GAI-LAP
Initial: CVZ / Steve Xi #: 79
DATE: 02/18/2022

Jan 16th, 2022

Dezhou Rongchuang Environmental Protection Material Co.,Ltd.
Liu Guoyong

YingbinRoad, LingchengZone,
Dezhou City, ShandongProv., China

Re: FINAL LABORATORY TEST REPORT 最终实验室检测报告

Dear Mr. Liu

Thank you for consulting TRI Suzhoufor your material testing needs.
感谢选用TRI 苏州实验室为您检测材料
Enclosed is thefinal laboratory report for the Conformance testing of one (1) HDPE Smooth Geomembrane sample.
附上一份一个 HDPE膜样品的最终符合性实验室检测报告

PROJECT NAME项目名称: HDPE Testing

DATE REPORTED报告日期: Feb 18th, 2022

REFERENCE TRI JOB NO.涉及工作编号: SCH19118

DATE RECEIVED 接收日期: Jan 16th, 2022

SAMPLE(S) SENT BY 送样人: Rong chuang

SAMPLE IDENTIFICATIONS样品信息:

SAMPLE ID样品 ID	TRI CONTROL NUMBER受控编号
Smooth HDPE	68803

TESTS REQUIRED / PERFORMED 检测需求/检毕:

TEST METHOD检测方法	DESCRIPTION描述
1. ASTM D5199	Thickness厚度
2. ASTM D1505	Density密度
3. ASTM D6693	Tensile Strength拉伸性能
4. ASTM D1004	Tear Resistance直角撕裂
5. ASTM D1603	Carbon Black Content炭黑含量
6. ASTM D5596	Carbon Black Dispersion炭黑分散度
7. ASTM D5397	SP-NCTL 耐环境应力开裂
8. ASTM D3895	Standard OIT 标准氧化诱导
9. ASTM D5885	HP OIT 高压氧化诱导
10. ASTM D5721	Oven Aging烘箱老化
12. GM 11	QUV 人工加速老化试验

TEST RESULTS检测结果: The test results are summarized in the attached Table(s) 1. 检测结果参见附表 1。

Respectfully,此致

TRI Geosynthetic Testing and Services (Suzhou) Co., Ltd.

Steve Xi
QualityAssurance

Chad Blackwell
General Manager

Signatures are on file

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It shall be noted that the sample/s tested is/are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate testmethods hereby employed are based on the current and accepted industry practices. TRI neither accepts responsibility for nor makes claims to the intended final use and purpose of the material.The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except infull and with prior written approval from the client or any pertinent entity duly authorized by the respective client.It is our policy to keep physical records of each job for five (5) years commencing from the date of receipt of the samples and keep itscorresponding electronic file for seven (7) years. Retained conformance samples are disposed of after one (1) month. On the other hand, should you need us to keep them at longer period, please advise us in writing.

需说明的是，所送检样品会被认为是根据设计所生产材料的真实代表。另外，所附实验室检测结果仅表明所检测样品质量。此次合适的检测方法的采用是根据目前通用行业实际情况。TRI既不对样品接受负责也不对材料的最终使用目的及用途发表声明。检测数据及相关项目信息为商业秘密，不得复制，非经客户书面同意或授权同意不得外泄给其他机构。我司自接收样品日起保存纸质记录5年，保存相应电子记录7年。样品留存1个月后废弃。如需保存更长时间，请以书面方式提前通知

7 Pages Total (including this sheet)

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TABLE表 1.

MATERIAL PROPERTIES
材料属性

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PROJECT项目: HDPE Testing

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Date Reported报告日期: 2022.02.18
Client Sample ID样品编号: Smooth HDPE
Material Description材料描述: Smooth HDPE

