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TEST REPORT

CLIENT: International Mulch Company
3585 Treecourt Industrial
Saint Louis MO 63122

TEST REPORT: 20223

LAB NUMBER: 1287-0596

DATE: September 27, 2001

INTRODUCTION: Mr Tim Miller, representing the client, submitted a container of playground rubber mulch "Rubberific" for testing. He requested TSi test this material for surface accessibility.

TEST METHOD: ASTM F 1951-99, *Standard Specification for Determination of Accessibility of Surface 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: **Loose Fill Surface Preparation:** Tests were conducted on 9/25/01 indoors at 70F and 65% R.H. The loose rubber mulch was fluffed into a wooden box in layers one inch thick. After each 1" increment, the mulch was walked in all directions for approximately 15 -minutes before adding another layer. The same procedure continued for a total of five layers (5"). The surface was smoothed by hand between each test run but no further compaction was done.

Wheelchair/Operator: The wheelchair used in these tests was manufactured by *Invcare*, model Action Xira, 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. His weight 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 *Micron 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 curve. 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: See the accompanying data sheet recap and graph printouts.

CONCLUSION: **The sample "Rubberific Mulch" meets or exceeds the standard.**

Testing Services Inc

Erle Miles, President
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Straight Propulsion on Smooth Ramp Compared to "Rubberific Mulch"

	Total Energy	Time (sec)	Distance (ft)	Total Work One Wheel	Norm. Both	Drop Hi/Lo	Avg. Work/ft Both wheels
Ramp #1	53.52	7.5	6.63	47.50	14.33	14.33	14.6
Ramp #2	52.55	7.0	7.06	52.70	14.93	14.93	
Ramp #3	52.37	7.2	7.25	52.81	14.57	14.57	
Ramp #4							
Ramp #5							
						Percent Difference	2.8
Test #1	51.25	6.9	6.63	49.53	14.94	14.94	14.2
Test #2							
Test #3	44.93	6.7	6.69	45.20	13.51	13.51	
Test #4	45.9	6.5	7.06	49.85	14.12	14.12	
Test #5							

Turning on Smooth Ramp Compared to "Rubberific Mulch"

	Total Energy	Time (sec)	Angle (degrees)	Total Work One Wheel	Norm. Outside	Drop Hi/Lo	Avg. Work/ft One Wheel
Turn #1	79.36	7.42	90	53.21	10.70	10.70	10.6
Turn #2	91.41	8.13	90	55.94	11.24	11.24	
Turn #3	82.66	8.35	92	50.34	9.90	9.90	
Turn #4	82.5	7.86	93	53.96	10.50	10.50	
Turn #5	84.35	8.07	92	53.16	10.45	10.45	
						Percent Difference	1.8
Test #1	67.21	6.92	90	48.32	9.71	9.71	10.4
Test #2	87.82	8.08	90	54.07	10.87	10.87	
Test #3	78.3	7.3	90	53.36	10.73	10.73	
Test #4	68.03	6.98	90	48.49	9.75	9.75	
Test #5	87.07	8.08	90	53.61	10.78	10.78	