



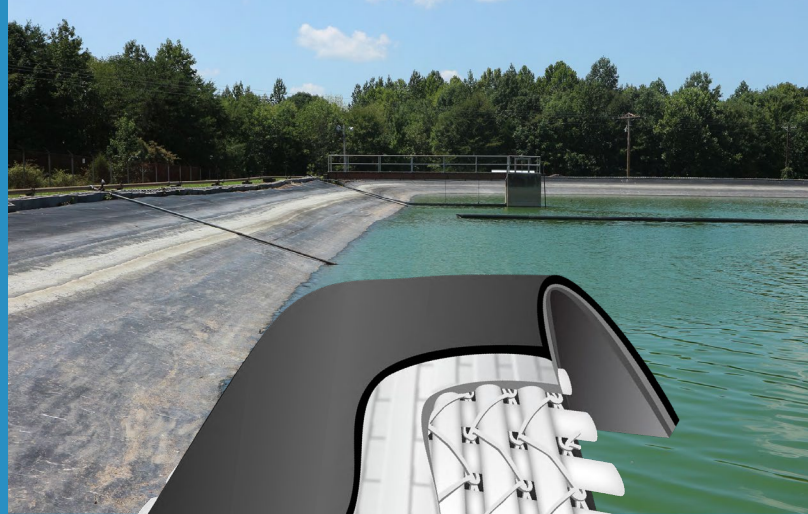
ERTHA XR5 Series

HIGH-STRENGTH GEOMEMBRANE LINER
PRODUCT DATA SHEETS

ERTHA™ IS A SERIES OF PRODUCTS WHOLLY-OWNED BY GEOSOLUTIONS, INC.

XR5 8130

30 Mil XR5 8130



- » All XR5 Series Geomembrane products are classified as an Ethylene Interpolymer Alloy (EIA)
- » All XR5 Series Geomembranes are fabric reinforced and are manufactured as polymer coated fabrics
- » XR5 grade is high strength and chemically resistant for maximum resistance to high temperature, and broad chemical resistance, including acids, oils and methane
- » Heat weldable-thermal weldable for seams as strong as the membrane. Factory panels over 15,000 square feet (1400 sq meters) for less field seaming
- » Stability is excellent, with low thermal expansion-contraction properties. All XR® Geomembranes are thermoplastic.
- » 30+ year application history

XR5 8130

30 Mil XR5 8130



PRODUCT APPLICATIONS

	XR5 8130
High Strength	✓
Long-term UV Resistance	✓
Floating Covers	✓
Hydrocarbon/Chemical Resistance	✓
Floating Diversion Baffles/Curtains	✓
INDUSTRIES	
Municipal Wastewater	✓
Hydrocarbon (Secondary Containment)	✓
Mining	✓
Industrial Process	✓
Portable Spill Berms	✓
Airport Fuel Containment	✓
Deicing Applications	✓
Brine Storage	✓

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



XR5 8130

30 Mil XR5 8130



MATERIAL PROPERTIES

	TEST METHOD	XR5 8130
Base Fabric Type / Weight (nominal)	ASTM D751	Polyester 6.5 oz/yd² (220 g/m²)
Thickness	ASTM D751	30 mils min. (0.76 mm min.)
Weight	ASTM D751	30.0 ± 2 oz/yd² (1017.0 ± 70 g/m²)
Tear Strength	ASTM D751 <i>Trap Tear</i>	40/55 lbf min. (175/245 N min.)
Breaking Yield Strength	ASTM D751 <i>Grab Tensile</i>	550/550 lbf min. (2448/2448 N min.)
Dimensional Stability	ASTM D1204 <i>100°C / 1 hour</i>	0.5% max each direction
Hydrostatic Resistance	ASTM D751 <i>Method A</i>	800 psi min. (5.51 MPa min.)
Blocking Resistance	ASTM D751 <i>180°F (82°C)</i>	#2 Rating max.
Adhesion-Ply	ASTM D413 <i>Type A</i>	15 lbf/in min. (13 daN/5 cm) <i>or film tearing bond</i>
Adhesion - Heat Welded Seam (minimum)	ASTM D413 <i>Dielectric Weld</i>	40 lbf/2" RF weld (17.5 daN/5 cm)
Dead Load Seam Strength	ASTM D751 <i>4 hour Test @ 70°F (21°C)</i> ASTM D751 <i>4 hour Test @ 160°F (70°C)</i>	Pass 240 lbf/in (1068 N/2.54 cm) Pass 120 lbf/in (534 N/2.54 cm)
Bonded Seam Strength	ASTM D751 <i>Procedure A - Grab</i>	550 lbf min. (2450 N min.)

