



# Sarnafil Green Roof Systems



**Sarnafil®**

With the increased desire for high-performance buildings and sustainable building products, green roofs have become a “growing” roofing option in North America. A “green roof,” also known as a garden roof, vegetated roof, or eco-roof, is simply a planted area on a flat or sloped roof. While conventional gardens on a rooftop usually consist of a few pots and planters, a green roof system can cover the whole roof area with the cultivation of plant life. And, depending on the type of green roof, you can have everything from low growing grass and moss to trees, shrubs, ponds and more.

Today’s green roofs are modern versions of centuries old roofing practices. From the hanging gardens of Babylon to the sod roofs in Iceland during the Viking era, adaptations of earth-covered roofs have been around for many years.

In Europe, extensive research and testing on how to waterproof green roofs started in the early 1970’s. This work resulted in today’s time-proven waterproofing solutions, allowing durable and sustainable green roofs to “grow” in popularity. Green roofs can now be found throughout Europe, as well as in North America and across the world. Green roofs are becoming a common roofing option, turning some of our green-starved cities into a living habitat for nature.



**On the Cover:**  
*The Posner Center, Carnegie Mellon University, Pittsburgh, PA*

**Challenge:**

*Choosing a green roof system that would stand up to the challenges of this unique installation and protect the rare and historic books housed inside.*







“Green roofs are healthy, sustainable and regenerative roof landscapes that can help our environment by diminishing developmental impacts on our communities.”



## Sika Sarnafil. The benefits are growing.

**The addition of a green roof to an otherwise unused area on a building is beneficial for the surrounding environment. Initial loss of “green” space and its inherent natural processes like photosynthesis are restored; now just a few stories higher. But green roofs also have other benefits that you might not be aware of.**

**Storm-Water Retention:** During heavy rainfalls, runoff from impervious surfaces such as pavements and rooftops can cause serious problems such as sewer overflow and water pollution. Green roofs slow down the water flow by retaining up to 75% of the rainwater, thus alleviating the pressure on storm-water infrastructures.

**Reducing Energy Consumption:** Green roofs are great insulators. They can reduce peak energy demand by lowering a building's cooling costs in the summer months and heating costs in the winter months.

**Reducing the Urban Heat Island Effect:** More green roofs and fewer dark colored roofs equal a cooler city. Dark roofs retain heat while plants naturally cool their surrounding environments through evapotranspiration cycles. In cities where the ambient temperature can be up to 10 degrees hotter than the surrounding areas, green roofs can help bring the overall temperature down.

**Waterproofing Membrane Protection:** A green roof protects the waterproofing membrane from damaging UV rays, freeze-thaw cycling and repeated foot traffic, extending its lifespan. Some green roofs in Europe have lasted more than 40 years without being replaced.

**Improved Air Quality:** Green roofs filter air by absorbing and converting carbon dioxide to oxygen.

**LEED® and Green Globes:** The U.S. Green Building Council's (USGBC) LEED program and the Green Globes system were developed to assist in the design and construction of high-performance, sustainable buildings. Green roofs contribute to certification in both programs.

**Sound Insulation:** Soil and plants are effective sound insulators.

**Aesthetics:** Green roofs are visually stimulating and can make great areas for recreation and pleasure.

**Increased Property Value:** Installing a green roof can increase property value by providing a valuable building asset.

**Project**

*The Pulitzer Foundation for the Arts  
St. Louis, MO*

**Design Architect**

*Tadao Ando Architect and Associates  
Osaka, Japan*

**Architect of Record**

*Christner, Inc.  
St. Louis, MO*

**Landscape Architect**

*SWT Associates  
St. Louis, MO*

**Green Roof Installer**

*Rand Rosenthal  
St. Louis, MO*

**Waterproofing Installer**

*Bartch Roofing Company, Inc.  
St. Louis, MO*

**Sarnafil Waterproofing System**

*Sarnafil Loose Laid System, G476 Membrane*

**Project Size**

*3,640 sq. ft.*

**Owner**

*Emily Rauh Pulitzer*







▲ Phoenix Zeppelin, Czech Republic

## Sika Sarnafil. Because performance is mandatory.

### Why Choose Sika Sarnafil?

Performance over time is the only true test of a waterproofing system's quality. Sika Sarnafil has been waterproofing green roofs and other landscaped areas across Europe for over 35 years and in the United States for over 25 years. With over 15 billion square feet of roofing and waterproofing membrane installed worldwide, architects, specifiers and building owners know they can depend on Sika Sarnafil for proven products and system performance.

