

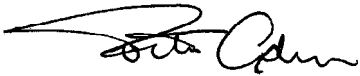
## ASTM F 1951-14 Surface Testing Report

Standard Specification for Determination of Accessibility of  
Surface Systems Under and Around Playground Equipment

### SUMMARY OF RESULTS

Beneficial Designs, Inc. received a surfacing sample from **Brock International LLC** classified as Artificial turf with the brand name **PowerBase**. This sample of PowerBase **met** the maneuverability performance requirements of ASTM F 1951-14.

Report prepared by:

  
Peter Axelson, Testing Supervisor

23 July 2015

Date

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### TEST SPECIMEN

Manufacturer **Brock International LLC**

Name **PowerBase**

Type Artificial turf

Source Butler, PA

Mfr's lot no. Not Applicable

Date of manufacture 2015

Thickness 1.0 in.

### TEST DATE

30 June 2015

### TESTING CONDITIONS

Surface temperature 88 deg F

Atmospheric temperature 88 deg F

Relative humidity 33 %

### INSTALLATION, LEVELING & COMPACTION

The Brock PowerBase panel system was fitted over the laboratory test floor. A 1 inch synthetic turf with polyethylene and nylon fibers was installed over the PowerBase system. The turf was then filed and conditioned with 3 pounds of 12/20 mesh Envirofill™ acrylic coated sand to produce a compacted "infill" depth of 12 mm.

### TEST WHEELCHAIR & RIDER

Manufacturer Sunrise Medical/Quickie

ID no. none

Model Quickie II

Weight 31.5 lb.

Weight of test wheelchair rider 176 lb.

Front-to-rear weight distribution  
of wheelchair-rider system 39% - 61 %

## WHEELCHAIR WORK MEASUREMENT METHOD RESULTS

### Straight Propulsion on PowerBase

	Work per meter (N*m)	Trial Time (sec)
Trial 1	46.1	6.6
Trial 2	47.5	6.8
Trial 3	47.5	6.8
Trial 4	47.2	7.2
Trial 5	47.1	6.5

**Average work per meter (n=3) 47.3 N\*m**

### Turning on PowerBase

	Work per meter (N*m)	Trial Time (sec)
Trial 1	38.0	1.6
Trial 2	36.1	1.5
Trial 3	35.1	1.6
Trial 4	33.7	1.6
Trial 5	34.6	1.6

**Average work per meter (n=3) 35.3 N\*m**

### Straight Propulsion on 7.1% Ramp\*

	Work per meter (N*m)	Trial Time (sec)
Trial 1	80.9	6.5
Trial 2	82.5	6.6
Trial 3	80.5	7.3
Trial 4	78.7	7.5
Trial 5	78.7	7.9

**Average work per meter (n=3) 80.0 N\*m**

### Turning on 7.1% Ramp\*

	Work per meter (N*m)	Trial Time (sec)
Trial 1	54.7	6.7
Trial 2	54.2	6.5
Trial 3	55.0	7.4
Trial 4	56.3	7.2
Trial 5	56.6	7.0

**Average work per meter (n=3) 55.3 N\*m**

\* Hard smooth surface with grade of 7.1+/-0.2% (1:14)