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



XR5 8130

30 Mil XR5 8130



MATERIAL PROPERTIES CONT'D

	TEST METHOD	XR5 8130
Abrasion Resistance	ASTM D471 <i>H-18 Wheel 1kg Load</i>	2000 cycles min. <i>before fabric exposure,</i> 50 mg/100 cycles <i>max. weight loss</i>
Weathering Resistance	Carbon Arc ASTM G153	8000 hours min. <i>with no appreciable changes or</i> <i>stiffening or cracking of coating</i>
Water Absorption	ASTM D471 <i>Section 12 – 7 days</i>	0.025 kg/m² max. @ 70°F / 21°C 0.14 kg/m² max. @ 212°F / 100°C
Wicking	ASTM D751	1/8" max. (0.3 cm max.)
Bursting Strength	ASTM D471 <i>Ball Tip</i>	750 lbf min. (3330 N min.)
Puncture Resistance	ASTM D4833	275 lbf min. (1200 N min.)
Coefficient of Thermal Expansion/Contraction (maximum)	ASTM D696	8x10⁻⁶ in/in/°F (1.4x10⁻⁵ cm/cm/°C)
Environmental/Chemical Resistant Properties	30-day Full Immersions	See Chemical Resistance Table
PassCold Crack	ASTM D 2136 <i>4 hrs, 1/8" Mandrel</i>	Pass @ -30°F Pass @ -34°C
Elongation @ Yield Break	20% min	20% min

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



XR5 8130

30 Mil XR5 8130



CHEMICAL RESISTANCE

AFFF (Aqueous Fire Fighting Foam)	A	Ethyl Acetate	C	Kerosene	T
Acetic Acid (5%)	B	Ethyl Alcohol	A	Liquid Nitrogen Fertilizer (28%)	A
Acetic Acid (50%)	C	Ethylene Dichloride	C	Magnesium Chloride	T
Acrylonitrile (10%)	A	Ethylene Dichloride 0.1%	A	Magnesium Hydroxide	T
Ammonium Phosphate	T	Ferric Chloride	A	Methanol	A
Ammonium Sulfate	T	Flowback/Produced Water (typical)	A	Methyl Alcohol	A
Antifreeze (Ethylene Glycol)	A	#2 Fuel Oil	A	Methyl Ethyl Ketone	X
Animal Oil	A	#6 Fuel Oil	A	Mineral Spirits	A
Aqua Regia	X	Furfural	X	Municipal Landfill Leachate (typical)	A
ASTM Fuel A (100% Iso-Octane)	A	Gasoline	B	N-Serve® Nitrogen Stabilizer	C
ASTM Oil #2 (Flash Pt. 240°C)	A	Glycerin	A		
ASTM Oil #3	A	Hexane	A		
Benzene	X	Hydraulic Fluid (Petroleum Based)	A		
Black Liquor (Typical)	A	Hydraulic Fluid (Phosphate Ester Based)	C		
Biodiesel	B	Hydrocarbon Type II (40% Aromatic)	C		
Calcium Chloride Solutions	T	Hydrochloric Acid (36%)	A		
Calcium Hydroxide	T	Hydrochloric Acid (50%)	A		
Chlorobenzene	X	Hydrofluoric Acid (5%)	A		
20% Chlorine Solution	A	Hydrofluoric Acid (50%)	A		
Clorox	A	Hydrofluosilicic Acid (30%)	A		
Conc. Ammonium Hydroxide	A	Hydrogen Peroxide (2%, 3%, 35%)	T		
Corn Oil	A	Isopropyl Alcohol	T		
Crude Oil	A	Ivory Soap	A		
Diesel Fuel	A	Jet A	A		
Dimethyl Sulfoxide (10%)	A	JP-4 Jet Fuel	A		
Envirotemp® FR3	A	JP-5 Jet Fuel	A		
Ethanol	A	JP-8 Jet Fuel	A		

LIST CONTINUED ON NEXT PAGE

RATING KEY

- A** Fluid has little or no effect
- B** Fluid has minor to moderate effect
- C** Fluid has severe effect
- T** No data - likely to be acceptable
- X** No data - not likely to be acceptable

NOTES

- » Results of visual and physical strength testing after 30 days minimum of constant exposure at room temperature.
- » All solutions are 100% unless indicated otherwise.
- » All XR5 samples simulate field conditions with the treated base fabric exposed at edges.
- » XR5 samples are completely submerged.
- » Solutions not on this chart should be tested prior to application.

