May 6th, 2026

GAI-LAP
Initial: CVZ / Steve Xi #: 79
DATE: 05/06/2026

Yan Tao
Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司
Workshop 1, New material R&D and Production Project, No. 3777,
Longteng Road, Beijipo Sub-District Office,
Gaoxin District, Tai 'an, Shandong

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

Dear Mr. Yan:

Thank you for consulting TRI Suzhou for your material testing needs.
感谢选用 TRI 苏州实验室为您检测材料
Enclosed is the ***final*** laboratory report for the **Conformance** testing of **one (1) Geocell sample**.
附上一份 1 个土工格室样品的最终符合性实验室检测报告

PROJECT NAME 项目名称: Geocell Testing DATE REPORTED 报告日期: **May 6th, 2026**

REFERENCE TRI JOB NO.涉及工作编号: SCH25251

DATE RECEIVED 接收日期: Aug 28th, 2025

SAMPLE(S) SENT BY 送样人: Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司

SAMPLE IDENTIFICATIONS 样品信息:

SAMPLE ID 样品 ID	***TRI CONTROL NUMBER 受控编号***
Geocell	13441

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 D5994	Core Thickness 核心厚度
3. ASTM D1505	Density 密度
4. EN 12224	UV Resistance 抗紫外老化
5. ISO 13438	Oxidation Resistance 抗氧化性能
6. ISO 527	Tensile Property 拉伸性能
7. ASTM D5885	HPOIT 高压氧化诱导
8. ASTM D1603	Carbon Black Content 炭黑含量
9. ASTM D751	Seam Shear Strength 剪切强度
10. ISO 13426-1	Peeling Strength 剥离强度
11. ASTM D1693	ESCR 耐环境应力开裂

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.

Note: The general conditioning and testing of material samples identified in this report were performed within the range of the laboratory environmental conditions; i.e. 21±2℃ and 65±5RH. Otherwise, the actual environmental conditions are indicated in the respective test method reported.
注意：本报告中所提及的材料样本的一般性处理和测试均在实验室环境条件下进行，即温度 21±2℃，相对湿度 65±5%。否则，实际环境条件会在相应的测试方法报告中予以说明。

Respectfully,此致

TRI Geosynthetic Testing and Services (Suzhou) Co., Ltd.
苏州缇尔埃土工材料检测服务有限公司

Steve Xi
Quality Assurance

Chad Blackwell
General Manager

Signatures are on file

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 test methods 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 in full 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 its corresponding 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 a 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

8 Pages Total *(including this sheet)*

TABLE表 1.

MATERIAL PROPERTIES

材料属性

CLIENT客户: Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司
PROJECT项目: Geocell Testing

Date Received接收日期: **2025.08.28**
Date Reported报告日期: **2026.05.06**
Client Sample ID样品编号: **Geocell**
Material Description材料描述: **Geocell**

QC'd By质量担当: Steve
TRI Job No.工作编号: **SCH25251**
TRI Control No.受控编号: **13441**

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
ASTM D5199	Thickness 厚度 (mm) ***Modified for Textured***														
	Apparatus:Dead weight dial micrometer with 6.35mm (0.250in) dia presser foot and a pressure of 20 kPA (2.9 psi)														
	仪器：测微计带6.35mm 直径的压脚，并由65.8g~509g 重的压脚提供20kPA 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														
		1.76	**1.75**	**1.76**	**1.77**	**1.78**	**1.76**	**1.78**	**1.76**	**1.75**	**1.76**	**1.76**	**0.01**	**1.75**	**1.78**
ASTM D5994	Thickness 厚度 (mm)														
	Apparatus: Dead-weight dial micrometer with gauge points tapered at an angle of 60° +/- 2 to the horizontal with the tip														
	仪器：带压脚的测微计，带锥形测量点，角度为60° +/- 2.顶端在水平面大小为半径 0.8+/-0.1mm(0.031+/-0.004in)														
	rounded to a radius of 0.8+/-0.1mm(0.031+/-0.004in), with a specified force of 0.56+/-0.05N (2+/-0.2oz)														
	附带一个大小为0.56+/-0.05N（2+/-0.2oz）指定的力														
	Loading Time 装载时间: 5sec Specimen Size 样品尺寸: 4" x 4"														
		1.02	**1.03**	**1.02**	**1.01**	**1.02**	**1.03**	**1.03**	**1.02**	**1.03**	**1.03**	**1.03**	**0.01**	**1.01**	**1.03**
ASTM D1505	Density 密度 (grams/ cm.^{3})														
		0.9430	**0.9421**	**0.9418**								**0.9423**	**0.0006**	**0.9418**	**0.9430**
ASTM D1603	Carbon Black Content/炭黑含量 (百分率percent)														
		2.45	**2.39**									**2.42**	**0.04**	**2.39**	**2.45**
ASTM D5885**	High Pressure Oxidative Induction Time/高压氧化诱导时间 (min分钟)														
	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														
	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														
	oxygen atmosphere (300 psi (2MPa)) and held for 5 min. Atmosphere is held isothermally at 150℃ 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。														
		>400										**>400**	N/A	**N/A**	**N/A**