When you specify a Sarnafil Green Roof, you get more than watertight security; you get peace of mind knowing you made the

right choice. The Sarnafil G476 membrane is specially designed for sub-grade environments, compounded to remain watertight in extreme conditions, including constant dampness, ponding water, high and low alkaline conditions, and exposure to plant roots, fungi and bacterial organisms.

### Extensive and Intensive

*There are two Green Roof categories: Extensive and Intensive.*

Extensive green roofs are generally lower in weight and cost and require less plant maintenance. With only a few inches of soil, extensive green roofs typically support plants

that are tolerant of high heat, drought, wind and frost like grasses, wildflowers and moss. Extensive roofs are often used in areas that will not be subject to regular traffic.

Intensive green roofs are generally heavier, cost more and require more maintenance. However, because the soil is deeper, intensive green roofs can accommodate trees, shrubs, bushes, and vegetable gardens. It is not uncommon to see an intensive green roof used for recreational purposes.



Life Expressions Chiropractic Center, Sugarloaf, PA

### Extensive

- Growth medium 1- 6 inches
- Lightweight 12-35 lbs/sf
- Low growing plants
- Low maintenance
- Low water requirements
- Usually non-accessible
- Slopes up to 30 degrees



St. Louis Children's Hospital, St. Louis, MO

### Intensive

- Growth medium 6 or more inches
- Heavier weight over 35 lbs/sf
- Trees, shrubs, gardens, and more
- Higher maintenance
- Irrigation usually necessary
- Designed for human recreation
- Only used on low slopes







▲ Oaklyn Branch Library, Evansville, IN

## Sika Sarnafil. Designed to meet your needs.

Sika Sarnafil has green roofs systems for use on both concrete and metal deck applications, providing the flexibility to choose the system that best fits your building's design criteria.

### Sika Sarnafil Over Concrete Decks

#### ❖ Adhered System

When your building demands absolute system integrity with maximum watertight security, Sika Sarnafil's adhered system is for you. The system uses the robust Sarnafil G476 Self-Adhered (SA) membrane –

a composite sheet comprised of the heat-weldable G476 waterproofing membrane with a closed-cell foam backing. The foam backing is factory-coated with a pressure sensitive adhesive and is protected by a plastic release liner which is removed during installation.