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



CHEMICAL RESISTANCE CONT'D

Naphtha (White Gas)	A	Sodium Bisulfite Solution	T	Turpentine	A
Naphtha (TT-N-95B NOT.2 Type I)	A	Sodium Hydroxide (60%)	A	Urea Formaldehyde	A
Natural Gas Condensate Synthetic Solution	A	Sodium Hypochlorite - PW (1%)	A	UAN (28%) - Urea Ammonium Nitrogen	A
Nitric Acid (5%)	B	Sodium Hypochlorite - PW (500 mg/l)	A	Varsol	A
Nitric Acid (50%)	C	Sodium Hypochlorite - PW (50 mg/l)	A	Vegetable Oil	A
Palm Oil	A	Sodium Phosphate	T	Water	A
Palm Oil (140°F)	A	Styrene Monomer	C	Water (Deionizead)	A
Peracetic Acid - PW (15%)	A	Sulfuric Acid (50%)	A	Water (LSI-5)	A
Perchloroethylene	C	THF - Tetrahydrofuran	X	Water (180°F)	A
Phenol	X	THF - Tetrahydrofuran (9%)	A	White Gas	A
Phenol Formaldehyde	B	Toluene	C	Xylene	C
Phosphoric Acid (50%)	A	Transformer Oil	A	Zinc Chloride	T
Phosphoric Acid (85%)	A				
Phosphoric Acid (100%)	C				
Phosphoric Chek® 075 Fire Retardent (60%)	X				
Phthalate Plasticizer	C				
Potassium Acetate (50%)	A				
Potassium Chloride	T				
Potassium Sulphate	T				
Raw Linseed Oil	A				
Roundup®	A				
SAE-30 Oil	A				
Salt Water (25%)	B				
Sea Water	A				
Shell Diala® Transformer Oil	A				
Sodium Acetate Solution	T				

RATING KEY

- A** Fluid has little or no effect
- B** Fluid has minor to moderate effect
- C** Fluid has severe effect
- T** No data - likely to be acceptable
- X** No data - not likely to be acceptable

NOTES

- » Results of visual and physical strength testing after 30 days minimum of constant exposure at room temperature.
- » All solutions are 100% unless indicated otherwise.
- » All XR5 samples simulate field conditions with the treated base fabric exposed at edges.
- » XR5 samples are completely submerged.
- » Solutions not on this chart should be tested prior to application.

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.

CHEMICAL RESISTANCE CONT'D

Part B: Vapor Transmission Data (XR5)

Tested according to ASTM D 0814 Inverted Cup Method and/or ASTM E-96.

All tests with 8130 XR-5® Black are typical values.

All tests were run at room temperature.

LIQUID	TEST METHOD	SVT		Hydraulic Conductivity* cm/sec
		g/m ² /day (typ.)	fl. oz/ft ² /day (typ.)	
AFFF 3%	ASTM D814	7.74	0.025	1.65 x 10 ⁻¹¹
ASTM Fuel B	ASTM D814	65.25	0.283	7.76 x 10 ⁻¹¹
Crude Oil	ASTM D814	2.70	0.010	1.68 x 10 ⁻¹¹
Diesel, No. 2	ASTM D814	4.11	0.015	8.12 x 10 ⁻¹⁰
Gasoline	ASTM D814	130.93	0.612	3.58 x 10 ⁻¹¹
Jet A	ASTM D814	13.13	0.052	7.14 x 10 ⁻¹¹
JP-8	ASTM D814	6.05	0.024	3.29 x 10 ⁻¹¹
Kerosene	ASTM D814	0.83	0.003	4.66 x 10 ⁻¹²
Kerosene	ASTM E96	1.30	0.005	7.27 x 10 ⁻¹²
Methanol	ASTM D814	19.52	0.081	1.34 x 10 ⁻¹¹
Water	ASTM D814	4.05	0.013	8.77 x 10 ⁻¹²

Part C: Chemical Resistance Studies (XR5)

28 day immersion, room temperature, exposed edges, 100% solution; XR5.

i) Welded seam strength after immersion

LIQUID	Seam Shear Strength, lbf	Seam Shear Strength, N
Control	340 – No Seam Failure	1513 – No Seam Failure
Kerosene	355	1579
Crude Oil	320	1424
Hydraulic Fluid	385	1713
Toluene	0 – Adhesion Failure	0 – Adhesion Failure
Naptha	380	1691
Perchlorethylene	390	1735

11 year immersion, room temperature, exposed edges, 100% solution, 8130 XR5, 2" thermal welds.

