

SECTION 07 55 65

EXTENSIVE GREEN ROOF SYSTEM

(ZinCo "Sloped Sedum" with Georaster - extensive)

PART 1 GENERAL

1.1 SUMMARY

- A. This sample specification serves as a guideline to the specifier. It shall be adapted to each project by either choosing from several suggestions or by adjusting the text to project specific and site conditions, such as type of roof construction, roof slope, insulation, water proofing, local climate, design goals, and other.
- B. This specification is prepared in accordance with the CSI format and shall be included as separate section under DIVISION 7 – Thermal and moisture protection.

1.2 SECTION INCLUDES

- A. Extensive green roof system including the following:
 - 1. Vegetation layer according to project specific plant list:
(Note to specifier: please select according to project requirements)
 - a. Pre-cultivated vegetation mats.
 - b. Plug plants.
 - c. Sedum cuttings.
 - 2. Growing media.
 - 3. Drainage layer.
 - 4. Protection layer.
 - 5. Related products.

1.3 RELATED SECTIONS

- A. Division 07 Section "Waterproofing" for waterproofing systems under vegetated roof system.
- B. Division 07 Section "Roofing" for roofing systems under vegetated roof system.
- C. Section 07 Section "Sheet Metal Flashing and Trim" for coordination with flashing.

1.4 DEFINITIONS

- A. Green roof: Multi-layered exterior system of growing media and plant materials for installation over membrane roofing and waterproofing systems.
- B. Extensive green roof: Vegetated ecological protection layer that is lightweight, has shallow growing media depths, uses diverse and drought resistant plant communities, with low maintenance requirements.
- C. Sloped roof: Roof surface with an inclination of min. 2/12 (10°) and subject to shear forces which are not relevant in flat roof conditions. For sloped roofs, additional measures are required to ensure the stability of the green roof.
- D. System build-up "Sloped Sedum" with Georaster - extensive: An attractive landscape on an inclined roof surface with a large variety of species that can act as an ecological protection layer.

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1.5 SUBMITTALS

- A. Submit in accordance with Division 01 Section "Submittal Procedures".
- B. Product data: Submit manufacturer's current published data including component materials, dimensions, standard details, and installation instructions.
- C. Shop drawings: Include the following:
 - 1. Details of green roofing system, plantings, and paving.
 - 2. Relationship to substrate, perimeter, and penetrating items.
 - 3. Location of roof drains and slopes.
 - 4. Average weight of green roof system.
- D. Range samples: Full size sample of each planting selection in trays minimum 1 x 1 feet by full thickness.
- E. Closeout submittals: Maintenance instructions and warranties.

1.6 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer qualifications: Minimum ten years' experience producing green roof systems of the size with the production facilities capable of meeting the project schedule.
 - 2. Installer qualifications: Minimum 2 years' experience with green roof systems and acceptable to the manufacturer, with adequate equipment and skilled workers.
- B. Pre-installation meeting: Convene on project site min. one week before beginning work to:
 - 1. Verify project requirements and site logistics.
 - 2. Coordinate between trades.
 - 3. Assess integrity of the roofing system and building structure.
 - 4. Review manufacturer's installation instructions and warranty requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery schedule to minimize on-site storage. Verify roofing installation system is tested and accepted prior to delivery. Do not overload roof.
- B. Store materials in a dry area, out of direct sunlight, protected from freezing, staining, contamination, or damage.
- C. Water plants and expose plant materials to daylight. Unpack trays for even daylight distribution.

1.8 WARRANTY

- A. Manufacturer's warranty: Provide manufacturer's 5-year limited warranty against deficiencies in materials or fabrication.
- B. Installer's warranty: Provide installer's 2-year growing warranty which provides periodic inspections and maintenance service to ensure vegetation is properly installed, is becoming established, and is of sufficient density over the roof area.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design: "Sloped Sedum" with Georaster – extensive Extensive Green Roof System by ZinCo USA, Inc.
401 VFW Drive
Rockland, MA 02370
Telephone: 866-766-3155
Website: www.zinco-usa.com.

