

Specification Suggestion

“Green Roof & Solar” with SolarBase® SB200

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.

Other requirements

- Wind Calculations are required by certified engineer.
- To be combined with other ZinCo green roof assembly (ZinCo Sedum Carpet or ZinCo Industrial Sedum)

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PART 1 – GENERAL

TECHNICAL DATA

Depth:

Based on wind calculations

Saturated weight:

Based on wind calculations

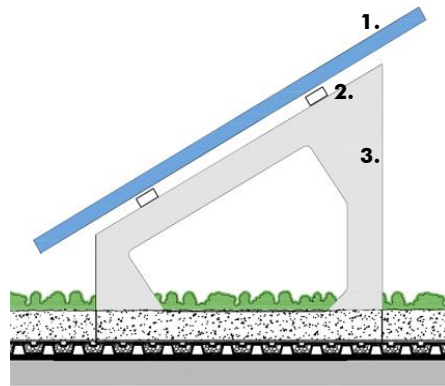
Water retention capacity:

Based on wind calculations

Slope:

2-9 degrees

SECTION



Section includes:

1. Solar Panel – By Others.
2. ZinCo Mounting Profile SMP 40/36.
3. ZinCo Solar Base Frame SGR.
4. Plant Community “Sedum Carpet”.
5. Growing Medium ZinCoblend-E.
6. ZinCo Solar Base SB200.
7. Protection Mats ZinCo SSM45.
8. ZinCo Root Barrier WSF40.

REFERENCES

- The ZinCo “Green Roof & Solar” 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.
- **Extensive Green Roof:** A vegetated ecological protection that is light weight, has a low growing medium depth, has a natural/native plant selection, and has low maintenance and low installation costs.

- **Sedum:** Sedum is a large and diverse group of durable Green Roof plants known for its fleshy succulent foliage and stalks of yellow, pink or white flowers. Sedum is very easy to care for, low maintenance plants and once established are drought tolerant.

- **Green Roofs & Solar:** This combination makes use of synergy effect, as the efficiency of solar panels is significantly improved if combined with a Green Roof

4. SUBMITTALS

- 5.
 - 6.
 - 7.
 - 8.
- 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.

QUALITY ASSURANCE

- **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



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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.
- 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 an structural engineer, with regard to the extra weight of the Green Roof system.
- Submit documentation certifying that the assembly is calculated and approved by a wind engineer, with regard to the wind up lift pressure of the Green Roof & Solar assembly.

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:
 - Four visits in the first year.
 - Four visits in the second year.
 - 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 SolarBase®: Green Roof & Solar

Supplier:

ZinCo Canada Inc.
P.O. Box 29
Carlisle, ON Canada, L0R 1H0

Phone: 905-690-1661
E-mail: greenroof@zinco.ca
Website: www.zinco.ca

1. ROOT BARRIER

- **ZinCo root barrier WSF 40** (Optional item if non root-resistant is waterproofing used.) made of special-polyethylene – Bitumen and Polystyrol resistant - Without plasticizer - UV-stabilized. Thickness: 0,40 mm. Weight: 380 g/m².



2. SEPARATION/PROTECTIVE LAYER

(PLEASE CHOOSE CONVENTIONAL OR INVERTED ASSEMBLY)

(CONVENTIONAL ROOF ASSEMBLY)

- **ZinCo moisture retention and protection mat SSM45** made of recycled non-rotting fibers for water- and nutrient retention as well as a protection layer. Thickness: 5 mm. Weight approx. 470 g/m². Water retention capacity: 5 l/m². Bitumen resistant – Biologically and Chemically neutral. Penetration resistance: > 2400N. Tensile strength length wise: >8.5 KN/m.

Or

(INVERTED ROOF ASSEMBLY)

- Air and vapour permeable membrane ZinCo diffusion membrane TGV21 made 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/m². To be used as separation layer on inverted roofs and protection against small particle infiltration.

3. SOLAR BASE

- **ZinCo drainage and Solar Base element ZinCo SB200** made of 100% thermoformed ABS, with water storage cells, openings for aeration and diffusion as well as a multidirectional drainage channel system on the underside. Including aluminum reinforced frame on the underside and fastening bolts. Compressive strength: 300 kg/m². Infill: 16 L/m². Weight: approx. 7 kg/m². Dimensions: 1.00 x 2.00 x 0.04 m.
- **ZinCoblend-M** for a filling in the Solar base-layer. Size: 2-10 mm. Quantity: 16 L/m²

4. FILTER LAYER

- **ZinCo Filter Sheet SF** made of non-rotting thermal consolidated Polypropylene. Water flow rate: 155 l/(m²s) if there is a water column of 100 mm. Apparent Opening size: $d_{90\%} = 110$ μ m. Weight: 100 g/m². The filter sheet is attached to the Fixodrain element.

5. RACKING SYSTEM

- Racking system **ZinCo Solar Base Frame SGR 30** made of one-piece aluminum (ALMG III). Racking bracket with a 30° angle. (angles available from 5° - 45°). Length: 950 mm. Height: 350/900 mm. Weight: 2.7 kg/piece. .