LIQUID	Seam Shear Strength, lbf	Seam Shear Strength, N
Control	40 lbf/2" (20 lbf/in)	178 N/5 cm (89 N/2.54 cm)
Kerosene	40	178
Crude Oil	18	80
Naptha	33	146
JP-4 Jet Fuel	33	146
Diesel Fuel	25	111

6 ½ year immersion, room temperature, exposed edges, 100% solution, 8130 XR5.

ii) Membrane strength after immersion in petroleum products

LIQUID	Breaking (Yield) Strength - % retention ASTM D75 Proc B, 1" (2.54 cm)
Kerosene	106%
Crude Oil	101%
Naptha	99%
JP-4 Jet Fuel	101%
Diesel Fuel	99%

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



CHEMICAL RESISTANCE CONT'D

Example Immersion Results

Results from full immersion of XR5 in various test chemicals, waste streams, or contaminated liquids. All testing with XR5 8130 using ASTM D 751 test methods, unless indicated otherwise. No special sample preparation so that field conditions would be best simulated. All test results are from single immersions and should be considered typical.

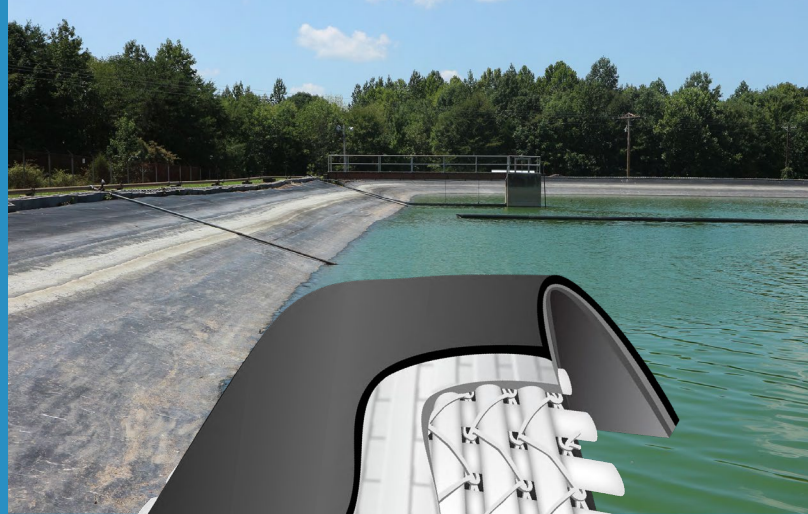
Solution	Immersion Period	Test	Specification Value (imp.)	Result	Specification Value (metric)	Result
26% UAN	60 days	Trap Tear	40/55 lbf	53/75 lbf	175/245 N	235/324 N
		Grab Tensile	550/550 lbf	608/179 lbf	2448/2448 N	2705/3200 N
3% AFFF	90 days	Strip Tensile	400/350 lbf	370/347 lbf	1780/1557 N	1646/1544 N
		Trap Tear	40/55 lbf	50/76 lbf	175/245 N	222/338 N
Concentrated Caustic with phenols	30 days	Strip Tensile	400/350 lbf	460/405 lbf	1780/1557 N	204/1557 N
		Trap Tear	40/55 lbf	72/100 lbf	175/245 N	320/445 N
		Weight	30 +2/-1 oz/yd ²	32 oz/yd ²	1017 g/m ²	1084 g/m ²
Groundwater with Cresote	32 days	Grab Tensile	550/500 lbf	611/556 lbf	2448/2448 N	2718/2474 N
		Trap Tear	40/55 lbf	47/58 lbf	175/245 N	209/258 N
40% Ferric Chloride	30 days	Strip Tensile	400/350 lbf	408/393 lbf	1780/1557 N	1815/1748 N
		Weight	30 oz/yd ²	32.7 oz/yd ²	1017 g/m ²	1108 g/m ²
Flowback Marcellus Shale	30 days	Strip Tensile	400/350 lbf	399/434 lbf	1780/1557 N	1775/1886 N
		Trap Tear	40/55 lbf	48/66 lbf	175/245 N	213/293 N
50% Potassium Acetate	30 days (6730 XR5)	Grab Tensile	612/572 lbf		2448/2448 N	2723/2545 N
Natural Gas Condensate, Synthetic	30 days	Grab Tensile	550/550 lbf	614/681 lbf	2448/2448 N	2732/3030 N
		Trap Tear	40/55 lbf	42/63 lbf	175/245 N	186/280 N
Methanol	30 days	Strip Tensile	400/350 lbf	374/351 lbf	1780/1557 N	1664/1561 N
		Trap Tear	40/55 lbf	56/75 lbf	175/245 N	249/333 N
		Weld Adhesion	40 lbf/2"	30 lbf/in	89 N/2.54 cm	133 N/2.54 cm
3% Hydrogen Peroxide	365 days	Strip Tensile	400/350 lbf	471/451 lbf	1780/1557 N	2095/2006 N
		Trap Tear	40/55 lbf	52/81 lbf	175/245 N	231/360 N
Palm Oil	365 days	Strip Tensile	400/350 lbf	471/451 lbf	1780/1557 N	2095/2006 N
		Trap Tear	40/55 lbf	52/84 lbf	175/245 N	231/373 N
80% Phosphoric Acid	30 days	Strip Tensile	400/350 lbf	426/409 lbf	1780/1557 N	1895/1820 N
		Trap Tear	40/55 lbf	28/37 lbf	175/245 N	124/164 N
3% AFFF	365 days	Strip Tensile	400/350 lbf	415/412 lbf	1780/1557 N	1846/1833 N
		Water Vapor Transmission (ASTM E-96)	0.0246 oz/24 hr/ft ²		0.3165 g/m ² /day	
15% Sodium Hypochlorite	365 days	Strip Tensile	400/350 lbf	403/369 lbf	1780/1557 N	1793/1642 N
		Elongation @ Break	20%/20%	24.3%/37.0%	20%/20%	24.3%/37.0%

