



- 00 Q37 GREEN ROOFS

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

- 00.1 GENERAL

- 00.1.0001 INTENSIVE GREEN ROOF

Roof Type:

ZinCo "Roof Garden" with Floradrain FD 60 neo

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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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

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Protection Layer

- ZinCo Protection Mat ISM 50

Drainage Layer

- Floradrain®FD 60-neo

Infill Drainage Element

- ZinCo "Zincolit® Plus"

Filter Layer

- ZinCo Filter Sheet "SF"

Mineral Sub-Substrate

- ZinCo "Zincolit® Plus"

Growing Medium

- ZinCo System Substrate "Roof Garden"

Vegetation

- Intensive planting or lawn

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" or lawn fertiliser

Gravel Edge

- Roofing pebbles 20/40 mm

Inspection Chamber

- ZinCo Inspection Chamber KS 10
- ZinCo Inspection Chamber KS 30-E

Edging

- ZinCo Concrete Kerb
- ZinCo Stainless Steel Facing for Concrete Kerb

- **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 Protection Mat ISM 50

Material and Properties:

- High-quality, non-rotting extremely stable fibre mat of polyester/polypropylene, bottom sided fibre impregnation using acrylic compounds.
- Thickness: ca. 6 mm
- Weight: ca. 850 g/m²
- Water storage capacity: ca. 4 l/m²
- Protection efficiency according to EN ISO 13428: Residual thickness 40 %
- Penetration force according to EN ISO 12236: > 3500 N
- Strength class: 5



- 00.3.0008 DRAINAGE LAYER

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

ZinCo Floradrain® FD 60 neo

Material and Properties:

- Drainage and water storage element of thermoformed, recycled polyolefin, free of chemical softeners; with water storage cells and openings for ventilation and evaporation as well as multidirectional drainage channel system on the underside
- Height: 60 mm
- Water storage capacity with Zincolit Plus fill: 13 l/m²
- Filling volume: 27 l/m²
- In-plane water flow capacity tested according to EN ISO 12958

- 00.3.0009 INFILL DRAINAGE ELEMENT

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo "Zincolit® Plus"

Material and Properties:

- Mineral substrate consisting of Zincolit® (sorted high quality crushed brick) enriched with selected mineral aggregates, 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
- Grain size: ca 0-16 mm
- Volume weight dry (compacted): ca. 1020 kg/m³
- Volume weight at max. water capacity (compacted): 1300 kg/m³
- Maximum water capacity: ca 28 vol %
- Compaction factor: ca. 1.1
- Filling volume: ca. 27 l/m²

- 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

- 00.3.0020 SUB SUBSTRATE (include where needed)

• **Manufacturer:**

ZinCo Green Roof Systems Ltd

• **Product reference:**

ZinCo "Zincolit® Plus "

Material and Properties:

- Mineral substrate consisting of Zincolit® (sorted high quality crushed brick) enriched with selected mineral aggregates, 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
- Grain size: ca. 0 – 16 mm
- Volume weight dry (compacted): ca. 1020 kg/m³
- Volume weight at max. water capacity (compacted): 1300 kg/m³
- Maximum water capacity: ca. 28 vol %
- Compaction factor: ca. 1.1
- required depth (after compaction): averagemm, according to plan.

- 00.3.0021 GROWING MEDIUM

Manufacturer:

- ZinCo Green Roof Systems Ltd

Product reference:

- ZinCo System Substrate "Roof Garden"

Material and Properties:

- Substrate for intensive green roof applications consisting of Zincolit® (high quality crushed bricks) and other selected mineral aggregates , enriched with Zincohum® (substrate compost enriched with fibre and clay materials), non-flammable, stable in structure and frost resistant. 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/m³
- Volume weight at max. water capacity (compacted): ca. 1500 kg/m³
- Maximum water capacity: ca. 50 vol %
- Compaction factor: ca. 1.3
- Required depth (after compaction): averagemm, according to plan.

- 00.3.0023 VEGETATION

- Intensive Planting according to planting list and planting plan or according to site manager planting, including first irrigation

- 00.3.0023 VEGETATION

- Turf Sport lawn
- Manufacturer:

- 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 for plantings

- 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. 40 g/m²
 - Development and maintenance fertilization as needed every 2–3 years: 40 g/m²
- 00.3.0025 FERTILIZER
- Organic lawn fertilizer
 - Make:
 - Base-Fertilization on the raked substrate, before turf installation.
 - For recommended quantity please refer to manufacturer's instructions.
 - Quantity: 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 (∅ 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 10
- 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. 100 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
- 00.3.0040 ACCESSORIES- INSPECTION CHAMBERS
- Manufacturer:**
- ZinCo Green Roof Systems Ltd
- Product reference:**
- ZinCo Inspection Chamber KS 30 Stainless Steel
- Material and Properties:**
- Inspection chamber of stainless steel; with walkable slotted cover, load-distributing support surfaces and lateral perforation, including extension pieces KSA 15-E, if necessary.
 - Outer dimension of the chamber: ca. 300 x 300 mm
 - Aperture dimension: ca. 240 x 240 mm
 - Height: ca. 300 mm
 - Also available: extension piece KSA 15-E (height 150 mm) - *include where needed*
 - Height including extension pieces: mm



