



GEOMEMBRANES PRODUCT DATA

FOR MORE INFORMATION

Geosynthetics magazine has provided information on the geomembrane specification charts for comparative purposes only. Designers should contact manufacturers for additional details and to discuss site-specific considerations.

Information on the use and specification of geomembranes is also available from the Geosynthetic Materials Association (GMA).

GMA
1801 County Road B West
Roseville, MN 55113-4061 USA
+1 651 225 6956
fax +1 651 631 9334
jjcurry@ifai.com
www.GMAnow.com

PUBLISHER'S NOTE

Geosynthetics magazine compiled all information included in the *Geosynthetics 2019 Specifier's Guide* from information submitted by firms in the geosynthetics industry. Companies provided specifications voluntarily, and specification accuracy is the responsibility of the manufacturer. The appearance of a listing in this directory is not an endorsement of the company or product by *Geosynthetics* magazine or the Industrial Fabrics Association International (IFAI). The *Geosynthetics 2019 Specifier's Guide* is intended as a guide, and *Geosynthetics* magazine and IFAI encourage readers to contact the companies listed for further information.

Manufacturers engineer these products to provide cost-effective solutions and to meet specific design requirements in fluid barrier, containment and other geotechnical applications.

Geomembranes have been used since the 1950s, and their use has steadily increased as a result of water resource concerns. It is now common to find local and state regulations calling for infrastructure designs that use geomembranes for containment, lining and capping. Whether for potable water or animal waste, these materials have become central to project acceptance and success.

Geomembranes are available in a variety of physical, mechanical and chemical resistance properties designed to meet the requirements of a wide range of applications. For example, the products can be compounded for exposure to ultraviolet light, ozone and microorganisms in soil. Different combinations of these properties exist in various geosynthetic lining materials to cover a wide spectrum of geotechnical applications and designs.

Manufacturers use several methods to bond the geosynthetic lining materials in the factory and in the field. Each material has highly developed quality control techniques that govern its manufacture and installation.

The numbers

Companies that submitted product data chart lines were asked to provide data determined through industry-accepted testing methods. Companies signed a certificate of compliance verifying the accuracy of this data.

Product Name	Base Polymer [1]	Dimensional Properties			Density ASTM D1505 (g/cm ³)s	Tensile Properties ASTM D6693			Puncture Resistance ASTM D4833 kN (lb)	Tear Resistance ASTM D1004 kN (lb)	Low Temperature Brittleness ASTM D746 °C (°F) [3]	Carbon Black Content ASTM D1603 (%)	Carbon Black Dispersion ASTM D5596 [4]	Manufacturer's Suggested Applications [5]
		Roll Width/Length m (ft)	[2] Thickness ASTM 5199 mm (mils)	[2] Thickness ASTM D5994 mm (mils)		Strength Yield kN/m (lb/in)	Strength Break kN/m (lb/in)	Elongation Yield/Break %						
Agru Drain Liner®	LLDPE Structured	7.0/152.4 (23/500')	NA	1.5 (60)	0.939 max.	NA	22 (126)	NA/300	0.31 (70)	0.18 (40)	-60 (-83)	2-3	Cat 1/2	CL, SIL, LL, LC, LPL, DL
Agru Grip Liner®	LLDPE Structured	7.0/152.4 (23/500')	NA	1.5 (60)	0.939 max.	NA	22 (126)	NA/300	0.31 (70)	0.18 (40)	-60 (-83)	2-3	Cat 1/2	CL, SIL, LL, LC, LPL, DL
Agru Microspike® Liner	LLDPE-T	7.0/283.57 (23/710')	NA	1.0 (40)	0.939 max.	NA	20 (112)	NA/400	0.22 (50)	0.11 (25)	-60 (-83)	2-3	Cat 1/2	CL, LC, TL, LPL, DL
Agru Microspike® Liner	LLDPE-T	7.0/216.4 (23/505')	NA	1.5 (60)	0.939 max.	NA	29 (168)	NA/400	0.31 (70)	0.16 (36)	-60 (-83)	2-3	Cat 1/2	CL, LC, TL, LPL, DL
Agru Microspike® Liner	LLDPE-T	7.0/117.4 (23/385')	NA	2.0 (80)	0.939 max.	NA	39 (224)	NA/400	0.40 (90)	0.22 (50)	-60 (-83)	2-3	Cat 1/2	CL, LC, TL, LPL, DL
Agru Smooth® Liner	LLDPE-S	7.0/254.5 (23/835')	1.0 (40)	NA	0.939 max.	NA	28 (160)	NA/800	0.26 (60)	0.11 (25)	-60 (-83)	2-3	Cat 1/2	CL, LC, TL, LPL, DL
Agru Smooth® Liner	LLDPE-S	7.0/164.6 (23/540')	1.5 (60)	NA	0.939 max.	NA	42 (240)	NA/800	0.40 (90)	0.16 (37)	-60 (-83)	2-3	Cat 1/2	CL, LC, TL, LPL, DL
Agru Smooth® Liner	LLDPE-S	7.0/126.5 (23/415')	2.0 (80)	NA	0.939 max.	NA	56 (320)	NA/800	0.53 (120)	0.21 (48)	-60 (-83)	2-3	Cat 1/2	CL, LC, TL, LPL, DL
Agru Super Gripnet® Liner	LLDPE Structured	7.0/152.4 (23/500')	NA	1.5 (60)	0.939 max.	NA	22 (126)	NA/300	0.31 (70)	0.18 (40)	-60 (-83)	2-3	Cat 1/2	CL, SIL, LL, LC, LPL, DL
ClosureTurf®	LLDPE O/C Structured -Turf	7.0/152.4 (23/500')	NA	1.5 (60)	0.939 max.	NA	22 (126)	NA/300	0.31 (70)	0.18 (40)	-60 (-83)	2-3	Cat 1/2	CL, SIL, LL, LC, LPL, DL

AGRU America Inc. | www.agruamerica.com

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 EPDM = Ethylene propylene diene monomer
 FPP = Flexible polypropylene
 LLDPE = Linear low density polyethylene
 LLDPE-T = Linear low density polyethylene, textured
 O/C = Other or combination
 TPO = Thermoplastic polyolefin
 T = Textured
 S = Smooth

- [2] ASTM D 5199: Nominal thickness of geosynthetics
 ASTM D 5994: Core thickness of textured geomembrane
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 • minimum of 9 of 10 in categories 1 or 2
 • all 10 in categories 1, 2, or 3

- [5] CL = Canal liner DL = Dam liner
 LPL = Leach pad liner SIC = Surface impoundment cover
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		Roll Width/Length m (ft)	[2] Thickness ASTM 5199 mm (mils)	[2] Thickness ASTM D5994 mm (mils)		Strength Yield kN/m (lb/in)	Strength Break kN/m (lb/in)	Elongation Yield/Break %						
ATARFIL LLD smooth	LLDPE	width: 6.0 (19.7)/6.3 (20.6)/7.5 (24.6) length: 70 (229) to 405 (1332)	0.5 to 4.0 mm (20 to 160 mils)	NA	≤ 0.940	NA	13-104	≥700	0.15-1.2	0.05-0.39	-75	2-2.5	1-2	CL, SIL, DP, RP
ATARFIL LLDS colored smooth	LLDPE	width: 6.0 (19.7)/6.3 (20.6)/7.5 (24.6) length: 70 (229) to 405 (1332)	0.5 to 4.0 mm (20 to 160 mils)	NA	≤ 0.940	NA	13-104	≥700	0.15-1.2	0.05-0.39	-75	2-2.5	1-2	CL, SIL, DP, RP
ATARFIL LLDE conductive	LLDPE	width: 6.0 (19.7)/6.3 (20.6)/7.5 (24.6) length: 70 (229) to 405 (1332)	0.5 to 4.0 mm (20 to 160 mils)	NA	≤ 0.940	NA	13-104	≥700	0.15-1.2	0.05-0.39	-75	≥2	1-2	CL, SIL, DP, RP
ATARFIL LLD TM/TMT [®] (single/double textured structured) asperity 0.9mm / 35mils	LLDPE	width: 6.0 (19.7) length: 90 (295) to 263 (864)	NA	0.5 to 4.0 mm (20 to 160 mils)	≤ 0.940	NA	13-104	≥700	0.15-1.2	0.05-0.39	-75	2-2.5	1-2	LC
ATARFIL LLD TM/TMT [®] (single/double textured structured) asperity 0.5mm / 28mils	LLDPE	width: 6.0 (19.7)/6.3 (20.6)/7.5 (24.6) length: 90 (295) to 200m	NA	0.5 to 4.0 mm (20 to 160 mils)	≤ 0.940	NA	13-104	≥700	0.15-1.2	0.05-0.39	-75	2-2.5	1-2	LC
ATARFIL LLD TM/TMT [®] S colored (single/double textured structured) asperity 0.5mm / 28mils	LLDPE	width: 6.0 (19.7)/6.3 (20.6)/7.5 (24.6) length: 90 (295) to 200 (656)	0.5 to 4.0 mm (20 to 160 mils)	NA	≤ 0.940	NA	13-104	≥700	0.15-1.2	0.05-0.39	-75	2-2.5	1-2	LC
ATARFLEX smooth	VLDPE	width: 2.0 (6.5) length: 20 (65.6)	0.75 to 2.0 mm (30 to 80 mils)	NA	≤ 0.920	NA	12-36	≥700	0.25-0.75	0.05-0.16	-70	2-2.5	1-2	SIL, TL
ATARFLEX TM/TMT [®] (single/double textured structured) asperity 0.9mm	VLDPE	width: 6.0 (19.7) length: 90 (295) to 200 (656)	NA	0.75-2.0 mm (30 to 80 mils)	≤ 0.920	NA	12-36	≥700	0.25-0.75	0.05-0.16	-70	2-2.5	1-2	SIL
ATARFLEX S colored smooth	VLDPE	width: 2.0 (6.5) length: 20 (65.6) to 40 (131)	NA	NA	≤ 0.920	NA	12-36	≥700	0.25-0.75	0.05-0.16	-70	2-2.5	1-2	SIL, TL
ATARFLEX TW tunnels	VLDPE	width: 2.0 (6.5) length: 20 (65.6) to 40 (131)	1.5 to 3.0 (60 to 120 mils)	NA	≤ 0.920	NA	16-33	≥700	0.33-1.0	0.06-0.13	-70	NA	NA	TL
ATARTEC Roofing	TPO/ FPO	width: 2.0 (6.5) length: 20 (65.6) to 40 (131)	0.75 to 2.5 (30 to 100 mils)	NA	NP	NA	8.3-41.5	NA/≥700,	NP	EN12310-2=54-270	-70	2-2.5	1-2	roofing
ATARTEC RSV	TPO/ FPO	PP/PES	width: 2.00 (6.5) Length: 15-25 (49-82)	1.2/1.5/2.0 mm (47/60/ 80 mil)	NP	NP	± 1.5	NA	NA	NA	NA	-40	NA	NA

