

SPECIFICATION – VIKING ROOF GARDEN SYSTEM

1.01 ROOF GARDEN DESCRIPTION

The Viking Roof Garden incorporates either Viking Enviroclad TPO membrane or General Membrane Garden torch-on membrane system - on top of which one of three types of roof garden assemblies is installed. (An electronic leak detection system installed under the membrane is strongly recommended).

1.02 ROOF GARDEN DEFINITIONS

A. Shallow (Ultra-Extensive) Roof Garden System

Shallow Roof Garden System (growth media depth min. 100mm) is ideally suited for areas that will receive little maintenance. Recommended shallow media plants include sedums, and some herbs. Please note: This depth is too shallow for grasses. The anticipated weight above the membrane assembly is generally around 35kg per square metre, per 25mm of system depth, in a saturated state. i.e.: 100mm depth medium saturated = $35\text{kg} \times 4 = 140\text{kg} / \text{m}^2$ *

B. Medium Depth (Extensive) Roof Garden System

Medium Depth Roof Garden System (growth media depth of 100mm to 150mm) includes grasses plants such as sedums, herbs, grasses and other vegetation, which can grow in this depth of media. Un-irrigated systems can be provided without difficulty; however, drip, mist or spray irrigation systems may be required (very important for grasses) to support more diverse plant types or for installations in semi-arid climates. The anticipated weight above the membrane assembly is less than 240kg per square metre.*

C. Deep (Intensive) Roof Garden System

Deep Roof Gardens typically incorporate a planting system requiring greater growth media depth (exceeding 150mm) that requires regular maintenance, such as watering, fertilizing and mowing/weeding. A variety of plants are available including turf grass, annual or perennial flowers, shrubs and even small trees. This system typically requires a structural concrete roof deck to support the larger dead load. An irrigation system may be utilized in these assemblies.

The anticipated weight above the membrane assembly is generally greater than 240kg per square metre.*

(*See 3.02 for notes re Roof Deck Criteria)

1.03 DESIGN GUIDELINES

To facilitate drainage, a minimum roof slope of 1.5 degrees (preferably 2.0) must be provided at the waterproofing membrane level. (Maximum slope = 30 degrees - which would require erosion control).

1.04 QUALITY ASSURANCE

A. This Roof Garden System must be installed by a Viking Approved Applicator in compliance with architectural drawings as approved by Viking Roofspec. There must be no deviations made from these specifications or the approved drawings without PRIOR approval of Viking Roofspec.

B. A pre-installation meeting should be coordinated by the specifier and attended by the roofing applicator; Viking Roofspec representative; electronic leak detection expert; and other trades working on the roof system - before and after membrane installation. The purpose of this meeting is to discuss the necessity of ensuring proper membrane protection during all phases of installation and to review other applicable requirements or unusual field conditions.

C. Upon request by the Approved Applicator, an inspection will be conducted by a representative of Viking Roofspec to ascertain that the membrane roofing system has been installed according to Viking Roofspec's specifications and details. This inspection shall be coordinated prior to installing the "above membrane roof garden components" so access to the membrane is not impaired.

1.05 SUBMITTALS

For all projects, prior to project inspection by Viking Roofspec, a final shop drawing must be approved by Viking Roofspec's technical department.

1.06 WARRANTY

A. A 20-year Product Warranty is available for the complete system installed by an Approved Applicator to these specifications. The membrane system is defined as membrane, drainage board, flashings, adhesives, primers, sealants and other Viking branded products utilized in this installation. For a complete description of these products, refer to the "Products Section" or the applicable "Attachment" in the specifications.

B. The formation or presence of mould or fungi in a building is dependent upon a broad range of factors including, but not limited to, the presence of spores and nutrient sources, moisture, temperatures, climatic conditions, relative humidity, and heating/ventilating systems and their maintenance and operating capabilities. These factors are beyond the control of Viking Roofspec who shall not be responsible for any claims, repairs, restoration or damages relating to the presence of any irritants, contaminants, vapours, fumes, moulds, fungi, bacteria, spores, mycotoxins, or the like in any building or in the air, land, or water serving the building.

1.07 JOB CONDITIONS

Material Safety Data Sheets (MSDS) must be on location at all times during transportation, storage, and application of materials. The applicator shall follow all safety regulation as recommended by OSH and other agencies having jurisdiction.