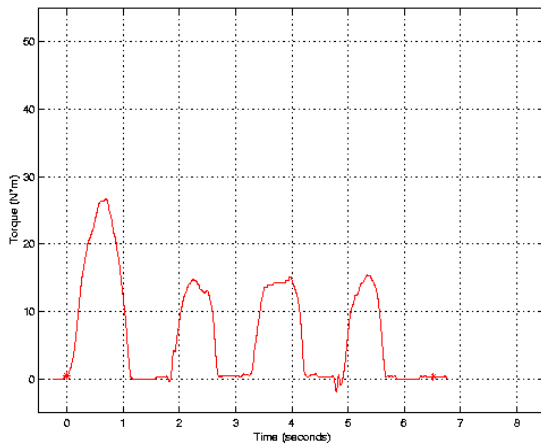
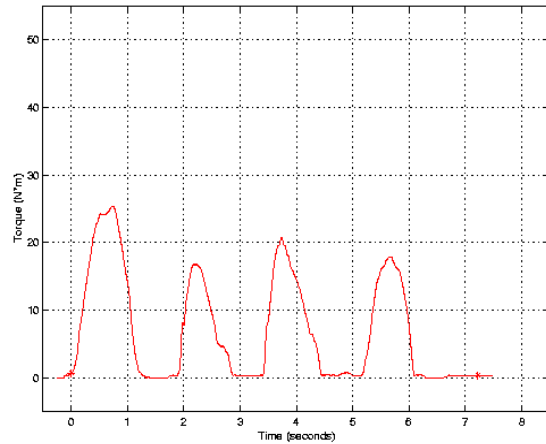
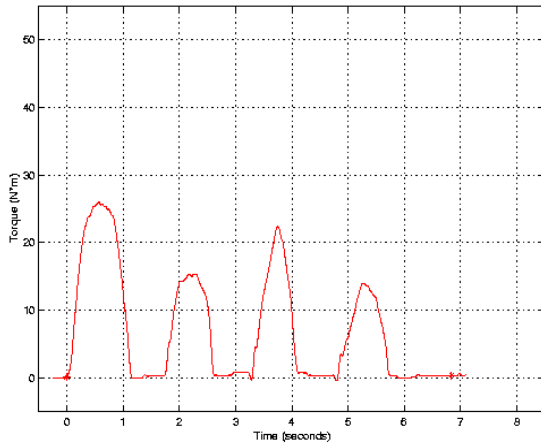
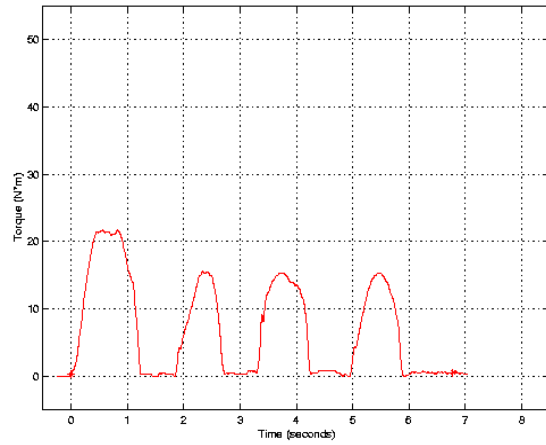
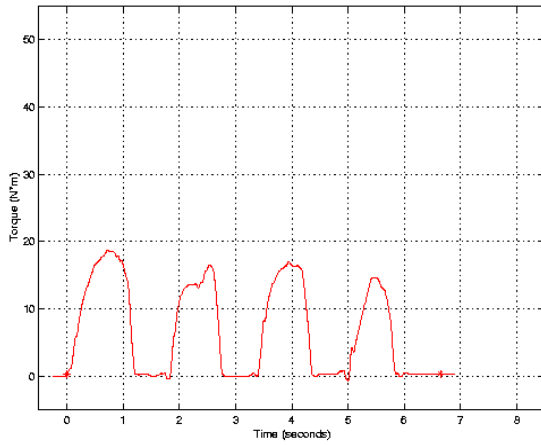
**Straight Propulsion Work Ratio 0.591**