QC'd By质量担当:
TRI Job No.工作编号: SCH19118
TRI Control No.受控编号: 86823

SPECIMENS样品

METHOD / DESCRIPTION	1	2	3	4	5	6	7	8	9	10	Avg. 平均值	Std. Dev. 标准偏差	Min 最小值	Max 最大值	Proj. Specs. 项目指标 (See Note1)
ASTM D5199 Thickness 厚度 (mm)															
Apparatus:Dead weight dial micrometer with 6.35mm (0.250in) dia presser foot and a pressure of 43.10 kPA (6.25psi)															
仪器：测微计带6.35mm直径的压脚，并由65.8g~509g重的压脚提供43.10kPA压力															
provided by a 65.8gm - 658gm weight. Loading time: 5 sec Specimen Size: 4" x 4"															
负载时间：5秒 样品尺寸：101.6mm×101.6mm															
	2.02	2.02	2.01	2.02	2.02	2.05	2.01	2.04	2.01	2.02	2.02	0.01	2.01	2.05	≥2.0
ASTM D1505 Density 密度 (grams/ cm.3)															
	0.9471	0.9469	0.9467								0.9469	0.0002	0.9467	0.9471	≥0.94
ASTM D6693 Tensile Properties拉伸性能:															
Type IV	Test Specimens: Type IV, Width of narrow section: 0.25"(6.4mm), Length of narrow section: 1.3"(33 mm), Width Overall: 0.75"(19.1 mm),														
IV型	检测样品：IV型，狭长部分宽度：0.25"(6.4mm)，狭长部分长度：1.3"(33mm)，总体宽度：0.75" (19.1mm)														
	Length Overall: 4.5"(114mm) Conditioning: Conducted test in standard laboratory atmosphere of 21 +/-2 ℃ (7 0 +/-3.6 o F) , and														
也可是 D638	总体长度：4.5" (114mm) 条件：测试条件在标准实验室大气压环境温度 21 ± 2 ℃相对湿度：60+/-10%下进行.														
	60+/-10% relative humidity. CRE Type Tensile Testing Machine (YT010P) is set for rate of Separation: 2"/min (HDPE)														
	设定 CRE 拉伸仪 (YT010P) 分离速率：2"/min (HDPE) 夹具初始距离: 2.5"(63 mm); 传感器量程: 100lbs(500 N)														
	Initial gauge length: 2.5" (63mm). Load full scal: 100lbs(500 N)														
	Tensile Strength at Yield 屈服拉伸强度 (kN/m)														
沿机方向	MD	32	34	35	33	33					34	1	32	35	≥29
非沿机方向	TD	33	33	34	34	35					34	1	33	35	
	Elongation at Yield屈服延伸率 (percent百分率)														
沿机方向	MD	20	20	20	20	20					20	0	20	20	≥12
非沿机方向	TD	20	20	19	20	20					20	0	19	20	
	Tensile Strength at Break 断裂强度 (kN/m)														
沿机方向	MD	57	61	65	57	59					60	3	57	65	≥53
非沿机方向	TD	66	63	60	66	62					64	3	60	66	
	Elongation at Break 断裂延伸率 (百分比percent)					Gauge Length标长 =2.0 in. (GRI-GM13 Mod)									
沿机方向	MD	847	863	920	842	911					876	37	842	920	≥700
非沿机方向	TD	958	933	897	973	953					943	29	897	973	

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TABLE表 1.

MATERIAL PROPERTIES
材料属性

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PROJECT项目: HDPE Testing

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SPECIMENS样品

METHOD	DESCRIPTION		1	2	3	4	5	6	7	8	9	10	Avg. 平均值	Std. Dev. 标准偏差	Min 最小值	Max 最大值	Proj. Specs. 项目指标 (See Note1)
ASTM D1004	Tear Resistance 撕裂强力 (N)																
Die C 模具C	Set CRE Type tensile testing machine(YT010 P) constant rate of separation 2" (50mm)/min, initial gauge length: 1"(25.4mm). 设定拉伸仪 (YT010 P) 速率为 2" (50mm)/min, 夹具初始距离: 1"(25.4mm). 传感器为 100lbs(500 N). 样本由蝶形模具裁取. Load full scale: 100lbs(500 N). Specimen was cut by butterfly die.																
沿机方向 非沿机方向		MD	303	364	324	326	309	309	352	344	318	306	332	24	303	369	≥249
		TD	303	298	313	309	296	321	311	316	324	329	312	11	296	329	
ASTM D4833	Puncture Resistance 穿刺强度 (N)																
	Specimens were treated as directed in Test Method D4833. They were clamped without tension between circular plates of a ring clamp attachment secured in the tensile machine. Test specimens extended to or beyond the outer edges of the clamping plates. 样品按检测方法D4833的指导进行检测，在用圆盘环形夹具夹住样品时不要有任何的张力。 夹具牢固的固定在拉伸仪上，待检样品需超过或漏出圆盘夹具的边缘。																
			663	675	668	709	694	673	700	720	676	681	687	16	663	720	≥640
			682	701	689	693	687										
ASTM D1603	Carbon Black Content/炭黑含量 (百分率percent)																
			2.49	2.48									2.49	0.00	2.48	2.49	2-3
ASTM D5596	Carbon Black Dispersion 炭黑分散度 (category rating per reference chart PCN: 12-[illegible]0-38等级范围参照图PCN)																
			1	1	1	1	1	1	1	1	1	1	1	N/A	N/A	N/A	A-1

