



# SURE-FLEX™ PVC

ROOFING SYSTEMS

INNOVATION • ENERGY EFFICIENT • LONG-TERM PERFORMANCE



**CARLISLE**  
SYNTEC SYSTEMS

## About Carlisle SynTec Systems

For 50 years, Carlisle SynTec Systems has been a leading manufacturer of sustainable, dependable and energy-efficient, commercial single-ply roofing systems. With more than 15 billion square feet of its single-ply roofing materials sold and installed, Carlisle continues to offer the roofing industry's most comprehensive package of innovation, field experience, roof system design and warranties.



### MYTH

A PVC membrane with no formulation changes in the last 10, 15 or 20 years is a benefit.

### FACT

Carlisle takes even the slightest change to its products very seriously, and the measures taken to ensure product consistency, long-term performance and improved physical properties are extraordinary. The environmental, long-term performance and design demands placed on PVC membranes are substantially different from those as recently as 10 years ago.

Formulation improvements utilize the latest technological advancements to address issues such as increased UV and acid rain exposure.

Consider the developments and improvements implemented into products such as tires, surgical equipment, batteries, paint or other building materials in the last 20 years. Would consumers be better off today if they had not improved in the last 10 or 20 years?

## Why PVC Roofing?

PVC single-ply roofing first rose to popularity in Europe more than 50 years ago, and for the past 30 years, it has been a sustainable solution for low-slope roofing projects throughout the United States. Today, tens of thousands of buildings are protected by billions of square feet of PVC roofing membranes. PVC's popularity stems from its dependable, heat-welded seams, superior physical attributes and resistance to water, chemicals, grease, fire and punctures.

## Why Carlisle SynTec Systems Sure-Flex PVC?

For half a century, Carlisle has continuously pushed the envelope to create products that are easier to install while simultaneously improving rooftop performance. This emphasis on continuous improvement has led to a number of breakthroughs that are now recognized as industry standards, including factory-applied seam tape on EPDM membranes and fleece-backed EPDM, TPO and PVC membranes for improved puncture resistance.

Carlisle has taken this same proactive approach with its Sure-Flex PVC product line, offering one of the industry's broadest range of products for virtually any low-slope roofing application. Our commitment to the PVC roofing industry is evident in our breadth of product, which includes:

- 10-foot-wide membranes for fewer seams
- FleeceBACK® membranes for increased puncture resistance
- KEE-enhanced membranes for increased chemical resistance
- Polyester- and fiberglass-reinforced membranes for proper mechanically attached and fully adhered applications

## PROJECT PROFILE



**Project Name:** Smith Cove Terminal at Pier 91

**Location:** Port of Seattle in Seattle, WA

**Size:** 90,000 square feet

**System:** 60-mil Sure-Flex® PVC  
Two layers of polyiso insulation  
Steel deck

**Warranty:** 15-year total system

The Port of Seattle Terminal 91 complex, one of America's busiest ports, serves cruise lines such as Carnival®, Holland America Line®, and Royal Caribbean®. When the government built a new Terminal 91 facility in 2009, it wanted four things for its roof: a great warranty, LEED compliance, Factory Mutual approval, and above all, protection from the elements. Carlisle Sure-Flex PVC met all of the terminal's requirements. The ENERGY STAR-qualified, LEED-compliant Sure-Flex PVC membrane has a proven history of performance and durability, so the Port of Seattle can rest assured that its new facility at the gateway to the ocean will remain dry for years to come.

## Energy Efficient and Sustainable

Energy costs continue to rise, which is why the need for an energy-efficient roof system is more important than ever. A properly insulated Carlisle Sure-Flex PVC roof system can help building owners reduce their air-conditioning costs no matter where their building is located.

Carlisle's bright white, highly reflective Sure-Flex PVC membranes have been proven to save building owners thousands of dollars annually on their facilities' cooling costs. The high levels of solar reflectance inherent in these membranes help reduce air-conditioning usage, abate urban heat islands and slow the formation of smog-forming pollutants. Benefits of bright white Sure-Flex PVC membranes include:

- ENERGY-STAR® qualification
- Contribute toward LEED® credit requirements
- Cool Roof Rating Council (CRRC)-rated
- California Title 24 compliant

For buildings with visible roofs, Carlisle's gray and tan Sure-Flex PVC membranes can help with building aesthetics. These attractive colors will help complement and integrate into the building's color scheme. Custom-ordered colors are also available.

## Code Approvals

All Sure-Flex PVC membranes provide excellent wind uplift and fire-retardant characteristics, and all meet or exceed the requirements of ASTM D4434. In addition to FM and UL approvals, Sure-Flex membranes meet the requirements for Miami-Dade and the Florida Building Code as well as the International Building Code. Additional code approval information can be found on the Carlisle SynTec Systems website.