**Turning Work Ratio 0.637**

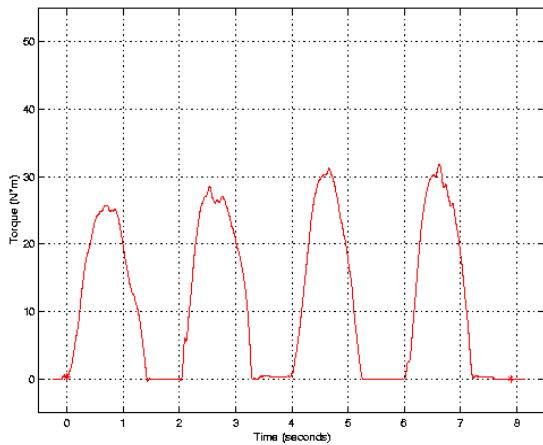
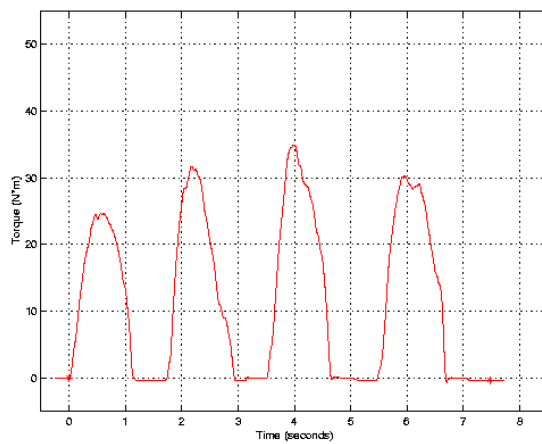
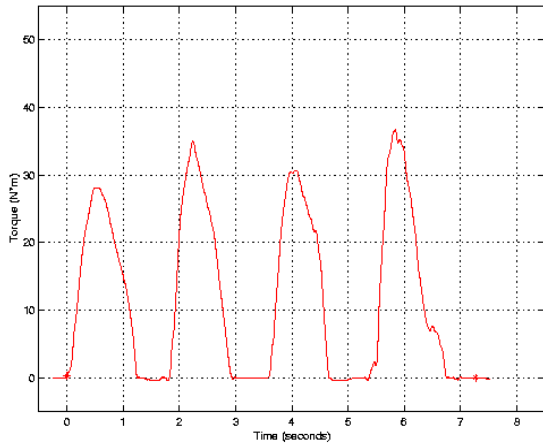
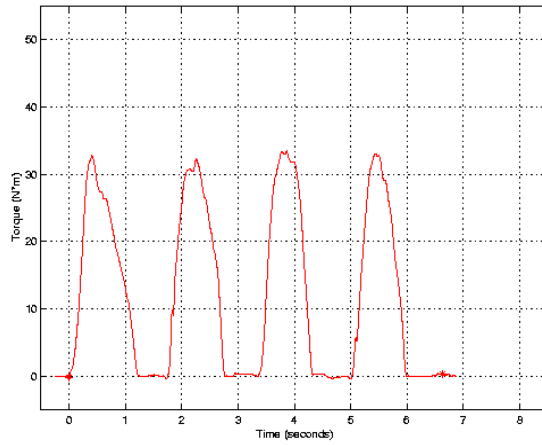
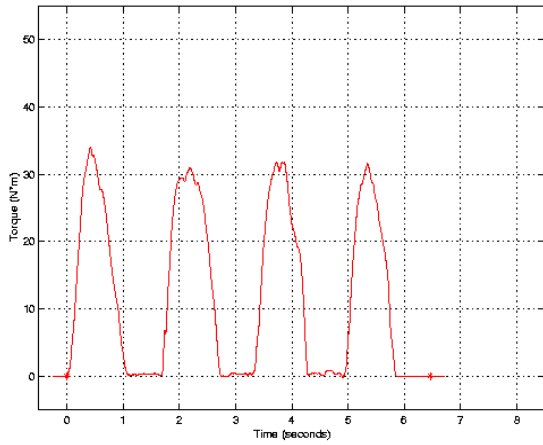
Work ratio = Avg work on surface/Avg work on 7.1% ramp. If both the straight propulsion and turning work ratios are less than 1.00, the surface system meets the performance requirements of F 1951-09b.