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ASTM D5397Δ	Notched Constant Tensile Load /抗应力裂纹 (hours/小时)															
Single Point 单点	Yield Stress at Room Temperature per ASTM D6693: 2375 psi 屈服压力在室温下参照ASTM D6693															
	30% of the Yield Stress obtained was used in the NCTL test: 713 psi 30%的获得屈服压力被用来进行NCTL检测															
		>500	>500	>500	>500	>500						>500	N/A	N/A	N/A	≥500
ASTM D3895*	Oxidative Induction Time 氧化诱导时间(min) Before Exposure 曝露前 Two (2) identical specimens were prepare in accordance with this standard. The specimens were obtained in the middle section of the sample, weighed and placed in a Tzero aluminum pan then heated from 35°C to 200°C with a heat rate of 20°C/min in flowing nitrogen 按照标准取两个相同样品，样品从中间部分取得，并称重放置在铝盘中加热从35度到200度速率为每分钟20度。在流动氮气中 Atmosphere was switched to oxygen while holding isothermal temperature of 200 °C until exothermic peak is detected. 进行并保持5分钟。当保持在200度等温时切换到氧气环境下直至放热顶点被探测到。	175.22	172.69									173.96	1.79	172.69	175.22	≥100
ASTM D5885*	High Pressure Oxidative Induction Time /高压氧化诱导时间 (min分钟) Before Exposure 曝露前 One (1) specimen was prepared in accordance with this standard. The specimen was obtained in the middle section of the sample, weighed and placed in a Tzero aluminum pan then heated from 40°C to 150°C with a heat rate of 20°C/min in oxygen atmosphere (300 psi (2MPa)) and held for 5 min. 按照标准取一个样品，样品从中间部分取得，并称重放置在铝盘中加热从40度到150度速率为每分钟20度。在流动氮气中 Atmosphere is held isothermally at 150°C until exothermic peak is detected. (300 psi (2MPa))进行并保持5分钟，当保持在150度等温时切换到氧气环境下直至放热顶点被探测到。	405.72										405.72	N/A	N/A	N/A	≥400
	Mass of the Test specimen 被检样品的质量 (mg)	6.0										6.00	N/A	N/A	N/A	

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METHOD	DESCRIPTION	1	2	3	4	5	6	7	8	9	10	Avg. 平均值	Std. Dev. 标准偏差	Min 最小值	Max 最大值	Proj. Specs. 项目指标 (See Note1)
GRI-GM11*	Accelerated Weathering using FluorescentUVA- Condensation Exposure Device 加速老化使用萤光紫外灯-压缩曝光装置															
ASTM D5885*	High Pressure Oxidative Induction Time/ 高压氧化诱导时间 (min分钟) After Exposure % Retained曝露后残留率															
	One (1) specimen was prepared in accordance with this standard. The specimen was obtained in the middle section of the sample, weighed and placed in a Tzero aluminum pan then heated from 40°C to 150°C with a heat rate of 20°C/min in oxygen atmosphere (300 psi (2MPa)) and held for 5 min. 按照标准取一个样品，样品从中间部分取得，并称重放置在铝盘中加热从40度到150度速率为每分钟20度。在流动氮气中 Atmosphere is held isothermally at 150°C until exothermic peak is detected. (300 psi (2MPa))进行并保持5 分钟，当保持在150度等温时切换到氧气环境下直至放热顶点被探测到。															
残留率		248.69										248.69	N/A	N/A	N/A	
% Retained		81										81	N/A	N/A	N/A	≥80

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METHOD / DESCRIPTION	1	2	3	4	5	6	7	8	9	10	Avg. 平均值	Std. Dev. 标准偏差	Min 最小值	Max 最大值	Proj. Specs. 项目指标 (See Note1)
ASTM D5721* Air- Oven Aging/烘箱老化															
Specimens were conditioned for 1 hr in the laboratory at 22 °C+/-2 °C(71.6 °F+/-3.6 °F) and at 60% +/-10 Relative Humidity 样品在实验室条件下22°C+/-2°C(71.6°F+/-3.6°F) and at 60% +/-10相对湿度下放置一小时在进行初始实验前。然后															
before conducting initial tests, and after exposure in the oven. Type of oven used: Gravity convection oven 放入烘箱中，烘箱类型: 重力对流烘箱。															
Exposure temperature: 85°C Exposure time: 90 days 曝露温度 度 曝露时间 天															
ASTM D5885* High Pressure Oxidative Induction Time/ 高压氧化诱导时间 (min分钟) After Exposure % Retained曝露后残留率															
One (1) specimen was prepared in accordance with this standard. The specimen was obtained in the middle section of the sample weighed and placed in a Tzero aluminum pan then heated from 40°C to 150°C with a heat rate of 20°C/min. in oxygen atmosphere (300 psi (2MPa)) and held for 5 min. 按照标准取一个样品，样品从中间部分取得，并称重放置在铝盘中加热从40度到150度速率为每分钟20度。在流动氮气中 Atmosphere is held isothermally at 150°C until exothermic peak is detected. (300 psi (2MPa))进行并保持5分钟，当保持在150度等温时切换到氧气环境下直至放热顶点被探测到。														
残留率	303.79										303.79	N/A	N/A	N/A	
% Retained	99										99	N/A	N/A	N/A	⩾50

Δ- Tested at TRI Austin Lab
* - Tested at TRI CA lab

End of Table 1

(Sheet 5 of 5)

Note 1 : The Project Specification values reflected herein were provided by the Client.
项目指标由客户提供

By accepting the data and results presented on this report, the Client agrees to limit the liability of TRI SUZHOU from Client and all other related parties for any claims on issues, due to the use of this data, to the cost respective of the tests presented in this report; and the Client agrees to indemnify and hold harmless TRI SUZHOU from and against all liabilities in excess of the aforementioned limits.
通过接受了这篇报告中数据和结果,客户同意限定TRI 苏州来自客户和所有其他相关方的责任.所有其因使用这些数据索赔问题,报告中提出的各项检测的成本;客户同意赔偿并承担后果,TRI 苏州不承担超过上述限额的所有责任。

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