◊Tensile and Puncture properties: values obtained from the smooth part of the geomembrane

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- TPO = Thermoplastic polyolefin
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		Roll Width/Length m (ft)	[2] Thickness ASTM 5199 mm (mils)	[2] Thickness ASTM D5994 mm (mils)	Strength Yield kN/m (lb/in)		Strength Break kN/m (lb/in)	Elongation Yield/Break %							

Engineered Polymer Technologies (EPT) | www.epttech.com

EPT Xtrm Ply TPU	TPU (ester or ether based polyurethane)	width 60" to 120"	20 to 120 mils ^o	NA	NA	NA	NA	NA	NA	NA	-40	NA	NA	SIL, SIC, SR, SC, LC, TL
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◊Data listed is min. value for 20 mil product.

HUITEX | www.huitex.com

HUITEX Both OIT Series	LLDPE CX	7 (23)/76 (249) ~ 420 (1378)	0.50 (20) ~ 2.50 (100)	0.50 (20) ~ 2.50 (100)	<0.939	NA	9 (52) ~ 66 (378)	NA/250 ~ 800	0.120 (26) ~ 0.620 (136)	0.050 (11) ~ 0.250 (55)		2.0~3.0	cat.1/2	all
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Layfield Environmental Containment | www.layfieldgroup.com

Enviro Liner® 6030x	O/C	3.75/457 (12.3/1250)	0.75 (30)	NA	≤ 0.939	NA	25 (141)	1000%	0.236 (53)	NA	-70 (-90)	≥2.0	Pass	all
Enviro Liner® 6040x	O/C	6.8/305 (22.5/1000)	1.0 (40)	NA	≤ 0.939	NA	31 (180)	1000%	0.298 (67)	NA	-70 (-90)	≥2.0	Pass	all
Enviro Liner® 6060x	O/C	6.8/158 (22.5/520)	1.50 (60)	NA	≤ 0.939	NA	44 (255)	1000%	0.40 (90)	NA	-70 (-90)	≥2.0	Pass	all
Enviro Liner® 6040x Textured	O/C	6.8/237 (22.5/780)	1.0 (40)	0.96 (38)	≤ 0.939	NA	13 (76)	350%	0.236 (53)	0.98 (22)	-70 (-90)	≥2.00	Pass	all
Enviro Liner® 6060x Textured	O/C	6.8/134 (22.5/440)	1.50 (60)	1.45 (57)	≤ 0.939	NA	20 (114)	350%	0.355 (80)	0.147 (33)	-70 (-90)	≥2.00	Pass	all
HAZGARD® 635FR	O/C	3.14/305 (10.3/1000)	0.88 (35)	NA	NA	NA	22.8 (130)	700%	0.218 (49)	NA	-70 (-90)	Red	NA	SC (Secondary Containment)
VaporFlex® Premium	Polyolefin/EVOH	5.80/250	0.75 (30)	NA	NA	NA	17 (99)	500%	0.235 (52)	0.10 (22)	-40 (-40)	≥2.00	NA	GC, SC, SR
VaporFlex® Premium	Polyolefin/EVOH	5.80/250	1.0 (40)	NA	NA	NA	22 (128)	500%	0.400 (90)	0.12 (27)	-40 (-40)	≥2.00	NA	GC, SC, SR

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		Roll Width/Length m (ft)	[2] Thickness ASTM 5199 mm (mils)	[2] Thickness ASTM D5994 mm (mils)		Strength Yield kN/m (lb/in)	Strength Break kN/m (lb/in)	Elongation Yield/Break %						

Raven Engineered Films Inc. | www.ravengeo.com

HydraFlex Ultra HU20B - Meets GRI-GM17	LLDPE	4600 (50,000 ft ²)	0.50 (20)	NA	≤0.939	NA	15 (84)	800	0.13 (30)	0.05 (11)	-70 (-57)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
HydraFlex Ultra HU30B - Meets GRI-GM17	LLDPE	3500 (35,000 ft ²)	0.75 (30)	NA	≤0.939	NA	22 (126)	800	0.20 (45)	0.08 (17)	-70 (-57)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
HydraFlex Ultra HU40B - Meets GRI-GM17	LLDPE	2300 (25,000 ft ²)	1.00 (40)	NA	≤0.939	NA	29 (168)	800	0.27 (60)	0.10 (23)	-70 (-57)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
HydraFlex HT30	LLDPE (textured)	3500 (35,000 ft ²)	NA	0.64 (25)	≤0.939	NA	9 (50)	300	0.17 (39)	0.06 (14)	-70 (-57)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
HydraFlex HT40	LLDPE (textured)	2300 (25,000 ft ²)	NA	0.89 (35)	≤0.939	NA	12 (70)	300	0.22 (50)	0.09 (20)	-70 (-57)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
HydraFlex V30B	VLDPE	2300 (25,000 ft ²)	0.75 (30)	NA	≤0.886	NA	16 (90)	700	0.18 (40)	0.04 (9)	-70 (-57)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
Absolute Barrier Y30BAC	LLDPE/EVOH	3500 (35,000 ft ²)	0.75 (30)	NA	≤0.924	NA	15 (85)	300	0.27 (60)	0.08 (18)	-40 (-40)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
Absolute Barrier Y40BAC	LLDPE/EVOH	2300 (25,000 ft ²)	1.00 (40)	NA	≤0.924	NA	22 (125)	350	0.31 (70)	0.10 (22)	-40 (-40)	2	Note [4]	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC

Solmax International Inc. | www.solmax.com

Solmax LLDPE Series Smooth	LLDPE	6.86/171 (22.5/560)	1.5 (60)	NA	0.939	NA	40 (228)	NA/800	0.370 (84)	0.150 (33)	<-70 (<-94)	2-3	1, 2, 3	all
Solmax LLDPE Series Textured	LLDPE-CX-T	6.86/158 (22.5/520)	NA	1.5 (60)	0.939	NA	16 (90)	NA/250	0.300 (66)	0.150 (33)	<-70 (<-94)	2-3	1, 2, 3	all
Solmax High Performance LLDPE Series Smooth	LLDPE	6.86/171 (22.5/560)	1.5 (60)	NA	0.939	NA	42 (240)	NA/900	0.444 (100)	0.150 (33)	<-70 (<-94)	2-3	1, 2, 3	all
Solmax High Performance LLDPE Series Textured	LLDPE-CX-T	6.86/158 (22.5/520)	NA	1.5 (60)	0.939	NA	29 (168)	NA/500	0.422 (95)	0.169 (38)	<-70 (<-94)	2-3	1, 2, 3	all

Note: All of Solmax Geomembranes are available in a variety of thicknesses, smooth or textured, and with black, white or green surface layers.

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		Roll Width/Length m (ft)	Thickness ASTM D5199 (smooth) ASTM D5994 (textured) min. avg. mm (mils) [2]	Density ASTM D1505/D792 (min.) (g/cm ³ min.)	Strength		Elongation							Standard OIT ASTM D 3895	High Pressure OIT ASTM D 5885	ASTM D3895 % retained after 90 days	ASTM D5885 % retained after 90 days		
					Yield Stress kN/m (lb/in)	Break Stress kN/m (lb/in)	Yield Elongation %	Break Elongation %											

AGRU America Inc. | www.agruamerica.com

Agru Drain Liner®	HDPE Structured	7.0/152.4 (23/500)	1.5 (60)	0.94	23 (132)	23 (132)	13	300	0.42 (95)	0.18 (40)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, LL, LC, LPL, DL
Agru Grip Liner®	HDPE Structured	7.0/152.4 (23/500)	1.5 (60)	0.94	23 (132)	23 (132)	13	300	0.42 (95)	0.18 (40)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, LL, LC, LPL, DL
Agru Smooth® Liner	HDPE-S	7.0/317 (23/835)	1.0 (40)	0.94	15 (88)	28 (160)	13	700	0.36 (80)	0.13 (30)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, SIC, LL, LC, LPL, TL, DL, DP
Agru Smooth® Liner	HDPE-S	7.0/164.6 (23/540)	1.5 (60)	0.94	23 (132)	42 (240)	13	700	0.53 (120)	0.20 (45)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, SIC, LL, LC, LPL, TL, DL, DP
Agru Smooth® Liner	HDPE-S	7.0/102.1 (23/415)	2.0 (80)	0.94	31 (176)	56 (320)	13	700	0.71 (160)	0.27 (60)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, SIC, LL, LC, LPL, TL, DL, DP
Agru Micro Spike® Liner	HDPE-T	7.0/253.4 (23/710)	1.0 (40)	0.94	15 (88)	15 (88)	13	350	0.40 (90)	0.13 (30)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, SIC, LL, LC, LPL, TL, DL, DP
Agru Micro Spike® Liner	HDPE-T	7.0/216.4 (23/505)	1.5 (60)	0.94	23 (132)	23 (132)	13	350	0.53 (120)	0.20 (45)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, SIC, LL, LC, LPL, TL, DL, DP
Agru Micro Spike® Liner	HDPE-T	7.0/117.4 (23/385)	20 (80)	0.94	31 (176)	31 (176)	13	350	0.66 (150)	0.27 (60)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, SIC, LL, LC, LPL, TL, DL, DP
Agru Super Gripnet® Liner	HDPE Structured	7.0/152.4 (23/500)	1.50 (60)	0.94	23 (132)	23 (132)	13	200	0.40 (90)	0.18 (40)	2-3	Cat 1/2	1000	160	800	55	80	80	CL, SIL, LL, LC, LPL, DL

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[2] Lowest individual of 10 values

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• Yield elongation calculated with a gage length of 33mm
• Break elongation calculated with a gage length of 50mm

[4] Other methods such as D 4218 (muffle furnace) or microwave methods are acceptable if an appropriate correlation to D 1603 (tube furnace) can be established.

