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MODIFIED ASTM D638 TENSION TESTING OF TRUEGRID PERMEABLE PAVERS

Stiles Manufacturing LLC		Date:	July 19, 2017
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Houston, TX 77007		Report Number:	ESP025656P-1
Attn: Barry Stiles		Client Reference:	N/A

Respectfully submitted,

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INTRODUCTION

Two (2) styles of TRUEGRID permeable pavers were received from Stiles Manufacturing LLC of Houston Texas. The pavers were either TRUEGRID ECO or TRUEGRID PRO PLUS. Test specimens before testing can be seen in Figure 1 and Figure 2. The specimens were received for tension testing in two configurations in accordance with ASTM D638-14. The testing and data analysis were completed on June 30, 2017. The following report documents this testing.

SUMMARY OF RESULTS

Test Number	Sample	Height (in)	Test Description	Ultimate Load (lbf)	Slope of Linear Portion (lbf/in)
1	TRUEGRID ECO	1.0	Triple Tab Pull Apart	371	762
2	TRUEGRID ECO	1.0	4 Cell Bond Tension Test	495	1335
3	TRUEGRID PRO PLUS	1.8	Triple Tab Pull Apart	519	906
4	TRUEGRID PRO PLUS	1.8	4 Cell Bond Tension Test	841	2116

Note: Pictures of fractures can be seen in Figures 7 – 10.

TEST METHODS

Tension testing was conducted in accordance with ASTM D638-14 “Standard Test Method for Tensile Properties of Plastics”. Test speed was 0.5 inches per minute as measured by crosshead movement. The test method was modified as follows, to account for the specimens being tested in the formed shape rather than as a standard sized coupon. Stress and strain were not calculated for these tests, rather load and deflection are reported.

Each specimen was loaded into a tension testing fixture designed to support the pavers with a steel round inside each circular surface. The pavers were held in place by another steel plate on the back of the paver, to simulate the ground underneath the paver. There were 2 different test configurations, tested on each the ECO and PRO PLUS pavers, for a total of 4 tests. The triple tab pull apart consisted of 3 cells on each side of the fixture connected to each other via tab and slots. The 4 cell bond pull apart tests consisted of one section of 4 cells (2 x 2 square) that was connected to the fixture on each side. There was no tab connection for these tests; rather the formed shape was pulled apart from itself. Photographs of the test setup can be seen in Figures 3 – 6.

TEST EQUIPMENT

MTS 20 kip Material Test System, MTA-041, Calibrated 11/22/2016, Calibration Due 11/22/2017

