Accessibility of Surface Systems Under and Around Playground Equipment

ASTM F1951-21

Material ID: *Fibar Engineered Wood Fiber*

Report #: *98695A*

Report Date: *March 23, 2026*

Client: *The Fibar Group*

80 Business Park Dr Suite 300

Armonk, NY 10504

Test Report Approval:

Digitally signed by Erle Miles
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Date: 2026.03.23 14:41:57 -04'00'

Erle Miles, III, Lab Director Testing Services (TSI) LLC

TSi Accreditation: *Testing Services LLC is a scientific body member of ISSS (International Sports Surface Science Society), ASTM and the Synthetic Turf Council.*

Report #: 98695	*Report Date:*	*3/23/2026*
	Test Period:	*3/2/2026-3/18/2026*
System Description		
Material Identification:	*Fibar Engineered Wood Fiber*	
Subbase	*Concrete*	

Test Scope:

Testing Services was instructed by the client to perform ASTM F1951, Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.

This specification outlines minimum characteristics which determine accessibility for all types of materials that can be used as the accessible route through the play area, and under and around playground equipment. Playground surface materials and systems installed, must comply with the technical provisions for the accessible route, and clear ground space including running slope, cross slope, openings in the surface, changes in level, pile height, firmness, and stability. The accessible surface performance criteria apply to the site or play surface sample to be tested, in accordance with the 2010 ADA Standards for Accessible Design.

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 %).

Sampling Plan:

The above referenced EWF was received at Testing Services laboratory on March 2, 2026. The test materials were acclimated to the appropriate temperatures as outlined in the test method prior to testing.

Test Apparatus:

<u>Wheelchair/Operator:</u>
The wheelchair used in these tests was manufactured by Invcare, Model Action Xtra, Serial Number 98J84142. This wheelchair is totally adjustable, a necessity for this test. 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 were 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.

<u>Torque Measuring System:</u> A certified calibrated Andilog Centor Easy II TW Force Gauge and 150 N/m Smart Torque Wrench, S/N 250108, was used as an interface to an Acer Laptop. Caligraph Software from Andilog 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. The total package added 10 pounds to the total weight, bringing the total to 199 pounds.

Deviation from Method: *None*

Decision Rule: *No consideration of uncertainty was taken in our statement of compliance.*

TEST DATA

Surface Preparation & Testing:

Tests were conducted on 3/18/2026 in an environmental condition of 70°F 27 % RH.
Install in 5" lifts. Each lift was raked and leveled before compacting with a mechanical plate compactor, changing direction 90 degrees between each layer. The steps were repeated until 12" compacted, finished, level thickness was achieved. Sample was NOT wet, tested as is.

TEST SUMMARY:

TEST METHOD	Maximum Requirements – Average Work/ft-Force	TEST RESULTS – Average Work/ft-Force
ASTM F1951-21	Baseline Straight: 16.32 lbs	16.09 lbs
	Baseline Turning: 10.18 lbs	9.47 lbs

Straight Propulsion	1	2	3	4	5
Circumference of Rear Wheel	75.375"	75.375"	75.375"	75.375"	75.375"
Area	59.2000 ft*lbs*s	56.9810 ft*lbs*s	56.1850 ft*lbs*s	63.6940 ft*lbs*s	59.4500 ft*lbs*s
Time	7.28 seconds	7.28 seconds	7.28 seconds	7.28 seconds	7.28 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)	8.13 ft lbs	7.83 ft lbs	7.72 ft lbs	8.75 ft lbs	8.17 ft lbs
Total Work (energy)	116.62 ft lbs	112.25 ft lbs	110.69 ft lbs	125.50 ft lbs	117.14 ft lbs
Work/ft (force)	16.27 lbs	15.66 lbs	15.44 lbs	17.50 lbs	16.34 lbs
Drop Hi/Low Work/ft (force)	16.27 lbs	15.66 lbs			16.34 lbs
Average Work/ft (force)	16.09 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	66.2230 ft*lbs*s	74.1900 ft*lbs*s	59.7320 ft*lbs*s	66.7660 ft*lbs*s	64.8400 ft*lbs*s
Time	7.33 seconds	7.33 seconds	7.33 seconds	6.80 seconds	6.80 seconds
Angle Traveled (degrees)	93.0°	93.0°	93.0°	93.0°	93.0°
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	58.03 inches
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)	9.04 ft lbs	10.13 ft lbs	8.15 ft lbs	9.82 ft lbs	9.54 ft lbs
Total Work (energy)	43.72 ft lbs	48.98 ft lbs	39.43 ft lbs	47.50 ft lbs	46.13 ft lbs
Work/ft (force)	9.04 lbs	10.13 lbs	8.15 lbs	9.82 lbs	9.54 lbs
Drop Hi/Low Work/ft (force)	9.04 lbs			9.82 lbs	9.54 lbs
Average Work/ft (force)	9.47 lbs				

CONCLUSION: *The above listed material meets/exceeds both the straight line and turning propulsion requirements in accordance with ASTM F1951, 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%*

END OF REPORT