

**TESTING SERVICES, INC.**

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<b>CLIENT:</b>	LTR Products, LLC	<b>REPORT NUMBER:</b>	60734-01
	1251 Waterfront Place #400	<b>LAB TEST NUMBER:</b>	2613-9745
	Pittsburg, PA 15222	<b>DATE:</b>	May 15, 2014

**TEST MATERIAL:**

Material ID
GroundSmart Rubber Mulch at 5" Compacted Depth

**INTRODUCTION:** Testing Services Inc was instructed by the client, to perform ADA wheelchair accessibility for the above described material being used under and around playground equipment.

**TEST METHOD:** *ASTM F1951-99: Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment*

**REQUIREMENT:** A surface in place shall have average work per foot (work per meter) values for straight propulsion and for turning *less* than the average work per foot (work per meter) values for straight propulsion and for turning, respectively, on a hard, smooth, surface with a grade of 1:14 (7.1 %).

**PROCEDURE:** **Test Surface Preparation:** Tests were conducted on 5/14/14 indoors at TSi Laboratories in an environment of 81°F and 49% R.H. The rubber mulch was installed in a wooden box (44"W x 117"L). The mulch was loaded into the container box in increments of 2 inches, slightly compacted, repeated until a total of 5" compacted depth was reached. The mulch, prior to testing, was again slightly compacted using a water-filled lawn roller to simulate foot traffic.

**Wheelchair/Operator:** The wheelchair used in these tests was manufactured by *Invcare*, Model Action Xtra, serial Number 98J84142. This wheelchair is totally adjustable, a necessity for these tests. The pneumatic tires were inflated to 60 psi on the rear and 32 psi on the front. The weight of the wheelchair was 24.25 pounds and the operator's weight was 165 pounds for a total of 189 pounds. The operator's distribution was adjusted to 60% on the rear wheels and 40 % on the front.

**Torque Measuring System:** A certified *Dillion Electronic Force Gauge*, Model BFG 500N, S/N 98-2277-07 was used as an interface between a *Dell* Laptop and a certified *Dillon Smart Torque Wrench*, S/N 97-0085-01. Software, also from Dillon, logged the load vs. time and integrated the area under the resulting curves. The adapters and accessories needed to attach the instrumentation were fabricated locally. This total package added 10 pounds to the total weight bringing the total to 199 pounds.

**TEST RESULTS:**

Baseline Straight (Average Work/ft-Force)	Rubber Mulch 5" Compacted Depth (Average Work/ft-Force)
14.33 lbs	12.67 lbs

Baseline Turning (Average Work/ft-Force)	Rubber Mulch 5" Compacted Depth (Average Work/ft-Force)
10.14 lbs	8.43 lbs

**CONCLUSION:** The above listed material *meets/exceeds* both the straight line and turning propulsion requirements set forth in this test method and therefore, passes the standard.

Erle Miles, Jr V.P., Testing Services Inc

**TSi Accreditation:** Our laboratory is accredited with US Dept of Commerce, National Institute of Standards and Technology: ISO/IEC 17025:2005. Our code # is NVLAP 100108-0. However, it should be noted that some or all of the tests performed are not under our scope of accreditation due to the work not fully conforming to the standard, or it being outside the scope of our accreditation, or subcontracted.

**Uncertainty:** We undertake all assignments for our clients on a best effort basis. Our findings and judgments are based on the information to us using the latest test methods available.