(Continued on next page)

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Room 113 A2, 218 Xinghu Road BIOBAY SIP, Suzhou, Jiangsu Prov. , www.tri-env.cn
江苏苏州工业园区星湖街218号生物纳米园 A2 楼

TABLE表 1.

MATERIAL PROPERTIES

材料属性

CLIENT客户: Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司
PROJECT项目: Geocell Testing

Date Received接收日期: **2025.08.28**
Date Reported报告日期: **2026.05.06**
Client Sample ID样品编号: **Geocell**
Material Description材料描述: **Geocell**

QC'd By质量担当: Steve
TRI Job No.工作编号: **SCH25251**
TRI Control No.受控编号: **13441**

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
ISO 527**	Tensile Properties/拉伸性能:						**Before Weathering 耐候前**								
	Tensile Strength at Yield 屈服拉伸强度 (kN/m)														
沿机方向	*MD*	**18.9**	**18.7**	**19.1**	**19.5**	**18.9**						**19.0**	**0.3**	**18.7**	**19.5**
	Tensile Strength at Break 断裂拉伸强度 (kN/m)														
沿机方向	*MD*	**26.9**	**25.3**	**23.2**	**25.0**	**28.5**						**25.8**	**1.8**	**23.2**	**28.5**
	Elongation at Yield 屈服延伸率 (百分比percent)														
沿机方向	*MD*	**18**	**19**	**17**	**17**	**18**						**18**	**1**	**17**	**19**
	Elongation at Break 断裂延伸率 (百分比percent)														
沿机方向	*MD*	**391**	**366**	**341**	**377**	**389**						**373**	**18**	**341**	**391**
ISO 527**	Tensile Properties/拉伸性能:						**After Weathering 耐侯后**								
	Tensile Strength at Yield 屈服拉伸强度 (kN/m)														
沿机方向	*MD*	**19.7**	**19.2**	**19.4**	**19.3**	**19.8**						**19.5**	**0.2**	**19.2**	**19.8**
	Tensile Strength at Break 断裂拉伸强度 (kN/m)														
沿机方向	*MD*	**28.1**	**27.2**	**26.5**	**28.4**	**27.6**						**27.6**	**0.7**	**26.5**	**28.4**
	Elongation at Yield 屈服延伸率 (百分比percent)														
沿机方向	*MD*	**18**	**19**	**20**	**20**	**18**						**19**	**1**	**18**	**20**
	Elongation at Break 断裂延伸率 (百分比percent)														
沿机方向	*MD*	**400**	**378**	**379**	**394**	**394**						**389**	**9**	**378**	**400**

(Continued on next page)

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Room 113 A2, 218 Xinghu Road BIOBAY SIP, Suzhou, Jiangsu Prov. , www.tri-env.cn
江苏苏州工业园区星湖街218号生物纳米园 A2 楼

TABLE表 1.