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



XR5 8138

40 Mil XR5 8138



- » All XR5 Series Geomembrane products are classified as an Ethylene Interpolymer Alloy (EIA)
- » All XR5 Series Geomembranes are fabric reinforced and are manufactured as polymer coated fabrics
- » XR5 grade is high strength and chemically resistant for maximum resistance to high temperature, and broad chemical resistance, including acids, oils and methane
- » Heat weldable-thermal weldable for seams as strong as the membrane. Factory panels over 15,000 square feet (1400 sq meters) for less field seaming
- » Stability is excellent, with low thermal expansion-contraction properties. All XR® Geomembranes are thermoplastic.
- » 30+ year application history

PRODUCT APPLICATIONS

XR5 8138	
High Strength	✓
Long-term UV Resistance	✓
Floating Covers	✓
Hydrocarbon/Chemical Resistance	✓
Floating Diversion Baffles/Curtains	✓
INDUSTRIES	
Municipal Wastewater	✓
Hydrocarbon (Secondary Containment)	✓
Mining	✓
Industrial Process	✓
Portable Spill Berms	✓
Airport Fuel Containment	✓
Deicing Applications	✓
Brine Storage	✓

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



XR5 8138

40 Mil XR5 8138



MATERIAL PROPERTIES

	TEST METHOD	XR5 8138
Base Fabric Type / Weight (nominal)	ASTM D751	Polyester 6.5 oz/yd² (220 g/m²)
Thickness	ASTM D751	40 mils min. (1.00 mm min.)
Weight	ASTM D751	38.0 ± 2 oz/yd² (1288 ± 70 g/m²)
Tear Strength	ASTM D751 <i>Trap Tear</i>	40/55 lbf min. (175/245 N min.)
Breaking Yield Strength	ASTM D751 <i>Grab Tensile</i>	550/550 lbf min. (2448/2448 N min.)
Dimensional Stability	ASTM D1204 <i>100°C / 1 hour</i>	0.5% max each direction
Hydrostatic Resistance	ASTM D751 <i>Method A</i>	800 psi min. (5.51 MPa min.)
Blocking Resistance	ASTM D751 <i>180°F (82°C)</i>	#2 Rating max.
Adhesion-Ply	ASTM D413 <i>Type A</i>	15 lbf/in min. (13 daN/5 cm) <i>or film tearing bond</i>
Adhesion - Heat Welded Seam (minimum)	ASTM D413 <i>Dielectric Weld</i>	40 lbf/2" RF weld (17.5 daN/5 cm)
Dead Load Seam Strength	ASTM D751 <i>4 hour Test @ 70°F (21°C)</i> ASTM D751 <i>4 hour Test @ 160°F (70°C)</i>	Pass 240 lbf/in (1068 N/2.54 cm) Pass 120 lbf/in (534 N/2.54 cm)
Bonded Seam Strength	ASTM D751 <i>Procedure A - Grab</i>	550 lbf min. (2450 N min.)