- Racking system **ZinCo Solar Base Frame SGR East – West** made of aluminum. Designed as frame for photovoltaic panels with East - West direction. Available with an inclination of 5°, 10°, 15° or 20°. To be installed in combination with Solar base SB200-4.

- Mounting profile **ZinCo Solar Mounting Profile SMP 40/65**, made of extruded aluminum, natural AlMgSi 0.5 F22, mill finish, with profile channel on the upper side, including connectors with stainless steel screws.

- **Wind bracing:** Two aluminum profiles for crosswise stabilization of the ZinCo Solar Base Fram SGR. Distance: approx. 1.00 m. Including stainless steel screws.

6. GROWING MEDIUM

- **Growing medium for extensive Green Roofs - ZinCo Blend-E**, 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: mm.

(REQUIRED DEPTH BASED ON WIND CALCULATIONS)

Particle Size Distribution

Proportion of silting components ($d < 0.063$ mm):
 ≤ 15 Mass %

Density Measurements

Bulk Density (at max. water-holding capacity): 1100 – 1500 kg/m³

Compression Factor: <20% Vol. %

Water/Air Measurements

Total Pore Volume: ≥ 65 Vol. %

Maximum water-holding capacity: $\geq 35\%$ Vol. %

Air-filled porosity at max water-holding: ≥ 10 Vol. %

Water permeability (saturated hydraulic conductivity) ≥ 0.001 cm/sec

pH

6.5 – 9.5

Organic Measurements

Organic matter content: $\leq 8\%$ mass%

Nutrients

Phosphorus, P205 (CAL): ≤ 200 mg/L

Potassium, K2O (CAL): ≤ 700 mg/L

Magnesium, Mg (CaCl2): ≥ 200 mg/L

Nitrate + Ammonium (CaCl2): ≤ 80 mg/L

7. PLANT MATERIAL

(PLEASE CHOOSE ONE OF THE PLANTING OPTIONS)

PLUG PLANTS

- **Plug plants:** Plant material potted in 50 or 72 tray plugs in a mix of Sedums, Grasses and Herbs. Quantity: at 16 plants/m² or 18 plants/m² or 20 plants/m²

(PLEASE CHOOSE REQUIRED PLANT DENSITY)



PRE-GROWN VEGETATION MATS

- **Pre-cultivated Vegetation Mats** with firmly rooted, for extensive green roofs suitable plant species, pre-cultivated over one growing season in the field. The carrier material decomposes after time. Delivery weight: approx. 16–20 kg/m² (3–5 lbs/ft²). Height: ca. 20–25 mm (0.75 – 1 inch) Supplying quantity: minimum 2.00 m². Standard dimensions: ca. 1.20 m x 2.00 m. On request also mats in other dimensions or with non-decaying carriers are available.

Plant types:

The basis vegetation mats are 12–14 adapted Sedum types, e.g. Sedum album, Sedum acre, Sedum spurium, Sedum floriferum, Sedum kamschaticum, Sedum reflexum, Sedum sexangulare, and Sedum hybridum. Various herbs and grasses are also available for extensive green roofs.

The coverage is at least 85% when shipped.

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

2. ROOT BARRIER

- Deliver and install the **ZinCo root barrier WSF40** on top of the non root-

resistant waterproofing with a minimum overlap of 500 mm according to the manufacturer's instructions. The root barrier must be installed above the growing medium along the edges and 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 SSM45** 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. SOLAR BASE

- Deliver and install the **ZinCo drainage and Solar Base element ZinCo SB200** directly on the protection mat or diffusion membrane according to the manufacturer's instructions. Install the Floradrain elements side by side with the ventilation and evaporation holes facing up and overlap them with the available side flange. Fill the water retention cups of the solar base with the required infill.

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. SOLAR RACKING SYSTEM

- Place the **ZinCo Solar Base Frame SGR (East – West)** over the fastening bolts and fasten the base frame to the ZinCo Solar Base SB200 with the required fasteners, (tightening torque > 20 Nm).
- Install the **ZinCo Solar Mounting Profile SMP 40** and **Wind bracing** profile according to the manufacturer's instruction.

7. GROWING MEDIUM

- Deliver and install the **growing medium for extensive Green Roofs ZinCo Blend-SI** in the drainage and anti-slip element. Spread out the growing medium equally to a depth of 80 mm – 100 mm. 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.

8. PLANT MATERIAL

(PLEASE CHOOSE ONE OF THE PLANTING OPTIONS)

- 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.

PLUG PLANTS:

Take the plugs out of the plant trays and lay them out on the growing medium following the planting design. Dig a hole,



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the size of root ball and apply the plug in the hole. Cover the root ball with growing medium and compact it gently in place. Water the plugs right after the installation.

PRE-GROWN VEGETATION MAT:

Install mats same day as the delivery. Do not store without permission of the grower. Do not place in full sun. During hot sunny days water/cool of the soil layer with 15-25 minutes of pre-watering. Hot scorching soil burns the roots and might damage the Sedum mats.

Starting in the corner, carefully place each roll at location and unroll the mats over the entire roof area. Make sure that the mats are in contact with the growing medium. Water immediately for 30-60 minutes after installation.

After installation: Water the first month according to the grower’s specification depending on the season and time of year using automatic timers.

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

