TEST REPORT

CLIENT:

Company:	Synthetic Grass Warehouse	Report Number:	73704
Address:	SGW Dallas	Lab Test Number:	3011-6272
	1317 W. Royal Lane	Test Date:	5/4/2018
	DFW Airport, TX 75261	Report Date:	5/7/2018
		Page:	1 of 2
Requested By:	Brad Neubauer		

TEST MATERIAL:

Material Type:	Synthetic Turf						Date Received:	4/23/2018	
Material Condition:	EXCELLENT:	XXX	GOOD:		POOR:		REJECTED:		
Turf ID:	Diamond Pro Fescue								
Infill System:	2.0 lbs/ft^2 EnviroFill								
Padding:	None								
Sub base:	2" Aggregate								

TESTING METHODS REQUESTED:

Testing Services, Inc was instructed by the client to perform the following testing.			
Standard:	ASTM F1951-14	Test Method:	Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment

SAMPLING PLAN:

Sampling Date:	4/23/2018

- Specimen sampling is performed in the sampling department at TSI.
- The sampling size of specimens is determined by the test method requirements.
- In the event a specific sampling size is not called for, a determination will be made based on previous testing experience, and approved for use by an authorized manager.
- All samples are subjected to the outside environmental conditions of temperature and relative humidly.
- Sample requiring pre-determined exposure to specified environmental conditions based on a specific test method, take place in the departments in which they are tested

DEVIATION FROM TEST METHOD:

State reason for any Deviation from, Additions to, or Exclusions From Test Method.
None

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 4/10/2018 indoors at TSi Laboratories in an environment of 65°F and 28% R.H. The synthetic turf was installed over a 2" thick layer of Aggregate sub-base in a wooden box (44"W x 117"L). The system, prior to testing, was slightly compacted using a Brinly 18" X 24" water-filled lawn roller, filled with 28 gallons of water, applying 270 lbs 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 is 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 calibrated *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.

PO Box 2041
Dalton, GA 30722-2041
(706) 226-1400
tsioffice@optilink.us

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TEST SUMMARY:

TEST METHOD	Maximum Requirements – Average Work/ft-Force	TEST RESULTS – Average Work/ft-Force
ASTM F1951-14	Baseline Straight: 14.81 lbs	9.13 lbs
	Baseline Turning: 10.68 lbs	6.31 lbs

Straight Propulsion	1	2	3	4	5
Circumference of Rear Wheel	75.375"	75.375"	75.375"	75.375"	75.375"
Area	41.4732 ft*lbs*s	33.9944 ft*lbs*s	34.0402 ft*lbs*s	32.8449 ft*lbs*s	33.3225 ft*lbs*s
Time	7.75 seconds	7.41 seconds	7.48 seconds	7.29 seconds	7.32 seconds
Distance	86.0 inches	86.0 inches	86.0 inches	86.0 inches	86.0 inches
Distance	7.17 ft	7.17 ft	7.17 ft	7.17 ft	7.17 ft
Angular Displacement (radians)	7.17 rad	7.17 rad	7.17 rad	7.17 rad	7.17 rad
Average Torque (energy)	5.35 ft lbs	4.59 ft lbs	4.55 ft lbs	4.51 ft lbs	4.55 ft lbs
Total Work (energy)	76.73 ft lbs	65.78 ft lbs	65.25 ft lbs	64.60 ft lbs	65.27 ft lbs
Work/ft (force)	10.71 lbs	9.18 lbs	9.10 lbs	9.01 lbs	9.11 lbs
Drop Hi/Low Work/ft (force)		9.18 lbs	9.10 lbs		9.11 lbs
Average Work/ft (force)	9.13 lbs				

Turning Propulsion	1	2	3	4	5
Circumference of Rear Wheel	75.375"	75.375"	75.375"	75.375"	75.375"
Distance from Pivot Point to Outer Wheel	35.75 inches	35.75 inches	35.75 inches	35.75 inches	35.75 inches
Area	52.0361 ft*lbs*s	49.0133 ft*lbs*s	50.6883 ft*lbs*s	47.3926 ft*lbs*s	46.7250 ft*lbs*s
Time	7.88 seconds	7.76 seconds	7.81 seconds	7.74 seconds	7.73 seconds
Angle Traveled (degrees)	93.0²	93.0²	93.0²	93.0²	93.0²
Angle Traveled (radians)	1.62 rad	1.62 rad	1.62 rad	1.62 rad	1.62 rad
Arc Length Traveled by Outer Wheel	58.03 inches	58.03 inches	58.03 inches	58.03 inches	58.03inches
Arc Length Traveled by Outer Wheel	4.84 ft	4.84 ft	4.84 ft	4.84 ft	4.84 ft
Angular Displacement of Outer Wheel (radians)	4.84 rad	4.84 rad	4.84 rad	4.84 rad	4.84 rad
Average Torque (energy)	6.60 ft lbs	6.32 ft lbs	6.49 ft lbs	6.12 ft lbs	6.04 ft lbs
Total Work (energy)	31.94 ft lbs	30.55 ft lbs	31.39 ft lbs	29.62 ft lbs	29.24 ft lbs
Work/ft (force)	6.61 lbs	6.32 lbs	6.49 lbs	6.12 lbs	6.05 lbs
Drop Hi/Low Work/ft (force)		6.32 lbs	6.49 lbs	6.12 lbs	
Average Work/ft (force)	6.31 lbs				

CONCLUSION: The above listed material *meets/exceeds* both the straight line and turning propulsion requirements set forth in this test, where the surface tested average work per foot value was less than the average work per foot value verses a hard, smooth surface with a grade of 7.1%

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. TSI can only ensure the test results for the specific items tested.

Unless otherwise noted in the deviations sections of this report, all tests performed are in compliance with stated test method.

Test Report Approval:

Digitally signed by Erle Miles
DN: cn=Erle Miles, o=Testing Services Inc, ou, email=tsioffice@optilink.us, c=US
Date: 2018.05.08 08:14:08 -04'00'

Erle Miles, III, Lab Director, Testing Services Inc

PO Box 2041
Dalton, GA 30722-2041
(706) 226-1400
tsioffice@optilink.us