

LABORATORY PERFORMANCE REPORT

Sample Reference **50mm Standard Monofilament Turf with BrockFILL on Brock PBEUR023**

Report Number **10634/9576**

Report Status **Final**

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Client **Brock USA**
3090 Sterling Circle,
Boulder, CO 80301
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FOREWORD

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*Not all tests carried out are within our scope of ISO 17025 Accreditation.

This report is not an official FIFA or World Rugby laboratory test report and does not imply governing body approval.



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REGIONAL LOCATIONS

- USA
- Morocco
- Turkey
- South Africa
- Netherlands
- Belgium
- Norway
- Israel

1.0 INTRODUCTION

We refer to the synthetic turf product delivered to our Laboratory for testing in accordance with a contracted specification to determine the suitability for use in relation to football and rugby, primarily focusing on the BrockFILL material and its performance within the turf product.

Prepared By



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02/12/2020

Checked By



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02/12/2020

Test Details			
Product Name		50mm Standard Monofilament Turf with BrockFILL on Brock PBEUR023	
Carpet Name		50mm Standard Monofilament Turf	
Substrate		Rigid Engineered Base	
Shockpad type		Brock PBEUR023	
Number of Conditioning Rolls		50	
Free Pile Height (mm)		15 mm	
Infill	Stabilising	Sand	30 kg/m ² (Approx ≈ 20 mm)
	Performance	BrockFILL	4.7 kg/m ² (Approx ≈ 15 mm)
Temperature Range		21.0 – 25.0 °C (unless otherwise stated)	
Humidity Range		40 – 60 %	

2.0 TEST DETAILS

2.1 The test specimens were prepared in accordance with the client's instructions.

3.0 TEST METHODS

- 3.1 Determination of Football Rebound – FIFA Test Method 01
- 3.2 Determination of Angle Ball Rebound – FIFA Test Method 02
- 3.3 * Determination of Ball Roll – FIFA Test Method 17
- 3.4 Determination of Shock Absorption – FIFA Test Method 04a
- 3.5 Determination of Standard Vertical Deformation – FIFA Test Method 05a
- 3.6 Determination of Energy Restitution – FIFA Test Method 13
- 3.7 Determination of Critical Fall Height using Head Injury Criteria (HIC) – World Rugby Test Method 01
- 3.8 Determination of Rotational Resistance – FIFA Test Method 06
- 3.9 * Determination of Skin / Surface Friction & Skin Abrasion – FIFA Test Method 08
- 3.10 Assessment of Synthetic Infill (TGA) – FIFA Test Method 11
- 3.11 * Determination of Heat – FIFA Test Method 14
- 3.12 * Determination of Wear – FIFA Test Method 15
- 3.13 * Determination of Quantity of Infill Splash – FIFA Test Method 16
- 3.14 Procedure for Measuring Free Pile Height – FIFA Test Method 18
- 3.15 Determination of Particle Size Distribution of Granulated Infill Materials – FIFA Test Method 20
- 3.16 Procedure for the Measurement of Infill Depth – FIFA Test Method 21
- 3.17 Procedure for the Measurement of DSC – FIFA Test Method 22
- 3.18 Determination of Decitex of Yarns – FIFA Test Method 23
- 3.19 Determination of Infiltration Rate – FIFA Test Method 24
- 3.20 * Procedure for the Measurement of Yarn Thickness – FIFA Test Method 25
- 3.21 Bulk Density of Infill Materials – EN 1097-3: 1998
- 3.22 Thickness of Shockpads and Depth of Infill Layers – EN 1969
- 3.23 * Joint Strength of Artificial Turf – EN 12228: 2013
- 3.24 * Tensile Strength of Shockpads – EN 12230: 2003
- 3.25 * Immersion in Hot Water – EN 13744: 2004
- 3.26 Mass per Unit Area of Artificial Turf & Total Pile Weight – ISO 8543: 1998
- 3.27 Tufts per Unit Area of Artificial Turf – ISO 1763: 1986
- 3.28 Pile Length Above Backing of Artificial Turf – ISO 2549: 1990
- 3.29 Tuft Withdrawal Force – ISO 4919: 2012
- 3.30 Particle Shape of Infill Materials and Unbound Base Materials – EN 14955: 2005

