL RETAINER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo Gravel Retainer
"KL 60/80", KL "100/120"

Material and Properties:

- Angle profile made of extruded aluminium with drainage slots on both legs
- Material thickness: ca. 1.5 mm (type KL 60/80), ca. 1.8 mm (type KL 100/120)
Profile height ca. 60/80 mm, 100/120 mm)
- Available accessories (*include as necessary*)
 - connectors: 60/80 mm, 100/120 mm
 - corner connectors: 60 mm, 80 mm, 100 mm, 120 mm
- Installation height: mm

- 00.7 EXECUTION

- 00.7.0000 INSTALLATION GENERALLY

- Preparation: Clear all surfaces of debris.
 - Timing: After certification of waterproof membrane integrity
 - Surface condition: Visually inspect waterproof membrane, report any damage or possible sources which might affect the condition
- Faults in waterproof membrane: Report
- Contamination: Do not use materials detrimental to healthy plant growth
- Storage: Do not overload
 - Point loads: Avoid
- Outlets: Do not block

- 00.7.0001 ADVERSE WEATHER

- Unfinished work: Secure from damage and wind uplift
- Conditions: Do not install or work with frozen materials

- 00.7.0002 RETENTION FLOW CONTROL SET INSTALLATION

- Set the adjustment ring and the overflow pipe of the Flow Controller according to project specific calculation of the manufacturer.
- Then position the Flow Controller centrally above the roof outlet and insert its overflow pipe into the drain

- Install the maintenance chamber of the Retention Flow Control Set above the roof drain after installing the Retention Spacer RS 60 and the filter sheet PV and before installing the drainage element FD 25-E
 - General: Follow manufacturer's specific installation instructions
- 00.7.0003 ROOT BARRIER INSTALLATION
- Extent: Install Root Barrier WSF 40 continuously over entire roof area above the non root resistant water proofing.
 - Joints: Minimize.
 - Fitting: Lay loose with overlaps.
 - Overlaps: (minimum): 1500 mm
 - Upstands: Extend to a vertical height of at least 150 mm above the finished roof level.
 - Water outlets: Fit closely around penetrations and outlets
 - General: Follow manufacturer's specific installation instructions
- 00.7.0004 PROTECTION LAYER INSTALLATION
- Extent: Install protection layer continuously over entire roof area above the water proofing or root barrier.
 - Joints: Minimize.
 - Overlaps: minimum 100 mm
 - Fitting: loose laid
 - Upstands: Extend to a vertical height of at least 150 mm above the finished roof level.
 - Water outlets and roof penetrations: cut the protection mat in situ and fit closely around penetrations and outlets.
 - General: Follow manufacturer's specific installation instructions.
- 00.7.0009 RETENTION LAYER INSTALLATION
- Extent: install the Spacer RS 60 continuously over entire roof area on the protection layer
 - Joints: minimize
 - Fitting: connect at the connection fold all along the edges, so that the smaller fold lies in the larger one. The edges are marked with arrows indicating the laying direction.
 - Ventilation openings (one hole per knob): facing upwards.
 - Water outlets and roof penetrations: Cut in situ and fit closely around penetrations and outlets.
- 00.7.0010 SEPARATION AND FILTER LAYER INSTALLATION
- Extent: Install Filter Sheet PV continuously over entire roof area above the Retention Spacer.
 - Joints: Minimize.
 - Overlaps: minimum 200 mm
 - Fitting: loose laid
 - Water outlets and roof penetrations: Cut the filter sheet in situ and fit closely around penetrations and outlets
- 00.7.0012 DRAINAGE LAYER INSTALLATION
- Extent: Install FD 25-E continuously over entire roof area on protection or separation layer
 - Joints: Minimize.
 - Fitting: butt joint, or optional with 1-2 stud rows of overlap
 - Connection, optional: Press connectors into diffusion openings.
 - Evaporation holes: facing up - for green roof applications
 - Water outlets and roof penetrations: Cut in situ and fit closely around penetrations and outlets.

