



# ROOFING

## Green Roof Systems

BUILDING TRUST  
CONSTRUIRE LA CONFIANCE



# GREEN ROOFS. THE BENEFITS ARE GROWING.

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, herbs and sedums to trees, shrubs 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.

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:**

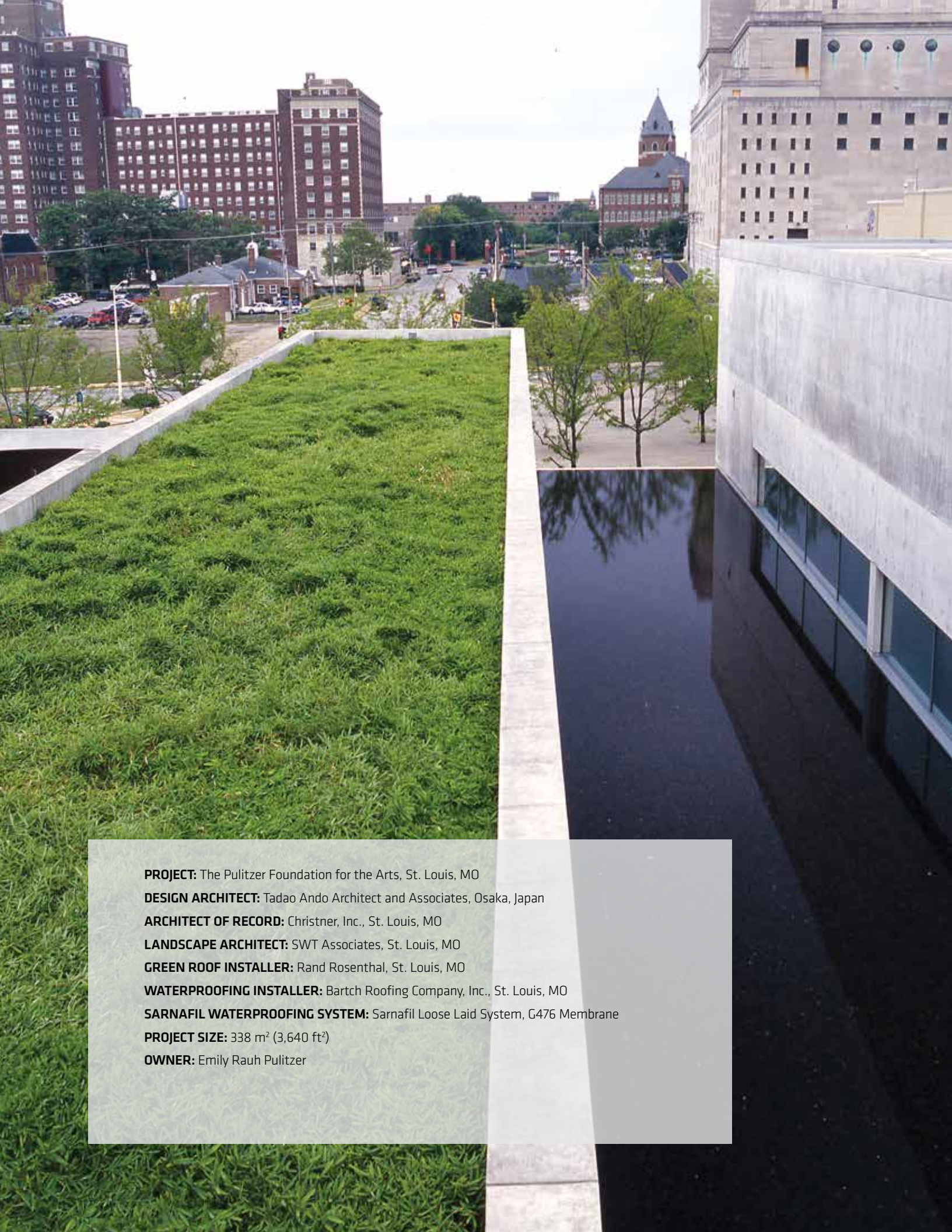
Soil and plants are effective sound insulators.

## **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:** 338 m<sup>2</sup> (3,640 ft<sup>2</sup>)

**OWNER:** Emily Rauh Pulitzer

# SARNAFIL. BECAUSE PERFORMANCE IS MANDATORY.

## WHY CHOOSE SARNAFIL?

Performance over time is the only true test of a waterproofing system's quality. Sarnafil-brand membranes have been waterproofing green roofs and other landscaped areas across Europe for over 45 years and in North America for over 35 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 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.

## 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 centimeters of soil, extensive green roofs typically support plants that are tolerant of high heat, drought, wind and frost like sedums, succulents and herbs. 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



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

### **EXTENSIVE**

- Growth medium 25 - 150 mm (1 - 6 in)
- Lightweight 12-35 lb/sf
- Low growing plants
- Low maintenance
- Low water requirements
- Usually non-accessible
- Slopes up to 30 degrees

### **INTENSIVE**

- Growth medium 150 mm (6 in) or more
- Heavier weight over 35 lb/sf
- Trees, shrubs, gardens, and more
- Higher maintenance
- Irrigation usually necessary
- Designed for human recreation
- Only used on low slopes



# SARNAFIL. DESIGNED TO MEET YOUR NEEDS.

Sika 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.