- Delivery and installation: according to manufacturer instructions.
- 00.3.0048 ACCESSORIES-CONCRETE KERB - **optional**
 - Manufacturer:**
 - ZinCo Green Roof Systems Ltd
 - Product reference:**
 - ZinCo Concrete Kerb
 - Material and Properties:**
 - Lightweight L-kerb made of concrete with two different leg lengths.
 - Leg lengths: ca. 250 / 300 mm
 - Width: ca. 500 mm
 - Weight: ca. 28.5 kg
 - Also available (include as necessary):
 - Customised pieces
 - Prefabricated external corner, leg length each 230 mm, Heights: 250 mm or 300 mm
 - Prefabricated internal corner, leg length each 480 mm, Heights: 250 mm or 300 mm
- 00.3.0048 ACCESSORIES - STAINLESS STEEL FACING FOR CONCRETE KERB - **optional**
 - Manufacturer:**
 - ZinCo Green Roof Systems Ltd
 - Product reference:**
 - ZinCo Stainless Steel Facing for Concrete Kerb
 - Material and Properties:**
 - Facing for concrete kerb made of bent stainless steel with integrated butt joint connector; height ca. 240 mm, usable on both sides (250 or 300 mm leg length); length ca. 2 m.
- **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 waterproofing 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 60 neo continuously over entire roof area on protection or separation layer.
 - Joints: Minimize.
 - Fitting: connect at the connection fold all along the edges, so that the larger fold is covering the smaller one.
 - Evaporation holes: facing up
 - Water outlets and roof penetrations: Cut in situ and fit closely around penetrations and outlets.
- 00.7.0009 INFILL DRAINAGE ELEMENT INSTALLATION
- Fill drainage and water storage elements "FD 60" with mineral substrate "Zincolit Plus". Consider compaction factor of ca. 1.1.
- 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.
- 00.7.0020 SUB SUBSTRATE INSTALLATION
- Handling: Minimize
 - Conditions: Handle in the driest condition possible. Do not handle or install when wet or frozen.
 - Extent: Continuous over entire roof area above the filter sheet.
 - Required depth (after compaction): averagemm, according to plan.
 - Settlement factor: 1.1
 - Sequence: Gently firm each layer before spreading the next.
- 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 "Roof Garden" according to plan above the filter sheet or above mineral sub substrate (as required depending on total substrate depth).
 - Required depth (after compaction): averagemm, according to plan.

- Settlement factor: 1.3
 - Sequence: Gently firm each layer before spreading the next. Apply nutrient regime according to planting plan and rake in.
- 00.7.0023 VEGETATION INSTALLATION - PLANTING
- Extent: Install vegetation professionally according to planting plan.
 - Storage: The plug plants must be stored in a cool and shaded area, excessive stacking not permitted.
 - Watering: Water the plug plants and root ball plants prior to planting. Thoroughly water directly following installation, and don't let dry out completely until plants have taken roots (approx. 3-4 weeks). Subsequently irrigate regularly as required according to specific vegetation, climate and weather conditions.
- 00.7.0023 VEGETATION INSTALLATION - TURF
- Extent: Install turf 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 and install on level substrate, firm to ensure full contact with growing medium.
 - Joints: Install with tight butt joints pressing together seams to avoid gaps. Do not stretch.
 - Watering: Thoroughly water directly following installation. Subsequently irrigate regularly as required according to climate and weather conditions.
- 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 – KS 10
- Location: Install KS 10 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.
 - Surround: 300 mm pebbles strip
- 00.7.0040 INSPECTION CHAMBER INSTALLATION – KS 30-E
- Location: Install KS 30 centrally over drain outlet, place chamber on top of protection mat, with PE-flange on top of drainage element.
 - Orientation: Align parallel with adjacent features.
 - Filter Sheet: Install the ZinCo Filter Sheet SF on top of the flange of the inspection chamber.
 - Surround: 300 mm pebbles strip
- 00.7.0048 CONCRETE KERB INSTALLATION
- Installation: Install the concrete kerb on top of the drainage element directly into a concrete or mortar foundation.
 - Orientation / Height: Depending on the desired height install the concrete kerb with the smaller or larger leg facing up. The internal and external corners, each consisting of two 45° angles, cannot be turned around, but have to be ordered in the corresponding height.
 - Stainless Steel Facing (optional): Push onto the concrete kerbs from above. Cut to size as required using a customary angle grinder with a metal disc. Deburr the sharp edges after cutting.

- **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

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.