CARLISLE
SYNTEC SYSTEMS

Sure-Weld® TPO
Roofing Systems

The Industry's Premier Heat-Weldable Roofing System

Experience the Carlisle Difference

In the 1960s, Carlisle SynTec Systems pioneered the single-ply roofing industry with the introduction of its Sure-Seal® EPDM membrane. Since that time, Carlisle has been recognized as the trusted provider of the most dependable and longest-lasting single-ply roof systems on the market.

Today, Carlisle's product offering has expanded to include Sure-Weld TPO, Sure-Flex™ PVC, and FleeceBACK® membranes, as well as a full line of complementing accessories. And while the company's primary focus is on producing innovative low-slope commercial roofing membranes and accessories, Carlisle also provides insulation, metal roofing, coatings, skylights, pavers, and edge metal. Carlisle also makes its own adhesives, primers, and membrane cleaners and is a leading provider of Roof Garden systems.

Carlisle's signature products have been installed on a wide range of buildings around the world, including schools, hospitals, warehouses, and cold-storage facilities. With tens of billions of square feet of roofing materials sold and installed, Carlisle continues to lead the industry by providing its valued customers with innovative products, services, and warranty options. Whatever your roofing needs, Carlisle has a system – and an answer – for you.

After All These Years, **There's Still No Equal**

TPO is the fastest-growing segment in the commercial roofing industry, and many companies offer TPO single-ply membranes. Unfortunately, not all TPO is created equally. Your building deserves a TPO roofing system from the manufacturer that has been at the forefront of TPO research, development, and technology: Carlisle SynTec Systems.

Why Sure-Weld TPO?

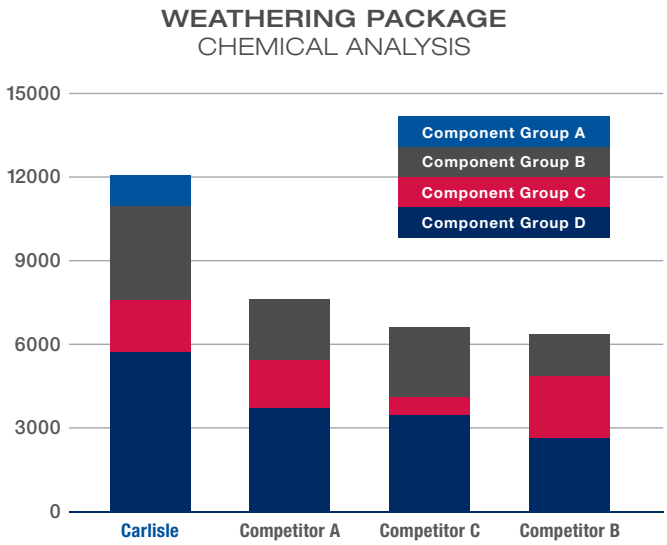
Carlisle's Sure-Weld TPO membrane is comprised of three layers –a strong, polyester-reinforced fabric center (scrim) encapsulated between the TPO-based top and bottom plies. Because the top ply is the most vital membrane component for long-term weathering characteristics, Carlisle manufactures its membranes with an industry-leading thicker and smoother top ply. The smooth surface resists dirt pick-up and biological growth better than other thermoplastic membranes.

OCTAGUARD XT™ WEATHERING PACKAGE

All Carlisle's Sure-Weld TPO membranes and accessories are manufactured with its high-performance OctaGuard XT weathering package. OctaGuard XT weathering package technology is comprised of eight performance-enhancing ingredients, including three heat-stabilizing antioxidants and three UV light stabilizers as well as organic and inorganic UV absorbers. When combined, these eight ingredients provide a weathering package second to none in the TPO industry.

Benefits of a Carlisle Sure-Weld TPO roof system featuring the OctaGuard XT weathering package include:

- Cleaner surface
- Long-term energy efficiency in warm, southern climates
- Greater weather resistance
- Improved long-term performance
- Heat and UV resistance



OCTAGUARD XT
WEATHERING PACKAGE

ENERGY-EFFICIENCY

Carlisle's white and tan Sure-Weld TPO membranes are ENERGY STAR® qualified, Cool Roof Rating Council (CRRC) certified, and California Title 24 compliant. The high reflectivity of Carlisle's TPO can significantly reduce air-conditioning costs, particularly for buildings in hot climates. Most manufacturers can produce a white product, but the true measure of how the membrane can reduce your building's cooling costs is found in its three-year reflectivity test results. A smoother top ply and a formulation that resists dirt pick-up gives Carlisle's TPO one of the highest three-year reflectivity values in the industry and enables Carlisle to offer a 10-year reflectivity warranty on all TPO membranes.

MEMBRANE FLEXIBILITY

TPO polymer is flexible in its original state prior to being converted to a membrane. This natural flexibility is maintained as the TPO membrane is exposed to extreme heat and UV. Also, this sheeting easily accommodates the building's normal expansion and contraction.