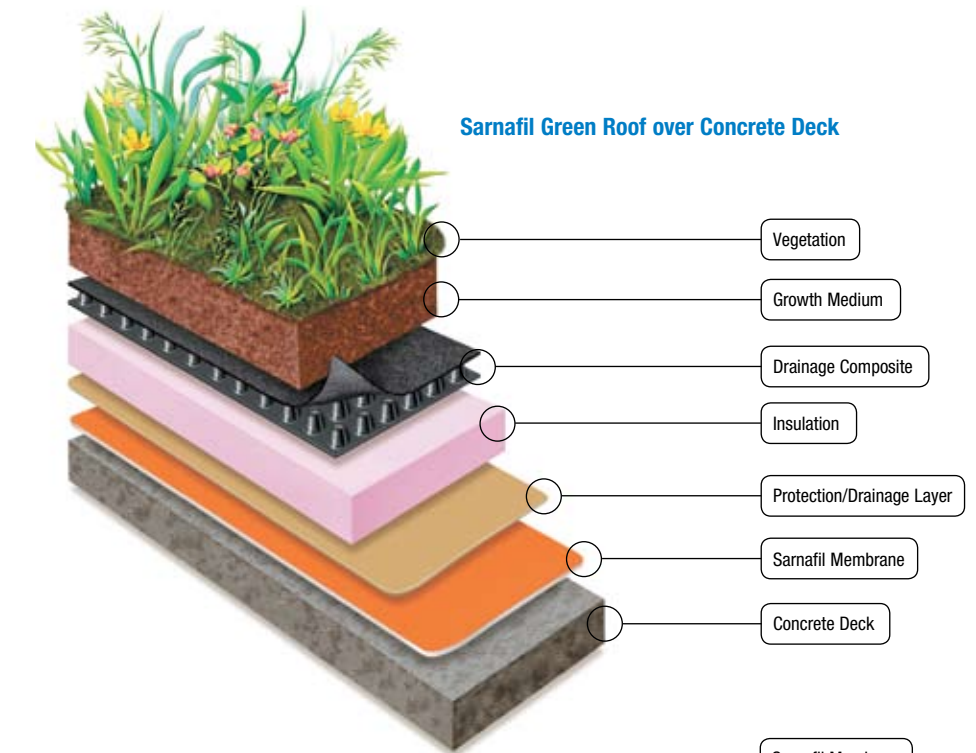
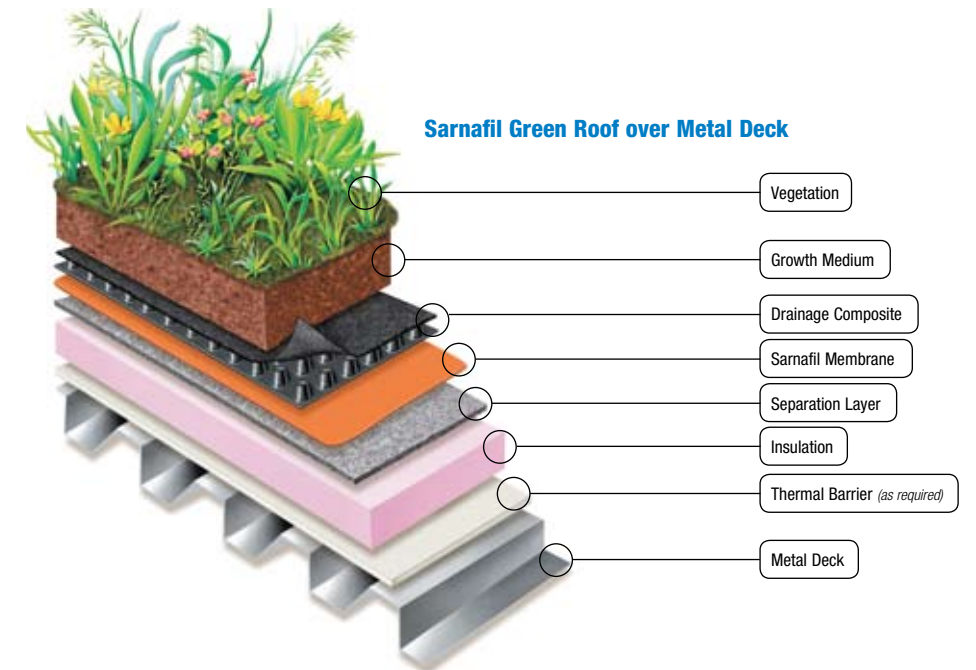
Sarnafil G476 SA combines the time-tested, proven performance of Sarnafil G476 waterproofing membrane with the added security of an adhered sheet system. G476 SA provides peace of mind for specifiers and owners who value the benefits of an adhered system and thermoplastic technology.

The flexible foam backing layer conforms to minor irregularities in the substrate and provides a cushion for the G476 waterproofing membrane. The pressure sensitive adhesive provides a tenacious bond to the substrate mitigating potential water migration under the membrane. The integration of G476 membrane with a foam backing layer and pressure sensitive adhesive eliminates the need for a field installed separation layer and adhesives. This 'all-in-one' product increases applicator productivity and helps keep the project on schedule. Sarnafil G476 SA also doesn't require hot asphalt kettles or flammable adhesives, improving worker and job site safety.

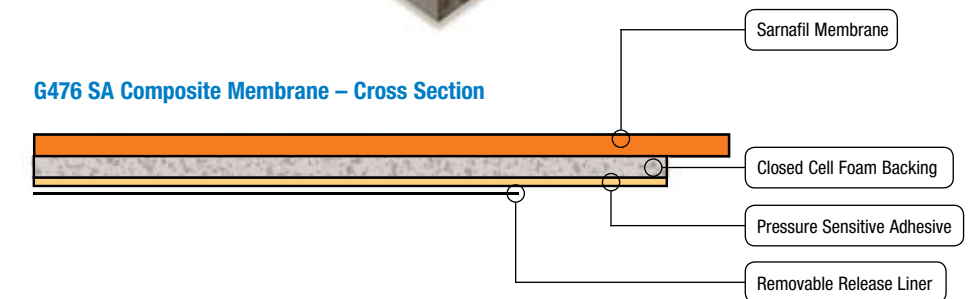
Sarnafil G476 SA is best suited for new construction. It can also be used on certain renovation projects where the old waterproofing system can be removed, or where a new concrete topping slab is placed over the structural deck.