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



XR5 8138

40 Mil XR5 8138



MATERIAL PROPERTIES CONT'D

	TEST METHOD	XR5 8138
Abrasion Resistance	ASTM D471 <i>H-18 Wheel 1kg Load</i>	2000 cycles min. <i>before fabric exposure,</i> 50 mg/100 cycles <i>max. weight loss</i>
Weathering Resistance	Carbon Arc ASTM G153	8000 hours min. <i>with no appreciable changes or</i> <i>stiffening or cracking of coating</i>
Water Absorption	ASTM D471 <i>Section 12 – 7 days</i>	0.025 kg/m ² max. @ 70°F / 21°C 0.14 kg/m ² max. @ 212°F / 100°C
Wicking	ASTM D751	1/8" max. (0.3 cm max.)
Bursting Strength	ASTM D471 <i>Ball Tip</i>	750 lbf min. (3330 N min.)
Puncture Resistance	ASTM D4833	275 lbf min. (1200 N min.)
Coefficient of Thermal Expansion/Contraction (maximum)	ASTM D696	8x10 ⁻⁶ in/in/°F (1.4x10 ⁻⁵ cm/cm/°C)
Environmental/Chemical Resistant Properties	30-day Full Immersions	See Chemical Resistance Table
PassCold Crack	ASTM D 2136 <i>4 hrs, 1/8" Mandrel</i>	Pass @ -30°F Pass @ -34°C
Elongation @ Yield Break	20% min	20% min

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



CHEMICAL RESISTANCE

AFFF (Aqueous Fire Fighting Foam)	A	Ethyl Acetate	C	Kerosene	T
Acetic Acid (5%)	B	Ethyl Alcohol	A	Liquid Nitrogen Fertilizer (28%)	A
Acetic Acid (50%)	C	Ethylene Dichloride	C	Magnesium Chloride	T
Acrylonitrile (10%)	A	Ethylene Dichloride 0.1%	A	Magnesium Hydroxide	T
Ammonium Phosphate	T	Ferric Chloride	A	Methanol	A
Ammonium Sulfate	T	Flowback/Produced Water (typical)	A	Methyl Alcohol	A
Antifreeze (Ethylene Glycol)	A	#2 Fuel Oil	A	Methyl Ethyl Ketone	X
Animal Oil	A	#6 Fuel Oil	A	Mineral Spirits	A
Aqua Regia	X	Furfural	X	Municipal Landfill Leachate (typical)	A
ASTM Fuel A (100% Iso-Octane)	A	Gasoline	B	N-Serve® Nitrogen Stabilizer	C
ASTM Oil #2 (Flash Pt. 240°C)	A	Glycerin	A		
ASTM Oil #3	A	Hexane	A		
Benzene	X	Hydraulic Fluid (Petroleum Based)	A		
Black Liquor (Typical)	A	Hydraulic Fluid (Phosphate Ester Based)	C		
Biodiesel	B	Hydrocarbon Type II (40% Aromatic)	C		
Calcium Chloride Solutions	T	Hydrochloric Acid (36%)	A		
Calcium Hydroxide	T	Hydrochloric Acid (50%)	A		
Chlorobenzene	X	Hydrofluoric Acid (5%)	A		
20% Chlorine Solution	A	Hydrofluoric Acid (50%)	A		
Clorox	A	Hydrofluosilicic Acid (30%)	A		
Conc. Ammonium Hydroxide	A	Hydrogen Peroxide (2%, 3%, 35%)	T		
Corn Oil	A	Isopropyl Alcohol	T		
Crude Oil	A	Ivory Soap	A		
Diesel Fuel	A	Jet A	A		
Dimethyl Sulfoxide (10%)	A	JP-4 Jet Fuel	A		
Envirotemp® FR3	A	JP-5 Jet Fuel	A		
Ethanol	A	JP-8 Jet Fuel	A		

LIST CONTINUED ON NEXT PAGE

RATING KEY

- A** Fluid has little or no effect
- B** Fluid has minor to moderate effect
- C** Fluid has severe effect
- T** No data - likely to be acceptable
- X** No data - not likely to be acceptable

NOTES

- » Results of visual and physical strength testing after 30 days minimum of constant exposure at room temperature.
- » All solutions are 100% unless indicated otherwise.
- » All XR5 samples simulate field conditions with the treated base fabric exposed at edges.
- » XR5 samples are completely submerged.
- » Solutions not on this chart should be tested prior to application.

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.



