

**- 00 Q37 GREEN ROOFS**

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

**- 00.1 GENERAL**

**- 00.1.0001 EXTENSIVE GREEN ROOF**

**Roof Type:**

ZinCo "Rockery Type Plants" with FD 25-E with European Technical Approval ETA-13/0668  
 Manufacturer: ZinCo Green Roof Systems Ltd., Wittas House, 2 Rivers Industrial Estate, Station Lane, Witney, OX28 4BH; phone: 01993 229700

**Water Proofing:**

- .....

**Root Barrier - optional**

- ZinCo Root Barrier WSB 100-PO
  - If the waterproofing is not root resistant, the root barrier ZinCo WSB 100-PO is required additionally

**Insulation**

- .....

**Protection Layer**

- ZinCo Moisture Retention / Protection Mat SSM 45

**Drainage Layer**

- Floradrain®FD 25-E

**Filter Layer**

- ZinCo Filter Sheet "SF"

**Growing Medium**

- ZinCo System Substrate "Rockery Type Plants"

**Vegetation**

- Plug Plants Extensive "Rockery Type Plants"

**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

**Eaves Profile - optional**

- ZinCo Eaves Profile DP 120-A / DP 120-E

**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 manufacturers' literature
  - Performance design: As landscape designer's requirements
  - Falls: Check that there is a minimum incline of about 2 % between the highest and the lowest drainage points.
  - 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
- 00.3 PRODUCTS
- 00.3.0001 ROOT BARRIER - OPTIONAL
- Manufacturer:**
- ZinCo Green Roof Systems Ltd
- Product reference:**
- ZinCo Root Barrier WSB 100-PO
- Materials and properties:**
- Made of polyester scrim reinforced flexible polyolefin (FPO), resistant to bitumen and for short periods of time resistant to oil.
  - Thickness: ca. 1.10 mm
  - Tensile strength according to European Standard EN 12311-2: 800 N/5cm
  - Tensile expansion according to EN 12311-2: > 20 %,
  - Root barrier tested according to the German FLL method 2002
  - Available accessories (include, where needed):  
ZinCo "WSB 100-PO-external edge" prefabricated external corner piece made of FPO
- 00.3.0004 PROTECTION LAYER
- Manufacturer:**
- ZinCo Green Roof Systems Ltd
- Product reference:**
- ZinCo Moisture Retention / Protection Mat SSM 45
- Material and Properties:**
- High quality fibre mat made of polyester/polypropylene, with fleece backing, non-rotting
  - Protective effect according to European Standard EN ISO 13428: residual thickness = 25 %
  - Tensile strength according to EN ISO 10319: > 5.5 kN/m, extension lengthwise: > 75%
  - Penetration force according to EN ISO 12236 > 2000 N
  - Strength class: 3
  - Thickness: ca. 5 mm
  - Weight: ca. 470 g/m<sup>2</sup>
- 00.3.0008 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/m<sup>2</sup>
- Filling volume: 10 l/m<sup>2</sup>
- Max. compressive strength: > 270 kN/m<sup>2</sup>
- 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/m<sup>2</sup>
- Penetration force according to EN ISO12236: ca. 1100 N
- Strength class: 2
- Flow rate (H<sub>50</sub>) according to EN ISO 11058: ca. 70 l/(m<sup>2</sup>·s)
- Effective opening width (O<sub>90</sub>) according to EN ISO12956: ca. 95 μm

- 00.3.0021 GROWING MEDIUM

**Manufacturer:**

- ZinCo Green Roof Systems Ltd

**Product reference:**

- ZinCo System Substrate "Rockery Type Plants"

**Material and Properties:**

- Substrate for extensive green roof applications consisting of Zincolit® Plus (sorted high quality crushed brick with 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 1000 kg/m<sup>3</sup>
- Volume weight at max. water capacity (compacted): 1400 kg/m<sup>3</sup>
- Maximum water capacity: ca. 40 vol %
- Compaction factor: ca. 1.2
- Required depth (after compaction): average .....mm, according to plan.