T = Textured
S = Smooth

[5] Carbon black dispersion for 10 different views:
• minimum 9 of 10 in Categories 1 or 2
• all 10 in Categories 1, 2, or 3

[6] The yield stress used to calculate the applied load for the SP-NCTL test should be the manufacturer's mean value via MQC testing.

[7] The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content in the geomembrane.

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[9] The condition of the test should be 20 hr. UV cycle at 75 C followed by 4 hr. condensation at 60 C.

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TL = Tunnel liner
RP = Reserve pit

Product Name	Base Polymer [1]	Dimensional Properties		Density ASTM D1505/D792 (min.) (g/cm ³ min.)	Tensile Properties ASTM D 6693 [3]				Puncture Resistance D 4833 (min. avg.) kN (lb)	Tear Resistance ASTM D 1004 (min. avg.) kN (lb)	Carbon Black Content ASTM D 1603 range (%) [4]	Carbon Black Dispersion ASTM D 5596 [5]	Stress Crack Resistance ASTM D 5397 Appendix [6]		Oxidative Induction Time (OIT) (min. avg.) [7]	Oven Aging at 85°C ASTM D 5721 [7], [8]		UV Resistance GM 11 [9]	Manufacturer's Suggested Applications [11]
		Roll Width/Length m (ft)	Thickness ASTM D5199 (smooth) ASTM D5994 (textured) min. avg. mm (mils) [2]		Strength		Elongation						Standard OIT ASTM D 3895	High Pressure OIT ASTM D 5885		ASTM D3895 % retained after 90 days	ASTM D5885 % retained after 90 days		
					Yield Stress kN/m (lb/in)	Break Stress kN/m (lb/in)	Yield Elongation %	Break Elongation %											
ATARFIL HD smooth	HDPE	width: 6.0 (19.7)/ 6.3 (20.6)/ 7.5 (24.6) length: 70 (229) to 405 (1332)	0.5 to 4.0 mm (20 to 160 mils)	≥ 0,942	8.0-64	10-108	> 12	≥ 700	0.16-1.28	0.06-0.54	2-2.5	1, 2	≥3000	100	≥400	55	80	70	CL, SIL, LL, CL, LPL, RP
ATARFIL HDS colored smooth	HDPE	width: 6.0 (19.7)/ 6.3 (20.6)/ 7.5 (24.6) length: 70 (229) to 405 (1332)	0.5 to 4.0 mm (20 to 160 mils)	≥ 0,942	8.0-64	10-108	> 12	≥ 700	0.16-1.28	0.06-0.54	2-2.5	1, 2	≥3000	100	≥400	55	80	70	DP, DL, RP, CL, SIL
ATARFIL HDE conductive	HDPE	width: 6.0 (19.7)/ 6.3 (20.6)/ 7.5 (24.6) length: 70 (229) to 405 (1332)	0.5 to 4.0 mm (20 to 160 mils)	≥ 0,942	8.0-64	10-108	> 12	≥ 700	0.16-1.28	0.06-0.54	≥ 2	1, 2	≥3000	100	≥400	55	80	70	CL, SIL, LL, CL, LPL, RP
ATARFIL TM-TMT[®] (single/double textured structured) asperity 0.9mm / 35mils	HDPE	width: 6.0 (19.7) length: 90 (295) to 263 (864)	0.5 to 4.0 mm (20 to 160 mils)	≥ 0,942	8.0-64	10-108	> 12	≥ 700	0.16-1.28	0.06-0.54	2-2.5	1, 2	≥3000	100	≥400	55	80	70	LC
ATARFIL TM-TMT[®] (single/double textured structured) asperity 0.5mm / 28mils	HDPE	width: 6.0 (19.7)/ 6.3 (20.6)/ 7.5 (24.6) length: 90 (295) to 200 (656)	0.5 to 4.0 mm (20 to 160 mils)	≥ 0,942	8.0-64	10-108	> 12	≥ 700	0.16-1.28	0.06-0.54	2-2.5	1, 2	≥3000	100	≥400	55	80	70	LC
ATARFIL TM-TMT[®] S colored (single/double textured structured) asperity 0.5mm / 28mils	HDPE	width: 6.0 (19.7)/ 6.3 (20.6)/ 7.5 (24.6) length: 90 (295) to 200 (656)	0.5 to 4.0 mm (20 to 160 mils)	≥ 0,942	8.0-64	10-108	> 12	≥ 700	0.16-1.28	0.06-0.54	2-2.5	1, 2	≥3000	100	≥400	55	80	70	LC
ATARLOCK CPL	HDPE	width: 2.0 (6.5) length: 20 (65.6)	2.0 to 5.0 mm (80 to 200 mils)	≥ 0,942	16-80	NA	NA	≥ 400	NA	NA	2-2.5	1, 2	≥3000	100	≥400	55	80	70	concrete protection

↳ Tensile and Puncture properties and Stress Crack Resistance: values obtained from the smooth part of the geomembrane

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CX = Coextruded S = Smooth

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[3] Machine direction (MD) and cross machine direction (XD) average values should be on the basis of 5 test specimens each direction

• Yield elongation calculated with a gage length of 33mm
• Break elongation calculated with a gage length of 50mm

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[9] The condition of the test should be 20 hr. UV cycle at 75 C followed by 4 hr. condensation at 60 C.

[10] UV resistance is based on percent retained value regardless of the original HP-OIT value.

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SIL = Surface impoundment liner LPL = Leach pad liner
SIC = Surface impoundment cover LC = Landfill cover
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NP = Not provided by manufacturer
NA = Not applicable, per manufacturer

Product Name	Base Polymer [1]	Dimensional Properties			Tensile Properties ASTM D 6693 [3]				Puncture Resistance D 4833 (min. avg.) kN (lb)	Tear Resistance ASTM D 1004 (min. avg.) kN (lb)	Carbon Black Content ASTM D 1603 range (%) [4]	Carbon Black Dispersion ASTM D 5596 [5]	Stress Crack Resistance ASTM D 5397 Appendix [6]	Oxidative Induction Time (OIT) (min. avg.) [7]		Oven Aging at 85°C ASTM D 5721 [7], [8]		UV Resistance GM 11 [9]	Manufacturer's Suggested Applications [11]
		Roll Width/Length m (ft)	Thickness ASTM D5199 (smooth) ASTM D5994 (textured) min. avg. mm (mils) [2]	Density ASTM D1505/D792 (min.) (g/cm ³ min.)	Strength		Elongation							Standard OIT ASTM D 3895	High Pressure OIT ASTM D 5885	ASTM D3895 % retained after 90 days	ASTM D5885 % retained after 90 days		
					Yield Stress kN/m (lb/in)	Break Stress kN/m (lb/in)	Yield Elongation %	Break Elongation %											

HUITEX | www.huitex.com

HUITEX Both OIT Series	HDPE CX	7 (23) ~ 8 (26)/70 (230) ~ 420 (1378)	0.50 (20) ~ 3.00 (120)	0.940	7 (40) ~ 45 (258)	5 (28) ~ 80 (458)	12	100 ~ 700	0.160 (34) ~ 0.960 (211)	0.07 (16) ~ 0.37 (82)	2.0 ~ 3.0	cat.1/2	500	100	400	55	80	50	all
HUITEX Colored Series	HDPE CX	7 (23) ~ 8 (26)/70 (230) ~ 420 (1378)	0.50 (20) ~ 3.00 (120)	0.940 (black layer)	7 (40) ~ 45 (258)	5 (28) ~ 80 (458)	12	100 ~ 700	0.160 (34) ~ 0.960 (211)	0.07 (16) ~ 0.37 (82)	2.0 ~ 3.0 black layer	cat.1/2 black layer	500	100 black layer	400 black layer	55 black layer	80 black layer	50 black layer	all
HUITEX K-Liner CPL series	HDPE	2.5 (8.21) ~ 3.0 (9.75)/60 (197) ~ 70 (230)	2.00 (80) ~ 5.00 (200)	0.940	30 (172) ~ 75 (430)	54 (309) ~ 135 (774)	12	500	0.640 (141) ~ 1.60 (352)	0.25 (55) ~ 0.63 (138)	2.0 ~ 3.0	cat.1/2	500	100	400	NA	NA	NA	Concrete Protection

Layfield Environmental Containment | www.layfieldgroup.com

Layfield HDPE 60	HDPE	6.86/158.5 m (22.5/520 ft)	1.5 (60)	≥ 0.94	22 (126)	40 (228)	12%	700%	0.48 (108)	0.187 (42)	≥ 2.0%	Note [5]	500	100	400	55%	80%	50%	all
Layfield HDPE 80	HDPE	6.86/122 m (22.5/400 ft)	2.0 (80)	≥ 0.94	29 (168)	53 (304)	12%	700%	0.64 (144)	0.249 (56)	≥ 2.0%	Note [5]	500	100	400	55%	80%	50%	all
Layfield HDPE 60 Textured	HDPE	6.86/171 m (22.5/560 ft)	1.45 (57)	≥ 0.94	22 (126)	16 (90)	12%	100%	0.4 (90)	0.187 (42)	≥ 2.0%	Note [5]	500	100	400	55%	80%	50%	all
Layfield HDPE 80 Textured	HDPE	6.86/134 m (22.5/440 ft)	1.90 (76)	≥ 0.94	29 (168)	21 (120)	12%	100%	0.534 (120)	0.249 (56)	≥ 2.0%	Note [5]	500	100	400	55%	80%	50%	all
HEATGARD™ High Temp 60	HDPE	6.86/158.5 m (22.5/520 ft)	1.5 (60)	≥ 0.94	27 (152)	40 (228)	13%	600%	0.534 (120)	0.2 (45)	≥ 2.0%	CAT1	1000	100	400	55%	80%	50%	High Temperature and Potable Water Containment
HEATGARD™ High Temp 80	HDPE	6.86/122 m (22.5/400 ft)	2.0 (80)	≥ 0.94	36 (204)	53 (304)	13%	600%	0.712 (160)	0.260 (58)	≥ 2.0%	CAT1	1000	100	400	55%	80%	50%	High Temperature and Potable Water Containment