CARLISLE'S  
**SURE-FLEX**



## THE BENEFITS OF ELVALOY

Historically PVC membranes have been formulated using liquid plasticizers that make the product more flexible. Over time these plasticizers can migrate out of the membrane, leaving it brittle. In an effort to find a more stable plasticizer that also offers increased durability and permanence, as well as better long-term performance, the chemists at DuPont developed a ketone ethylene ester (KEE) plasticizer they have branded Elvaloy®. KEE, or Elvaloy, has a high molecular weight making it extremely stable and durable even under the harshest conditions.

## The Elvaloy Advantage

PVC membranes enhanced with Elvaloy KEE offer building owners a number of distinct advantages over PVC membranes with traditional liquid plasticizers. The largest benefits include:

### **Resistance to migration.**

Low-grade liquid plasticizers of the past were problematic, migrating and evaporating from the membrane over time and leaving it brittle and inflexible. Elvaloy KEE is a solid plasticizer with a high molecular weight—it does not migrate from the membrane, keeping it weldable and pliable throughout a roof system's entire service life.

### **Protection from the elements.**

For proven durability against severe weather conditions, there's nothing like PVC membrane enhanced with Elvaloy KEE. It remains flexible in the most extreme weather conditions and its remarkable toughness provides increased resistance to abrasion and tearing. KEE-enhanced PVC also provides enhanced protection against UV degradation.

### **High performance, even under duress.**

Elvaloy KEE is a durable plasticizer that enhances a roof's resistance to harmful chemicals and pollutants. It can handle the heavy-duty challenges of acid rain, harsh chemicals, industrial pollutants, oil, fats, and even jet fuel. These chemicals can extract liquid plasticizers out of standard PVC membranes, leading to premature degradation. Elvaloy-enhanced PVC membranes are more resistant to the effects of harsh chemicals, making them the ideal choice for rooftops exposed to the harshest environments.

### **Easy repairs.**

Because it remains more flexible than traditional PVC plasticizers over time, Elvaloy KEE-enhanced roofing membranes are able to be re-welded with ease years after installation if repairs need to be made.







## MYTH

| PVC is harmful to the environment.

## FACT

PVC is an extremely durable product that is mainly used in construction materials because of its versatility, energy efficiency, and long-term performance. Generally, construction materials made from PVC are in use for an extensive period of time resulting in a lengthy life cycle before they need to be replaced. Despite the fact that there is a limited supply of post-consumer PVC available, because it is still in service, tens of millions of pounds of PVC are recycled every year.

## FRS vs. Polyester Scrim Reinforcement

PVC membranes with polyester or fiberglass reinforcement have both been used with great success in roofing over the past 40 years. Due to its greater tensile strength, Polyester reinforced membrane can be used in either adhered or mechanically fastened systems, while fiberglass reinforced products are limited to adhered applications. Both reinforcements provide excellent dimensional stability, durability and contribute to superior puncture resistance.

## Long-Term Protection

Each detail of a Sure-Flex PVC roofing system is meticulously addressed by Carlisle to ensure the long-term peace of mind customers crave. Due to the excellent long-term dependability of Carlisle Sure-Flex PVC membranes, 5-30-year No Dollar Limit warranty coverage is available and can be supplemented with accidental puncture coverage.

## Warranty Options

	Sure-Flex PVC and Sure-Flex FRS Membranes					Sure-Flex KEE Membrane				
	10-Year	15-Year	20-Year	25-Year	30-Year	10-Year	15-Year	20-Year	25-Year	30-Year
50-Mil	X	X				X	X	X		
60-Mil	X	X	X			X	X	X	X	
80-Mil	X	X	X	X		X	X	X	X	X

## A Membrane for Every Specification

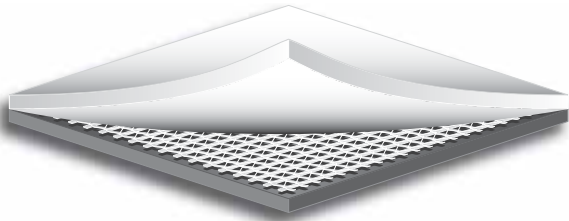
Carlisle offers more PVC membranes than other manufacturers. Sure-Flex PVC membranes are ideal for fully adhered and mechanically attached applications, and are available in a variety of colors including gray, tan and highly reflective white. Thicknesses range from 50-135 mils in sheet sizes up to 10 feet wide. **Carlisle Sure-Flex: A PVC for every specification.**

### Sure-Flex PVC

Carlisle's flagship PVC membrane, Sure-Flex PVC, is a 3-layer, polyester-reinforced membrane. Developed decades ago, Carlisle's formulation is designed for long-term performance.