CHEMICAL RESISTANCE CONT'D

Naphtha (White Gas)	A	Sodium Bisulfite Solution	T	Turpentine	A
Naphtha (TT-N-95B NOT.2 Type I)	A	Sodium Hydroxide (60%)	A	Urea Formaldehyde	A
Natural Gas Condensate Synthetic Solution	A	Sodium Hypochlorite - PW (1%)	A	UAN (28%) - Urea Ammonium Nitrogen	A
Nitric Acid (5%)	B	Sodium Hypochlorite - PW (500 mg/l)	A	Varsol	A
Nitric Acid (50%)	C	Sodium Hypochlorite - PW (50 mg/l)	A	Vegetable Oil	A
Palm Oil	A	Sodium Phosphate	T	Water	A
Palm Oil (140°F)	A	Styrene Monomer	C	Water (Deionizead)	A
Peracetic Acid - PW (15%)	A	Sulfuric Acid (50%)	A	Water (LSI-5)	A
Perchloroethylene	C	THF - Tetrahydrofuran	X	Water (180°F)	A
Phenol	X	THF - Tetrahydrofuran (9%)	A	White Gas	A
Phenol Formaldehyde	B	Toluene	C	Xylene	C
Phosphoric Acid (50%)	A	Transformer Oil	A	Zinc Chloride	T
Phosphoric Acid (85%)	A				
Phosphoric Acid (100%)	C				
Phosphoric Chek® 075 Fire Retardent (60%)	X				
Phthalate Plasticizer	C				
Potassium Acetate (50%)	A				
Potassium Chloride	T				
Potassium Sulphate	T				
Raw Linseed Oil	A				
Roundup®	A				
SAE-30 Oil	A				
Salt Water (25%)	B				
Sea Water	A				
Shell Diala® Transformer Oil	A				
Sodium Acetate Solution	T				

RATING KEY

- A** Fluid has little or no effect
- B** Fluid has minor to moderate effect
- C** Fluid has severe effect
- T** No data - likely to be acceptable
- X** No data - not likely to be acceptable

NOTES

- » Results of visual and physical strength testing after 30 days minimum of constant exposure at room temperature.
- » All solutions are 100% unless indicated otherwise.
- » All XR5 samples simulate field conditions with the treated base fabric exposed at edges.
- » XR5 samples are completely submerged.
- » Solutions not on this chart should be tested prior to application.

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.

CHEMICAL RESISTANCE CONT'D

Part B: Vapor Transmission Data (XR5)

Tested according to ASTM D 0814 Inverted Cup Method and/or ASTM E-96.

All tests with 8130 XR-5® Black are typical values.

All tests were run at room temperature.

LIQUID	TEST METHOD	SVT		Hydraulic Conductivity* cm/sec
		g/m ² /day (typ.)	fl. oz/ft ² /day (typ.)	
AFFF 3%	ASTM D814	7.74	0.025	1.65 x 10 ⁻¹¹
ASTM Fuel B	ASTM D814	65.25	0.283	7.76 x 10 ⁻¹¹
Crude Oil	ASTM D814	2.70	0.010	1.68 x 10 ⁻¹¹
Diesel, No. 2	ASTM D814	4.11	0.015	8.12 x 10 ⁻¹⁰
Gasoline	ASTM D814	130.93	0.612	3.58 x 10 ⁻¹¹
Jet A	ASTM D814	13.13	0.052	7.14 x 10 ⁻¹¹
JP-8	ASTM D814	6.05	0.024	3.29 x 10 ⁻¹¹
Kerosene	ASTM D814	0.83	0.003	4.66 x 10 ⁻¹²
Kerosene	ASTM E96	1.30	0.005	7.27 x 10 ⁻¹²
Methanol	ASTM D814	19.52	0.081	1.34 x 10 ⁻¹¹
Water	ASTM D814	4.05	0.013	8.77 x 10 ⁻¹²

Part C: Chemical Resistance Studies (XR5)

28 day immersion, room temperature, exposed edges, 100% solution; XR5.

i) Welded seam strength after immersion

LIQUID	Seam Shear Strength, lbf	Seam Shear Strength, N
Control	340 – No Seam Failure	1513 – No Seam Failure
Kerosene	355	1579
Crude Oil	320	1424
Hydraulic Fluid	385	1713
Toluene	0 – Adhesion Failure	0 – Adhesion Failure
Naptha	380	1691
Perchloroethylene	390	1735

11 year immersion, room temperature, exposed edges, 100% solution, 8130 XR5, 2" thermal welds.

Control	40 lbf/2" (20 lbf/in)	178 N/5 cm (89 N/2.54 cm)
Kerosene	40	178
Crude Oil	18	80
Naptha	33	146
JP-4 Jet Fuel	33	146
Diesel Fuel	25	111

6 ½ year immersion, room temperature, exposed edges, 100% solution, 8130 XR5.

ii) Membrane strength after immersion in petroleum products

LIQUID	Breaking (Yield) Strength - % retention ASTM D75 Proc B, 1" (2.54 cm)
Kerosene	106%
Crude Oil	101%
Naptha	99%
JP-4 Jet Fuel	101%
Diesel Fuel	99%

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.

CHEMICAL RESISTANCE CONT'D

Example Immersion Results

Results from full immersion of XR5 in various test chemicals, waste streams, or contaminated liquids. All testing with XR5 8130 using ASTM D 751 test methods, unless indicated otherwise. No special sample preparation so that field conditions would be best simulated. All test results are from single immersions and should be considered typical.