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Product Name	Base Polymer [1]	Dimensional Properties		Density ASTM D1505/D792 (min.) (g/cm ³ min.)	Tensile Properties ASTM D 6693 [3]				Puncture Resistance D 4833 (min. avg.) kN (lb)	Tear Resistance ASTM D 1004 (min. avg.) kN (lb)	Carbon Black Content ASTM D 1603 range (%) [4]	Carbon Black Dispersion ASTM D 5596 [5]	Stress Crack Resistance ASTM D 5397 Appendix [6]			Oxidative Induction Time (OIT) (min. avg.) [7]	Oven Aging at 85°C ASTM D 5721 [7], [8]		UV Resistance GM 11 [9]	Manufacturer's Suggested Applications [11]
		Roll Width/Length m (ft)	Thickness ASTM D5199 (smooth) ASTM D5994 (textured) min. avg. mm (mils) [2]		Strength		Elongation						Standard OIT ASTM D 3895	High Pressure OIT ASTM D 5885	Standard OIT		High Pressure OIT			
Absolute Barrier X40BAL	HDPE/EVOH	1600 (19,200 ft ²) LF Mill Rolls	1.00 (40)	≥ 0.940	15 (84)	11 (60)	12	300	0.32 (72)	0.12 (28)	2	Note [4]	500 hrs	100 min	400 min				CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC	
Absolute Barrier X60BAL	HDPE/EVOH	1200 (13,600 ft ²) LF Mill Rolls	1.50 (60)	≥ 0.940	22 (126)	16 (90)	12	350	0.45 (108)	0.19 (42)	2	Note [4]	500 hrs	100 min	400 min				CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC	
Absolute Barrier X60BCS	HDPE/EVOH	1200 (13,600 ft ²) LF Mill Rolls	1.50 (60)	≥ 0.940	22 (126)	16 (90)	12	100	0.40 (90)	0.19 (42)	2	Note [4]	500 hrs	100 min	400 min				CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC	

Raven Engineered Films Inc. | www.ravengeo.com

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Product Name	Base Polymer [1]	Dimensional Properties		Density ASTM D1505/D792 (min.) (g/cm ³ min.)	Tensile Properties ASTM D 6693 [3]				Puncture Resistance D 4833 (min. avg.) kN (lb)	Tear Resistance ASTM D 1004 (min. avg.) kN (lb)	Carbon Black Content ASTM D 1603 range (%) [4]	Carbon Black Dispersion ASTM D 5596 [5]	Stress Crack Resistance ASTM D 5397 Appendix [6]	Oxidative Induction Time (OIT) (min. avg.) [7]		Oven Aging at 85°C ASTM D 5721 [7], [8]		UV Resistance GM 11 [9]	Manufacturer's Suggested Applications [11]
		Roll Width/Length m (ft)	Thickness ASTM D5199 (smooth) ASTM D5994 (textured) min. avg. mm (mils) [2]		Strength		Elongation							Standard OIT	High Pressure OIT	ASTM D3895 % retained after 90 days	ASTM D5885 % retained after 90 days		
					Yield Stress kN/m (lb/in)	Break Stress kN/m (lb/in)	Yield Elongation %	Break Elongation %											
Solmax HDPE Series Leak Location Liner Smooth	HD-CX-S	6.86/171 (22.5/560)	1.5 (60)	0.940	22 (126)	40 (228)	12	700	0.480 (108)	0.187 (42)	2-3	1, 2, 3	300	100	400	55	80	50	all
Solmax HDPE Series Leak Location Liner Smooth	HD-CX-S	6.86/131 (22.5/430)	2.0 (80)	0.940	29 (168)	53 (304)	12	700	0.640 (144)	0.249 (56)	2-3	1, 2, 3	300	100	400	55	80	50	all
Solmax HDPE Series Leak Location Liner Textured	HD-CX-T	6.86/158 (22.5/520)	1.5 (60)	0.940	22 (126)	16 (90)	12	100	0.400 (90)	0.187 (42)	2-3	1, 2, 3	300	100	400	55	80	50	all
Solmax HDPE Series Leak Location Liner Textured	HD-CX-T	6.86/122 (22.5/400)	2.0 (80)	0.940	29 (168)	21 (120)	12	100	0.534 (120)	0.249 (56)	2-3	1, 2, 3	300	100	400	55	80	50	all
Solmax HDPE Series Smooth	HD-S	6.86/171 (22.5/560)	1.5 (60)	0.940	22 (126)	40 (228)	12	700	0.480 (108)	0.187 (42)	2-3	1, 2, 3	300	100	400	55	80	50	all
Solmax HDPE Series Textured	HD-C-T	6.86/158 (22.5/520)	1.5 (60)	0.940	22 (126)	16 (90)	12	100	0.400 (90)	0.187 (42)	2-3	1, 2, 3	300	100	400	55	80	50	all
Solmax High Performance HDPE Series Smooth	CX-S	6.86/171 (22.5/560)	1.5 (60)	0.940	23 (132)	42 (243)	13	800	0.556 (125)	0.187 (42)	2-3	1, 2, 3	1000	160	800	N/A	80	80	all
Solmax High Performance HDPE Series Smooth	CX-S	6.86/131 (22.5/430)	2.0 (80)	0.940	31 (177)	57 (327)	13	800	0.711 (160)	0.257 (58)	2-3	1, 2, 3	1000	160	800	N/A	80	80	all
Solmax High Performance HDPE Series Textured	CX-T	6.86/158 (22.5/520)	1.5 (60)	0.940	23 (132)	20 (115)	13	200	0.578 (130)	0.200 (45)	2-3	1, 2, 3	1000	160	800	N/A	80	80	all
Solmax High Performance HDPE Series Textured	CX-T	6.86/122 (22.5/400)	2.0 (80)	0.940	31 (177)	27 (155)	13	200	0.711 (160)	0.266 (60)	2-3	1, 2, 3	1000	160	800	N/A	80	80	all
Solmax Goliath Series	CX-S	6.8/158.5 (22.3/520)	1.5 (60)	0.940	24.5 (140)	42 (240)	13	650	0.534 (120)	0.200 (45)	2-3	1, 2, 3	600	160	800	N/A	90	85	High Temperature Applications
Solmax High Temperature Series Liner	HD-S	7.5/130 (24.6/427)	1.5 (60)	0.940	22 (126)	40 (228)	12	600	0.480 (108)	0.190 (43)	2-3	1, 2, 3	500	160	800	N/A	90	80	High Temperature Applications

Note: All of Solmax Geomembranes are available in a variety of thicknesses and with black, white or green surface layers.

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GEOMEMBRANES POLYPROPYLENE

Product Name	Polymer Type	Dimensional Properties		Specific Gravity ASTM D792	Dimensional Stability ASTM D1204 %	Puncture Resistance ASTM D4833 kN (lb)	Tear Resistance STM D1004 Die C kN (lb)	Tensile Properties ASTM D638				Low Temperature Brittleness ASTM D2136 °C	Suggested Seam Strength ASTM D4545		Carbon Black Content ASTM D1603	Manufacturer's Suggested Applications [1]
		Maximum Panel Size m ² (ft ²)	Thickness ASTM D751 mm (mils)					Strength		Elongation			Shear kN/m (lb/in)	Peel kN/m (lb/in)		
								Yield kN/m (lb/in)	Break kN/m (lb/in)	Yield %	Break %					
Atarfil S.L. www.atarfil.com																
ATARPOL smooth	PP	40 m ² (430 ft ²), width: 2.0 m (6.5 ft)	1.00-2.50 mm (40-100 mils)	≥ 0.88	±1.50	0.13-0.32	0.06-0.15	NA	12-30	NA	≥ 500	-40	NP	NP	2-2.5	CL, SIC, LPL, LC, RP, SIL
ATARPOL S colored smooth	PP	40 m ² (430 ft ²), width: 2.0 m (6.5 ft)	1.00-2.50 mm (40-100 mils)	≥ 0.88	±1.50	0.13-0.32	0.06-0.15	NA	12-30	NA	≥ 500	-40	NP	NP	2-2.5	CL, SIL, SIC, DP, RP
Cooley Group www.cooleygroup.com																
CoolPro-UPP30	fPP	width = 65 to 150 in (1.6 to 3.8 m)	0.75 (30)	0.9	1	0.11 (25)	0.04 (10)	NP	10 (54)	NP	700	-40	NP	NP	NP	CL, SIC, SIL, TL, DP, LL, LPL, DL, LC
CoolPro-UPP40	fPP	width = 65 to 150 in (1.6 to 3.8 m)	1.0 (40)	0.9	1	0.13 (30)	0.05 (12)	NP	13 (72)	NP	700	-40	NP	NP	NP	CL, SIC, SIL, TL, DP, LL, LPL, DL, LC
CoolPro-UPP100	fPP	width = 65 to 150 in (1.6-3.8 m)	2.5 (100)	0.9	-0.5	0.30 (68)	0.19 (43)	NP	33 (180)	NP	700	-40	NP	NP	NP	CL, SIC, SIL, TL, DP, LL, LPL, DL, LC
Engineered Polymer Technologies (EPT) www.epttech.com																
EPT Xtrm Ply fPP	flexible PP	width: 60-120"	20 to 120 mils [◇]	1.2	0.5	10 lb [◇]	9 lb [◇]	NA	70 [◇]	NA	700	-40	25 [◇]	15 [◇]	>2.5	CL, SIL, SIC, LL, DL, LPL, LC, TL
EPT Xtrm Ply rPP	TPO-PP ^{◇◇}	PET 60-120"	20 to 120 mils [◇]	1.2	0.9	15 [◇]	1	350 [◇]	70 [◇]	200 [◇]	400 [◇]	-40	NP	NP		CL, SIL, SIC, LL, DL, LPL, LC, TL
[◇] Data listed is min. value for 20 mil product ^{◇◇} Data listed is min. value for 30 mil product																
Raven Engineered Films Inc. www.ravengeo.com																
Hydrflex PP40	Flexible pp	2,300 (25,000)	0.91 (36)	0.9	±2	0.15 (34)	0.05 (12)	NA	13 (75)	NA	700	-40	8.9 (51)	5.6 (32)	2	CL, LPL, SIC, LC, TL, SIL, DP