Coordination between various trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent damage to the membrane. Heavily travelled areas must be protected by placing temporary protection courses to prevent damage to the membrane.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the original, unopened containers labelled with the manufacturer's name, brand name and installation instructions.
- B. Job site storage temperatures in excess of 32° C may affect shelf life of curable materials (i.e., sealants, cleaners, primers, adhesives).
- C. When liquid adhesives, primers and sealants are exposed to lower temperatures, restore to a minimum of 7° C before use. Do not store containers with opened lids due to loss of solvent that will occur from flash off.
- D. If using Viking Torch-on membranes, store in the shade and stack upright (on end) at all times.
- E. Insulation. If a Warm Roof is specified to go below the Roof Garden, polyiso panels must be stored so they are kept dry and are protected from the elements. Store on a skid and completely cover with a breathable material such as tarp or canvas. It should also be weighted to prevent possible wind damage.
- F. Growth Media should be stored under cover whenever possible to avoid direct sunlight exposure. Care should be taken not to damage the packaging to avoid leakage when hoisted to the rooftop.
- G. Roof Garden Plants should be planted quickly after delivery to the jobsite. Sedum cuttings should be used within 12 hours of arrival.

PART II PRODUCTS

2.01 GENERAL

The components of this roofing system are to be products of Viking Roofspec. The installation, performance or integrity of products supplied by others is not the responsibility of Viking Roofspec and is expressly disclaimed by the Warranty.

2.02 MEMBRANE

(i) Torch-on Membrane Option:

Viking Solvent-based bitumen primer (on top of Polyiso)– Viking Code SES299

Viking Termostar self-adhered base sheet (first layer) – Viking Code SEM300

Viking General Garden FLL Anti-root) (second layer) – Viking Code SEM630

(ii) Enviroclad Membrane Option:

Viking Enviroclad 1.5mm Grey TPO (Viking code STP510, or STP513)

Root Barrier 3.6m wide Polypropylene (Viking Code SRG002)

2.04 ROOF GARDEN COMPONENTS

A. Drainage Board system – Viking Code SRG001, consists of a high impact plastic core with “cups” and high-flow overflow drains. A non-woven 100% post-consumer recycled polyester combination filter fabric and green moisture retention mat is bonded to the retention side of the moulded core to prevent passage of particles into the water reservoirs. Designed to filter and retain water in all Roof Gardens while allowing excess water to quickly reach the drainage system. Drainage composite is 30mm thick and holds up to 86mm of rainfall per square metre. (Packaged in 1.2m x 15.2m rolls weighing 32kg – supplied cut-to-length)

B. Growth Media and Plants - Growing medium - Please note: normal topsoil alone is inappropriate for a roof garden system which requires a light, fast draining medium with high pumice content. Generally a soil layer of 10-20 cm thickness is sufficient for planting various foliage and flowering plants. A good soil mixture for roof gardening consists of a 2:1:1 split of pumice perlite, topsoil and FYM (farmyard manure) or compost. Other components could include digested fibre, expanded clay or shale, or coir.

Plants - It is necessary to choose drought resilient plants with shallow root system which will not penetrate the roof floor in long run such as grasses, sedums and aloes. At the same time, it is also advisable to grow such plants that flower at various periods of year and are very easily be maintained at roof top. Some recommended plants that thrive on Roof Garden include:

Foliage plants:- Asparagus, coleus, croton, diffenbachia, dracena, paperomias, philodendron rubber plant, etc.

Flowering plants: Seasonal flowers like Anthurhium, Asters, Balsam, Calendula, Celosia, Cosmos, Daisy, Dianthus, Gaillardia, Marigold Nasturtium, Pansies, Phlox, Verbena, Zeinia, etc., and perennial flowers like Carnation, Chrysanthemum, Dahlia, Rose, Tuberose, etc.

Fruits:- Gooseberry, strawberry, peach, pear, pineapple pomegranate, etc

Cactii and succulents:- Agave, Aloe, Kalanchoe, Opuntia, Cehpalocereus, Notocactus Nyctocereus, etc.

Vegetables like Bringal, broccoli, chillies, lettuce, tomato, etc

Caution: Do not use plants with aggressive root systems such as flaxes and bamboos.

C. Aluminum Roof Garden Edge – a 2mm thick extruded aluminum edge used to separate roof garden assemblies from adjacent walkways or perimeter stone ballast. The edging comes in 3.0m lengths and 100mm high with a 76mm flange or 200mm high with a 152mm flange.