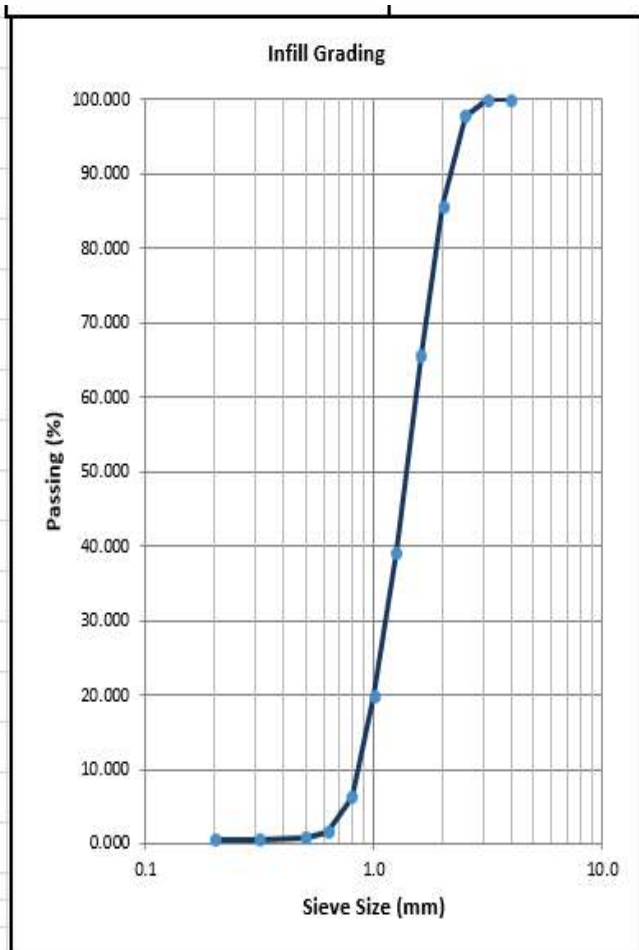
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TEST RESULTS		
Property	Test condition	Mean result
Vertical ball rebound	Dry	0.75 m
	Wet	0.73 m
	After simulated wear 3,000	0.84 m
	After simulated wear 6,000	0.95 m
Angle ball rebound	Dry	50 %
	Wet	70 %
Reduced Ball roll	Dry	4.7 m
	After simulated wear 3,000 Dry	5.3 m
	After simulated wear 3,000 Wet	5.5 m
	After simulated wear 6,000 Dry	5.2 m
	After simulated wear 6,000 Wet	5.5 m
Shock Absorption (AAA)	Dry	67.1 %
	Wet	67.4 %
	After simulated wear 3,000	63.0 %
	After simulated wear 6,000	61.4 %
	50°C	66.7 %
	-5°C	64.5 %
Vertical Deformation (AAA)	Dry	8.9 mm
	Wet	9.2 mm
	After simulated wear 3,000	7.7 mm
	After simulated wear 6,000	7.3 mm
	50°C	9.9 mm
	-5°C	8.6 mm

Property	Test condition	Mean result
Energy Restitution (AAA)	Dry	35.8 %
	Wet	34.8 %
	After simulated wear 3,000	35.8 %
	After simulated wear 6,000	37.3 %
	50°C	32.7 %
	-5°C	42.6 %
HIC (Critical Fall Height)	Dry	1.54 m
	Wet	1.55 m
	After simulated wear 6,000	1.55 m
	50°C (HIC value at 1.3m drop height)	604
	-5°C (HIC value at 1.3m drop height)	663
Rotational resistance	Dry	33 Nm
	Wet	32 Nm
	After simulated wear 3,000	39 Nm
	After simulated wear 6,000	43 Nm
Skin / surface friction	Dry	0.73 μ
	After simulated wear 3,000	0.72 μ
	After simulated wear 6,000 (un-dressed/dressed)	0.73 μ / 0.71 μ
Skin Abrasion	Dry	- 25 %
	After simulated wear 3,000	- 22 %
	After simulated wear 6,000 (un-dressed/dressed)	- 21 % / - 21 %
Heat	Dry	Category 2
Splash	Dry	3.2 %

Product Identification		
Artificial turf and pile yarn(s)	Mass per unit area	2439 g/m ²
	Tufts per unit area	9316 /m ²
	Pile length above backing	50 mm Monofilament
	Pile weight	1609 g/m ²
	dTex	15453 /6 strands (400 micron thickness off-set diamond shape yarn)
Performance Infill	Particle size range	0.8 – 2.5 mm
	Particle shape	B3
	Bulk density	0.268 g/cm ³
Stabilising Infill	Particle size range	0.5 – 1.0 mm
	Particle shape	C2
	Bulk density	1.5 g/cm ³
Shockpad	Thickness	23 mm
	Mass per unit area	0.7 kg/m ²
	Tensile Strength	0.32 MPa
	Shock Absorption	71.5 %
	Vertical Deformation	11.9 mm
	Energy Restitution	35.3 %

