



Firestone Reinforced Polypropylene (fPP-R) Geomembrane

Firestone Item Number

Various: See Attached Page

DESCRIPTION:

Firestone fPP-R Geomembrane is a reinforced polypropylene geomembrane that is produced with a 9 x 9 polyester weft inserted scrim reinforcement. This heat weldable fPP-R geomembrane is available in 0.91 mm (0.036") and 1.14 mm (0.045") thicknesses and in 3.05 m (10.0') widths. Available in black, white, patina, tan and grey all with a black backing.

PREPARATION OF SUBSTRATES:

1. Substrates must be dry, smooth, and free of sharp edges, loose or foreign materials, oil, grease, and other materials which may damage the geomembrane.
2. All rough surfaces or voids which could damage the geomembrane shall be repaired prior to installing the geomembrane, as specified.

METHOD OF APPLICATION:

1. Firestone fPP-R Geomembrane is installed as a continuous layer. Rolls or panels made from rolls are overlapped (Side Laps and End Laps) prior to the heat welding of the seam areas.
2. All cut scrim areas must be sealed with Firestone extrusion weld bead.
3. Install Firestone fPP-R Geomembrane in accordance with current Firestone Specialty Products specifications and details.

STORAGE:

1. Store away from sources of punctures and physical damage.
2. Store away from ignition sources as geomembrane will burn when exposed to open flame.

This sheet is meant only to highlight Firestone's products and specifications. Information is subject to change without notice. Firestone takes responsibility for furnishing quality materials, which meet Firestone's published product specification. As neither Firestone itself nor its representatives practice design, Firestone offers no opinion on and expressly disclaims any responsibility for the soundness of any project on which its products may be applied. If questions arise as to the soundness of a project, or its ability to support a planned installation property, the Owner should obtain opinions of competent design engineers before proceeding. Firestone accepts no liability for any failure or for resultant damages, and no Firestone Representative is authorized to vary this disclaimer.



PRODUCT DATA

PACKAGING:

Thickness	Weight
0.91 mm (0.036")	0.83 kg/m ² (0.17 lb/ft ²)
1.14 mm (0.045")	1.03 kg/m ² (0.21 lb/ft ²)
1.52 mm (0.060")	1.22 kg/m ² (0.25 lb/ft ²)

See attached page for available length, width and color options.

PRECAUTIONARY DATA:

1. Take care when moving, transporting, handling, etc. to avoid sources of punctures and physical damage.
2. Isolate waste products, such as petroleum products, greases, oils (mineral and vegetable) and animal fats from the geomembrane. Contact Firestone Specialty Products for specific recommendations regarding chemical compatibility.
3. Refer to Material Safety Data Sheets (MSDS) for safety information.

LEED INFORMATION:

Post Consumer Recycled Content:	0%
Post Industrial Recycled Content:	10%
Manufacturing Locations:	Wellford, SC Muscle Shoals, AL

Firestone Specialty Products

250 West 96th Street, Indianapolis, Indiana 46260
Specialty Products (800) 428-4442
Internet Address: <http://www.firestonesp.com>