[1] CL = Canal liner
DL = Dam liner
DP = Decorative Pond
LPL = Leach pad liner

LC = Landfill cover
LL = Landfill liner
TL = Tunnel liner
SIL = Surface impoundment liner
SIC = Surface impoundment cover

[2] Cannot separate
NP = Not provided by manufacturer
NA = Not applicable, per manufacturer

Product Name	[1] Polymer Type	Dimensional Properties		Specific Gravity ASTM D792	Dimensional Stability ASTM D1204 %	Tear Resistance ASTM D1004 Die C kN (lb)	Tensile Properties [2] ASTM D882		Hydrostatic Resistance ASTM D751 Method A kPa (lb/in ²)	Low Temperature Brittleness ASTM D1790 °C	Manufacturer's Sug- gested Applications [3]
		Roll Width/ Length m (ft)	Thickness ASTM D1593 or D5199 mm (mil)				MD kN/m (lb/in)	XD kN/m (lb/in)			

Cooley Group | www.cooleygroup.com

CoolGuard-UCG40	EIA	width = 65 to 150 in (1.6 to 3.8 m)	1.0 (40)	1.2	5	0.30 (67)	0.09 (20)	NP	13 (72)	NP	350
CoolGuard-UCG80	EIA	width = 65 to 150 in (1.6 to 3.8 m)	2.0 (80)	1.2	5	0.59 (133)	0.18 (40)	NP	25 (144)	NP	350

Engineered Polymer Technologies (EPT) | www.epttech.com

EPT Xtrm Ply fPVC	PVC-GP, NSF 61 and/or ASTM-7176	width 60" to 120"	20-120 mils [◇]	1.3	0.5	10 [◇]	50 [◇]	50 [◇]	80 [◇]	-30	CL, SIL, SIC, LL, LPL, DL, SR, SC, LC, TL
EPT Xtrm Ply fEIA	KEE/EIA-GP, NSF 61 and/or ASTM-7176	width 60" to 120"	20-120 mils [◇]	1.2	0.5	10 [◇]	50 [◇]	50 [◇]	80 [◇]	-40	CL, SIL, SIC, SR, SC, LC, LPL, TL

◇Data listed is min. value for 20 mil product.

Layfield Environmental Containment | www.layfieldgroup.com

HAZGARD® 100	O/C	1.83/261 (6/855)	0.76 (30)	1.15	4	0.027 (6)	9.98 (57)	8.93 (51)	420 (61)	-30	SC
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Plastatech Engineering Ltd. | www.plastatech.com

Plastatech FG (Fish Grade)	PVC - Fish Grade	76 in. x 480 yd.	20-30 mil	1.20 min.	3-4 max.	6.0 min. - 8.0 min.	48 min. - 73 min.	48 min. - 73 min.	68 min. - 100 min.	Pass at 5°F (-15°C) and -9.4°F (-23°C)	CL, SIL, SC, LL, DL, LPL
Plastatech IG (Industrial Grade)	PVC - Industrial Grade	76 in. x 1,025 yd.	10-30 mil	1.20 min.	3-4 max.	2.5 min. - 8.0 min.	24 min. - 73 min.	24 min. - 73 min.	42 min. - 100 min.	Pass at -9.4°F (-23°C), -14.8°F (-26°C) and -20°F (-29°C)	CL, SIL, SC, LL, DL, LPL
Plastatech OR (Oil Resistant)	PVC - Oil Resistant	76 in. x 300 yd.	30 mil	1.20 min.	3 max.	8.0 min.	73 min.	73 min.	100 min.	Pass at 10.4°F (-12°C)	CL, SIL, SC, LL, DL, LPL

Raven Engineered Films Inc. | www.ravengeo.com

Hydraflex PV30B (PVC Available 20-60 mil)	PVC	2300 (25,000 ft ²)	0.5 (30)	1.2	3	.04 (8)	13 (73)	13 (73)	689 (100)	-20	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC
Hydraflex EP45B (Available 45 & 60 mil)	EPDM	2300 (25,000 ft ²)	1.14 (45)	1.1	1	26.27 [◇] (150)				◇-45	CL, LPL, LC, TL, RP, SIC, DP, SIL, RSC

◇ASTM D624 Tear Resistance ◇◇ASTM D2137 Brittleness Point

Solmax International Inc. | www.solmax.com

Solmax PGI	PVC	2,16/224-303.6 (7.08/735-996)	0.75-1.00 (30-40)	1.2	3	0.035-0.044 (8-10)	12.8-17.0 (73-97)	12.8-17.0 (73-97)	690-830 (100-120)	-20 (-4°F)	CL, SIL, SIC, LL, LC, LPL, DL
Solmax 220 FG	PVC - FISH GRADE	1.83/384 (6.00/1,260)	0.50 (20)	NP	NP	0.017 (4)	5.3 (30)	5.3 (30)	NP	NP	CL, SIL, SIC, LL, LC, LPL, DL
Solmax 260 PG	PVC - POTABLE GRADE	1.55/128 (5.08/420)	1.50 (60)	1.2	4	0.044 (10)	17.5 (100)	17.5 (100)	621 (90)	-20 (-4°F)	CL, SIL, SIC, LL, LC, LPL, DL

- [5] PVC = Polyvinyl chloride
- PVC-R = Polyvinyl chloride-reinforced
- [2] MD = Machine direction
- XD = Cross-machine direction

- [3] CL = Canal liner
- SC = Secondary containment
- SR = Soil remediation
- SIL = Surface impoundment liner
- SIC = Surface impoundment cover

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- TL = Tunner liner

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Unless otherwise indicated, these are minimum average roll values (MARV). All claims are the responsibility of the manufacturer.

GEOMEMBRANES REINFORCED

Product Name	Polymer Type [1] (membrane)	Polymer Type [1] (reinforcement)	Dimensional Properties		Specific Gravity ASTM D792	Ply Adhesion ASTM D413 MD kN/m (lb/in)	Dimensional Stability ASTM D1204 %	Puncture Resistance FTMS 101C Method 2031 kN (lb)	Tear Resistance ASTM D5884 Method B Tongue Tear kN (lb)	Tensile Strength ASTM D751 [2] kN (lb)	Hydrostatic Resistance ASTM D751 [2] Method A kN/m ² (lb/in ²)	Low Temperature Brittleness ASTM D1790 °C	Suggested Seam Strength		Manufacturer's Suggested Applications [4]	
			Maximum Panel Size Roll Width/Length m/m (ft/ft)	Thickness ASTM 1593 or D5199 mm (mil)									Shear ASTM D751 [3] kN/m (lb/in)	Peel ASTM D413 kN/m (lb/in)		
Atarfil S.L. www.atarfil.com																
ATARPOL RSP	PP	PP/PES	width: 2.00 (6.5) Length: 20-25 (65.6-82)	1.0/1.14/ 1.2/1.5 mm (40/ 44/ 47/ 60 mil)	≥ 0.88	ASTMD 6636 ≥65N	≤0.3	NA	NA	NA	NA	-40	NA	NA	CL, SIL, SIC, DP, RP, roofing	
ATARTEC RSP Roofing	TPO/ FPO	PP/PES	width: 2.00 (6.5) Length: 15-25 (49-82)	1.2/1.5/ 2.0 mm (47/ 60/ 80 mil)	NP	NP	≤0.3	NA	NA	NA	NA	-40	NA	NA	roofing	
BTL Liners www.btl liners.com																
BTL™-12 Woven Clear	LDPE	HDPE	155,000 f ²	(12 mil)				75 LB	MD (65) CD (65)	MD (220) CD (175)		-40			Greenhouse/ Ag/Rain Covers	
BTL™-12 Black/White	LDPE	HDPE	175,000 f ²	(12 mil)				MD -3.6% CD -2.4%	76 LB	MD(50) CD (50)	MD (140) CD (100)	130 LB	-40	MD (110) CD (80)	5 LB	Greenhouse/ Ag/Rain Covers
BTL™-24	LDPE	HDPE	75,000 f ²	(24 mil)				MD -4.2% CD -3.7%	182 LB	MD (110) CD (110)	MD (350) CD (335)	425 LB	-65	MD (196) CD (35.5)	5 LB	CL, DP, ILC, LC, LPL, GC, RP, RSC, SIL, SIC, TL
BTL™-30	LDPE	HDPE	65,000 f ²	(30 mil)				MD -2.8% CD -1.5%	202 LB	MD (50) CD (55)	MD (345) CD (420)	610 LB	-65	MD (188) CD (240)	5 LB	CL, DP, ILC, LC, LPL, GC, RP, RSC, SIL, SIC, TL
RPEL-30	LDPE	HDPE	55,000 f ²	(30 mil)				0.5% x 0.9%	325 LB	MD (60) CD (60)	MD (385) CD (385)	600 LB	-65	CD 315 lb/in	24 lb/in	CL, DP, ILC, LC, LPL, GC, RP, RSC, SIL, SIC, TL
BTL™-40	LDPE	HDPE	50,000 f ²	(40 mil)				MD -3.8% CD -1.8%	347 LB	MD (150) CD (155)	MD (460) CD (450)	685 LB	-65	MD (368) CD (360)	5 LB	CL, DP, ILC, LC, LPL, GC, RP, RSC, SIL, SIC, TL
PPL™-45	LDPE	HDPE	42,000 f ²	(45 mil)				MD -2.1% CD -3.1%	380 LB	MD (90) CD (90)	MD (385) CD (360)	880 LB	-65	MD (308) CD (288)	5 LB	CL, DP, ILC, LC, LPL, GC, RP, RSC, SIL, SIC, TL
BTL™-60	LDPE	HDPE	33,000 f ²	(60 mil)				NA	380 LB	MD (100) CD (100)	MD (385) CD (360)	881 LB	-85	MD (308) CD (288)	27 LB/IN	CL, DP, ILC, LC, LPL, GC, RP, RSC, SIL, SIC, TL
Burke Industries www.burkeind.com																
M283	CSPE	PET	NP	36	1.45	-8	NA	(240)*	(100)**	-275	(405)[3]	-45 F[5]	NA	NA	NP	
M284	CSPE	PET	NP	45	1.45	-10	NA	(250)*	(105)**	-280	(415)[3]	-45 F[5]	NA	NA	NP	

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 O/C = Other or combination
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[2] As modified in NSF 54, appendix A
 Note: NSF 54 has been withdrawn.