FIRE RESISTANCE

Sure-Weld TPO roofing systems meet UL 790 requirements for external fire Class A ratings and UL P assemblies for internal hourly fire ratings. Consult the UL Building Material Directory for specific assemblies.

CHEMICAL RESISTANCE

Sure-Weld TPO membrane is highly chemical- and contaminant-resistant. Most liquids and chemicals exhausted onto the roof have no effect on the membrane.

WIND RESISTANCE

Sure-Weld TPO roofing has surpassed many of Factory Mutual's wind resistance classifications, which consist of the most stringent standards in the industry. Refer to Carlisle's Code Approval Guide for details.

ENVIRONMENT

Sure-Weld TPO membranes are 100% recyclable. All post-industrial scrap is recycled back into the product through an in-house process. Additionally, Carlisle offers recycling options for TPO membrane after usage through a partnership with Nationwide Foam. Carlisle's White Sure-Weld TPO membranes are also NSF P151 certified as a rainwater catchment product. This certification ensures that rainwater that comes in contact with our Sure-Weld membrane will not impart contaminants into the water at levels that exceed U.S. Environmental Protection Agency (EPA) drinking water regulations or advisories.

INSTALLATION

Heat-welded systems are easy to install since minimal labor and few components are required. Sure-Weld TPO membrane welds at fast speeds — 10 to 15 feet per minute at moderate temperature settings. Sure-Weld TPO promotes one of the widest windows of weldability in the industry.

Refer to the Sure-Weld TPO Welding Guide for more information.

Innovative **Enhancements**

APEEL™ PROTECTIVE FILM

Carlisle's patented APEEL Protective Film guards the surface of TPO membrane from scuffs and dirt accumulation during installation, eliminating the need to clean the roof once the project is complete. Durable and easy to remove, APEEL Protective Film helps save time and labor, improves aesthetics, and increases customer satisfaction. Sure-Weld TPO membrane with APEEL Protective Film is ideal for re-roofing, re-cover, and new construction projects.

- Tough protective film helps protect TPO membrane during the construction process
- Eliminates the need to clean the roof after installation
- Durable heat- and UV-resistant film will not splinter during removal
- Film stays in place until you remove it
- Film is easily removed by one person due to its manageable five-foot-wide size
- Gray color helps the surface dry quickly and cuts down on glare

SELF-ADHERING TECHNOLOGY™ (SAT)

Carlisle's SAT TPO membrane combines the energy efficiency and durability you expect from Carlisle's Sure-Weld TPO with the easiest installation in the industry. Self-adhering technology saves labor and improves membrane performance, which translates into satisfied building owners. Years of extensive trials comparing various adhesives and substrates have resulted in a self-adhering TPO membrane with the perfect combination of high-performance adhesive and membrane from the industry leader in TPO manufacturing. This advanced membrane and adhesive combination, partnered with Carlisle's state-of-the-art manufacturing capabilities, offers consistent adhesion and a finished rooftop appearance void of wrinkles or blemishes.

- Exclusive Lay-Flat Technology provides a wrinkle-free appearance and minimal expansion and contraction of the membrane providing superior performance
- Consistent adhesive application provides uniform performance
- No odors or VOCs to disrupt building occupants
- Up to 80% labor savings when compared to traditional bonding adhesive
- Cool roofing properties contribute to building envelope energy efficiency

CARLISLE SELF-ADHERING TPO

SAT Self-Adhering Technology

Actual time **12 minutes** Compared to 42 minutes using standard bonding adhesive

THICKER IS BETTER

With such a wide variety of single-ply thermoplastic roofing membranes on the market, it can be difficult to know which one to choose. As the largest TPO supplier, Carlisle recognizes the importance of selecting a TPO membrane that will provide long-term protection for your building and its contents. While thinner membranes can be an attractive option due to their low installed costs, using a thicker membrane can be a simple and inexpensive way to extend your roof's service life and maximize return on investment.

For as little as a 4% increase in total installed cost, membrane thickness can be significantly upgraded. Thicker membranes are also eligible for longer warranties with enhanced coverage. Selecting a thicker membrane is a minimal expenditure that delivers a significant payoff. Return on investment is substantially improved, as increasing membrane thickness can extend the roof's service life by as much as 33%.

- Thicker membranes contain up to 77% more weathering package than thinner membranes and provide greater resistance to UV degradation
- Increasing membrane thickness provides better resistance to punctures and hail and 25% greater seam strength
- Because they contain more weathering package, thicker membranes maintain their high reflectivity and smooth surface longer than thinner membranes
- Increasing membrane thickness improves return on investment
- Thicker membranes are eligible for additional warranty coverage and increased wind uplift performance on certain assemblies

Protect your assets with a thicker, stronger, and longer-lasting TPO membrane!

