

# Specification Suggestion

## “Roof Garden” with Floradrain® FD 60

### SPEC NOTE:

This guide specification gives general information about the ZinCo green roof systems. It has to be clear, that the information that is shown must be understood as guide and recommendations.

It is possible that your green roof project need special technical requirements. Please contact us for further information regarding technical advice, specifications and budget cost.

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## PART 1 – GENERAL

### TECHNICAL DATA

#### Depth:

>310 mm (>12")

#### Saturated weight:

>375 kg/m<sup>2</sup> (>77 lbs/ft<sup>2</sup>)

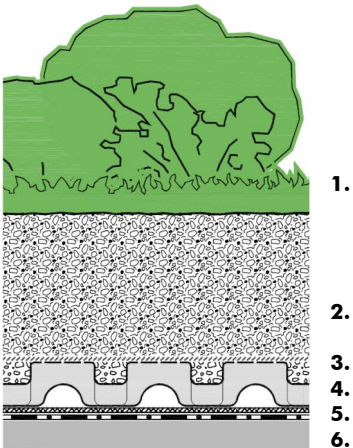
#### Water retention capacity:

>143 L/m<sup>2</sup>

#### Slope:

2-5 degrees

### SECTION



### Section includes:

1. Plant Community: “Roof Garden”
2. Growing Medium ZinCo Blend-I.  
Depth: >250 mm (> 10.0”)
3. Filter Sheet ZinCo SF
4. Drainage Element ZinCo Floradrain® FD 60
5. Protection Mat ZinCo ISM50
6. Related Materials:
  - ZinCo Root Barrier WSB100
  - Inspection Chamber KS30
  - Gravel Strip
  - Irrigation System

### REFERENCES

- The ZinCo “Roof Garden” assembly meets or exceed the requirements of the FLL-standards (Guideline for Planning, Execution and Upkeep of Green-Roof Sites, Release 2008).

### DEFINITIONS

- **Green Roof:** A Green Roof is an innovative, multi-layered system that covers all types of waterproofed roof surfaces with growing medium and plant material.
- **Intensive Green Roof:** Well-maintained gardens on utilized flat roofs. Intensive green roofs are generally heavy weight with high growing medium depths. The plant selection includes perennials, shrubs, trees, and/or lawn, and other landscape options like pavement, pergola’s, and ponds may be included. Typically there are high maintenance requirements and greater costs for an intensive green roof, depending on the plants and the design. An intensive green roof should be designed with a multi-layered green roof system.
- **Roof Garden:** An attractive intensive green roof landscape according to the landscape architects desire.

### SUBMITTALS

- Submit signed shop drawings showing that the roofing system, green roof assembly, materials, perimeter and penetration details and fall protection are accepted by the green roof manufacturer to ensure that the green roof system meets the necessary performance requirements.
- Submit a certification showing that all the components of the green roof assembly are supplied and warranted by the green roof manufacturer.
- Submit an inspection report, signed by the roof contractor and the green roof contractor, resulting from the quality control of the roofing system installation prior to the installation of the green roof assembly indicating that the roofing system is installed correctly.
- Submit references which indicate that the green roof manufacturer as well as the green roof contractor has recently successfully completed projects of similar scope and nature.
- **Installers Qualifications:** Work of this section shall be installed by a recognized green roof or landscape contractor, approved by ZinCo Canada Inc. The contractor shall have adequate equipment, skilled workers with extensive practical experience, skills and knowledge of plants horticulture techniques and overall landscape design requirements.
- Roof details such as flashing, roof edges, roof penetrations, outlets, roof fall and type of insulation must be adjusted to the Green Roof System used. ZinCo Canada Inc. provides consultation and engineering to (landscape) architects, roof contractors and green roof contractors to finalize these adjustments before construction of the roof commences, if requested.

### QUALITY ASSURANCE

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- Prior to the installation of the green roof system, test the water tightness of the roofing system by flood testing for at least a 48 hour period or an electronic leak detection process performed by a qualified testing agency.
- Submit documentation certifying that the load bearing capacity of the roof and building construction is tested and approved by a structural engineer, with regard to the extra weight of the Green Roof system.