MATERIAL PROPERTIES

材料属性

CLIENT客户: Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司
PROJECT项目: Geocell Testing

Date Received接收日期: **2025.08.28**
Date Reported报告日期: **2026.05.06**
Client Sample ID样品编号: **Geocell**
Material Description材料描述: **Geocell**

QC'd By质量担当: Steve
TRI Job No.工作编号: **SCH25251**
TRI Control No.受控编号: **13441**

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
EN 12224**	Weathering Resistance (% Retained) via ISO 527 Tensile Property / 耐候老化后用ISO 527测抗拉强度（残留率）														
	Tests were made as directed in EN12224. Total Exposure time: 430 hrs														
	检测按照EN 12224 指导进行。总的曝露时间为430 小时														
	Yield Strength 屈服强度 (% Retained残留率)														
沿机方向	*MD*	**102**										**102**	**N/A**	**N/A**	**N/A**
	Break Strength 断裂强度 (% Retained残留率)														
沿机方向	*MD*	**107**										**107**	**N/A**	**N/A**	**N/A**
	Yield Elongation 屈服延伸率 (% Retained残留率)														
沿机方向	*MD*	**107**										**107**	**N/A**	**N/A**	**N/A**
	Break Elongation 断裂伸长率 (% Retained残留率)														
沿机方向	*MD*	**104**										**104**	**N/A**	**N/A**	**N/A**

(Continued on next page)

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Room 113 A2, 218 Xinghu Road BIOBAY SIP, Suzhou, Jiangsu Prov. , www.tri-env.cn
江苏苏州工业园区星湖街218号生物纳米园 A2 楼

TABLE表 1.

MATERIAL PROPERTIES

材料属性

CLIENT客户: Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司
PROJECT项目: Geocell Testing

Date Received接收日期: **2025.08.28**
Date Reported报告日期: **2026.05.06**
Client Sample ID样品编号: **Geocell**
Material Description材料描述: **Geocell**

QC'd By质量担当: Steve
TRI Job No.工作编号: **SCH25251**
TRI Control No.受控编号: **13441**

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
ISO 527**	Tensile Properties/拉伸性能:						**Before Oxidation 氧化前**								
	Tensile Strength at Yield 屈服拉伸强度 (kN/m)														
沿机方向	*MD*	**20.2**	**20.2**	**20.6**	**20.1**	**20.6**						**20.3**	**0.2**	**20.1**	**20.6**
	Tensile Strength at Break 断裂拉伸强度 (kN/m)														
沿机方向	*MD*	**28.2**	**26.1**	**24.3**	**26.3**	**25.1**						**26.0**	**1.3**	**24.3**	**28.2**
	Elongation at Yield 屈服延伸率 (百分比percent)														
沿机方向	*MD*	**18**	**18**	**17**	**18**	**18**						**18**	**0**	**17**	**18**
	Elongation at Break 断裂延伸率 (百分比percent)														
沿机方向	*MD*	**411**	**379**	**359**	**379**	**371**						**380**	**17**	**359**	**411**
ISO 527**	Tensile Properties/拉伸性能:						**After Oxidation 氧化后**								
	Tensile Strength at Yield 屈服拉伸强度 (kN/m)														
沿机方向	*MD*	**21.6**	**21.4**	**21.8**	**21.7**	**21.7**						**21.6**	**0.1**	**21.4**	**21.8**
	Tensile Strength at Break 断裂拉伸强度 (kN/m)														
沿机方向	*MD*	**28.7**	**25.6**	**25.3**	**28.3**	**30.3**						**27.6**	**1.9**	**25.3**	**30.3**
	Elongation at Yield 屈服延伸率 (百分比percent)														
沿机方向	*MD*	**16**	**16**	**16**	**15**	**16**						**16**	**0**	**15**	**16**
	Elongation at Break 断裂延伸率 (百分比percent)														
沿机方向	*MD*	**390**	**360**	**354**	**385**	**407**						**379**	**20**	**354**	**407**

(Continued on next page)

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Room 113 A2, 218 Xinghu Road BIOBAY SIP, Suzhou, Jiangsu Prov. , www.tri-env.cn
江苏苏州工业园区星湖街218号生物纳米园 A2 楼

TABLE表 1.

