



Penn State's

**Center for
Sports Surface Research**

Soccer Ball Roll Testing Report

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Soccer Ball Roll Testing on FieldTurf Revolution and UBU Sports Speed M6-M

Soccer ball roll was measured on two synthetic turf fields to determine if direction of roll affects the distance a ball travels. The distance a ball travels is an indicator of the “speed” of a field (FIFA, 2012a). Testing was performed on a FieldTurf Revolution field and a UBU Sports Speed M6-M field. Both fields were installed in 2011. Ball roll was tested at six points on each field per the FIFA Quality Concept, Handbook of Test Methods for Football Turf (FIFA, 2012b). The test locations are shown in Figure 1.

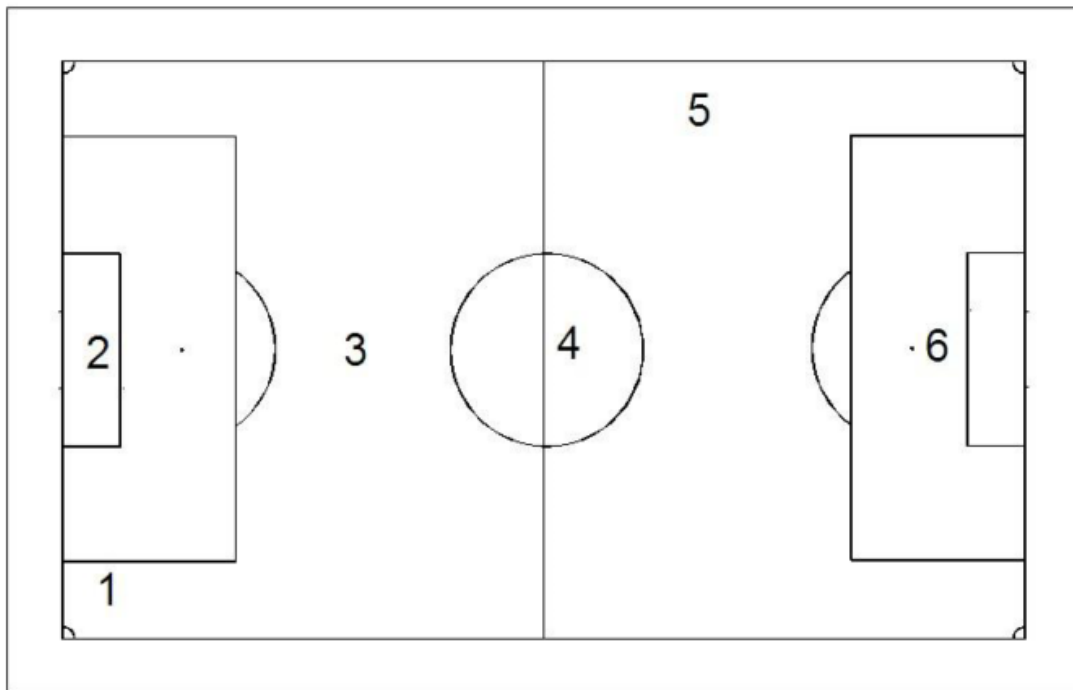


Figure 1. Ball roll test locations

At each test point, the ball roll test was conducted in four directions (0° , 90° , 180° , and 270°). The 0 and 180 degree directions were classified as “East-West” and the 90 and 270 degree directions were classified as “North-South”. Three balls rolls were completed for each direction at each test point. The distance the ball travelled from first contact with the turf to its final resting point was measured. The ramp used for testing is shown in Figure 2.



Figure 2. Ramp used for soccer ball roll testing

Characteristics of Fields

The FieldTurf Revolution field is an outdoor soccer and lacrosse field with a pile height of 2 inches. The average infill depth at the time of testing was 35 mm, which is 69% of the pile height. The distance between fiber rows (gauge) is 3/4".

The UBU Sports Speed M6-M field is an indoor football practice field with a pile height of 2.5 inches. The average infill depth at the time of testing was 36 mm, which is 56% of pile height. The distance between fiber rows (gauge) is 3/8".

Statistical Testing

Two-sample t-tests were used to compare the mean ball roll distances at each test point and the combination of all test points for each field.