# ASTM F1951 – 08 Part 6: Wheelchair Work Measurement Method – Straight Propulsion

## Brock International LLC – PowerBase

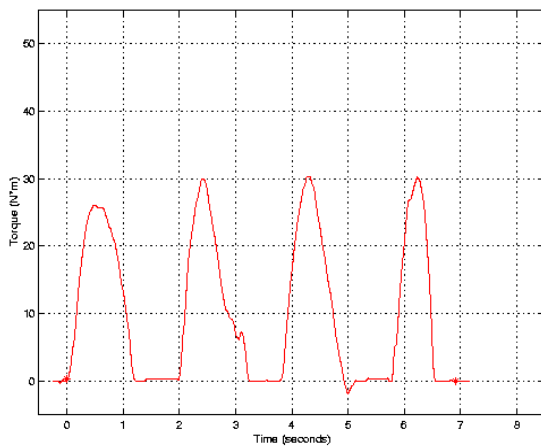
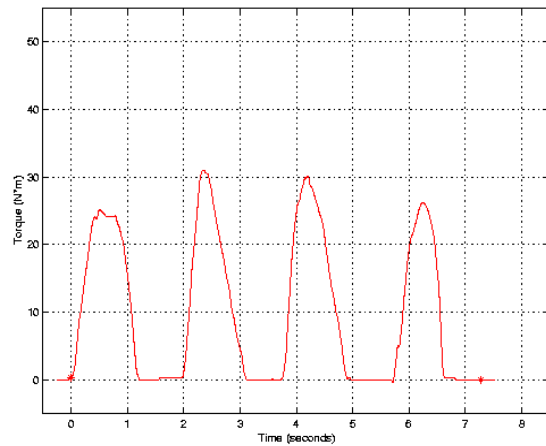
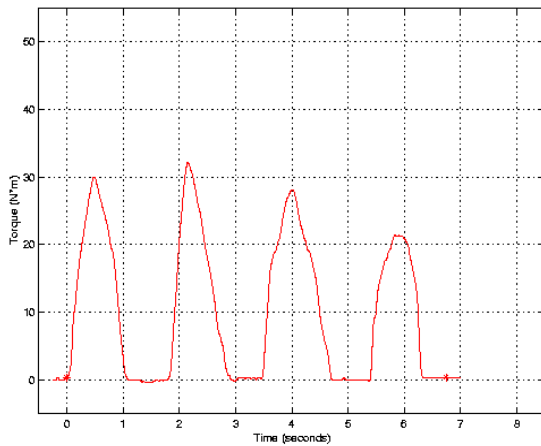
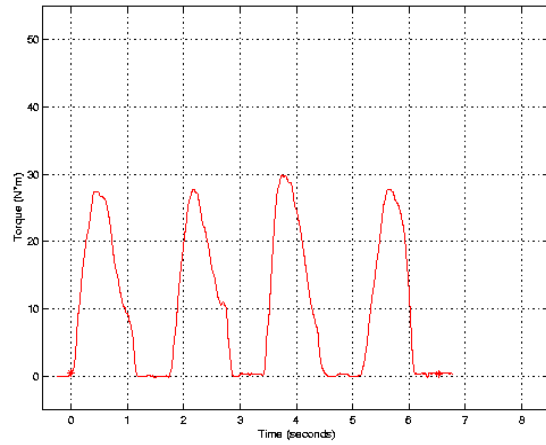
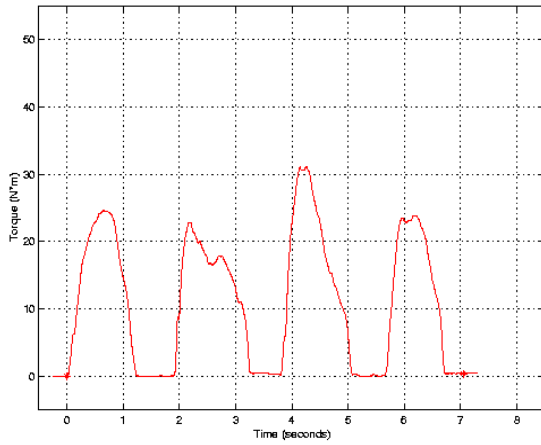


**ASTM F1951 – 08 Part 6: Wheelchair Work Measurement Method – Straight Propulsion**  
**Hard, smooth surface with a grade of  $7.1 \pm 0.2\%$  (1:14)**



# ASTM F1951 – 08 Part 7: Wheelchair Work Measurement Method – Turning

## Brock International LLC – PowerBase



# ASTM F1951 – 08 Part 7: Wheelchair Work Measurement Method – Turning Hard, smooth surface with a grade of $7.1 \pm 0.2\%$ (1:14)

