KANGAROO PLASTICS COMPANY

Kangaroo Plastics is a leading manufacturer of polyethylene based products in Dubai. UAE. with over 34 years of film extrusion and manufacturing expertise and are accredited with IS0 9001: 2008.
Kangaroo are committed to Quality without Compromise.

The company is backed by dedicated and highly qualified technical, product development and production personnel picked for their experience and professionalism to produce high quality geomembranes.

The geomembrane types produced at the new facility at Jebrl Ali, UAE are smooth and textured HDPE, ULDPE, VLDPE & PP.
Kangaroo Plastics manufacture 7 metre wide geomembranes from 0.75mm to 3.0mm thick\ and are all produced in accordance with international standards as per GM 13, GM 17, GM 18, & GM 19.
All of Kangaroo Plastics geomembranes are fully tested and certified and meet or exceed current American and European standards.

KANGAROO PLASTICS SMOOTH FACE HDPE GEOMEMBRANE

EXTENSIVELY USED FOR CONTAINMENT STRUCTURES
MEETS OR EXCEEDS GRI TEST METHOD GM 13 : Revision 10 : 4/11/11

DATA SHEET : KANGAROO SMOOTH FACE HDPE GEOMEMBRANE									
Properties	**Test Method**	**Frequency**	**Units**	**All Values Minimum Values**					
Thickness	ASTM D 5199	Every Roll	mm	**0.75**	**1.00**	**1.50**	**2.00**	**2.50**	3.00
• Minimum Average • Lowest Individual	ASTM D 5199	Every Roll	mm mm	**0.75** 0.68	**1.00** 0.90	**1.00** 1.35	**2.00** 1.8	**2.50** 2.25	3.00 2.70
Density (min. ave.)	ASTM D 1505	50,000 Kg	g/cc	0.940	0.940	0.940	0.940	0.940	0.940
Tensile [1] (min. ave.) • Strength at yield • Strength at break • Elongation at yield (gauge length 33mm) • Elongation at break (gauge length 50mm)	ASTM D 6693 Type IV @50 mm/min	7,000 Kg	 kN/m kN/m % %	 11 20 12 800	 18 32 15 800	 27 46 15 800	 36 65 15 800	 48 74 15 800	 56 85 15 800
Tear Resistance (min. ave.)	ASTM D 1004	14,000 Kg	N	93	150	220	300	380	460
Puncture Resistance (min. ave.)	ASTM D 4833	14,000 Kg	N	240	380	530	680	820	970
Stress Crack Resistance (NCTL)[2]	ASTM D 5397	Per Formulation	hrs.	>400	>400	>400	>400	>400	>400
Carbon Black Content	ASTM D 1603	7,000 Kg	%	2 to 3	2 to 3	2 to 3	2 to 3	2 to 3	2 to 3
Carbon Black Dispersion	ASTM D 5596	14,000 Kg	Category	Note 3*	Note 3*	Note 3*	Note 3*	Note 3*	Note 3*
Oxidative Induction Time • Standard OIT or • High Pressure OIT	 ASTM D 3895 ASTM D 5885	 50,000 Kg 50,000 Kg	 min. min.	 >120 >400	 >120 >400	 >120 >400	 >120 >400	 >120 >400	 >120 >400
Oven Aging at 85°C • Standard OIT. % Retained after 90 days	ASTM D 5721 ASTM D 3895	Per Formulation	%	55	55	55	55	55	55
UV Resistance[4] • High pressure OIT % Retained after 1600 hrs (min. ave.) see note[5]	GRI GM 11 ASTM D 5885	Per Formulation	%	50	50	50	50	50	50
Dimensional Stability	ASTM D 1204	50,000 kg	%	±1	±1	±1	±1	±1	±1
Seam Strength • Shear • Peel – Hot Wedge - Extrusion Fillet	ASTM D 6392 @50mm/min.	Per Formulation	kN/m kN/m kN/m	10 7.8 6.8	14 10.5 9	21 15.9 13.6	28 21.2 18.2	35 26.4 22.8	42 31.7 27.2
Roll Dimensions • Width • Length • Area	--	--	 m m m^2.	 7 280 1960	 7 210 1470	 7 140 980	 7 105 735	 7 84 588	 7 70 490