Results

The average ball roll distances for the East-West and North-South directions for each field are shown in Table 1. There was no statistical difference in distance rolled between ball roll directions on either field (FieldTurf p-value = 0.480; UBU Sports p-value = 0.664). Therefore, the ball rolled the same distance, regardless of direction, on both FieldTurf Revolution and UBU Sports Speed M6-M.

Table 1. Average ball roll distances

Direction	Average Ball Roll Distance (m) [†]
<u>FieldTurf</u>	
East-West	6.1
North-South	6.2
<u>UBU Sports</u>	
East-West	10.5
North-South	10.5

[†] A chart of FIFA ball roll requirements for One and Two Star Recommended fields can be found in the appendix of this report.

A comparison of ball roll distances between the East-West direction and the North-South direction at each test point is shown in Table 2. With one exception, there were no statistical differences in distance rolled between ball roll directions for all points on both surfaces (p-values > 0.05). The exception was Test Point 2 on the UBU Sports field, at which the one meter difference in ball roll distance was statistically significant (p-value = 0.001). Therefore, on FieldTurf Revolution, the ball rolled the same distance regardless of direction of roll at all test points. On UBU Sports Speed M6-M, the ball also travelled the same distance at each test point regardless of direction of roll, with the exception of Test Point 2, at which the ball rolled a longer distance in the North-South direction than in the East-West direction.

Table 2. Average ball roll distances at each test point on each field

Test Point	Ball Roll Direction	FieldTurf	UBU Sports
----Average Ball Roll Distance (m)----			
1	East-West	6.6	10.8
1	North-South	5.8	9.9
2	East-West	6.1	9.8
2	North-South	5.8	10.8
3	East-West	6.8	10.4
3	North-South	6.1	10.6
4	East-West	5.8	10.5
4	North-South	6.5	10.7
5	East-West	5.8	10.8
5	North-South	5.9	10.3
6	East-West	6.1	10.9
6	North-South	6.2	10.5

Summary

The distance a soccer ball rolled was not affected by the direction of the roll on both FieldTurf Revolution and UBU Sports Speed M6-M.

References

- Federation Internationale de Football Association (FIFA). 2012a. FIFA quality concept for football turf. Available at http://www.fifa.com/mm/document/afdeveloping/pitchequip/fqc_football_turf_folder_342.pdf (verified 14 Aug. 2012).
- Federation Internationale de Football Association (FIFA). 2012b. FIFA quality concept for football turf: handbook of test methods. Available at [http://de.fifa.com/mm/document/footballdevelopment/footballturf/01/13/56/09/fqchandbo okoftestmethods\(january2012\).pdf](http://de.fifa.com/mm/document/footballdevelopment/footballturf/01/13/56/09/fqchandbo okoftestmethods(january2012).pdf) (verified 14 Aug. 2012).
- Federation Internationale de Football Association (FIFA). 2012c. FIFA quality concept for football turf: handbook of requirements. Available at [http://de.fifa.com/mm/document/footballdevelopment/footballturf/01/13/56/08/fqchandbo okofrequirements\(january2012\).pdf](http://de.fifa.com/mm/document/footballdevelopment/footballturf/01/13/56/08/fqchandbo okofrequirements(january2012).pdf) (verified 14 Aug. 2012).

Appendix

FIFA ball roll test requirements (FIFA, 2012c)

FIFA Recommended Two Star		FIFA Recommended One Star	
-----Roll Distance-----		-----Roll Distance-----	
Initial Assessment	4m – 8m	Initial Assessment	4m – 10m
Re-Tests After 12 Months of Play	4m – 10m	Re-Tests After 12 Months of Play	4m – 12m

Conditions at the time of testing on the FieldTurf Revolution field (outdoors) and the UBU Sports Speed M6-M field (indoors)

Test Point	Air Temp (F)	Surface Temp (F)	Wind Speed (MPH)	Infill Depth (% of fiber height)
<u>FieldTurf</u>				
1	88	137	2.8	69%
2	88	137	0.8	69%
3	89	126	7.5	69%
4	89	135	1.0	67%
5	89	149	1.3	69%
6	90	156	2.3	71%
<u>UBU Sports</u>				
1	79	79	0	58%
2	79	79	0	57%
3	79	79	0	57%
4	79	79	0	54%
5	79	79	0	55%
6	79	79	0	55%