[3] Method A, Procedure I

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* = FTMS 101B
 ** = ASTM D751
 *** = ASTM D4833
 **** = ASTM D7003

Product Name	Polymer Type [1] (membrane)	Polymer Type [1] (reinforcement)	Dimensional Properties		Specific Gravity ASTM D792	Ply Adhesion ASTM D413 MD kN/m (lb/in)	Dimensional Stability ASTM D1204 %	Puncture Resistance FTMS 101C Method 2031 kN (lb)	Tear Resistance ASTM D5884 Method B Tongue Tear kN (lb)	Tensile Strength ASTM D751 [2] kN (lb)	Hydrostatic Resistance ASTM D751 [2] Method A kN/m ² (lb/in ²)	Low Temperature Brittleness ASTM D1790 °C	Suggested Seam Strength		Manufacturer's Suggested Applications [4]
			Maximum Panel Size Roll Width/Length m/m (ft/ft)	Thickness ASTM 1593 or D5199 mm (mil)									Shear ASTM D751 [3] kN/m (lb/in)	Peel ASTM D413 kN/m (lb/in)	
Cooley Group www.cooleygroup.com															
CoolGuard FTL30	EIA	PET	width up to 150 in (3.8 m)	0.91 (36)	NP	2.6 (15)	1	1.45 (325)	0.13 (30)	2.7 x 2.7 (600 x 600)	6897 (1,000)	-34	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolGuard FTL40N	EIA	PET	width up to 150 in (3.8 m)	1.17 (46)	NP	2.6 (15)	1	2.45 (550)	0.22 (50)	4.4 x 4.4 (1,000 x 1,000)	6897 (1,000)	-34	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolGuard HPK80	EIA	PET	width up to 150 in (3.8 m)	2.03 (80)	NP	1.7 (10)	2.5	0.89 (200)	0.13 (30)	1.1 x 0.9 (250 x 200)	2413 (350)	-34	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolGuard HRL36 (PW version available)	EIA	PET	width up to 150 in (3.8 m)	0.91 (36)	NP	2.1 (12)	2.5	1.67 (375)	0.53 (120)	2.8 x 2.7 (625 x 600)	5517 (800)	-40	NP	NP	SIL, SC, SR, SC, LC, TL
CoolGuard MPK36 (PW version available)	EIA	PET	width up to 150 in (3.8 m)	0.91 (36)	NP	1.8 (10)	2.5	0.89 (200)	0.18 (40)	1.1 x 0.9 (250 x 200)	2413 (350)	-25	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolGuard MPK60 (PW version available)	EIA	PET	width up to 150 in (3.8 m)	1.52 (60)	NP	1.8 (10)	2	0.89 (200)	0.13 (30)	1.1 x 0.9 (250 x 200)	2413 (350)	-29	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolPro 45	PP	PET	width = 78 or 150 in (2.0 or 3.8 m)	1.14 (45)	0.9	3.5 (20)	1	1.33 (300)	0.31 (70)	1.3 x 1.1 (300 x 250)	2413 (350)	-40	NP	NP	CL, SIL, SIC, LL, DL, LPL, LC, TL
CoolPro 60	PP	PET	width = 78 or 150 in (2.0 or 3.8 m)	1.52 (60)	0.9	3.5 (20)	1	1.33 (300)	0.31 (70)	1.3 x 1.1 (300 x 250)	2413 (350)	-40	NP	NP	CL, SIL, SIC, LL, DL, LPL, LC, TL
CoolThane FML 87	urethane	PET	width = 60 to 68 in (1.5 to 1.7 m)	0.89 (35)	NP	3.5 (20)	2	NP	0.67 (150)	1.8 x 1.6 (400 x 350)	3447 (500)	-43	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolThane L1023DEP	urethane	PET	width = 60 to 68 in (1.5 to 1.7 m)	0.76 (30)	NP	3.0 (17.5)	2	NP	0.71 (160)	1.6 X 1.3 (350 X 300)	2758 (400)	-54	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolThane L1612ESU	urethane	PET	width = 60 to 68 in (1.5 to 1.7 m)	0.50 (20)	NP	2.6 (15)	2	NP	0.29 (65)	1.4 x 1.1 (325 x 250)	3448 (500)	-43	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolThane L3390NESU	urethane	PET	width = 60 to 68 in (1.5 to 1.7 m)	1.3 (50)	NP	2.6 (15)	2	NP	0.18 (40)	4.9 x 4.9 (1,100 x 1,100)	4138 (600)	-46	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolThane L4490NESU	urethane	nylon	width = 60 to 68 in (1.5 to 1.7 m)	1.4 (54)	NP	2.6 (15)	2	NP	0.18 (40)	5.3 x 4.9 (1,200 x 1,100)	4138 (600)	-46	NP	NP	SIL, SIC, SR, SC, LC, TL
CoolShield 45E	PVDF	PET	width = 60 to 68 in (1.5 to 1.7 m)	1.10 (45)	NP	4.4 (25)	2	NP	0.45 (100)	1.3 x 1.1 (300 x 250)	2413 (350)	-29	NP	NP	SIL, SIC, SR, SC, LC, TL
Oasis	TPA	PET	width = 150 in (3.8 m)	1.52 (60)	NP	3.5 (20)	2	NP	0.58 (130)	1.8 x 1.7 (400 x 380)	4482 (650)	-26	NP	NP	SIL, SIC, SR, SC, LC, TL
Oasis	TPA	PET	width = 196 in (5.0 m)	1.10 (45)	NP	2.6 (15)	2.5	NP	0.24 (55)	1.0 x 1.1 (225 x 2400)	2413 (350)	-26	NP	NP	SIL, SIC, SR, SC, LC, TL

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[2] As modified in NSF 54, appendix A
 Note: NSF 54 has been withdrawn.
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GEOMEMBRANES REINFORCED

Product Name	Polymer Type [1] (membrane)	Polymer Type [1] (reinforcement)	Dimensional Properties		Specific Gravity ASTM D792	Ply Adhesion ASTM D413 MD kN/m (lb/in)	Dimensional Stability ASTM D1204 %	Puncture Resistance FTMS 101C Method 2031 kN (lb)	Tear Resistance ASTM D5884 Method B Tongue Tear kN (lb)	Tensile Strength ASTM D751 [2] kN (lb)	Hydrostatic Resistance ASTM D751 [2] Method A kN/m ² (lb/in ²)	Low Temperature Brittleness ASTM D1790 °C	Suggested Seam Strength		Manufacturer's Suggested Applications [4]
			Maximum Panel Size Roll Width/Length m/m (ft/ft)	Thickness ASTM 1593 or D5199 mm (mil)									Shear ASTM D751 [3] kN/m (lb/in)	Peel ASTM D413 kN/m (lb/in)	

Engineered Polymer Technologies (EPT) | www.epttech.com

EPT XTRM Ply TPU	TPU-ester or ether	PET ^o or nylon	60" - 120"	30° to 120	1.1 ^o -1.2	15°	2	400°	125°	550°	800°	-40	NP	NP	SIL, SIC, SR, SC, LC, TL
EPT Xtrm Ply PVC	PVC-GP, NSF 61 or ASTM 7176 ^o	PET	60" - 120"	20° to 120	1.3	15°	0.5	350°	125°	550°	700°	-30	NP	NP	CL, SIL, SIC, LL, LPL, DL, SR, SC, LC, TL
EPT Xtrm Ply KEE/EIA	KEE/EIA-GP, NSF 61 or ASTM 7176 ^o	PET	60" - 120"	20° to 120	1.2	12°	0.5	350°	125°	550°	700°	-35	NP	NP	CL, SIL, SIC, SR, SC, LC, LPL, TL
EPT Xtrm Ply KEE/EIA HPL	KEE/EIA-GP, NSF 61 or ASTM 7176 ^o	PET	60" - 120"	30° to 120	1.2	12°	0.5 [*]	400°	150°	600°	900°	-35	NP	NP	CL, SIL, SIC, SR, SC, LC, LPL, TL
EPT Xtrm Ply KEE/EIA Geocomposite	KEE/EIA-2-ply composite (film & nonwoven back), NSF 61 or ASTM 7176 ^o	PET	60" - 120"	30° to 120	1.2	15°	2	75	25	75	200	-15	NP	NP	CL, SIL, SIC, SR, SC, LC, LPL, TL

o Data listed is min. value for 30 mil products

Inland Tarp & Liner, LLC | www.inlandtarp.com

ITL® 40 X	LDPE	HDPE	3,716m ² (40,000ft ²)	1 (40)	<0.97	NP	< -4%	(291 ^o *)	(MD83/CD92)	(MD453/CD504)	(590psi)	-60	(>200)	(5lb)	CL, DP, ILC, LC, LPL, RP, RSC, SIL, SIC
ITL® 40 XGL	LDPE	HDPE	3,716m ² (40,000ft ²)	1 (40) ^o	<0.97	NP	< -4%	(291 ^o *)	(MD92/CD137)	(MD628/CD668)	(542psi)	-60	(>200)	(5lb)	CL, DP, ILC, LC, LPL, RP, RSC, SIL, SIC
ITL® 60 XGL	LDPE	HDPE	2,787m ² (30,000ft ²)	1.5 (60) ^o	<0.97	NP	< -4%	(413 ^o *)	(MD91/CD144)	(MD839/CD865)	(523psi)	-60	(>300)	(5lb)	CL, DP, ILC, LC, LPL, RP, RSC, SIL, SIC