#### Advantages:

- Robust, factory-manufactured composite sheet
- Conforms to minor surface irregularities and mitigates water migration under the sheet
- Improved applicator productivity and job site safety



### G476 SA Composite Membrane – Cross Section



Note: Above drawings are for illustrative purposes. Consult with Sika Sarnafil representative and printed specifications and details for project specific requirements.







**Project**

St. Louis Children's Hospital  
St. Louis, MO

**Architect**

Cannon Design  
St. Louis, MO

**Landscape Architect**

Edaw Inc.  
Fort Collins, CO

**Green Roof Contractor**

McGrath and Associates Inc.  
St. Louis, MO

**Green Roof Installer**

A Waldbart and Sons Nursery  
Hazelwood, MO

**Waterproofing Installer**

Bi-state Roof Systems Inc.  
St. Louis, MO

**Sarnafil Waterproofing System**

Sarnafil Adhered and Grid System  
G476 Membrane

**Project Size**

8,000 sq. ft.

**Owner**

BJC Health Systems



▲ Chicago City Hall, Chicago, IL

❖ **Grid System**

For renovation projects where the substrate is contaminated or removal of the existing waterproofing system is not practical, Sika Sarnafil offers the grid system. The grid system combines all of the advantages of a loose-laid membrane installation with the added security of adhered membrane grid strips. The grid strips compartmentalize the waterproofing system into smaller areas, effectively limiting the scope of vegetated cover removal if a problem develops. Optional control drains can be installed in each grid area as an active monitoring and alerting mechanism. The drain opening can be used as an injection port to facilitate repair without vegetated cover removal. And, because grid strips are only adhered to small portions of the roof, deck preparation and removal of existing waterproofing system are minimized.

**Advantages:**

- Adhered grid strips act as a sub-membrane waterstop
- The grid system can be installed economically, due to installation, over existing waterproofing systems with minimal deck preparation
- Optional control drains allow active system monitoring and facilitate repairs

**Sika Sarnafil Over Metal Decks**

❖ **Loose-Laid System**

The most common design approach over a metal deck is to build a 'conventional' loose-laid roof assembly under the vegetated cover.

The rigid insulation material is typically extruded polystyrene (XPS), which is resistant to moisture absorption and has been used in green roof applications for decades. It is available in 40 psi, 60 psi, and 100 psi compressive strengths so it will not crush during construction or under load after placement of the vegetated cover.

Local building codes usually require the installation of a rigid, fire-tested thermal barrier over the metal deck prior to installing the XPS insulation board. A separation felt is installed over the XPS prior to installing the waterproofing membrane.

Rigid isocyanurate foam insulation may be used in this configuration. The benefit is it does not require a thermal barrier. However, since isocyanurate foam is typically manufactured with a 20 or 25 psi compressive strength, rigid hardboard should be installed over the isocyanurate insulation to protect it from damage and potential long-term creep from the weight of the vegetated cover. The Sarnafil G476 waterproofing membrane is installed over the hardboard.

Both XPS and isocyanurate insulation are available in tapered designs to enhance drainage.

After the Sarnafil G476 is installed, it is covered by a drainage composite or protection layer followed by the vegetated cover.

**Advantages:**

- Insulation is protected from the elements
- Insulation will not float since it is under the waterproofing membrane
- Allows the designer to create slope in the roof assembly







▲ Howard Hughes Medical Institute, Janelia Farm Research Campus, Ashburn, VA

## Quick Reference Guide

### Green Roof Systems provide...

**Storm Water Retention:** Green roofs greatly lessen erosion and storm water burden on sewer systems

**Reduction in Energy Consumption:** Green roofs can reduce peak energy demand by lowering a building's heating and cooling costs

**Reduction in the Urban Heat Island Effect:** Dark roofs hold onto the heat while plants naturally cool their surrounding environments

**Waterproofing Membrane Protection:** A green roof protects the waterproofing membrane from damaging UV rays and freeze-thaw cycling, extending its lifespan

**Improved Air Quality:** Green roofs filter air and produce oxygen

**LEED and Green Globes:** Green roofs contribute to certification within these programs

**Sound Insulation:** Soil and plants can be great sound insulators

**Aesthetics:** Green roofs are visually stimulating and can make great areas for recreation and pleasure

**Increased Property Value:** Installing a green roof can increase property value by providing a valuable building asset

### Sarnafil Green Roof Systems provide...

#### Proven Performance

- An industry veteran, Sika Sarnafil has produced more than 15 billion sq. ft. of membrane worldwide
- The same basic membrane formulation that has protected buildings for more than 40 years
- Material that consistently ranks as the highest quality thermoplastic membrane in independent testing