Firestone Reinforced Polypropylene (fPP-R) Geomembrane

PHYSICAL PROPERTIES

<u>Physical Property</u>	<u>Test Method</u>	<u>Property Of Unaged Sheet</u>	<u>Property After Aging</u> 672 hrs (28 days) @ 116°C (240°F)
Tolerance on nominal thickness, %	ASTM D 5199	0.91 mm (0.036") ± 10 1.14 mm (0.045") ± 10 1.52 mm (0.060") ± 10	
Thickness over scrim, mm (inches) 0.91 mm (0.036") 1.14 mm (0.045") 1.52 mm (0.060")	ASTM D 4637 Optical Method	0.254 (0.010) min. 0.330 (0.013) min. 0.762 (0.030) min.	
Mass per unit area, kg/m ² (g/ft ²) (lb/ft ²) 0.91 mm (0.036") 1.14 mm (0.045") 1.52 mm (0.060")	ASTM D 5261	0.83 (77) (0.17) typical 1.03 (95) (0.21) typical 1.22 (117) (0.25) typical	
Breaking strength, kN (lbf) (grab tensile at strain rate of 12 in./min.) 0.91 mm (0.036"), 1.14 mm (0.045") & 1.52 mm (0.060")	ASTM D 7004	0.9 (200) min. 260 typ. 1.1 (250) min. 300 typ.	0.9 (200) min. 260 typ. 1.1 (250) min. 300 typ.
Elongation at break of fabric, %	ASTM D 7004	25 typical	25 typical
Tearing strength, N (lbf) (50.8 mm (2") / min. strain rate) 0.91 mm (0.036"), 1.14 mm (0.045") & 1.52 mm (0.060")	ASTM D 5884 (max. load)	356 (80) min. 578 (130) typ. 445 (100) min. 712 (160) typ.	
Low temperature flexibility, °C (°F)	ASTM D 2136 1/8 in. mandrel 4 hour @ temp.	- 40 (- 40) max. - 46 (- 50) typical	
Linear Dimensional Change (shrinkage), % 6 h @ 70°C (158°F) or 1 h @ 100°C (212°F)	ASTM D 1204	+/- 1.0 max. - 0.5 typical	
Ozone resistance, 100 pphm, 168 hours	ASTM D 1149	No cracks	
Resistance to water (distilled) absorption After 30 days immersion 50 °C (122 °F) Change in mass. %	ASTM D 471 (coating compound only)	1.0 max. 0.5 typical	
Hydrostatic resistance, MPa (lbf/in. ² or psi) (Mullen burst) 0.91 mm (0.036") 1.14 mm (0.045") 1.52 mm (0.060")	ASTM D 751 Procedure A	2.4 (350) min. 2.8 (400) typical 3.1 (450) typical 3.4 (500) typical	2.4 (350) min. 2.8 (400) typical 3.1 (450) typical 3.1 (500) typical
Field seam strength, kN/m (lbf/in.) Seam tested in peel after weld	ASTM D 413 1 in. wide	3.9 (22) min. 7.9 (45) typical peak load	
Water vapor permeance, Perms	ASTM E 96	0.10 max. 0.05 typical	
Puncture resistance, N (lbf) 0.91 mm (0.036") 1.14 mm (0.045") 1.52 mm (0.060")	ASTM D 4833 (index puncture)	378 (85) min. 489 (110) typical 534 (120) typical 525 (118) typical	
Resistance to xenon-arc weathering ¹ Xenon-Arc, 15,120 kJ/m ² total radiant exposure, visual condition at 10X	ASTM G 155 0.70 W/m ² 80°C B.P.T.	No cracks No loss of breaking or tearing strength	
Potable Water Accepted	NSF-61	Passes	
Chronic Toxicity Screening	EPA/600/4-89/ 001 ASTM E-729 Method 1000.0	Passes	Passes

¹Equivalent to 12,000 hours exposure at 0.35 W/m² irradiance B.P.T. is black panel temperature.
Note: Factory Seams are not a normal condition of the supplied sheet described in this chart.



Firestone fPP-R Geomembrane Panel Sizes

Dimensions		Packaging Type	Part Number	Gauge	Color	Coverage		Weight (typical max weight)	
SI Units (Meters)	Eng Units (Feet)					SI Units (Sq Meters)	Eng Units (Sq Feet)	SI Units (kg)	Eng Units (lbs)
3.05 x 152.40	10 x 500	Roll	W56VB39950	0.91 mm (0.036")	Black	464.52	5,000	467	1029
3.05 x 121.92	10 x 400	Roll	W56VB49940	1.14 mm (0.045")	Black	371.61	4,000	461	1017
3.05 x 91.44	10 x 300	Roll	W56VB69930	1.52 mm (0.060")	Black	278.71	3,000	413	910
3.05 x 152.40	10 x 500	Roll	W56VW39950	0.91 mm (0.036")	White	464.52	5,000	467	1029
3.05 x 121.92	10 x 400	Roll	W56VW49940	1.14 mm (0.045")	White	371.61	4,000	461	1017
3.05 x 91.44	10 x 300	Roll	W56VW69930	1.52 mm (0.060")	White	278.71	3,000	413	910
3.05 x 152.40	10 x 500	Roll	W56VP39950	0.91 mm (0.036")	Patina	464.52	5,000	467	1029
3.05 x 121.92	10 x 400	Roll	W56VP49940	1.14 mm (0.045")	Patina	371.61	4,000	461	1017
3.05 x 91.44	10 x 300	Roll	W56VP69930	1.52 mm (0.060")	Patina	278.71	3,000	413	910
3.05 x 152.40	10 x 500	Roll	W56VT39950	0.91 mm (0.036")	Tan	464.52	5,000	467	1029
3.05 x 121.92	10 x 400	Roll	W56VT49940	1.14 mm (0.045")	Tan	371.61	4,000	461	1017
3.05 x 91.44	10 x 300	Roll	W56VT69930	1.52 mm (0.060")	Tan	278.71	3,000	413	910
3.05 x 152.40	10 x 500	Roll	W56VG39950	0.91 mm (0.036")	Grey	464.52	5,000	467	1029
3.05 x 121.92	10 x 400	Roll	W56VG49940	1.14 mm (0.045")	Grey	371.61	4,000	461	1017
3.05 x 91.44	10 x 300	Roll	W56VG69930	1.52 mm (0.060")	Grey	278.71	3,000	413	910