o Does not include geotextile top layer

o ASTM D4833

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Product Name	Polymer Type [1] (membrane)	Polymer Type [1] (reinforcement)	Dimensional Properties		Specific Gravity ASTM D792	Ply Adhesion ASTM D413 MD kN/m (lb/in)	Dimensional Stability ASTM D1204 %	Puncture Resistance FTMS 101C Method 2031 kN (lb)	Tear Resistance ASTM D5884 Method B Tongue Tear kN (lb)	Tensile Strength ASTM D751 [2] kN (lb)	Hydrostatic Resistance ASTM D751 [2] Method A kN/m ² (lb/in ²)	Low Temperature Brittleness ASTM D1790 °C	Suggested Seam Strength		Manufacturer's Suggested Applications [4]
			Maximum Panel Size Roll Width/Length m/m (ft/ft)	Thickness ASTM 1593 or D5199 mm (mil)									Shear ASTM D751 [3] kN/m (lb/in)	Peel ASTM D413 kN/m (lb/in)	
Aquamaster NovaLiner 12	LDPE	HDPE	3.65 m x 1800 m (12 ft x 6000 ft) 6600 m ² (72000 ft ²)	0.30 (12)	NA	NA	-3.6% MD -2.4% CD	0.34 (76) [◇]	0.22 (50) MD 0.22 (50) CD	24.5 (140) MD 17.5 (100) CD	900 (130)	-40C ^{◇◇}	19.9 (112) MD 14.0 (80) CD	0.8 (5)	CL, DP, RSC, ILC, SIC
Aquamaster NovaLiner 20	LDPE	HDPE	3.65 m x 900 m (12 ft x 3000 ft) 3300 m ² (36000 ft ²)	0.51 (20)	NA	NA	-4.3% MD -1.8% CD	0.62 (140) [◇]	0.33 (75) MD 0.33 (75) CD	30.6 (175) MD 47.3 (270) CD	957 (139)	-65C ^{◇◇}	24.5 (140) MD 37.8 (216) CD	0.8 (5)	CL, DP, RSC, ILC, SIC
Aquamaster NovaLiner 24	LDPE	HDPE	3.65 m x 900 m (12 ft x 3000 ft) 3300 m ² (36000 ft ²)	0.61 (24)	NA	NA	-3.6% MD -1.0% CD	0.67 (150) [◇]	0.40 (90) MD 0.41 (92) CD	42.0 (240) MD 47.3 (270) CD	1803 (262)	-65C ^{◇◇}	30.8 (176) MD 25.9 (148) CD	0.8 (5)	CL, DP, RSC, ILC, SIC, RP
Aquamaster NovaLiner 30	LDPE	HDPE	3.65 m x 450 m (12 ft x 1500 ft) 1650 m ² (18000 ft ²)	0.76 (30)	NA	NA	-4.4% MD -1.8% CD	0.73 (165) [◇]	0.31 (70) MD 0.38 (85) CD	32.9 (188) MD 39.4 (225) CD	2917 (423)	-65C ^{◇◇}	26.3 (150) MD 31.5 (180) CD	0.8 (5)	CL, DP, SIL, SIC, LC, RP
Aquamaster ArmorLiner 24	LDPE	HDPE	3.65 m x 900 m (12 ft x 3000 ft) 3300 m ² (36000 ft ²)	0.61 (24)	NA	NA	-4.7% MD -1.6% CD	0.81 (182) [◇]	0.49 (110) MD 0.49 (110) CD	42.9 (245) MD 43.8 (250) CD	2927 (425)	-65C ^{◇◇}	34.8 (196) MD 35.0 (200) CD	0.8 (5)	CL, DP, SIL, SIC, LC, RP
Aquamaster ArmorLiner 30	LDPE	HDPE	3.65 m x 450 m (12 ft x 1500 ft) 1650 m ² (18000 ft ²)	0.76 (30)	NA	NA	-4.4% MD -1.8% CD	0.89 (200) [◇]	0.20 (45) MD 0.24 (55) CD	36.8 (210) MD 56.0 (320) CD	4206 (610)	-65C ^{◇◇}	29.4 (168) MD 34.2 (195) CD	0.8 (5)	CL, DP, SIL, SIC, LC, RP
Aquamaster ArmorLiner 40L	LDPE	HDPE	3.65 m x 450 m (12 ft x 1500 ft) 1642 m ² (18000 ft ²)	1.02 (40)	NA	NA	-3.8% MD -1.8% CD	1.55 (350) [◇]	0.62 (140) MD 0.60 (135) CD	80.6 (460) MD 80.6 (460) CD	4723 (685)	-65C ^{◇◇}	64.5 (368) MD 64.5 (368) CD	0.8 (5)	CL, DP, SIL, SIC, LC, TL, LPL
Aquamaster ArmorLiner 45L	LDPE	HDPE	3.65 m x 450 m (12 ft x 1500 ft) 1642 m ² (18000 ft ²)	1.14 (45)	NA	NA	-3.1% MD -1.5% CD	1.62 (365) [◇]	0.47 (105) MD 0.49 (110) CD	76.2 (435) MD 98.9 (565) CD	6063 (880)	-65C ^{◇◇}	61.0 (348) MD 51.1 (452) CD	0.8 (5)	CL, DP, SIL, SIC, LC, TL, LPL
Aquamaster ArmorLiner 30SFL	LDPE / LLDPE	HDPE	3.65 m x 450 m (12 ft x 1500 ft) 1642 m ² (18000 ft ²)	0.76 (30)	NA	NA	-2.9% MD -1% CD	0.87 (195) [◇]	0.35 (79) MD 0.36 (81) CD	45.5 (260) MD 45.5 (260) CD	4375 (635)	-65C ^{◇◇}	36.4 (208) MD 36.4 (208) CD	0.8 (5)	CL, DP, SIL, SIC, LC, TL, LPL
Aquamaster ArmorPad 3NW	LDPE + PP Non-Woven	HDPE	3.65 m x 450 m (12 ft x 1500 ft) 1642 m ² (18000 ft ²)	0.61 (24) ^{◇◇◇}	NA	NA	-3.6% MD -2.5% CD	0.87 (195) [◇]	0.44 (100) MD 0.44 (100) CD	35.0 (200) MD 32.4 (185) CD	2756 (400)	NA	35.0 (200) MD 28.0 (160) CD	0.8 (5)	CL, DP, RP
Aquamaster ArmorPad 3NWLD	LDPE + PP Non-Woven	HDPE	3.65 m x 450 m (12 ft x 1500 ft) 1642 m ² (18000 ft ²)	0.61 (24) ^{◇◇◇}	NA	NA	-3.6% MD -2.5% CD	0.87 (195) [◇]	0.44 (100) MD 0.44 (100) CD	43.8 (250) MD 35.0 (200) CD	2756 (400)	NA	35.0 (200) MD 28.0 (160) CD	0.8 (5)	CL, DP, RP

◇ ASTM D4833 ◇◇ ASTM D2136 ◇◇◇ Without non-woven layers

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GEOMEMBRANES REINFORCED

Product Name	Polymer Type [1] (membrane)	Polymer Type [1] (reinforcement)	Dimensional Properties		Specific Gravity ASTM D792	Ply Adhesion ASTM D413 MD kN/m (lb/in)	Dimensional Stability ASTM D1204 %	Puncture Resistance FTMS 101C Method 2031 kN (lb)	Tear Resistance ASTM D5884 Method B Tongue Tear kN (lb)	Tensile Strength ASTM D751 [2] kN (lb)	Hydrostatic Resistance ASTM D751 [2] Method A kN/m ² (lb/in ²)	Low Temperature Brittleness ASTM D1790 °C	Suggested Seam Strength		Manufacturer's Suggested Applications [4]
			Maximum Panel Size Roll Width/Length m/ft (m/ft)	Thickness ASTM 1593 or D5199 mm (mil)									Shear ASTM D751 [3] kN/m (lb/in)	Peel ASTM D413 kN/m (lb/in)	

Layfield Geosynthetics & Industrial Fabrics Ltd. | www.layfieldgroup.com

HAZGARD® 1000	O/C	PU	2,300 m ² (25,000 ft ²)	0.68 (27)	NA	2.6 (15)	2	1.25 (280)	0.40 (90)	1.55 kN (350 lb)	3100 (450)	-40	26.3 (150)	2.6 (15)	SC
HAZGARD® 5000 HT	O/C	PET	1,250 m ² (13,000 ft ²)	0.76 (30)	NA	2.6 (15)	0.5	N/A	N/A	2.67 kN (600 lbs)	4140 (800)	-35	36.8 (210)	3.5 (20)	SC
CSPE 36	O/C	CSPE	2,300 m ² (25,000 ft ²)	0.91 (36)	NA	1.22 (7)	2	0.89 (200)	0.31 (70)	1.0 (225)	1.33 (300)	-40	0.89 (200)	Film Tear Bond	SC
CSPE 45	O/C	CSPE	2,135 m ² (23,000 ft ²)	1.14 (45)	NA	1.22 (7)	2	1.0 (225)	0.36 (80)	1.11 (250)	1.56 (350)	-40	1.0 (225)	Film Tear Bond	SC
CSPE 60	O/C	CSPE	1670 m ² (18,000 ft ²)	1.52 (60)	NA	1.22 (7)	2	1.33 (300)	0.36 (80)	1.33 (300)	1.78 (400)	-40	1.2 (270)	Film Tear Bond	SC