#### Features and Benefits

- Wide window of weldability for ease of installation
- Long-term resistance to solar UV, ozone and oxidation
- Energy-efficient, recyclable and sustainable; contributes toward LEED credit requirements

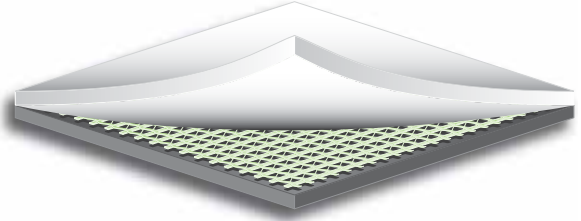


### Sure-Flex FRS PVC

Sure-Flex FRS PVC utilizes a fiberglass-reinforced scrim. This dimensionally stable scrim is fully encapsulated and is designed for fully adhered applications in all areas, especially those with extreme temperature fluctuations.

#### Features and Benefits

- Good puncture resistance
- Low water vapor permeance and water absorption
- Excellent low temperature impact resistance in cold climates



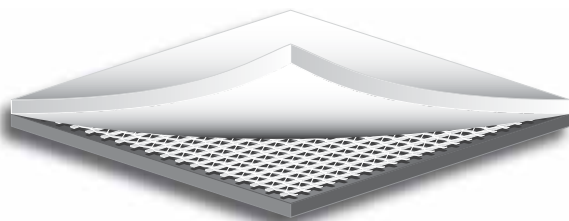
### Sure-Flex KEE

Sure Flex KEE membrane utilizes DuPont™ Elvaloy KEE, a resin modifier that results in permanent flexibility, increased UV resistance and improved long-term weathering. Elvaloy eliminates the need for a lacquer coating, which may be effective initially but loses its resistance to dirt and microbial growth over a short time.

Sure-Flex KEE is ideal when the roofing membrane will be subjected to harsh chemicals and conditions like acid rain, grease, air-conditioning coolants and intense sunlight.

#### Features and Benefits

- Excellent long-term weldability
- Increased cold weather flexibility
- Easier repairs, maintenance and modifications, particularly on older roofs

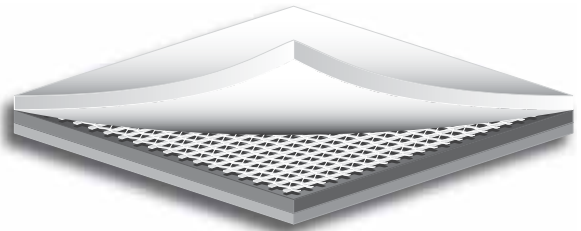


### Sure-Flex KEE FRS FleeceBack

Sure-Flex KEE FRS FleeceBACK membrane is composed of an industry-leading combination of Elvaloy copolymer and fiberglass scrim with a polyester fleece backing. The membrane is designed to enhance weatherability, flexibility and toughness. The fleece backing enhances puncture resistance and provides a separating layer for rough or asphalt substrates.

#### Features and Benefits

- Excellent puncture and chemical resistance
- Greater uplift performance when applied with Flexible FAST™ Adhesive
- No odors, fumes or VOCs during installation
- Ideal for re-roofing applications



## MYTH

| All prefabricated accessories are the same.

## FACT

All prefabricated accessories may look the same, but that does not mean they were created, or will perform, the same. Many manufacturers offer only a limited number of prefabricated accessories, which are often produced using sub-standard materials or are inconsistent from piece to piece. It can be difficult to identify a quality accessory from one that is subpar without a certification from the roofing manufacturer.



## Accessories

It is not unusual for a roof to have hundreds of penetrations. Flashing these pipes, curbs and other obstructions can be a labor-intensive task, adding considerable time and money to any roofing project. Plus, if not flashed properly, these penetrations can be a point of continual leaks.

Carlisle offers over a dozen prefabricated, in-stock, standard-order accessories and countless custom-order accessories to accommodate even the most difficult and unique penetrations. No matter what details are present on your project, you can rest assured that Carlisle has an accessory to meet your needs.

Every Carlisle PVC accessory carries a CFA (Certified Fabricated Accessory) stamp of approval, so you know they are manufactured to the highest standards. Carlisle CFA-approved accessories save time and money during installation and help maintain the watertight integrity of every Sure-Flex PVC roofing system. To ensure the penetrations on your next roofing project are properly waterproofed, be sure that your PVC accessories are certified by the membrane manufacturer issuing your warranty.



800-479-6832 • P.O. Box 7000 • Carlisle, PA 17013 • Fax: 717-245-7053 • [www.carlisesyntec.com](http://www.carlisesyntec.com)

Carlisle, Sure-Flex and FAST are trademarks of Carlisle.

ENERGY STAR is a registered trademark owned by the US government. LEED is a registered trademark of the U.S. Green Building Council.

REPRINT CODE: 605397 - "PVC Brochure" - 051112 - © 2012 Carlisle.