### ENVIRONMENTAL CONDITIONS

- The plant community should be chosen in consideration of the climatic circumstances and hardiness zone. Please contact ZinCo Canada Inc. for more information.
- Proceed with planting between spring and early fall so as to enable plants to take root in order to survive the winter months.
- Provide a temporary fall protection (safety railing or fall arrest) during the installation to ensure a safe and healthy work environment.
- Provide a permanent fall protection (safety railing or fall arrest) for maintenance to ensure a safe and healthy work environment.

### DELIVERY, STORAGE & HANDLING

- By storage on the roof makes sure that the load of the materials does not exceed the load bearing capacity of the roof and building construction
- Store the materials in a dry area, out of direct sunlight, protected from freezing, staining or damage.
- Stored plant materials have to be watched carefully. Watering the plants can be necessary during a long storage period.

### WARRANTY

- Submit a 5-year product manufacturing warranty according to the specifications of the green roof manufacturer which warrants all the components of the green roof assembly. (except the vegetation)
- Submit a 2-year workmanship warranty which warrants the installation of the green roof system according to the specifications.
- Submit a 2 year growing warranty to take effect immediately after the installation of the Green Roof. This warranty is to ensure that the vegetation properly encloses the roof area. After that a maintenance program has to be covering the full period of the warranty.

### MAINTENANCE

- Provide a maintenance program for the duration of two growing seasons as per following maintenance measures:
  - The removal of coarse and unwanted weeds and the seedlings of trees; some 'newcomers' are quite acceptable.
  - The removal of vegetation from the gravel strips;
  - Visual inspection of the drain outlets; Maintaining a functioning drainage layer is critical to the establishment of the vegetation. Retained water will stagnate and is detrimental to proper plant growth;
  - Fertilizing the vegetation with a slow released chemical fertilizer;
    - type of fertilizer: slow release N-P-K: 20-6-11 75 % coated
    - recommended quantity: 25 gram per square .meter.
  - Replace plant material that dies, as necessary;
  - Irrigation if necessary;

Submit maintenance report to the owner at the end of the growing season.

### PART 2 - PRODUCTS

**Specified green roof assembly:**  
ZinCo Floradrain® FD60: Roof Garden

Supplier:

**ZinCo Canada Inc.**  
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#### 1. ROOT BARRIER

- **ZinCo root barrier WSB 100-PO** (Optional item if non root-resistant is waterproofing used.) made of flexible Polyolefin (FPO); compatible with bitumen, flexible at low temperatures; hot air weldable; tested for root and rhizome resistance in accordance to FLL 2002; UV-stabilized. Tensile strength: > 8 N/mm<sup>2</sup> Thickness: 1,10 mm. Weight: 1.13 kg/m<sup>2</sup>.

#### 2. SEPARATION/PROTECTIVE LAYER

(PLEASE CHOOSE CONVENTIONAL OR INVERTED ASSEMBLY)

(CONVENTIONAL ROOF ASSEMBLY)

- **ZinCo moisture retention and protection mat ISM50** made of recycled non-rotting Polypropylene fibers for water- and nutrient as well as protection layer. High resistant to high mechanical pressure. Thickness: 20 mm. Weight approx. 1500 g/m<sup>2</sup>. Water retention capacity: 12 l/m<sup>2</sup>. Bitumen resistant – Biological and Chemical neutral.

Or

(INVERTED ROOF ASSEMBLY)

- Air and vapour permeable membrane ZinCo diffusion membrane TGV21 made



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of thermal consolidated Polypropylene. Bitumen resistant – Biologically and Chemically neutral. Vapour opening size  $S_d \leq 0,01$  m) Thickness: 0,55 mm. Weight: 80 g/m<sup>2</sup>. To be used as separation layer on inverted roofs and protection against small particle infiltration.

