

6.2.8 Green Roofs

PURPOSE & DESCRIPTION

Green roofs are multi-functional roofing systems that provide significant economic and environmental benefits. Green roofs mitigate the impact of urban development by **managing stormwater, reducing building heat absorption, and creating valued green space**. Filtrex[®] GrowingMedia[™] may be utilized as an important component of the green roof soil media for a successful green roof installation.

The green roof GrowingMedia may be used as: 1) the growing media component of the green roof system; or, 2) the growing media component + mesh containment system using Filtrex GroSoxx[®].

APPLICATION

Green roof systems can have a variety of objective applications including: storm water runoff reduction, storm water pollutant reduction, thermal buffering of the building envelope to save energy in cooling and heating, creation of urban wildlife habitat, creation of human recreational green space, air pollution mitigation, and/or mitigation of heat island effects in urban areas.

Green roof systems have been used in Europe for centuries, the first systems appeared as grass or sod roofs that provided thermal insulation in Northern Europe. The engineered green roof systems we use today began to appear over thirty years ago in Germany. Today they are widespread throughout Europe and are becoming common throughout the United States.

All green roof systems utilize the following components (see Figure 8.1):

- High-quality impermeable waterproofing membrane covering the roof structure.
- Drainage layer.
- Lightweight growing medium layer.
- Vegetation.

There are many commercially available green roof systems that vary only slightly. Some systems utilize a drainage layer that unrolls into one continuous cover over the waterproofing while other systems utilize interlocking trays or grids that are combined to create a continuous drainage layer. Additional components, such as root barriers, are also used in some systems.

Green roofs may be divided into two broad categories, intensive and extensive. Intensive green roof systems generally consist of a deep (6 in+, 150mm+) soil layer and vegetation that may include groundcovers, turf grass, shrubs and trees.

Extensive green roof systems have a shallow (1-6 in, 25-150mm) soil layer and only hardy, drought-tolerant groundcover vegetation. Extensive systems are less expensive, lighter weight, lower maintenance and more common than intensive green roof systems.

Green roof systems may be installed during new building construction or retrofitted onto an existing building. Extensive green roof systems are feasible on roofs with up to a 30° slope. The key consideration for extensive systems is whether the roof structure is adequate to hold the weight of the green roof. Extensive green roofs can weigh 12-50 lbs/square ft. (59-244 kg/square m), and intensive roofs often weigh over 50 lbs/square ft (244 kg/square m). Consult a structural engineer to verify the roof and building structure is adequate before installing any green roof system.

Green roof soils are typically engineered to be very lightweight.

They are primarily made of inorganic components such as expanded slate and shale, and extruded clay and perlite, which provide volume and rooting structure with little additional weight. Mixing a small percentage of GrowingMedia into the green roof system soil media will provide the nutrients and water holding capacity necessary for plant growth.

Extensive green roof systems are specifically designed to be low-maintenance. Typical maintenance procedures include: irrigation to establish vegetation, semi-annual inspection and removal of invasive weeds.

Rainfall Absorption/Runoff Reduction

While green roof systems can absorb between 50 and 90% of total rainfall, increasing the organic matter content of the soil media by increasing the inclusion rate of GrowingMedia will increase the rainwater absorption and initial abstraction (Ia) properties of the green roof soil media.

It is important to understand that many green roof plants, including sedums, do not thrive in organic rich soil media. If rainfall absorption/runoff reduction is one of the key design objectives, plant material selection may need account for organic matter tolerance.