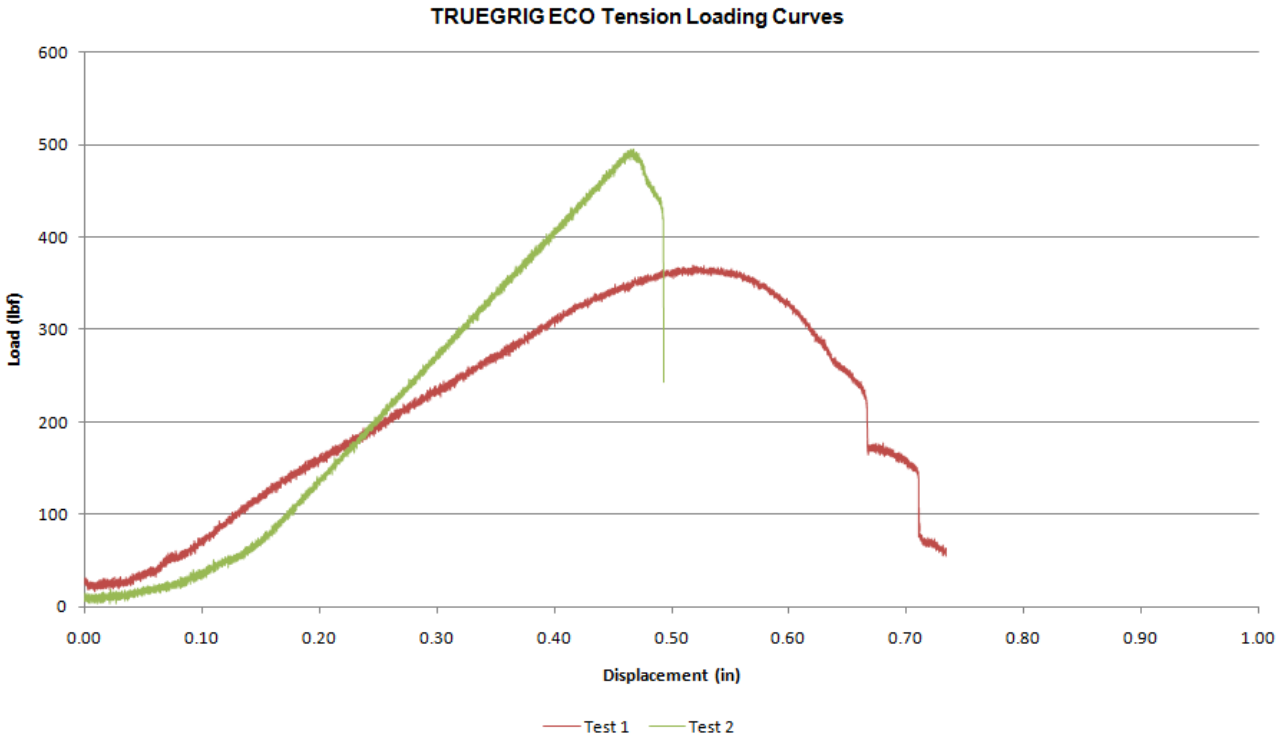
REMARKS

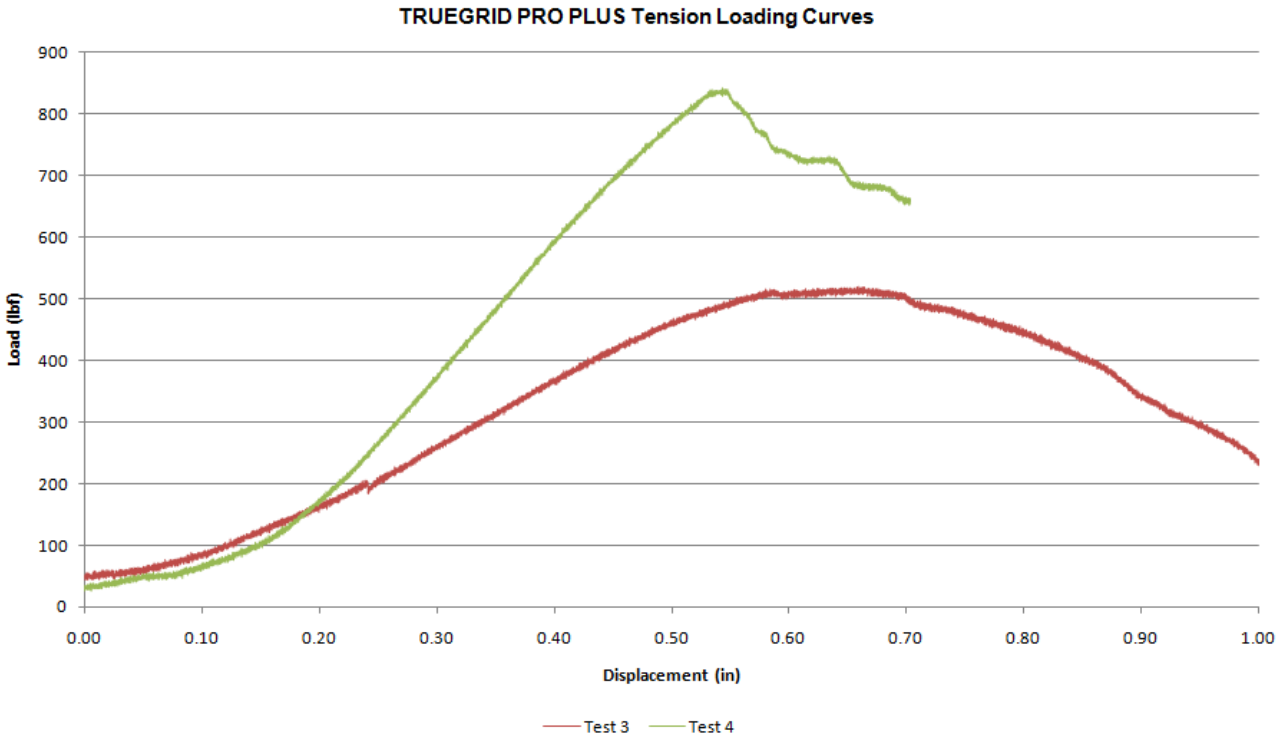
All samples will be retained for 30 days and then discarded unless directed otherwise by the customer.