Protecting Your **Investment**

FLEECEBACK TPO MEMBRANE

Looking for a membrane that offers extreme durability, puncture resistance and long-term performance? Carlisle's FleeceBACK TPO membrane is adhered to a strong 55-mil fleece that provides long-term protection against high winds, hail, and punctures, and is particularly well-suited for critical facilities, as well as for Roof Garden and solar applications. Carlisle's FleeceBACK TPO membrane is installed using FAST™ or Flexible FAST Adhesive for a VOC-free, quiet, low-odor, non-penetrating application that provides excellent durability, wind uplift performance, and hail resistance.

SPECIAL COLOR PROGRAM

Turn your roof into a canvas with Carlisle's TPO Special Color Program. The leader in single-ply technology offers more pre-formulated colors than any other manufacturer, with reinforced membrane available in 10' x 100' sheets and non-reinforced flashing available in 24" x 50' rolls.

Rock Brown | Slate Gray | Terra Cotta | Patina Green | Mansard Brown

Color samples printed here are approximations. For actual colors, request a sample of TPO Special Color membrane.

TOTAL SYSTEM WARRANTIES

Five-year to 30-year No Dollar Limit Total System Warranty coverage is available. Reflectivity, hail, and puncture warranties are also available upon request.

ACCESSORIES

The most critical and time-consuming portion of TPO roofing installations are made easier and faster with Sure-Weld Certified Fabricated Accessories. Sure-Weld accessories are heat-weldable and provide exceptional durability and weatherability while reducing labor costs.

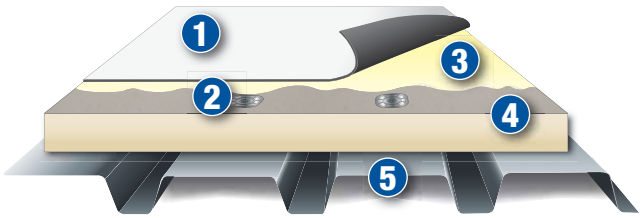
Carlisle offers a wide variety of standard and custom-order accessories to accommodate even the most difficult and unique rooftop penetrations. No matter what details are present, you can be confident that Carlisle has an accessory to meet your needs. Every Carlisle accessory carries a Certified Fabricated Accessory (CFA) stamp of approval, so you know they are manufactured to the highest standards. These accessories save time and money during installation and help maintain the watertight integrity of every Carlisle TPO roofing system.

Sure-Weld TPO Roofing System Accessories:

1. Square Tubing Wraps
2. Split Pipe Seals
3. Molded Pipe Seals
4. Pressure-Sensitive Coverstrip
5. Pressure-Sensitive RUSS
6. Inside and Outside Corners
7. T-Joint Covers
8. Universal Corners
9. Molded Sealant Pockets
10. Walkway Rolls
11. Yellow Pressure-Sensitive Warning Strip
12. Curb Wrap Corners

TPO **Typical Applications**

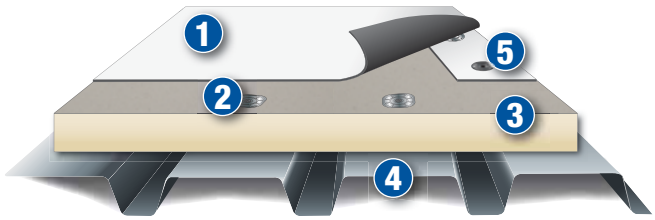
FULLY ADHERED TPO ROOFING SYSTEM



Typical Application

1. Sure-Weld TPO Membrane
2. Carlisle Insulation Fasteners and Plates
3. Sure-Weld TPO Bonding Adhesive
4. Acceptable Insulation
5. Approved Roof Deck

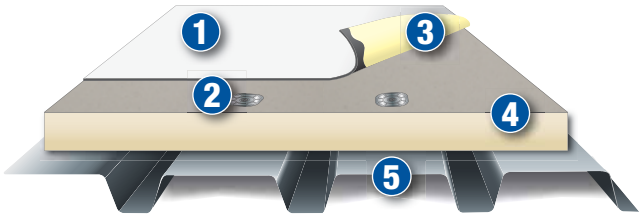
MECHANICALLY FASTENED TPO ROOFING SYSTEM



Typical Application

1. Sure-Weld TPO Membrane
2. Carlisle Insulation Fasteners and Plates
3. Acceptable Insulation
4. Approved Roof Deck
5. Membrane Fasteners and Plates