Solution	Immersion Period	Test	Specification Value (imp.)	Result	Specification Value (metric)	Result
26% UAN	60 days	Trap Tear	40/55 lbf	53/75 lbf	175/245 N	235/324 N
		Grab Tensile	550/550 lbf	608/179 lbf	2448/2448 N	2705/3200 N
3% AFFF	90 days	Strip Tensile	400/350 lbf	370/347 lbf	1780/1557 N	1646/1544 N
		Trap Tear	40/55 lbf	50/76 lbf	175/245 N	222/338 N
Concentrated Caustic with phenols	30 days	Strip Tensile	400/350 lbf	460/405 lbf	1780/1557 N	204/1557 N
		Trap Tear	40/55 lbf	72/100 lbf	175/245 N	320/445 N
		Weight	30 +2/-1 oz/yd ²	32 oz/yd ²	1017 g/m ²	1084 g/m ²
Groundwater with Cresote	32 days	Grab Tensile	550/500 lbf	611/556 lbf	2448/2448 N	2718/2474 N
		Trap Tear	40/55 lbf	47/58 lbf	175/245 N	209/258 N
40% Ferric Chloride	30 days	Strip Tensile	400/350 lbf	408/393 lbf	1780/1557 N	1815/1748 N
		Weight	30 oz/yd ²	32.7 oz/yd ²	1017 g/m ²	1108 g/m ²
Flowback Marcellus Shale	30 days	Strip Tensile	400/350 lbf	399/434 lbf	1780/1557 N	1775/1886 N
		Trap Tear	40/55 lbf	48/66 lbf	175/245 N	213/293 N
50% Potassium Acetate	30 days (6730 XR5)	Grab Tensile	612/572 lbf		2448/2448 N	2723/2545 N
Natural Gas Condensate, Synthetic	30 days	Grab Tensile	550/550 lbf	614/681 lbf	2448/2448 N	2732/3030 N
		Trap Tear	40/55 lbf	42/63 lbf	175/245 N	186/280 N
Methanol	30 days	Strip Tensile	400/350 lbf	374/351 lbf	1780/1557 N	1664/1561 N
		Trap Tear	40/55 lbf	56/75 lbf	175/245 N	249/333 N
		Weld Adhesion	40 lbf/2"	30 lbf/in	89 N/2.54 cm	133 N/2.54 cm
3% Hydrogen Peroxide	365 days	Strip Tensile	400/350 lbf	471/451 lbf	1780/1557 N	2095/2006 N
		Trap Tear	40/55 lbf	52/81 lbf	175/245 N	231/360 N
Palm Oil	365 days	Strip Tensile	400/350 lbf	471/451 lbf	1780/1557 N	2095/2006 N
		Trap Tear	40/55 lbf	52/84 lbf	175/245 N	231/373 N
80% Phosphoric Acid	30 days	Strip Tensile	400/350 lbf	426/409 lbf	1780/1557 N	1895/1820 N
		Trap Tear	40/55 lbf	28/37 lbf	175/245 N	124/164 N
3% AFFF	365 days	Strip Tensile	400/350 lbf	415/412 lbf	1780/1557 N	1846/1833 N
		Water Vapor Transmission (ASTM E-96)	0.0246 oz/24 hr/ft ²		0.3165 g/m ² /day	
15% Sodium Hypochlorite	365 days	Strip Tensile	400/350 lbf	403/369 lbf	1780/1557 N	1793/1642 N
		Elongation @ Break	20%/20%	24.3%/37.0%	20%/20%	24.3%/37.0%

The information provided by GeoSolutions is based on our manufacturer's research and is considered accurate, but we do not provide any warranty, expressed or implied, regarding the accuracy of this data or the results obtained from its use. The presented values are typical data and are not intended as limiting specifications. They represent the minimum expected measurements at the time of manufacture and are subject to revision as additional knowledge and experience are gained. Please contact a GEO Pro for additional information on warranties or values presented. We also do not guarantee that any use of this information will not infringe upon any patent. It is the sole responsibility of the user to determine the suitability and use of the information and materials provided for their specific application. GeoSolutions is not an installer of geosynthetic membranes, and the information is only provided as a guideline and not as an authority. GeoSolutions will not be held liable for the installation of geosynthetic membranes by others. Our standard terms and conditions of sale apply to all orders, and we exclude all liability for damages, including consequential damages exceeding the purchase price. No one is authorized to make oral warranties on our behalf, and we reserve the right to make changes without notice or obligation in our products and publications.