For every ½ in (15mm) of GrowingMedia added to the green roof soil media, it will hold approximately 8 cubic ft (0.2 cubic m) of water per 1000 sq. ft (93 sq m), or 360 cubic ft/ac (26 cubic m/ha). Alternatively, GrowingMedia typically holds approximately 1.6 oz (45 g) of water per 3.6 oz (100 g) of GrowingMedia (dry weight); 1 gal (0.004 cubic m) of water per 20 lbs (9 kg) of GrowingMedia (dry wt) or per 30 lbs (14 kg) of GrowingMedia (wet wt). This equates to approximately 40 gal (0.15 cubic m) of water per cubic yard (0.76 cubic m) of GrowingMedia and 5,400 gal (722 cubic ft, 20 cubic m) of water per acre inch (0.01 ha meter, 103 cubic m) of GrowingMedia, and 10,800 gal (1444 cubic ft, 41 cubic m) of water for a 2 in (50mm) GrowingMedia. An acre inch (0.01 ha meter) of GrowingMedia requires approximately 135 cubic yards (103 cubic meters) of material.

INSTALLATION

Installation should follow the manufacturer's specifications for the specific system being installed.

Green Roofs may be manufactured and installed on-site using a blower truck, Filtrex FX Machine, or delivery of pre-manufactured system on pallets to jobsite. The project designer shall specify placement of system. Green roof soil media and GrowingMedia may be installed using a blower truck in most situations. Green roof vegetation should be installed soon after soil installation.

INSPECTION & MAINTENANCE

Inspection and maintenance should follow the manufacturer's specifications for the specific system being installed.

In general, it is recommended that inspections be performed at least semi-annually to check to make sure the vegetation is healthy and monitor for invasive weeds. GroSoxx should be inspected to make sure UV exposure is not weakening the containment system.

ADDITIONAL INFORMATION

For other references on this topic, including additional research reports and trade magazine and press coverage, visit the Filtrexx website at filtrexx.com

Filtrexx International, Technical Support
877-542-7699 | www.filtrexx.com | info@filtrexx.com
Call for complete list of international installers and distributors.

the branch & leaf logo®, EnviroSoxx®, Filtrexx®, Filtrexx SiltSoxx®, GreenLoxx®, GroSoxx®, and the color GREEN®, are Registered Trademarks used by Filtrexx International.

CECB™ [Compost Erosion Control Blanket], CSWB™ [Compost StormWater Blanket], DitchChexx™, EdgeSaver™, FilterCell™, FilterMedia™, FilterSoxx™, GrowingMedia™, InletSoxx™, LivingWall™, and Lockdown™, are Trademarks used by Filtrexx International.

Filtrexx CertifiedSM and its accompanying logo are Service Marks used by Filtrexx International.

The information contained herein may be subject to confidential intellectual property of Filtrexx International, including but not limited to US Patents 7,226,240; 7,452,165; 7,654,292; 8,272,812; 8,439,607; 8,740,503; 8,821,076; 9,044,795; 9,945,090; and 9,982,409 or Patents Pending and is the property of Filtrexx International.

Copyright 2005-2021, Filtrexx International, all rights reserved. Unauthorized reproduction prohibited. All statements, product characteristics, and performance data contained herein are believed to be reliable based on observation and testing, but no representations, guarantees, or warranties of any kind are made as to accuracy, suitability for particular applications, or the results to be obtained. Nothing contained herein is to be considered to be permission or a recommendation to use any proprietary process or technology without permission of the owner. No warranty of any kind, expressed or implied, is made or intended.

Table 8.2. Preferred Green Roof Plant List.

- *Allium schoenoprasum*
- *Delosperma nubigenum* 'Basutoland'
- *Sedum acre* 'Aureum'
- *Sedum album*
- *Sedum album* 'Murale'
- *Sedum floriferum* 'Weihenstephaner Gold'
- *Sedum kamtschaticum*
- *Sedum reflexum*
- *Sedum sexangulare*
- *Sedum spurium* 'Fuldaglut'
- *Sedum spurium* 'John Creech'
- *Sedum spurium* 'Roseum'
- *Sedum spurium* 'White Form'
- *Talinum calycinum*

(Source: Emory Knoll Farms, Inc.)

Figure 8.1. Typical Green Roof Cross-Section.