RECORD OF REVISIONS

Date	Revision Number	Description of Changes
6/30/2017	0	N/A
7/19/2017	1	Added references to ASTM D638 throughout the report. Added deviations from ASTM D638 to the Test Methods section. Revised loading curves and results to Tests 1-4. Updated photographs and removed obsolete photographs.

TEST RESULTS





DIGITAL PHOTOS

Figure 1 – A photograph of the TRUEGRID ECO.

Figure 2 – A photograph of the TRUEGRID PRO PLUS.

Figure 3 – An overall photograph of the test setup.

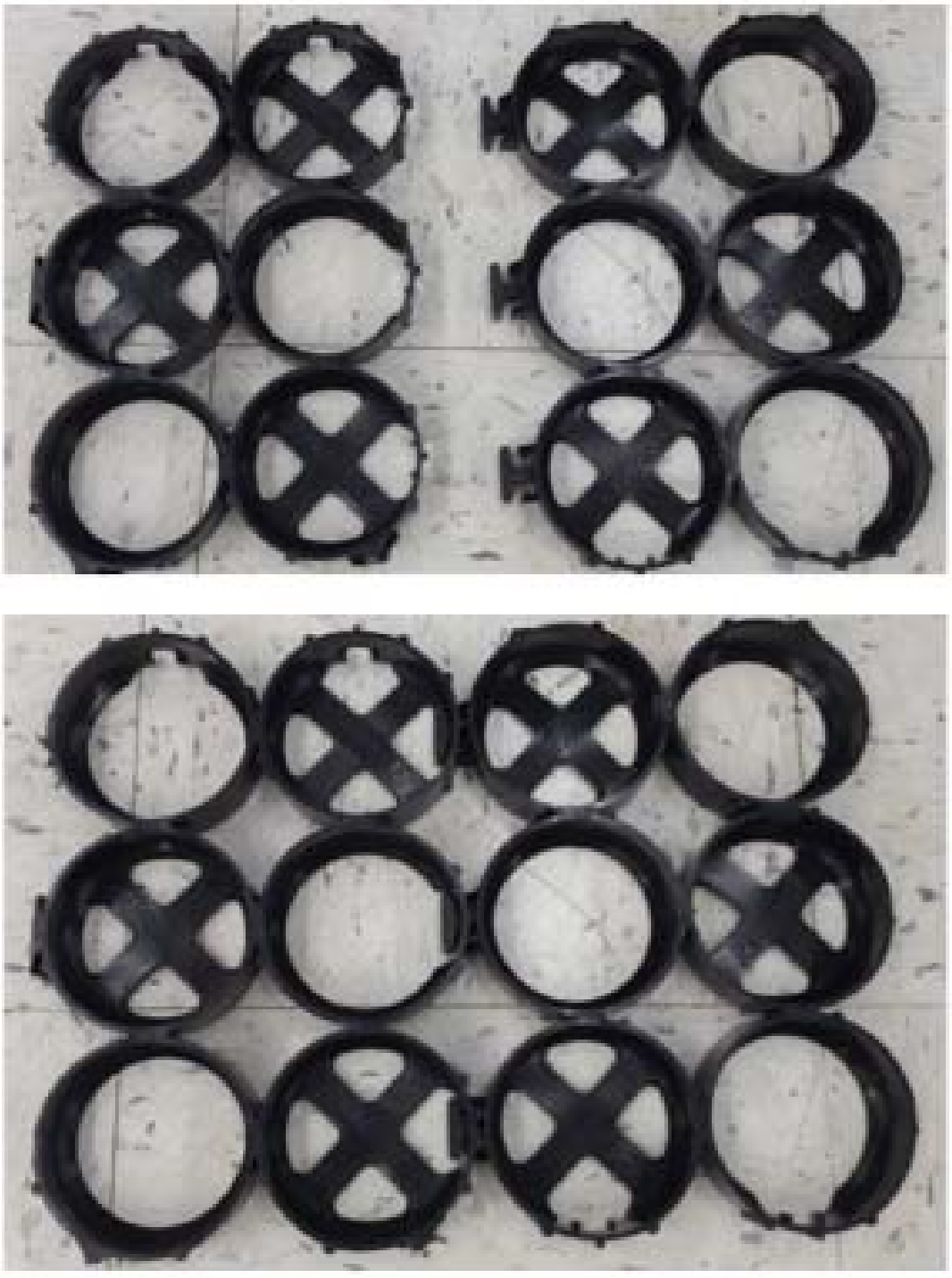


Figure 4 – A photograph of 3 tabs before and after connection.

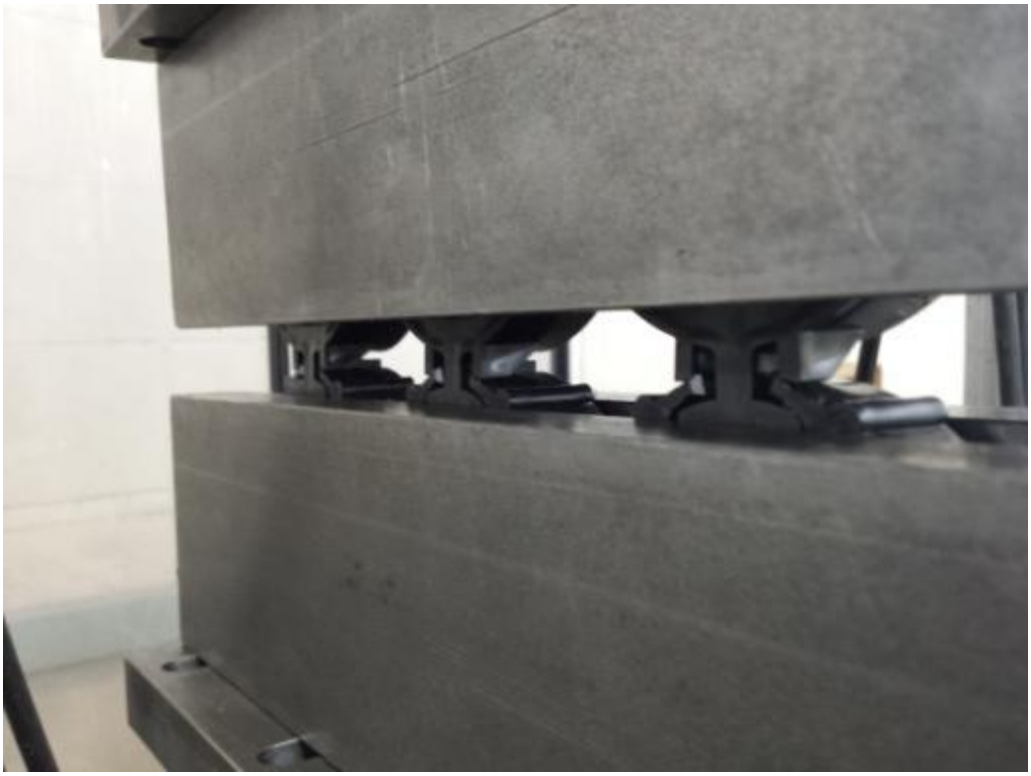


Figure 5 – A close up photograph of the back side of the test setup for a triple tab pull apart.

Figure 6 – A close up photograph of the test setup for a 4 cell bond tension test.

Figure 7 – A photograph of the fracture for Test 1.

Figure 8 – A photograph of the fracture for Test 2.

Figure 9 – A photograph of the fracture for Test 3.

Figure 10 – A photograph of the fracture for Test 4.

NOTE from TRUEGRID Pavers:

TRUEGRID formally announces effective 1 September 2019, the product know as TRUEGRID® ECO™ (ECO) has changed its name to TRUEGRID® PRO LITE™ (PRO LITE). PRO LITE™ product dimensions, add-ons, properties, material source, and components remain the same as ECO™.