2.2 COMPONENTS

(Note to specifier: select applying components.)

- A. Vegetation layer:
Sedum species, sizes, and qualities according to project specific plant list. Delivery and appropriate installation in growing media, incl. suitable watering regime after installation.
(Note to specifier: please select according to project requirements)
1. Pre-cultivated vegetation mats: ZinCo Sedum Carpet. Tightly rooted outdoor pre-grown mat with approved mix of sedum, including min. 6 durable sedum varieties. – mandatory for slopes > 7/12 (approx. 30°).
 2. Plug plants: ZinCo Sloped Sedum. Plug Plants with approved mix of sedum, drought resistant small herbs and grasses of 72-count plug trays.
 - a. Min. 2.5 plants/sq.ft (26 plants/m²) for slopes 2/12 to 4/12 (10-18°).
 - b. Min. 3 plants/sq.ft (31 plants/m²) for slopes 4/12 to 7/12 (18-30°).
 3. Sedum cuttings: Cuttings of various sedum species – slopes not exceeding 4/12 (18°).
 - a. Min. 18 lbs/1000 sq.ft. (approx. 85 g/m²) for slopes 2/12 to 3/12 (10-14°).
 - b. Min. 20 lbs/1000 sq.ft. (approx. 95 g/m²) and additional adhesive for slopes 3/12 to 4/12 (14-18°).
- B. Growing media:
Engineered growing media purpose made for sloped green roofs.
1. For roof slopes < 4/12 (approx. 18°): Zincoblend E, typical for extensive green roofs; meets the ASTM E 2399-05. Depth approx. 0.5 in. (approx. 13 mm) above Georaster Elements. Delivery and installation in the Georaster elements.
 2. For roof slopes > 4/12 (approx. 18°): Zincoblend I, typical for intensive green roofs; meets the ASTM E 2399-05. Depth approx. 0.5 in. (approx. 13 mm) above Georaster Elements. Delivery and installation in the Georaster elements.
- C. Drainage layer and reinforcement:
ZinCo Georaster. Stable grid element made of recycled polyethylene (PE-HD, approx. 80 % recycled material). Shear force protection on sloped green roofs or as reinforcement for pavings, etc. Color: black. Height: approx. 3.9 in. (approx. 100 mm). Weight: approx. 4.6 lbs/element (approx. 2.1 kg/element). Grid dimension approx. 2.05 ft. (approx. 625 mm). Quantity approx. 0.24 elements/ sq. ft. (approx. 2.56 elements/sqm); light weight structure with high load bearing capacity and shear strength, full reinforcement of the area due to T-plug connections. Delivery and installation on top of the protection layer.
- D. Protection layer:
ZinCo Protection Mat WSM 150. Non-rotting water and nutrient retention and protection layer, needled fleece mat made of recycled fibers for water- and nutrient retention as well as a protection layer. Color: grey. Thickness: approx. 0.7 in. (approx. 17 mm). Weight: approx. 0.3 lbs/sq. ft. (approx. 1.5 kg/m²). Water retention capacity: approx. 0.3 gal/sq. ft. (approx. 12 l/m²). Compatible with bitumen, biologically and chemically neutral. Delivery and installation on top of the root resistant waterproofing.

- E. Related Products:
(Note to specifier: please select, if required.)
1. Provide gravel for non-vegetated areas, including roof edges, flashing, and roof penetrations: smooth, washed, clean, well rounded gravel.
 2. Protection mat to protect the waterproofing in front of shear barriers or roofs eaves or upstands, in case shear barriers are constructed with non-ZinCo profiles and brackets.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions:
1. Confirm work by others is installed per the project requirements. Do not cover work by others prior to inspection or acceptance.
 2. Inspect seams, penetrations and details. Identify defects in writing to the Architect.
- B. Do not proceed until unacceptable conditions are corrected.