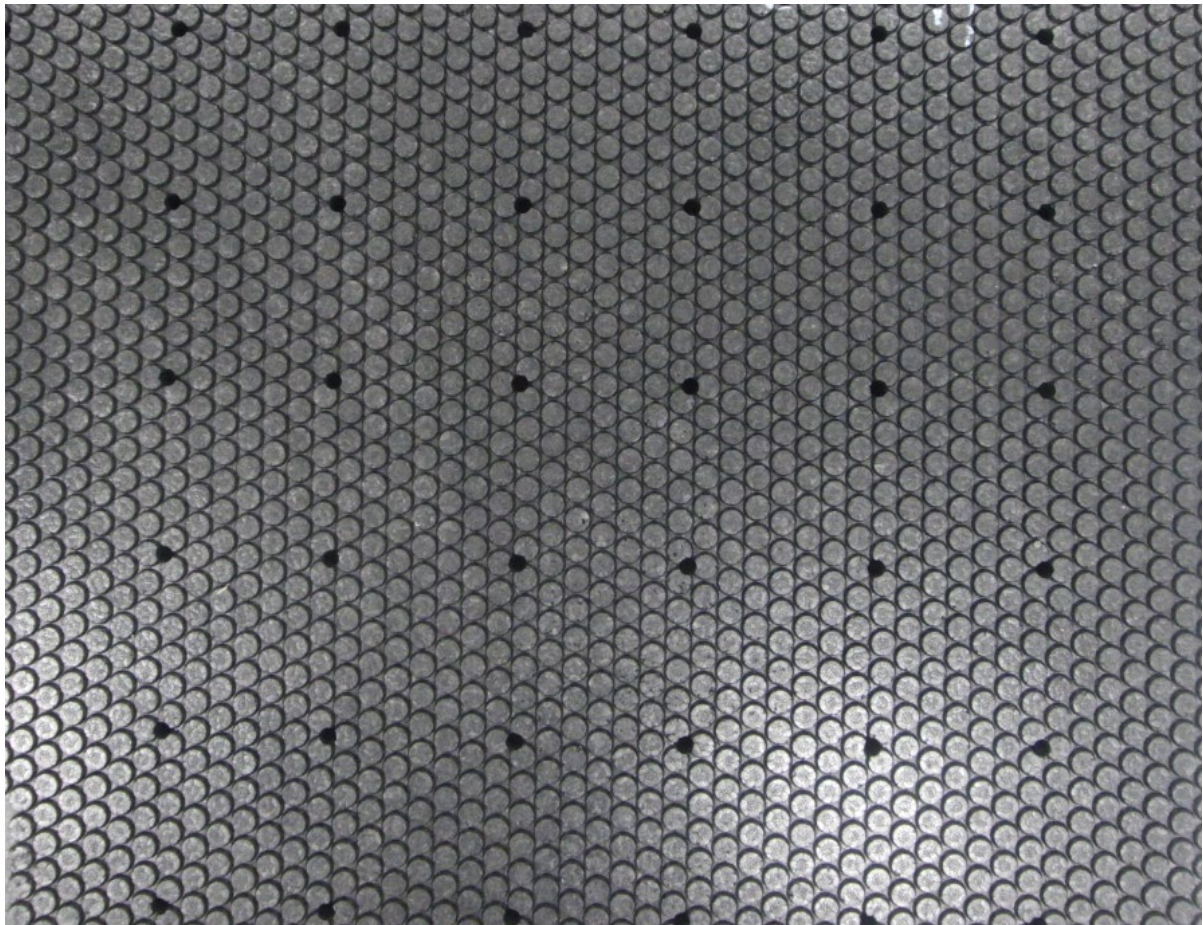
Infill Identification – Performance Infill	
Characteristic	Result
Particle Size	0.8 – 2.5 mm
Particle Shape	B3
Bulk Density	0.268 g/cm ³
Colour	Natural Wood









Sieve Size (mm)	Passing (%)
4.000	100.0
3.150	100.0
2.500	97.8
2.000	85.8
1.600	65.6
1.250	39.2
1.000	19.9
0.800	6.3
0.630	1.6
0.500	0.8
0.315	0.6
0.200	0.5
Passing to base tray	0.5



Identification – Shockpad	
Characteristic	Result
Thickness	23 mm
Mass per unit area	0.7 kg/m ²
Tensile Strength	0.32 MPa
Shock Absorption	71.5 %
Vertical Deformation	11.9 mm
Energy Restitution	35.3 %



PICTURES	
Pre-Wear	
	
Simulated Use 3,000 Cycles	
	
Simulated Use 6,000 Cycles	
	

End of Report