MATERIAL PROPERTIES
材料属性

CLIENT客户: Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司
PROJECT项目: Geocell Testing

Date Received接收日期: **2025.08.28**
Date Reported报告日期: **2026.05.06**
Client Sample ID样品编号: **Geocell**
Material Description材料描述: **Geocell**

QC'd By质量担当: Steve
TRI Job No.工作编号: **SCH25251**
TRI Control No.受控编号: **13441**

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
ISO 13438**	Oxidation Resistance (% Retained) via ISO 527 Tensile Property / 氧化后用ISO 527测抗拉强度（残留率）														
	Tests were made as directed in ISO 13438 method A for 25 years service life.														
	检测按照ISO 13438 方法A进行，服务年限为25年。														
	Yield Strength 屈服强度 (% Retained残留率)														
沿机方向	*MD*	**107**										**107**	**N/A**	**N/A**	**N/A**
	Break Strength 断裂强度 (% Retained残留率)														
沿机方向	*MD*	**106**										**106**	**N/A**	**N/A**	**N/A**
	Yield Elongation 屈服延伸率 (% Retained残留率)														
沿机方向	*MD*	**88**										**88**	**N/A**	**N/A**	**N/A**
	Break Elongation 断裂伸长率 (% Retained残留率)														
沿机方向	*MD*	**100**										**100**	**N/A**	**N/A**	**N/A**

(Continued on next page)

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION

Room 113 A2, 218 Xinghu Road BIOBAY SIP, Suzhou, Jiangsu Prov. , www.tri-env.cn
江苏苏州工业园区星湖街218号生物纳米园 A2 楼

TABLE表 1.

MATERIAL PROPERTIES

材料属性

CLIENT客户: Geoleed Engineering Materials Co., Ltd 泰安瑞丰工程材料有限公司
PROJECT项目: Geocell Testing

Date Received接收日期: **2025.08.28**
Date Reported报告日期: **2026.05.06**
Client Sample ID样品编号: **Geocell**
Material Description材料描述: **Geocell**

QC'd By质量担当: Steve
TRI Job No.工作编号: **SCH25251**
TRI Control No.受控编号: **13441**

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
ASTM D751	Seam Shear Strength 焊缝剪切强度 ***Modified for whole height***														
	Shear Strength 剪切强度 (N/100mm)														
		2201	**2217**	**2177**	**2175**	**2159**						**2186**	**23**	**2159**	**2217**
	Break on the Geocell Sheet: 断裂点位于格室母材上。														
ASTM D751**	Dead Load Seam Strength														
	160lbs for 7 days, temperature change on a 1 hour cycle from ambient room temp to 54°C														
	负载160 磅持续 7 天，温度每小时循环变化一次，从室温变化至 54°C														
		Pass										**Pass**	**N/A**	**N/A**	**N/A**
ISO 13426 Method B	Strength of Internal Structural Junctions 内部结构强度														
	Test was performed as directed in ISO 13426-1. CRE Type Tensile Testing Machine (TH8100S) equipped with 2" x 8" (50mmX 200mm) Grips														
	测试根据ISO 13426 的规定进行。很顶拉伸速率拉伸仪(TH8100S)，夹具尺寸：50×200mm 。拉伸速率20mm/min， 夹间距100mm 。														
	was used. set for 0.8" (20 mm/min) constant rate of extension, with initial gauge length (distance between grips) of 4"(100mm)														
	Full scale force range used for testing 量程：50000N														
	Peeling Strength 剥离强度 (kN)														
		1.801	**1.804**	**1.816**	**1.649**	**1.747**						**1.763**	**0.069**	**1.649**	**1.816**
ASTM D1693**	Environmental Stress-Cracking Resistance 耐环境应力开裂 (hours)														
		>5000	**>5000**	**>5000**	**>5000**	**>5000**	**>5000**	**>5000**	**>5000**	**>5000**	**>5000**	**>5000**	**N/A**	**N/A**	**N/A**

*** - Tested in TRI Texas*

End of Table 1

(Sheet 6 of 6)

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。

MD - MACHINE DIRECTION
TD - TRANSVERSE DIRECTION