- 00.7.0015 FILTER LAYER INSTALLATION
 - Extent: Install filter sheet continuously over entire roof area above the drainage element.
 - Joints: Minimize.
 - Overlaps: minimum 200 mm
 - Fitting: loose laid
 - Water outlets and roof penetrations: Cut the filter sheet in situ and fit closely around penetrations and outlets.

- 00.7.0021 GROWING MEDIUM INSTALLATION
 - Handling: Minimize.
 - Conditions: Handle in the driest condition possible. Do not handle or install when wet or frozen.
 - Extent: Install System Substrate "Sedum Carpet" continuously over entire roof area above the filter sheet.
 - Required depth (after compaction): averagemm, according to plan.
 - Settlement factor: 1.12
 - Sequence: Gently firm each layer before spreading the next. Apply nutrient regime according to planting plan and rake in.

- 00.7.0023 VEGETATION INSTALLATION
 - Precultivated Vegetation Mat**
 - Handling:
 - Extent: Install precultivated vegetation mat continuously over area to be vegetated.
 - Timing: within day of delivery
 - Storage: must be stored in a cool and shaded area, excessive stacking not permitted
 - Fitting: Roll out vegetation mat and install on level substrate, so not lay dry, damaged or waterlogged blankets
 - Joints: Stagger. Install with tight butt joints, pressing together seams to avoid gaps. Do not stretch blankets. Firm as laying proceeds to ensure full contact with the growing medium.
 - Edges: Finish with whole blankets
 - Dressing: Sedum vegetative material.
 - Brush in to fill joints.
 - Watering:
 - Gently water following installation
 - Keep growing medium moist until plants are established (typically 6-8 weeks following installation)
 - Account for climatic variation and seasonality

- 00.7.0027 GRAVEL EDGE INSTALLATION
 - Extent: Install roofing pebbles in the required depth at non-vegetated areas, including roof edges, flashing, and roof penetrations

- 00.7.0040 INSPECTION CHAMBER INSTALLATION
 - Location: Install KS 6 centrally over drain outlet, place chamber on top of drainage layer.
 - Orientation: Align parallel with adjacent features.
 - Filter Sheet: Install the ZinCo Filter Sheet SF on top of the flange of the inspection chamber.

- 00.7.0047 GRAVEL RETAINER INSTALLATION
 - Installation: If used as separation between gravel and growing medium the profiles are applied loosely on top of the filter sheet. As separation of the entire build-up e.g. to a lower gravel strip the profile can be placed loosely on the protection mat.

- Orientation: Depending on the desired height install the profile with the smaller or larger leg facing up.
 - Joints: The suitable joint connectors are inserted from the inside between the folded edge at the top and the supporting leg.
 - Corners: Place two gravel retainers next to each other, with their supporting legs facing outwards for internal corners, with their supporting legs facing inside for external corners, and insert the corner connector.
 - Fitting: Cut the retainers on site and deburr any sharp grates.
- **00.9 COMPLETION**
- 00.9.0010 INSPECTION
- Timing: Before handover
 - Give notice (min.): 3 days
- 00.9.0020 COMPLETION
- General: Leave the work in a clean, tidy condition
 - Surfaces: Clean immediately before handover.
 - Outlets: Clean and clear obstructions.
 - Completed green roof: Protect from adjacent or high level working.
- 00.9.0030 DOCUMENTATION
- Timing: Submit at handover.
 - Contents:
 - Growing medium declaration of analysis
 - Manufacturer's guarantees and warranties
 - Procedures for maintenance of the green roof
 - Record drawings showing the location of planting and associated features
 - Manufacturer's recommendations for the setting of the flow controller

The specification is for guidance only and ZinCo Green Roof Systems Ltd cannot be held responsible for any errors or omissions.

It is the specifier's responsibility to ensure that the specification is suitable for the requirements of the construction. This specification may require adjustment in accordance with project specific requirements. The substitution of any products is strictly prohibited, unless agreed in writing, in advance, with ZinCo.