## SARNAFIL OVER CONCRETE DECKS

### Adhered System

When your building demands absolute system integrity with maximum watertight security, Sika'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.

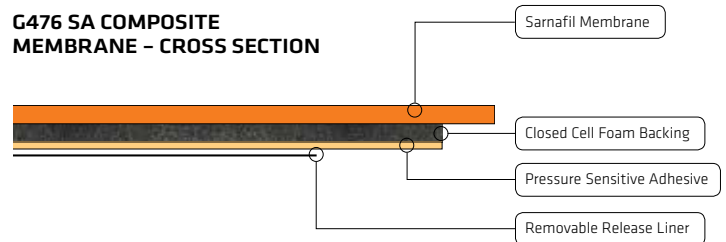
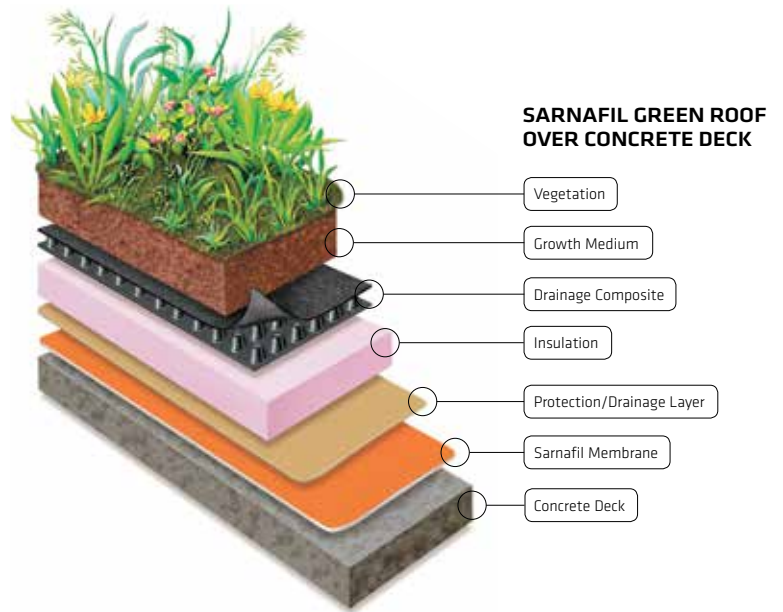
Sarnafil G476 SA combines the time-tested, proven performance of Sarnafil G476 waterproofing membrane with the added security of an adhered sheet system. G476 SA provides peace of mind for specifiers and owners who value the benefits of an adhered system and thermoplastic technology.

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




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

“GREEN ROOFS ARE HEALTHY, SUSTAINABLE AND REGENERATIVE ROOF LANDSCAPES THAT CAN HELP OUR ENVIRONMENT BY DIMINISHING DEVELOPMENTAL IMPACTS ON OUR COMMUNITIES.”

Oaklyn Branch Library, Evansville, IN





**PROJECT:** St. Louis Children's Hospital, St. Louis, MO  
**ARCHITECT:** Mackey Mitchell Architects, 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:** 743 m<sup>2</sup> (8,000 ft<sup>2</sup>)  
**OWNER:** BJC Health Systems





Chicago City Hall, Chicago, IL

## 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.

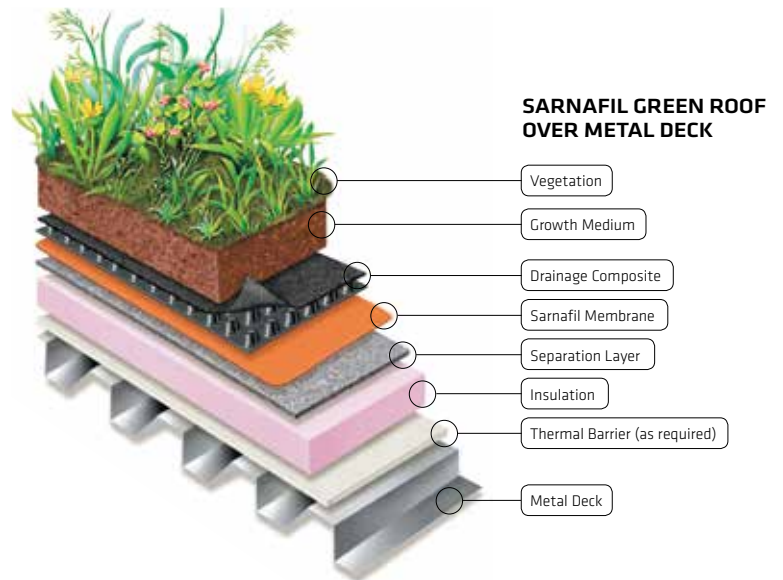
Rigid isocyanurate foam insulation may be used in this configuration. The benefit is it does not require a thermal barrier. However, since isocyanurate foam is typically manufactured with a 20 or 25 psi compressive strength, rigid hardboard should be installed over the isocyanurate insulation to protect 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 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