### 3. DRAINAGE – WATER STORAGE LAYER

- **ZinCo drainage and water storage element Floradrain® FD60** made of ABS (Acrylonitrile Butadiene Styrene) - plastic, with water retaining troughs and openings for ventilation and evaporation as well as a multidirectional drainage channel system on the underside. Bitumen resistant - Resistance to compression of more than 75 kN/m<sup>2</sup> (filled up). Water retention capacity: 8 l/m<sup>2</sup>. Weight: approx. 2,3 kg/m<sup>2</sup>. Dimensions: 1,00 x 2,00 x 0,06 m.

- **ZinCoblend-M** for a filling in the Floradrain-layer. Size: 2-15 mm. Quantity: 27 l/m<sup>2</sup>.

### 4. FILTER LAYER

- **ZinCo Filter Sheet SF** made of non-rotting thermal consolidated Polypropylene. Water flow rate: 155 l/(m<sup>2</sup>s) if there is a water column of 100 mm. Apparent Opening size:  $d_{90\%} = 110$   $\mu$ m. Weight: 100 g/m<sup>2</sup>. The filter sheet is attached to the Fixodrain element.

### 5. GROWING MEDIUM

- **Growing medium for intensive Green Roofs - ZinCo Blend-I**, produced using light weight recycled or re-used materials and minerals, enriched with high quality compost elements, resistant to flying sparks, frost-resistant, stable structure. Specially engineered by ZinCo Canada and meets the FLL-Standards for Planning, Execution and Upkeep of Green Roof sites. Depth: > 300 mm.

(PLEASE CHOOSE REQUIRED DEPTH)

#### Particle Size Distribution

Proportion of silting components ( $d < 0.063$  mm):  $\leq 20$  Mass %

#### Density Measurements

Bulk Density (at max. water-holding capacity): 1300 – 1600 kg/m<sup>3</sup>

Compression Factor: <20% Vol. %

#### Water/Air Measurements

Total Pore Volume:  $\geq 65$  Vol. %

Maximum water-holding capacity:  $\geq 45\%$  Vol. %

Air-filled porosity at max water-holding:  $\geq 10$  Vol. %

Water permeability (saturated hydraulic conductivity):  $\geq 0.005$  cm/sec

#### pH

5.5 – 8.0

#### Organic Measurements

Organic matter content:  $\leq 20\%$  mass%

#### Nutrients

Phosphorus, P2O5 (CAL):  $\leq 200$ mg/L

Potassium, K2O (CAL):  $\leq 700$ mg/L

Magnesium, Mg (CaCl2):  $\geq 200$ mg/L

Nitrate + Ammonium (CaCl2):  $\leq 80$ mg/L

- **ZinCo Mineral Aggregate:** In the case of higher substrate elevations than 14.0 in. (350 mm) a pure mineral aggregate as sub-substrate is recommended. ZinCoblend M, engineered mineral aggregate, especially suitable as infill of drainage elements and for the installation of vegetation free zones, meets the FLL-Guidelines for the Planning, Construction and Maintenance of Green Roofing. Delivery and installation on the filter sheet.

### 6. PLANT MATERIAL

- **Plant material** according to a planting design of the (landscape) architect / designer or ZinCo Canada Inc. (Type of plants dependent of the climatic circumstances and hardiness zone).

### 7. RELATED PRODUCTS

- **ZinCo inspection chamber KS30-PE** made of Polyethylene and/or **KS30-E** made of stainless steel, resistance to compression to ensure accessibility of the outlets at any time. Height: 30 cm. Including extension pieces.

- **ZinCo gravel retainer DP150** made of aluminum L-bracket with square slots for drainage. Designed as gravel retainer for gravel strips. Length: approx. 3 m. Height: 150 m. Including joint connectors.

- **Gravel strip** to protect roofing details, using a 1"-2" round washed aggregate. Width: at least 30 cm. Depth: > 150 mm.

#### Irrigation system

During the first two growing seasons the plant material needs sufficient water to root successfully. It is recommended to install an irrigation system, including controller, irrigation pipe, Sprinklers, fittings and etc. A water tap must be available at the roof level.

Additional irrigation can be necessary in geographical regions with drought climatic conditions.