**Supply:**

- 1.2 m<sup>3</sup> bulk bags, loose or 25 litre bags

- 00.3.0023 VEGETATION

**Plug Plants:**

**Product reference:**

- Plug plants extensive

**Material and Properties:**

- Outdoor pre-cultivated root ball plants, suitable for extensive green roofs, pre-grown in growing medium matching conditions on extensive green roof, according to planting plan and plant list, including first irrigation.
- Sedum species, herbs, small grasses. Species and tray sizes according to planting plan and plant list
- Recommended quantity: minimum 16 pcs/m<sup>2</sup>, plant quantity can vary depending on project specific site conditions such as roof slope or climate, please refer to manufacturers recommendations or planting plan
- Quantity: ..... pcs/m<sup>2</sup>

- 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 3 to 4 weeks.  
Watering in intervals can be necessary until handover, especially during periods of draught.

- 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/m<sup>2</sup>
- Development and maintenance fertilization as needed every 2–3 years: 25 g/m<sup>2</sup>

- 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
- 00.3.0043 ACCESSORIES - ROOF EDGE: EAVES PROFILES - Optional
- Manufacturer:**
- ZinCo Green Roof Systems Ltd
- Product reference:**
- ZinCo Eaves Profile DP 120-A / DP 120-E
- Material and Properties:**
- Roof edge/eaves profile with drainage slots for water run-off and perforation in the support leg, stainless steel or aluminium
  - Material thickness: 0.8 mm
  - Profile height: ca. 120 mm
  - Support leg: ca. 140 mm
  - Available accessories (*include as needed*):
    - Connectors, internal and external 90 ° corners, leg length approx. 250 mm
  - Material: ..... (Aluminium or stainless steel)
- 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
    - Outlet grilles: Installed
- 00.7.0010 ADVERSE WEATHER
- Unfinished work: Secure from damage and wind uplift
  - Conditions: Do not install or work with frozen materials

- 00.7.0001 ROOT BARRIER INSTALLATION

- Extent: Install Root Barrier WSB 100-PO continuously over entire roof area above the non-root resistant water proofing.
- Joints: Minimize.
- Fitting: hot air welded
- Overlaps: minimum 75 mm
- Seams: minimum 38 mm in case of automatic welding, minimum 50 mm in case of manual welding
- Upstands: Extend to a vertical height of at least 150 mm above the finished roof level.
- Water outlets: Fit closely around penetrations and outlets using handmade form pieces made of the root barrier.
- 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.

- 00.7.0008 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 connection clamps 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): average .....mm, according to plan.
- Settlement factor: 1.2
- Sequence: Gently firm each layer before spreading the next. Apply nutrient regime according to planting plan and rake in.

- 00.7.0023 VEGETATION INSTALLATION

**Plug Plants:**

- Handling:
  - Extent: Install plug plants for extensive green roof evenly over area to be planted.
  - Timing: within day of delivery
  - Storage: must be stored in a cool and shaded area, excessive stacking not permitted, keep growing medium moist in the trays.
- Fitting: Display plants at recommended application rate, the non-carpeting plants can be displayed irregular in small groups of 3, 5 or 7 pc/m<sup>2</sup>.
- Planting: Water plants thoroughly before display, after display plant immediately into growing medium.
- Watering:
  - Thoroughly water following installation.
  - Keep growing medium moist until plants are established (typically 4-6 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.

- 00.7.0043 EAVES PROFILE INSTALLATION

- Cutting: neat, accurate and without spalling
- Junctions: vertical, secured using proprietary connectors
- Position: true to line and level, smooth continuous lines
- Location: on top of protection mat, or if fixed to the water proofing: on top of the water proofing
- Fixing: The fixing method depends on the field of application.
  - The Profiles can be placed loosely on top of the waterproofing or the protection mat.
  - To avoid any shifts the profiles can be stabilised on the waterproofing by applying short strips of the same waterproofing material and fixing them through the holes in the support leg.

- 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

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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.