### Grid System

For renovation projects where the substrate is contaminated or removal of the existing waterproofing system is not practical, Sika 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 over existing waterproofing systems with minimal deck preparation
- Optional control drains allow active system monitoring and facilitate repairs

# SIKA GREEN ROOFS. INTEGRATED SYSTEM SOLUTIONS.

Sika teams with leading green roof providers and produces quality waterproofing membranes, elements essential for landscaped roof areas.

## **SINGLE-SOURCE RESPONSIBILITY**

Sika offers a single-source warranty program for extensive green roof systems (less than 150 mm / 6 in of vegetated cover). The integration of Sika'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 roofing representative for specific requirements.

## **'PHASED' GREEN ROOF DESIGN OPTION**

Sika 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 representative for specific roofing system requirements.

## **MORE SARNAFIL BENEFITS**

Sika'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 the Sarnafil membrane is thermoplastic, seams and flashings are welded together using Sika's automatic hot-air welder, the Sarnamatic. When welded together, the sheets become one monolithic layer of material impervious to moisture infiltration.

## **WARRANTY OPTIONS**

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

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

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



## **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.



Target Center, Minneapolis, MN

## 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 has produced more than 15 billion square feet of membrane worldwide
- Leader in thermoplastic membrane manufacturing expertise with more than 50 years of production history.
- 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:** The Sika 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.

# SIKA SOLUTIONS FROM ROOF TO FOUNDATION

## Roofing Systems



Sarnafil®  
Sikaplan®  
Sikalastic®

## Concrete Production



Sika® ViscoCrete®  
Sika® Plastocrete®, SikaSet®  
Sika® Air / AER<sup>CA</sup>

## Joint Sealing



Sikaflex®  
Sikasil®  
Sikadur® Combiflex

## Grouting and Anchoring



SikaGrout®  
Sikadur®  
Sika AnchorFix®

## Concrete Repair & Protection



Sika MonoTop®  
SikaTop®, SikaRepair®  
Sikagard®

## Structural Strengthening



Sikadur®, Sika® CarboDur®  
SikaWrap®  
Sika® CarboShear

## Floor & Wall Systems



Sikafloor®  
Sikagard®  
Sikagard® Duroplast

## Waterproofing Systems



SikaProof®, SikaFuko®  
Sika® Greenstreak®  
SikaSwell®, SikaFix®

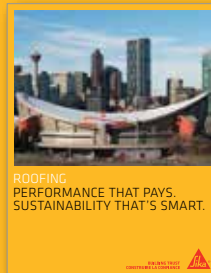
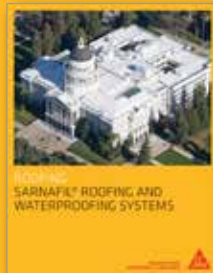
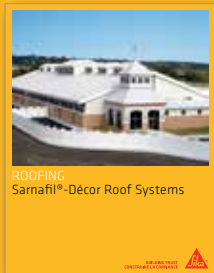
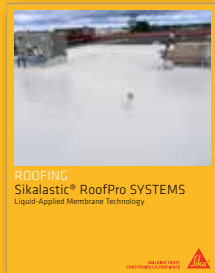
Sika Canada Inc., a member of the Sika Group, is a leader in the field of speciality chemicals for construction and manufacturing industries. Our product lines feature high quality roofing systems, concrete admixtures, mortars and resins, sealants and adhesives, structural strengthening components, industrial and decorative flooring, as well as protective coatings and waterproofing systems. Our expertise is borne out of a global presence and served by strong, local support. Sika has earned the trust of our customers for over 100 years, by delivering the highest standards of commitment and partnership.



## ADDRESSING THE CHALLENGES OF TRANSPARENCY - LEED® v4

As a leading manufacturer of specialty chemicals for the construction and manufacturing sectors, and a member of the Canadian Green Building Council (CaGBC), Sika Canada is officially engaged in the transparency process associated with sustainable construction. Environmental Product Declarations (EPD) are available for Sarnafil® G410 and S327 Membranes (Cradle-to-Grave) and Sikaplan® Adhered & Fastened Roofing Membranes (Cradle-to-Gate). For more information, contact your local Sika Technical Sales Representative.

## Also Available:



SIKA CANADA INC.  
Head Office  
601, avenue Delmar  
Pointe-Claire, Quebec  
H9R 4A9

### Other locations

Toronto  
Edmonton  
Vancouver

1-800-933-SIKA  
www.sika.ca

Certified ISO 9001 (CERT-0102780)  
Certified ISO 14001 (CERT-0102791)

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