For more information about irrigations systems or an irrigation plan contact ZinCo Canada (905) 690 1661 or e-mail: [greenroof@zinco.ca](mailto:greenroof@zinco.ca).

### PART 3 – EXECUTION

#### 1. INSPECTION

- Clean up the waterproofing membrane carefully (well-swept)

- Careful inspection of the waterproofing membrane including seams, penetrations and details after flood testing or electronic leak detection. If the waterproofing system and the Green Roof system are not carried out by the same company, the acceptance of the method used for waterproofing quality should be agreed by all the parties.



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Identified defects are to be reported in written form. Do not proceed until corrected.

### 2. ROOT BARRIER

- Deliver and install the **ZinCo Root Barrier WSB 100-PO** on the no root-resistant waterproofing with a minimum overlap of 50 mm, hot air or solvent welded according to the manufacturer's instructions. The root barrier must be taken above the growing medium along the edges and at roof penetrations.

### 3. SEPARATION / PROTECTIVE LAYER

(PLEASE CHOOSE CONVENTIONAL OR INVERTED ASSEMBLY)

(CONVENTIONAL ROOF ASSEMBLY)

- Deliver and install the **ZinCo moisture retention and protection mat ISM50** directly on the top of the root barrier with a minimum overlap of 100 mm, according to the manufacturer's instructions. The separation sheet must be installed above the growing medium along the edges and at roof penetrations.

Or

(INVERTED ROOF ASSEMBLY)

- In the case of an inverted roof: Deliver and install the **ZinCo diffusion membrane TGV21** directly on the top of the insulation with a minimum overlap of 100 mm, according to the manufacturer's instructions. The separation sheet must be installed above the growing medium along the edges and at roof penetrations.

### 4. DRAINAGE & WATER STORAGE LAYER

- Deliver and install the **ZinCo Drainage and water storage element Floradrain® FD60** directly on the protection mat or diffusion membrane according to the manufacturer's

instructions. Install the Floradrain elements butt jointed with the evaporation holes facing up and infill with Zincoblend-M. Cut the drain elements in place along the edges and roof penetrations. Fill the water retention cups of the drain layer once with water.

### 5. FILTER SHEET

- Deliver and install the **ZinCo filter sheet SF** on the drainage layer with a minimum overlap of 200 mm according to the manufacturer's instructions. The filter must be installed above the growing medium along the edges and roof penetrations. Cut the filter sheet in place along the edges and at roof penetrations.

### 6. GROWING MEDIUM

- Deliver and install the **growing medium for Intensive Green Roofs ZinCo Blend-I** on the filter sheet. Spread out the growing medium equally to a depth of 250 mm. (or required depth) Check the depth on several places to ensure the right thickness. A tolerance of 1 cm is acceptable. Small amounts of growing medium will be delivered in big bags. Larger amounts will be delivered by a blower truck.

- For greater substrate depths install Zincoblend-M in the necessary depth. Check the depth in several places to ensure a continuous thickness. A tolerance of 0.5 in. (13 mm) is acceptable.

### 7. PLANT MATERIAL

- Deliver and install the plant material in the growing medium according to the planting design and plant lists. Including one watering right after the installation.

### 8. RELATED PRODUCTS

- **ZinCo Inspection Chamber KS30 + Extension pieces** Deliver and install the ZinCo Inspection Chamber on top of the drainage layer above the roof outlets.

Take of the lid and install the extension piece on top of the inspection chamber. Place lid on top of the extension piece. Install the ZinCo filter sheet TG on the flange of the inspection chamber.

### - Gravel strip

Deliver and install a gravel strip along roof edges, flashing details and roof penetrations using a 1"-2" round aggregate. Depth: > 150 mm.

- **Irrigation system.** Deliver and install an irrigation system according to an irrigation plan. Install the controller in a mechanical room with electricity and a water tap at roof level close to the green roof. Install the irrigation pipes and sprinklers in the growing medium, just below the surface.

### 9. COMPLETION

- Upon completion, water the plant material and leave the site in a neat, clean and workmanlike condition.

### 10. MAINTENANCE

- Execute the maintenance program as described on page 2.

### END OF SECTION