3.2 INSTALLATION

(Note to specifier: select applying components.)

- A. General:
Install green roof system in strict accordance with manufacturer's instructions and in proper relationship with adjacent materials and the following.
1. Protection layer:
Install the Protection Mat WSM150 butt jointed above a root proof waterproofing. The protection mat shall be taken above the growing media along edges and at roof penetrations. Cut the protection mat in situ at roof penetrations. Consider an allowance for wastage of approx. 3–5 %.
 2. Drainage layer:
Install the ZinCo Georaster elements on the protection layer observing the installation direction marked on each element. Connect the elements with the T-shaped plug connectors. Cut the drainage element in situ at roof penetrations and along edges. An allowance for wastage shall be considered on a project-specific basis.
 3. Growing Media:
Zincoblend E or Zincoblend I:
Install the Growing Media Zincoblend E (for roof slope < 4/12 (approx. 18°)) or Zincoblend I (for roof slope > 4/12 (approx. 18°)) for the "Sloped Sedum" Green Roof System in the Georaster. Install the growing media equally in a depth of approx. 0.5 in. (approx. 13 mm) above the Georaster elements. Check the depth in several places to ensure a continuous thickness. A tolerance of 0.5 in. (13 mm) is acceptable. Consider a settlement factor of 1.2.
 4. Vegetation layer:
(Note to specifier: please select according to project requirements)
 - a. Pre-cultivated vegetation mats: Level growing media Zincoblend E, apply coated slow release fertilizer, roll out vegetation mat and install on growing media with tight butt joints pressing together seams to avoid gaps. Do not stretch. After installation, thoroughly water the vegetation mats. Mat joints can be covered with growing media Zincoblend E to ensure seamless installation. Vegetation mats shall be installed immediately upon delivery. Avoid delivery and installation of vegetation mats during periods of frost or hot weather conditions.

- b. Plug plants: Apply plug plants at recommended application rate and according to the project specific plant list and drawings. Water and fertilize as required by the specific plant lists and local climate.
 - c. Sedum cuttings: Apply sedum cuttings at recommended application rate. Observe handling instructions. Water and fertilize as required by the specific plant lists and local climate.
- B. Related Products:
(Note to specifier: please select, if required.)
- 1. Install gravel in non-vegetated areas: Install flush with plant materials without spilling into planting areas.
 - 2. Install strips of the protection mat directly in front of shear barriers or upstands to protect the waterproofing or upstands, in case shear barriers are constructed with non-ZinCo profiles and brackets.

3.3 CLEANING

- A. Remove all debris from the project site in accordance with the owner's construction waste management requirements.

3.4 PROTECTION

- A. Protect green roof planting and components from dirt and damage caused by subsequent construction activities.

3.5 MAINTENANCE

- A. Initial irrigation: Ensure the plants have sufficient water to root successfully immediately after installation. Irrigation regime depends on weather, location, and project specific plant material. Automated irrigation for the initial period is recommended. Minimum duration: planting – 3 to 4 weeks, vegetation mats – 4 to 5 weeks, seeding – 6 to 8 weeks (avoid any drying out after germination). Irrigation in intervals is recommended. Unclosed vegetation results in evaporation losses from the growing media. Minimum duration of interval irrigation may vary from region to region.
- B. Initial fertilization: An initial fertilization with a slow release fertilizer is recommended. Fertilization regime depends on weather, location, project specific plant list.
- C. Monitor the first two growing seasons carefully. Replace dead plants to ensure full-vegetation coverage and prevent weed growth. Remove coarse or unwanted plants and tree seedlings.
- D. General maintenance: includes but is not limited to the removal of unwanted plants and the seedlings of trees, keeping the vegetation zone free from unwanted plants, visual inspection and cleaning of the outlets, and fertilization of the vegetation with a slow release fertilizer, replacing plant material that dies, plant specific irrigation.

END OF SECTION