

FleeceBACK® TPO

Spectro-Weld™ Membrane



Overview

Spectro-Weld FleeceBACK TPO membrane is designed for appropriate photovoltaic (PV) applications where its industry-leading 0.88 solar reflectance will maximize sunlight-to-energy conversion while minimizing heat gain into the building. Once the highly reflective Spectro-Weld TPO is reinforced and enhanced with fleece, the total sheet thickness is 115-mils, creating a very tough, durable and versatile sheet that is ideal for re-roofing or new construction. Spectro-Weld is chlorine free and plasticizer free with excellent chemical resistance to acids, bases, restaurant oil and greases.

Spectro-Weld with Octaguard XT™ weathering package technology withstands extreme durability testing intended to simulate exposure to severe climates. Spectro-Weld is based on advanced polymerization technology that combines the flexibility of ethylene-propylene (EP) rubber with the heat weldability of polypropylene.

Features and Benefits

- » Solar reflectance of 0.88 (ASTM C1549), higher than any competitive TPO
- » Superior wind uplift performance and ratings (up to an FM 1-945) due to a mechanical bond between fleece and adhesive
- » 75% fewer seams than Modified Bitumen
- » Wide window of weldability
- » Fleece reinforcement adds toughness, durability and enhanced puncture resistance
 - 115-mil membrane delivers 33% greater puncture resistance and 33% greater breaking strength than 60-mil TPO
 - Greater puncture resistance than Modified Bitumen

- » Excellent hail damage resistance
 - Passes FM's severe hail test
 - Passes UL-2218 Class 4 rating
 - Passes National Bureau of Standards – 23 Ice Ball test up to 3"-diameter hail with the membrane cooled to 32°F

Installation

Adhered Roofing System

Insulation is mechanically fastened or adhered with Flexible FAST™ Adhesive to the roof deck. When adhering insulation with Flexible FAST Adhesive, the adhesive is applied to the substrate and allowed to rise and foam. Once Flexible FAST Adhesive develops string/body/gel (typically 1–2 minutes), place insulation into the adhesive and walk it in. Roll the insulation with a 30"-wide, 150-pound weighted roller to ensure full embedment. Spray-apply, splatter, or extrude Flexible FAST Adhesive to the substrate and allow foam to develop string/body/gel (typically 1–2 minutes) prior to setting Spectro-Weld FleeceBACK into the Flexible FAST Adhesive. Roll Spectro-Weld FleeceBACK membrane with a 30"-wide, 150-pound weighted roller to ensure full embedment. Splices are hot-air welded. End laps are butted and sealed with minimum 6" strip of reinforced TPO membrane or a header sheet may be utilized.

Review Carlisle specifications and details for complete installation information.

Precautions

- » Use proper stacking procedures to ensure sufficient stability.
- » Exercise caution when walking on wet membrane.
- » UV-resistant sunglasses are required when working on Sure-Weld membranes.
- » White surfaces reflect heat and may become slippery due to frost and ice accumulation.
- » Care must be exercised when working close to a roof edge when the surrounding area is snow-covered.
- » Spectro-Weld FleeceBACK membrane rolls must be tarped and elevated to keep them dry prior to installation. If the fleece gets wet use a wet vac system to help remove moisture from the fleece. **DO NOT INSTALL MEMBRANE IF FLEECE IS WET.**
- » Spectro-Weld FleeceBACK membrane exposed to the weather must be prepared with Weathered Membrane Cleaner prior to hot-air welding.

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LEED® Information

Pre-consumer Recycled Content	10%
Post-consumer Recycled Content	0%
Manufacturing Location	Senatobia, MS
Solar Reflectance Index (SRI)	White: 111

Radiative Properties for ENERGY STAR®, Cool Roof Rating Council (CRRC), and LEED

Physical Property	Test Method	White
ENERGY STAR – Initial solar reflectance	Solar Spectrum Reflectometer	0.88
ENERGY STAR – Solar reflectance after 3 years	Solar Spectrum Reflectometer	0.75
CRRC – Initial solar reflectance	ASTM C1549	0.88
CRRC – Solar reflectance after 3 years	ASTM C1549 (uncleaned)	0.75
CRRC – Initial thermal emittance	ASTM C1371	0.89
CRRC – Initial thermal emittance after 3 years	ASTM C1371 (uncleaned)	0.90
LEED – Thermal emittance	ASTM C1371	0.89
Solar Reflectance Index (SRI)	ASTM E1980	111

Carlisle Extreme Testing – Heat Aging

	ASTM Requirement	Spectro-Weld Requirement
ASTM Test 240°F	670 hours or 4 weeks	5,376 hours or 32 weeks*

*Comparable to 1,024 weeks (20 years) at 185°F for 6 hrs/day.

Heat Aging accelerates the oxidation rate that roughly doubles for each 18°F (10°C) increase in roof membrane temperature. Oxidation (reaction with oxygen) is one of the primary chemical degradation mechanisms of roofing materials.

Carlisle Extreme Testing – Environmental Cycling

–10 days heat aging at 240°F (116°C) followed by 5 days water immersion at 158°F (70°C)
–Followed by 5,040 kJ/m² (2000 hrs. at 0.70 W/m² irradiance) xenon-arc exposure

Environmental Cycling subjects the membrane to repeated cycles of heat aging, hot-water immersion by xenon-arc exposure.

Typical Properties and Characteristics

Physical Property	Test Method	SPEC. (Min)	Spectro-Weld FB Typical
Tolerance on Nominal Thickness, %	ASTM D412	+/-10	+/-10
Thickness over Fleece, min 115-mil (2.92 mm)	—	—	.060 (1.52)
Weight, lbm/ft² 115-mil	—	—	0.34
Breaking Strength, min, lbf (kN) 115-mil	ASTM D751 Grab Method	220 (1)	450 (2)
Elongation at break of internal fabric, %	ASTM D751	15	25
Tearing Strength, min, lbf (N) 115-mil	ASTM D751 B Tongue Tear	55(245)	100 (445)
Puncture Resistance, Joules 115-mil	ASTM D5635	—	22.5
Puncture Resistance, lbf 115-mil	FTM 101C Method 2031	400	500
Brittleness point, max, °F (°C)	ASTM D2137	-40 (-40)	-50 (-46)
Linear Dimensional Change, %	ASTM D1204	± 1 max	-0.2 typical
Field Seam Strength, lbf/in. (kN/m) ASTM D1876 tested in peel 115-mil	ASTM D1876	25 (4.4)	60 (10.5)
Water Vapor Permeance, Perms	ASTM E96 Proc B	—	0.10 max 0.05 typical
Resistance to Microbial Surface Growth, Rating (1 is very poor, 10 is no growth)	ASTM D3274	—	9-10 typical
Properties after heat aging 670 hrs. at 240 °F	ASTM D573	—	90 min
Breaking strength, % retained	—	—	90 min
Elongation reinf. % retained	—	—	60 min
Tearing Strength, % retained	—	—	± 1.0 max
Weight Change, %	—	—	± 1.0 max
Ozone Resistance 100 pphm, 168 hours	ASTM D1149	No cracks	No cracks
Resistance to Water Absorption After 7 days immersion @ 158°F (70°C) Change in mass, max, % (one side)	ASTM D471	±3.0	0.90
Resistance to Outdoor (Ultraviolet) Weathering Xenon-Arc, total radiant exposure at 0.70 W/m² irradiance, 80°C black panel temp.	ASTM G155	No cracks No loss of breaking or tearing strength	No cracks No loss of breaking or tearing strength
115-mil			20,160 kJ/m²