#### Watertight Integrity

- Permanent watertight flashings and details with hot-air welded seams and flashings
- The G476 membrane is designed for sub-grade environments such as constant dampness, ponding water, high and low alkaline conditions, exposure to plant roots, fungi and bacterial organisms

#### Milestone Management

- Proven Materials – Sika Sarnafil's manufacturing process uses only the highest quality materials to produce a monolithic, non-laminated membrane that offers excellent waterproofing and dimensional stability
- Expert Assistance – We're involved at each major milestone, offering design assistance to architects and specifiers if needed
- Skillful Workmanship – We sell directly to a select group of trained, authorized applicators – only the best are invited to join our team

### Warranty Options

Sika Sarnafil offers several types of warranties, including 5, 10, 15 and 20 year durations:

- Waterproofing Membrane only
- Waterproofing Labor and Material (Standard)
- Single-Source warranty\*

\* Sika Sarnafil offers a single-source warranty for extensive green roof assemblies that includes overburden removal, waterproofing and vegetated cover.

## Sika Sarnafil. Integrated system solutions.



### Sarnafil Milestone Management

The Sarnafil Milestone Management™ process integrates proven materials, skilled workmanship, and expert assistance into every phase of every project for comprehensive quality control. The result: peace of mind for architects, engineers, owners, and occupants alike.

### Single-Source Responsibility

Sika Sarnafil offers a single-source warranty program for extensive green roof systems (less than 6" vegetated cover). The integration of Sika Sarnafil's waterproofing expertise with the vegetated cover know-how simplifies the design and project delivery process. Specifications, construction documents and trade coordination are no longer difficult tasks. Contact your Sika Sarnafil representative for specific requirements.

### 'Phased' Green Roof Design Option

Sika Sarnafil also offers a 'phased' green roof design option if the vegetated cover installation is planned months or years after the roof installation. This is especially helpful for clients who want a green roof, but the budget may not allow for it. The solution is to install a Sarnafil roof system that allows for a vegetated cover down the road. The roof system will meet the requirements of an exposed roof so you don't have to worry about when the vegetated cover is placed. Please contact your Sika Sarnafil representative for specific roofing system requirements.

### More Sika Sarnafil Benefits

Sika Sarnafil's G476 waterproofing membrane is specially designed for sub-grade environments. The G476 membrane is available in a range of thicknesses to match your application, overburden type and specific project requirements. Highly puncture resistant, its bright orange color makes it easy to identify and inspect to maintain high levels of quality assurance and control during installation.

### Root Resistance

Many waterproofing membranes are not resistant to root penetration. They fail due to root infiltration into the field seams and flashings. Sarnafil membranes are inherently root and algae resistant and require no additional barriers to be added to the system. Sarnafil membranes have passed the most stringent European tests for root resistance including both the German FLL and the Swiss SIA 280 standards. The FLL standard test exposes the waterproofing membrane to 4 years of accelerated root growth.

### Hot-Air Welded Seams and Flashings

Faulty seams and details are a common source of leaks in green roofs. Some waterproofing membranes use sealants, adhesives or tapes to secure the seams, but because Sika Sarnafil's membrane is thermoplastic, seams and flashings are welded together using Sika Sarnafil's automatic hot-air welder, the Sarnamatic. When welded together, the sheets become one monolithic layer of material impervious to moisture infiltration.

**Call 1-800-576-2358 to request a FREE Green Roof Design Guide.**



## Sika – Your Local Partner with a Global Presence

Sika is a globally active company in the specialty and construction product and chemicals businesses. It has subsidiary manufacturing, sales and technical support facilities in more than 70 countries around the world.

Sika is THE global market and technology leader in waterproofing, sealing, bonding, dampening, strengthening and protection of buildings and civil engineering structures.

Sika has more than 12,000 employees worldwide and is therefore ideally positioned to support the success of its customers.



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### Serving Your Needs Worldwide from Roof to Floor



Sika Corporation can assist you with your construction needs from roof to floor. Call 1-800-576-2358 to learn about our complete building system solutions.

**Our most current General Sales Conditions shall apply.  
 Please consult the Product Data Sheet prior to any use and processing.  
 ISO 14001: 2004-Compliant**