Note:
1) Machine Direction (MD) and Transverse Direction (TD) average values are on the basis of 5 specimens each direction.
2) The yield stress used to calculate the applied load for the SP-NCTL test should be the mean value via MQC testing.
3) Carbon Black Dispersion for 10 different views: 9 in Categories 1 and 2 with 1 allowed in Category 3.
4) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.
5) UV resistance is based on percent retained value regardless of the original HP-OIT value.
6) Kangaroo Plastics an ISO 9001 Certified Company
7) Kangaroo Plastics provide up to a 20 year warranty on their HDPE geomembranes
8) The GRI standard developed by the Geosynthetic Research Institute through consultation and review by the member organizations. GRI GM13 specification reviewed at least every 2-years or on an as-required basis. In this regard it is subject to change at any time.
9) This data is provided for informational purpose only. The specifications on this sheet are subject to change without notice

KP / GM-HDS / TDS / Rev.03 / May 11

Precision Geosynthetic Laboratories International
A Texas Research International Company

CERTIFICATE OF CONFORMANCE

THE materials identified in the accompanying Test Report, as sampled and tested under the appropriate protocols agreed between Precision Geosynthetic Laboratories International (PGLI) and Kangaroo Plastics ME LLC were found to be in conformance with GRI GM 13 Specifications.

THIS represents produced materials of 1.5mm HDPE Smooth Geomembrane tested and described in the Precision Geosynthetic Laboratories International Job Number G120126 Test Report.

The conformance testing was performed by (Name of supplier, manufacturer, contractor or consultant): Precision Geosynthetic Laboratories International
of (address): 1160 North Gilbert Street
Anaheim, California
U.S.A. 92801

THIS certification is being issued solely for the purpose of: Certification of material properties in accordance with GRI GM 13 specifications listed in Table 1 of PGL Job No. G120126.

and does not replace, substitute, remove or relieve any person or party from their liabilities, obligations or responsibilities under any agreement or contract in respect of or connected to the works which are subject of this certification.

Signed By: Date:

06/14/2012

Carmelo Zantua
Technical/Laboratory Director

Authorized By: Date:

06/14/2012

Cora B. Queja
Vice President

Precision Geosynthetic Laboratories International

1160 North Gilbert Street, Anaheim, CA. 92801, Tel# 714-520-9631, Fax#714-520-9637

KANGAROO PLASTICS TEXTURE FACE HDPE GEOMEMBRANE

EXTENSIVELY USED FOR CONTAINMENT STRUCTURES
MEETS OR EXCEEDS GRI TEST METHOD GM 13 : Revision 10 : 4/11/11

DATA SHEET : KANGAROO TEXTURE FACE HDPE GEOMEMBRANE									
Properties	**Test Method**	**Frequency**	**Units**	**All Values Minimum Values**					
Thickness	ASTM D 5199	Every Roll	mm	**0.75**	**1.00**	**1.50**	**2.00**	**2.50**	3.00
• Minimum Avg. Value	ASTM D 5199	Every Roll	mm	0.71	0.95	1.42	1.90	2.37	2.85
• Lowest individual value of 8 of 10 readings			mm	0.67	0.90	1.35	1.80	2.25	2.70
• Lowest Individual of 10 readings			mm	0.64	0.85	1.27	1.70	2.13	2.55
Asperity Height[1]	ASTM D 7466	Every 2nd Roll	mm	0.25	0.25	0.25	0.25	0.25	0.25
Density (min. ave.)	ASTM D 1505	50,000 Kg	g/cc	0.940	0.940	0.940	0.940	0.940	0.940
Tensile[2] (min. ave.)									
• Strength at yield	ASTM D 6693 Type IV @50 mm/min	7,000 Kg	kN/m	11	15	22	29	37	44
• Strength at break			kN/m	8	11	16	21	26	32
• Elongation at yield (gauge length 33mm)			%	12	12	12	12	12	12
• Elongation at break (gauge length 50mm)			%	100	100	100	100	100	100
Tear Resistance (min. ave.)	ASTM D 1004	14,000 Kg	N	93	125	187	249	311	374
Puncture Resistance (min. ave.)	ASTM D 4833	14,000 Kg	N	200	267	400	534	667	800
Stress Crack Resistance (NCTL)[3]	ASTM D 5397	Per Formulation	hrs.	>400	>400	>400	>400	>400	>400
Carbon Black Content	ASTM D 1603	7,000 Kg	%	2 to 3	2 to 3	2 to 3	2 to 3	2 to 3	2 to 3
Carbon Black Dispersion	ASTM D 5596	14,000 Kg	Category	Note 4*	Note 4*	Note 4*	Note 4*	Note 4*	Note 4*
Oxidative Induction Time									
• Standard OIT	ASTM D 3895	50,000 Kg	min.	>120	>120	>120	>120	>120	>120
or									
• High Pressure OIT	ASTM D 5885	50,000 Kg	min.	>400	>400	>400	>400	>400	>400
Oven Aging at 85°C									
• Standard OIT. % Retained after 90 days	ASTM D 5721 ASTM D 3895	Per Formulation	%	55	55	55	55	55	55
UV Resistance[5*]									
• High pressure OIT [6] % Retained after 1600 hrs (min. ave.) see note[5]	GRI GM 11 ASTM D 5885	Per Formulation	%	50	50	50	50	50	50
Dimensional Stability	ASTM D 1204	50,000 Kg	Kg %	±1	±1	±1	±1	±1	±1
Seam Strength									
• Shear	ASTM D 6392 @50mm/min.	Per Formulation	kN/m	10	14	24	28	35	42
• Peel – Hot Wedge			kN/m	7.8	10.5	15.9	21.2	26.4	31.7
- Extrusion Fillet			kN/m	6.8	9.1	13.6	18.2	22.8	27.2
Roll Dimensions									
• Width	--	--	m	7	7	7	7	7	7
• Length			m	180	130	100	84	60	50
• Area			m^2.	1260	910	700	588	420	350

Note:

1) Of 10 readings; 8 shall be ≥ 0.18mm and lowest individual reading shall be ≥ 0.13mm.
2) Machine Direction (MD) and Transverse Direction (TD) average values are on the basis of 5 specimens each direction.
3) The yield stress used to calculate the applied load for the SP-NCTL test should be the mean value via MQC testing.
4) Carbon Black Dispersion for 10 different views: 9 in Categories 1 and 2 with 1 allowed in Category 3.
5) The condition of the test should be 20 hr. UV cycle at 75°C followed by 4 hr. condensation at 60°C.
6) UV resistance is based on percent retained value regardless of the original HP-OIT value.
7) Kangaroo Plastics an ISO 9001 Certified Company
8) Kangaroo Plastics provide up to a 20 year warranty on their HDPE geomembranes
9) The GRI standard developed by the Geosynthetic Research Institute through consultation and review by the member organizations. GRI GM13 specification reviewed at least every 2-years or on an as-required basis. In this regard it is subject to change at any time
10) This data is provided for informational purpose only. The specifications on this sheet are subject to change without notice

KP / GM-HDT / TDS / Rev.02 / May 11

Precision Geosynthetic Laboratories International
A Texas Research International Company

GAI-LAP
Initial: eVZ #:0.13
DATE: 9/11/2012

CERTIFICATE OF CONFORMANCE

THE materials identified in the accompanying Test Report, as sampled and tested under the appropriate protocols agreed between Precision Geosynthetic Laboratories International (PGLI) and Kangaroo Plastics ME LLC were found to be in conformance with GRI GM 13 Specifications.

THIS represents produced materials of 1.5mm HDPE Double-Sided Textured Geomembrane tested and described in the Precision Geosynthetic Laboratories International Job Number G120460 Test Report.

The conformance testing was performed by (Name of supplier, manufacturer, contractor or consultant): Precision Geosynthetic Laboratories International
of (address): 1160 North Gilbert Street
Anaheim, California
U.S.A. 92801

THIS certification is being issued solely for the purpose of:
Certification of material properties in accordance with GRI GM 13 specifications listed in Table 1 of PGL Job No. G120460.

and does not replace, substitute, remove or relieve any person or party from their liabilities, obligations or responsibilities under any agreement or contract in respect of or connected to the works which are subject of this certification.

Signed By: Date:

09/11/2012

Carmelo Zantua
Technical/Laboratory Director

Authorized By: Date:

09/11/2012

Cora B. Queja
Vice President

Precision Geosynthetic Laboratories International