Owens Corning | www.owenscorning.com/rhinomat

RhinoSkin 12	LDPE	HDPE	up to 100,000 sq. ft./144" wide	12 mil	0.971	NA [°]	0.50%	100lb	74lb x 77lb	176lb x 129lb	102psi	-60C	30 lb/in	3 lb/in	Agriculture crop covers, rain covers, etc.
RhinoSkin 16	LDPE	HDPE	up to 100,000 sq. ft./144" wide	16 mil	0.970	NA [°]	0.50%	135lb	64lb x 59lb	188lb x 161lb	119psi	-60C	40 lb/in	4 lb/in	Agriculture crop covers, rain covers, etc.
RhinoSkin 20	LDPE	HDPE	up to 100,000 sq. ft./144" wide	20 mil	0.970	NA [°]	0.30%	171lb	89lb x 85lb	226lb x 206lb	352psi	-60C	50 lb/in	5 lb/in	Oil and gas, canal liners, secondary containment.
RhinoSkin 24	LDPE	HDPE	up to 100,000 sq. ft./144" wide	24 mil	0.972	NA [°]	0.40%	176lb	82lb x 80lb	251lb x 210lb	380psi	-60C	60 lb/in	5 lb/in	Oil and gas, canal liners, secondary containment.
RhinoSkin 30	LDPE	HDPE	up to 100,000 sq. ft./144" wide	30 mil	0.970	NA [°]	0.60%	225lb	75lb x 60lb	270lb x 225lb	213psi	-60C	70 lb/in	9 lb/in	Oil and gas, canal liners, secondary containment.
RhinoMat 500	LLDPE	HDPE	up to 100,000 sq. ft./144" wide	24 mil	0.970	NA [°]	3.00%	200lb	56lb x 56lb	265lb x 229lb	525psi	-60C	80 lb/in	20 lb/in	Water containment-moderate impoundments.
RhinoMat 750	LLDPE	HDPE	up to 100,000 sq. ft./144" wide	30 mil	0.970	NA [°]	1.52%	305lb	56lb x 56lb	246lb x 272lb	600psi	-60C	100 lb/in	25 lb/in	Water containment-moderate impoundments.
RhinoMat 1000	LLDPE	HDPE	up to 100,000 sq. ft./144" wide	40 mil	0.970	NA [°]	2.86%	242lb	60lb x 62lb	303lb x 265lb	800psi	-60C	165 lb/in	30 lb/in	Water containment-deep impoundments.

↳ Membrane could not be pulled off in one piece in order to conduct the test

Plastatech Engineering Ltd. | www.plastatech.com

Plastatech Tech 5	PVC	PVC	64 in. x 150 yd.	30 mil	NA	NA	-0.7 MD/0.03 CMD	>180	105 MD/81 CMD	NA	>660	NA	NA	NA	CL, DP, RP, RSC, SIL
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			Maximum Panel Size Roll Width/Length m/m (ft/ft)	Thickness ASTM 1593 or D5199 mm (mil)									Shear ASTM D751 [3] kN/m (lb/in)	Peel ASTM D413 kN/m (lb/in)	

Raven Engineered Films Inc. | www.ravengeo.com

Dura-Skrim N30B - Meets GRI-GM25	LLDPE	PET	3700M ² (40,000 ft ²)	0.69 (27)	NP	3 (17)	<1%	.36 (80)°	0.33 (70)	38 (220)°♦♦	NP	<-40	9.6 (55)	7 (40)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim N36B - Meets GRI-GM25	LLDPE	PET	2800M ² (30,000 ft ²)	0.81 (32)	NP	3.6 (21)	<1%	.38 (85)°	0.36 (80)	42 (240)°♦♦	NP	<-40	13 (75)	8 (45)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim N45B - Meets GRI-GM25	LLDPE	PET	2400M ² (26,000 ft ²)	1.01 (40)	NP	4.2 (24)	<1%	.48 (108)°	0.45 (100)	48 (275)°♦♦	NP	<-40	17 (95)	8.7 (50)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim R24BV - Meets GRI-GM22	LLDPE	PET	4600M ² (50,000 ft ²)	0.43 (17.0)	NP	NA	NP	NP	0.29 (65)	24 (135)	1241 (180)°♦♦♦	<-40	NP	NP	ILC, SIL, SIC, RP
Dura-Skrim R20BDV - Meets GRI-GM22	LLDPE	PET	5300M ² (57,000 ft ²)	0.33 (13.0)	NP	NA	NP	NP	0.24 (53)	20 (115)	827 (120)°♦♦♦	<-40	NP	NP	ILC, SIL, SIC, RP
Dura-Skrim R12BV - Meets GRI-GM22	LLDPE	PET	7600M ² (82,000 ft ²)	0.28 (11.0)	NP	NA	NP	NP	0.18 (40)	14 (80)	586 (85)°♦♦♦	<-40	NP	NP	ILC, RSC, RP
Dura-Skrim R8BV - Meets GRI-GM22	LLDPE	PET	11000M ² (120,000 ft ²)	0.18 (7.2)	NP	NA	NP	NP	0.09 (20)	11 (60)°♦♦	448 (65)°♦♦♦	<-40	NP	NP	ILC, RSC, RP
Dura-Skrim NQ36B - Meets GRI-GM18	Flexible PP	PET	2800M ² (30,000 ft ²)	0.81 (32)	NP	3.5 (20)	<1%	.36 (80)°	0.40 (90)	35 (200)°♦♦	NP	<-40	13 (75)	7.0 (40)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim NQ45B - Meets GRI-GM18	Flexible PP	PET	2400M ² (26,000 ft ²)	1.02 (40)	NP	3.8 (22)	<1%	.38 (85)°	0.40 (90)	44 (250)°♦♦	NP	<-40	18 (100)	8.7 (50)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim N36BT1 - Meets GRI-GM25	LLDPE Textured 1-Side	PET	1200M ² (13,000 ft ²)	0.79 (31)	NP	5.4 (31)	<1%	.38 (85)°	0.36 (80)	42 (240)°♦♦	NP	<-40	13 (75)	8 (45)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim N36BT2 - Meets GRI-GM25	LLDPE Textured 2-Side	PET	1200M ² (13,000 ft ²)	0.79 (31)	NP	5.4 (31)	<1%	.38 (85)°	0.36 (80)	42 (240)°♦♦	NP	<-40	13 (75)	8 (45)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim N45BT1 - Meets GRI-GM25	LLDPE Textured 1-Side	PET	1200M ² (13,000 ft ²)	0.99 (39)	NP	5.6 (32)	<1%	.48 (108)°	0.45 (100)	48 (275)°♦♦	NP	<-40	17 (95)	8.7 (50)	CL, SIL, SIC, LPL, TL, LC, DP
Dura-Skrim N45BT2 - Meets GRI-GM25	LLDPE Textured 2-Side	PET	1200M ² (13,000 ft ²)	0.99 (39)	NP	5.6 (32)	<1%	.48 (108)°	0.45 (100)	48 (275)°♦♦	NP	<-40	17 (95)	8.7 (50)	CL, SIL, SIC, LPL, TL, LC, DP
CSPE M284 (45 Mil)	CSPE	PET	1200M ² (13,000 ft ²)	1.14 (45)	1.45	NA	NA	1.11 (250) °FTMS 101B	0.47 (105) ASTM D751	49 (280)°♦♦	3102 (450)	<-40	NP	NP	CL, SIL, SIC, LPL, TL, LC, DP

♦ Puncture Resistance ASTM D4833 ♦♦ Tensile Strength ASTM D7003 ♦♦♦ Mullen Burst ASTM D751

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Seaman Corporation www.xr-technology.com															
6730 XR-5	EIA	PET	1,400 m ² 15,000 ft ²	0.75 (30)	1.2 app.	2.63 (15)	0.5	400	70	2.46 (550)	5520 (800)	-35	2.46 (550)	3.50 (20)	CL, SIL, SIC, LL, DL
8130 XR-3 PW	EIA	PET	1,400 m ² 15,000 ft ²	0.75 (30)	1.2 app.	2.63 (15)	0.5	350	125	2.46 (550)	5520 (800)	-35	2.46 (550)	3.50 (20)	CL, SIL, SIC, DL
8130 XR-5	EIA	PET	1,400 m ² 15,000 ft ²	0.75 (30)	1.2 app.	2.63 (15)	0.5	350	125	2.46 (550)	5520 (800)	-35	2.46 (550)	3.50 (20)	CL, SIL, SIC, LL, DL, LC, LPL
8138 XR-5	EIA	PET	1,200 m ² 13,000 ft ²	1.0 (40)	1.2 app.	2.63 (15)	0.5	350	125	2.46 (550)	5520 (800)	-35	2.46 (550)	3.50 (20)	CL, SIL, SIC, LL, DL, LC, LPL
8228 XR-3	EIA	PET	1,400 m ² 15,000 ft ²	0.75 (30)	1.2 app.	2.10 (12)	0.5	205	50	0.89 (200)	2070 (300)	-32	1.11 (250)	1.75 (10)	CL, SIL, SIC, LC, LPL
8142 XR-5 PW	EIA	PET	1,200 m ² 13,000 ft ²	1.13 (45)	1.2 app.	2.63 (15)	0.5	350	125	2.46 (550)	5520 (800)	-35	2.46 (550)	3.50 (20)	SIC, SIL, CL
9832 XR-5G	EIA	PET	1,400 m ² 15,000 ft ²	0.914 (36)	1.2 app.	2.63 (15)	0.5	440	125	2.90 (650)	5520 (800)	-40	2.90 (650)	3.50 (20)	CL, SIL, SIC, LL, DL, LC, LPL, GC
8123 ULTA	TPU	PET	1,400 m ² 15,000 ft ²	0.635 (25)	1.2 app.	1.75 (10)	0.5	350	125	2.23 (500)	3450 (500)	-65	2.23 (500)	3.50 (20)	CL, SIL, SIC, LL, LC
1936 PTF	TPU	nylon	1,400 m ² 15,000 ft ²	1.0 (40)	1.2 app.	7.01 (40)	0.5	700	125	4.46 (1,000)	10,340 (1,500)	-50	4.46 (1000)	3.50 (20)	SIL, OB, PT

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