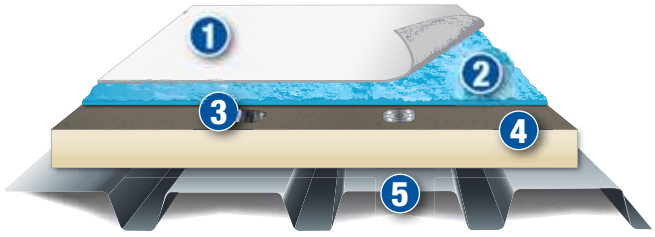
SELF-ADHERING TPO ROOFING SYSTEM



Typical Application

1. SAT TPO Membrane
2. Carlisle Insulation Fasteners and Plates
3. Pre-Applied Adhesive
4. Acceptable Insulation
5. Approved Roof Deck

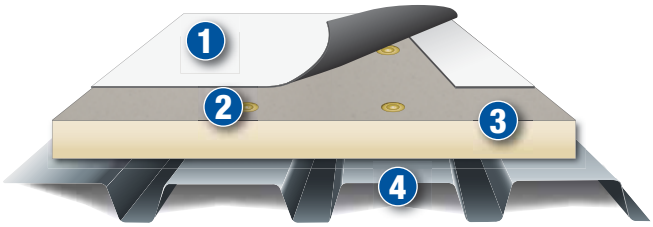
FLEECEBACK TPO ROOFING SYSTEM



Typical Application

1. FleeceBACK TPO Membrane
2. Flexible FAST Adhesive
3. Carlisle Insulation Fasteners and Plates
4. Acceptable Insulation
5. Approved Roof Deck

INDUCTION WELDED TPO ROOFING SYSTEM



Typical Application

1. Sure-Weld TPO Membrane
2. Induction Welded Fasteners and Plates
3. Acceptable Insulation
4. Approved Roof Deck

Typical Properties and Characteristics

Physical Property	ASTM D6878 Requirement	45-mil	60-mil	80-mil EXTRA
Tolerance on Nominal Thickness, % ASTM D751 test method	+15, -10	± 10	± 10	± 10
Thickness Over Scrim, in. (mm) ASTM D7635 optical method, average of 3 areas	0.015 min (0.380)	0.018 typical (0.457)	0.024 typical (0.610)	0.034 typical (0.864)
Breaking Strength, lbf (kN) ASTM D751 grab	220 (976 N) min	225 (1.0) min 320 (1.4) typical	250 (1.1) min 360 (1.6) typical	350 (1.6) min 425 (1.9) typical
Elongation Break of Reinforcement, % ASTM D751 grab method	15 min	15 min 25 typical	15 min 25 typical	15 min 25 typical
Tearing Strength, lbf (N) ASTM D751 proc. B 8 in. x 8 in.	55 (245) min	55 (245) min 130 (578) typical	55 (245) min 130 (578) typical	55 (245) min 130 (578) typical
Brittleness Point, °F (°C) ASTM D2137	-40 (-40) max	-40 (-40) max -50 (-46) typical	-40 (-40) max -50 (-46) typical	-40 (-40) max -50 (-46) typical
Linear Dimensional Change, % ASTM D1204, 6 hours at 158°F	± 1 max	± 1 max -0.2 typical	± 1 max -0.2 typical	± 1 max -0.2 typical
Ozone Resistance, no cracks 7X ASTM D1149, 100 pphm, 168 hrs	PASS	PASS	PASS	PASS
Water Absorption Resistance, mass % ASTM D471 top surface only 166 hours at 158°F water	± 3.0 max	± 3.0 max 0.90 typical	± 3.0 max 0.90 typical	± 3.0 max 0.90 typical
Factory Seam Strength, lbf/in (kN/m) ASTM D751 grab method	66 (290) min	66 (290) min	66 (290) min	66 (290) min
Field Seam Strength, lbf/in (kN/m) ASTM D1876 tested in peel	No requirement	25 (4.4) min 50 (8.8) typical	25 (4.4) min 60 (10.5) typical	40 (7.0) min 70 (12.3) typical
Water Vapor Permeance, Perms ASTM E96 proc. B	No requirement	0.10 max 0.05 typical	0.10 max 0.05 typical	0.10 max 0.05 typical
Puncture Resistance, lbf (kN) FTM 101C, method 2031 (see supplemental section)	No requirement	250 (1.1) min 325 (1.4) typical	300 (1.3) min 350 (1.6) typical	400 (1.8) min 450 (2.0) typical
Properties After Heat Aging ASTM D573, 32 weeks @ 240°F or 8 weeks @ 275°F No cracking when bent around 3" diameter mandrel Weight Change, %	 PASS No cracking ± 1.5 max	 PASS No cracking 1.0 max	 PASS No cracking 1.0 max	 PASS No cracking 1.0 max
Typical Weights lb/ft² (kg/m²)		0.23 (1.1)	0.29 (1.4)	0.40 (2.0)

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

EXPERIENCE THE CARLISLE DIFFERENCE

CARLISLE SYNTEC SYSTEMS

800-479-6832 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7053 | **www.carlislesyntec.com**

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