



Pioneer in Green Roof Technology

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# Specification - Xero Flor® XF301 Pre-cultivated Green Roof System Enhanced Water Retention Buildup

## PART 1 GENERAL

### 1.1 Summary

This document is to be included as a separate section in **DIVISION** \_\_\_\_\_. It is intended as a guideline for materials function and assembly instruction. The specific project design is subjected to modification as needed for each specific project, such as increasing the water retention capability of the system as permitted by the structural load bearing capacity.

### 1.2 Definitions

- A. Root Barrier: A water impermeable, flexible layer below the green roof system that serves as protection against root encroachment into the underlying roof components.
- B. Drainage/Filter: A composite material that creates sufficient space below the vegetated and water layers to permit unrestricted movement of excess water to roof drains while restricting particulates from clogging the drainage path.
- C. Water Retention Mineral Wool Blanket: A mineral wool roll that helps to contain particulate materials, retain water for plant use and increase water retention capacity of the green roof system.
- D. Pre-cultivated Vegetation Mat: A thin combination of plant material, planting substrate, and synthetic fabric carrier. Pre-cultivated mats are harvested from the field fully vegetated and delivered to the installation site as sheets or rolls.

- E. Growing Medium: A low-organic/high-mineral composition growing mix composed of porous aggregate, sand and compost.

1.3 Related Sections

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1.4 Submittals

The manufacturer shall provide a cross section of the green roof system to the architect / builder / installer detailing the components comprising the Xero Flor<sup>®</sup> system

1.5 Delivery, Storage, and Handling of Material

- A. Pre-cultivated plant material shall be delivered in such a manner as to preserve the quality of the plants. Truck delivery will be conducted in a manner to protect the vegetation mats from temperature or wind damage. For transport times less than 1 day, a closed or open trailer may be used. For longer duration transport times, vegetation mats shall be delivered in a climate controlled trailer (e.g. refrigerated container). Upon arrival, the mats shall be immediately off-loaded, plastic wrap removed (if used), and installed within 12 hours. If timely installation is not achievable, then a holding area shall be reserved to unroll and store the mats until transport to the roof and installed.
- B. Non-living components such as root barrier, drainage mat, water retention fleece and mineral wool blanket shall be kept dry and protected from the elements (e.g. cover with a water-resistant tarp) while storing on site.

1.6 Vegetative Coverage Guarantee

The vegetation shall be sufficiently pre-established to provide a minimum of 70% vegetation coverage at the time of installation and minimum of 90% coverage after the second full growing season.

## PART 2 PRODUCTS

### 2.1 XF112 Root Barrier

A low density polyethylene sheet to be installed on top of the roof membrane and below the other green roof components. It is certified to protect the roof membrane against root penetration.

### 2.2 XF108 Drainage/Filter

A layer of flexible, non-woven, entangled polymeric filaments with a perforated, geotextile filter fabric bonded to one side.

### 2.3 XF107 Water Retention Mineral Wool Blanket

A blanket made of non-combustible mineral wool with a water-saturated weight of approximately 23.9 kg/m<sup>2</sup> (4.8 lb/ft<sup>2</sup>).

### 2.4 XF301 Pre-cultivated Vegetation Mat

A textile-based vegetation carrier of lightweight fleece sown to polymer entanglements bonded to a geotextile fabric, filled with a Xero Terr<sup>®</sup> growing medium, and pre-cultivated with an even layer of low-profile, drought-tolerant vegetation, with a water-saturated weight of approximately 37.0 kg/m<sup>2</sup> (7.5 lb/ft<sup>2</sup>).

### 2.5 XF200 Xero Terr<sup>®</sup> Growing Medium

A propriety mixture of lightweight mineral based materials and organic matter formulated for green roof planting, with a water-saturated density of approximately 1880 kg/m<sup>3</sup> (3162 lb/yd<sup>3</sup>).

### 2.6 Irrigation (if necessary)

An outlet or other means of supplying water to the roof with sufficient pressure is required. Irrigation shall be applied during the first 2 weeks after installation depending on the climatic conditions. Periodic irrigation is recommended during the hottest months of the establishment period (e.g. first and possibly second growing seasons after installation) until the roots have grown into the water retention mineral wool blanket. Irrigation is also recommended during extreme drought. The method of supplying irrigation may vary with regard to removable or permanent piping, rotary heads or drip irrigation, or other irrigation technologies, as well as the irrigation schedule, and are to be determined by the architect, contractor, facility manager and/or the manufacturer.

## PART 3 EXECUTION

### 3.1 General

All green roof system components, including irrigation if specified, are to be installed by certified contractors with demonstrated experience and project references. The various layers shall be installed in such a manner as to not damage or disturb any previously installed roofing components. Installing the system in any manner inconsistent with manufacturer guidelines voids all guarantees and warranties. Contact a Xero Flor® Canada representative for guidance if needed.

### 3.2 Inspection

- A. Underlying roof components (deck, vapour barrier, insulation, waterproofing membrane, etc.) shall be installed and tested according to manufacturer guidelines. The surface of the roof shall be swept free of debris prior to installing the green roof system.
- B. The roof structure must be approved to support the water saturated weight of the green roof which is a minimum of 62.19 kg/m<sup>2</sup> (12.57 lb/ft<sup>2</sup>)
- C. The roofing system must be tested for continuity (e.g. flood test or EFVM test) and certified to be watertight prior to the green roof installation.

### 3.3 Root Barrier

The root barrier is loose-laid and shall be installed with a minimum of 30 cm (12") overlap. The ends of root barrier rolls also need to be overlapped. Staggering of adjacent rolls to avoid creating a seam perpendicular to the length of the roll is optional. The root barrier rolls shall be installed working out from the drains. Each subsequent roll shall overlap the previous roll by 30 cm (12") in shingle fashion to facilitate water flow towards the drains and minimize water seepage between the rolls.