F. Aluminum Roof Garden Drain Box – extruded aluminum drain box that is 300mm x 300mm with a welded 112mm flange to keep the drain areas clear of stone ballast or growth media. The drain box is available in 100mm or 200mm heights. Drainage holes are pre-punched around the sides. Access to the drain is provided by a removable lid.

PART III EXECUTION

3.01 GENERAL

3.01 ROOF DECK CRITERIA

Proper decking shall be provided by the building owner. The building owner or its designated representative must ensure that the building structure is investigated by a registered structural engineer to assure its ability to withstand the total weight of the specified roofing system, as well as construction loads and live loads, in accordance with all applicable codes. The specifier must also designate the maximum allowable weight and location for material loading and storage on the roof.

Defects in the roof deck must be reported and documented to the specifier, general contractor and building owner for assessment. The Approved Applicator shall not proceed unless the defects are corrected.

3.03 SUBSTRATE REQUIREMENTS

The substrate must be dry, relatively smooth and free of protrusions, debris, sharp edges or foreign materials and must be free of accumulated water, ice and snow. Cracks or voids in the substrate greater than (6 mm) must be filled with a suitable material such as Holdfast Gorilla Grip.

3.04 WATERPROOFING INSTALLATION

Before beginning installation, refer to the applicable Material Safety Data Sheets, OSH safety requirements, and Technical / Product Data Bulletins for cautions and warnings.

- A. ILD – Electronic leak detection installation on the insulation surface.

- B. (i) Torch-on Membrane Installation option - Follow Viking Roofspec's two-layer torch-on specifications (including surface preparation procedures) and membrane positioning,
(ii) Enviroclad Membrane installation option - - Follow Viking Roofspec's Enviroclad specifications (including surface preparation procedures) and membrane positioning,
- C. Aluminium components - These must be positioned and secured around all drains with Easy Paste before the drainage board is installed
- D. Root Barrier (Installed on top of Enviroclad membrane option) – This weldable polypropylene sheet is loose-laid on the waterproofing layer and dressed up the parapets and then splice-taped around the tops of the parapets. All seams are to be heat welded. Where the root barrier meets the already-installed aluminium components, it is to be splice taped to the membrane surface and then overlay taped using SET153.
- E. G4 Drainage board – cover the entire roof with drainage board – (Position additional drainage composite rolls next to each other with green moisture retention mat butted against the long side. Once in place, flip 150mm retention mat flap over the first drainage composite. For runs of drainage board exceeding 15m in length, peel back both fabrics approximately 76mm on the adjacent ends of the rolls and insert two rows of the “cups” into the cups of the abutting roll. This locks the rolls together and does not allow for passage of growth media directly onto the waterproofing membrane.

NB: Walls, curbs, skylights and all other penetrations through the membrane must be flashed in accordance with Viking Roofspec's published specifications/details for the applicable membrane specified. Refer to Roof Garden Typical Details.

Flashing heights shall be greater in height than the specified depth of the Roof Garden assembly

Roof Drains

Drains should be Aquaknight drains (Viking code SDM049). As mentioned, these are to be covered with Aluminium Drain Box or a perforated drain box by others with removable lid (at the growth media surface height) for inspection purposes. 25-35mm nominal diameter rounded river washed gravel is applied around the drain box a minimum 450mm to promote drainage. Refer to Roof Garden Typical Details

3.05 ROOF GARDEN INSTALLATION

Growth Media

- a. If possible, hoist growth media in sacks by crane to the roof area that is receiving the Roof Garden.
- b. Distribution of the growth media shall be directly over the roof from sacks that are lowered by crane 600mm to 1200mm above the drainage board composite.

c. Slit the bottom of the sack with a knife or other cutting device to dispense the growth media directly over the drainage composite or into wheelbarrows for transportation to difficult access areas.

Caution: Location points for distribution of growth media must not overload the structural capacity of building.

Caution: Care must be taken when distribution of growth media is during windy conditions to limit potential scouring of media. (Coir matting can be commissioned in exceptionally windy areas). If growth media is not used on the day of arrival, product should be stored under a tarp or other opaque cover to prevent direct exposure to sunlight and moisture.

3. Plants

a. Sedum Cuttings

- i. Broadcast sedum cuttings by hand with a coverage rate of 0.5 kg per m² (Ensure the roof is more than 90% covered)
- ii. Immediately water the assembly until the system is saturated
- iii. Irrigate the Roof Garden for a minimum of 60 days following installation

4. After installation of Roof Garden Components

Irrigate the Roof Garden with a lawn sprinkler, hand sprayer, or with a designed irrigation system until saturation to the point of runoff.