### 3.4 Drainage

Install the water retention fabric with the polymeric entanglement facing down and geotextile fabric surface facing up. One edge of the roll has a 10 cm (4") extension of geotextile material, which is designed to overlap the adjacent roll.

### 3.5 Water Retention Mineral Wool Blanket

Install the water retention mineral wool blanket on top of the drainage tightly butted against one another (i.e. no gap or overlap) with either side facing up. Adjacent rolls

shall also be butted against one another but offset by half length of the roll during installation to avoid alignment of end seams across rows.

### 3.6 Pre-cultivated Vegetation Mat

- A. Immediately prior to installation of the vegetation mat layer on top of the mineral wool blanket, all base component layers must be thoroughly saturated with water. Failure to saturate green roof system base layers will result in severe stress to the root system and harm to the vegetation mat.
- B. Pre-cultivated vegetation mats are supplied to the site either in rolls or in flat sheets and with a minimum of 70% vegetation coverage. Vegetated mats are cultivated using plant seeds and stem cutting of a mixture of succulent species. The relative proportion, final makeup, and appearance of individual species will vary among individual mats within a shipment and after plant community development in a roof installation.
- C. Each vegetation mat section has a lightweight fleece affixed to the mat underside, which is offset by approximately 10 cm (4") creating an exposed strip to be overlapped by the adjacent vegetation mat. Each row of adjacent vegetation mats should be offset by half the length of an individual mat to avoid alignment of end seams across rows.
- D. Upon complete installation of the mats, it may be necessary to redistribute and/or supplement the substrate to ensure even coverage across the carrier mat. In areas or along edges where substrate was lost during transport and handling, new substrate must be added to support vegetative coverage.
- E. The assembled vegetation mat system must be immediately and thoroughly watered after installation to assist with settling of individual components and to support recovery and establishment of the vegetation.

### 3.7 Irrigation (if necessary)

The installation of the irrigation system shall be carried out by a contractor with not less than two years experience in irrigation system installation.

### 3.8 Roof Edges, Drains, and Other Penetrations

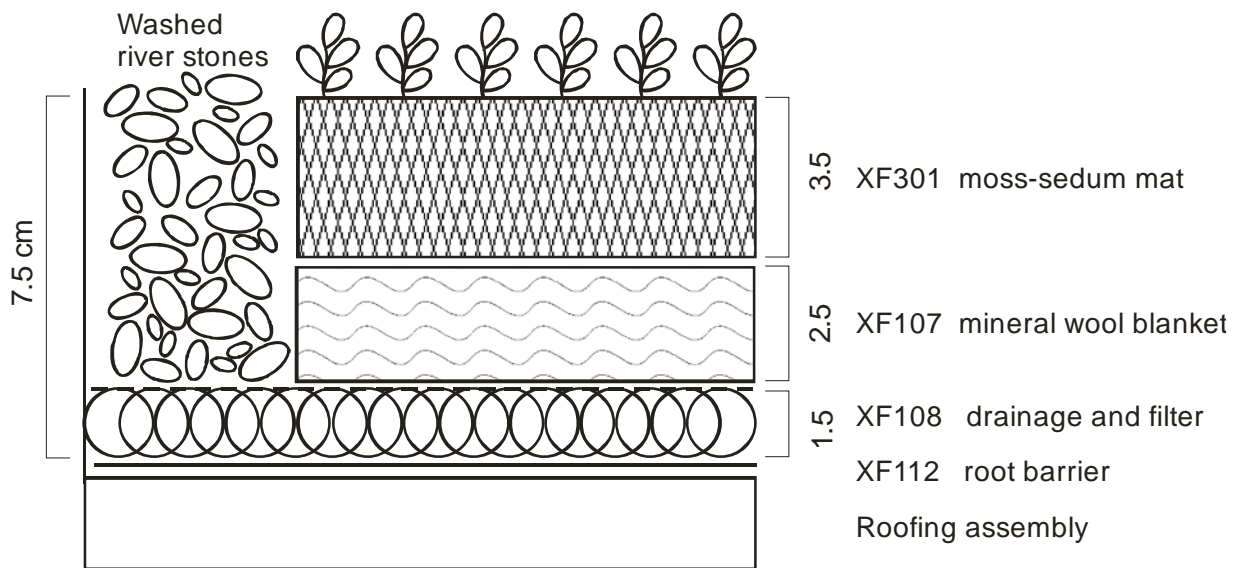
- A. The root barrier and the drainage/filter mat should be installed butting the roof edge or to a fixed boundary, such as a metal edge detail. The water retention mineral wool blanket and the vegetation mats shall be installed to the edge of the non-vegetated border (please refer to 3.8B) around the roof.

- B. A border of 10 – 50 cm (4 - 20") in width (depend on size of the vegetated area compared to the roof area) shall be kept non-vegetated between vegetation mats and the roof edge, as well as the roof penetrations, such drains and vents.
- C. Ballast such as round washed river stone of diameter between 2 and 4 cm (¾" and 1½") or concrete paver blocks are placed on the drainage/filter mat in the non-vegetated border areas.

### 3.9 Repair

The green roof system must not be adhered or otherwise affixed to the constructed roof in any manner, thereby allowing access for roof repairs or modifications by rolling back or removing the vegetation system components.

#### XF301 Green Roof System - with XF107 mineral wool blanket



Saturated Weight = 62.19 kg/m<sup>2</sup>  
Water Retention = 40.01 L/m<sup>2</sup>