



**WORLD  
RUGBY™**

## **RUGBY TURF PRODUCT TEST REPORT FOR REGULATION 22**

**CCGrass Max EX2 50-B2 SP1**

CC Grass

Tested by



Manufacturer

**CCGrass**

## Test details

Test	
Test date	26/01/2021
Technician Name	Sean Ramsay
Report Date	26/01/2021
Base Type	Concrete

Product	
Manufacturer Name	CC Grass
Carpet Name	CCGrass Max EX2 50-B2 SP1
Pile Height	51
Shockpad Name	Shockwave
Product Name	CCGrass Max EX2 50-B2 SP1

Infill		
Material	Supplier	Application Rate (kg/m3)
SBR	Various	5
sand	Various	35

Shockpad	
Manufacturer Name	
Shockpad Name	Shockwave
Thickness	40
Mass per unit area (kg / m2)	1.5

Accredited Test Institute	
Institute Name	Sports Labs
Institute Director	Richard Nixon
ATI Reference Number	10626/8868
Contact Details	info@sportslabs.co.uk / +44 845 602 6354

**CC Grass CCGrass Max EX2 50-B2 SP1 has been found to satisfy the product test requirements of World Rugby Regulation 22, the Performance Specification for Rugby Turf (2016 Performance Specification) and the World Rugby Laws of the Game – Law 1 for use on Outdoor and Indoor venues.**

## Performance Testing

Shock Absorption (%)				
Requirement	57% - 68%			
Test	Result	Max	Min	Test Status
Preconditioned – Dry	67%	68%	67%	Pass
Preconditioned – Wet	68%	68%	67%	Pass
After simulated wear	65%	66%	64%	Pass
@ -5°C	64%			Pass
@ +50°C	68%			Pass

Vertical Deformation (mm)				
Requirement	6mm - 10mm			
Test	Result	Max	Min	Test Status
Preconditioned – Dry	9.97	10.00	9.95	Pass
Preconditioned – Wet	9.95	9.95	9.95	Pass
After simulated wear	9.13	9.60	8.80	Pass
@ -5°C	9.00			Pass
@ +50°C	9.85			Pass

Energy Restitution (%)				
Requirement	22% - 48%			
Test	Result	Max	Min	Test Status
Preconditioned – Dry	38%	39%	37%	Pass
Preconditioned – Wet	37%	38%	37%	Pass
After simulated wear	41%	41%	39%	Pass
@ -5°C	39%			Pass
@ +50°C	35%			Pass

Vertical Ball Rebound (m)				
Requirement	0.6m - 1m			
Test	Result	Max	Min	Test Status
Preconditioned – Dry	0.70			Pass
Preconditioned – Wet	0.61			Pass
After simulated wear	88%			Pass

Angled Ball Rebound (%)				
Requirement	45% - 80%			
Test	Result	Max	Min	Test Status
Preconditioned – Dry	51%			Pass
Preconditioned – Wet	68%			Pass

Rotational Resistance (Nm)				
Requirement	32Nm - 43Nm			
Test	Result	Max	Min	Test Status
Preconditioned – Dry	42.20			Pass
Preconditioned – Wet	42.80			Pass
After simulated wear	42.00			Pass

Impact Attenuation (m)				
Requirement	≥1.3m (Single drop ≤1,000 HIC)			
Test	Result	Max	Min	Test Status
Preconditioned – Dry	2.40			Pass
Preconditioned – Wet	2.49			Pass
After simulated wear	2.48			Pass
@ -5°C	510.00			Pass
@ +50°C	472.00			Pass

Ratings	
Test	Result
Splash	Normal
Heat	2-3

### Identification Tests

Rugby Turf - Carpet				
Test	Result	Declaration	Permitted Variance	Test Status
Pile length (mm)	51	50	≥ 60 m	Pass
Mass per unit area (kg/m <sup>2</sup> )	2,644	2,418	± 10%	Pass
Tufts/Knots per unit area (m <sup>-2</sup> )	7,373	7,350	± 10%	Pass
Tuft withdrawal force (N)	58	40	≥ 90%	Pass
Total pile weight (kg/m <sup>2</sup> )	1,357	1,418	± 10%	Pass
Water permeability (mm/hr)	1,194	-	≥ 500mm/hr	Pass



Pre-wear carpet



Post-wear carpet



Pre-wear closeup



Post-wear closeup

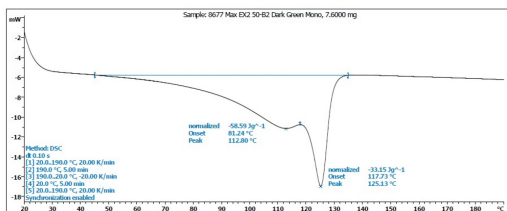


Pre-wear yarn closeup

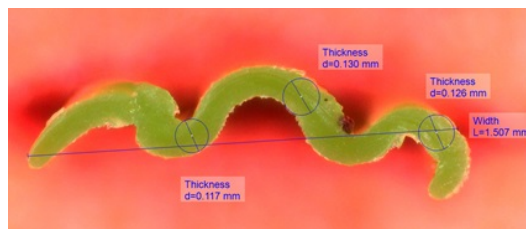


Post-wear yarn closeup

Yarn 01 - Matt Emerald - Wave				
Test	Result	Declaration	Permitted Variance	Test Status
Thickness – Cross Section (nm)	130	130	≥ 90%	Pass
Thickness – Width (mm)	1.51	1.4	≥ 90%	Pass
Thickness - Depth (mm)	0.13	0.13	≥ 90%	Pass
dTex (dTex)	5,460	6,000	± 10%	Pass
DSC - Peak 01 (°C)	112.8	112	± 3°C	Pass
DSC - Peak 02 (°C)	125.13	125	± 3°C	Pass

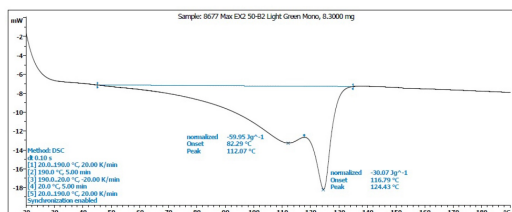


Yarn 1 DSC

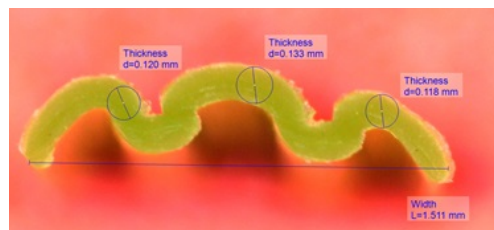


Yarn 1 cross section

Yarn 02 - Matt Olive - Wave				
Test	Result	Declaration	Permitted Variance	Test Status
Thickness – Cross Section (nm)	133	130	≥ 90%	Pass
Thickness – Width (mm)	1.51	1.4	≥ 90%	Pass
Thickness - Depth (mm)	0.13	0.13	≥ 90%	Pass
dTex (dTex)	5,781	6,000	± 10%	Pass
DSC - Peak 01 (°C)	112.07	112	± 3°C	Pass
DSC - Peak 02 (°C)	124.43	125	± 3°C	Pass

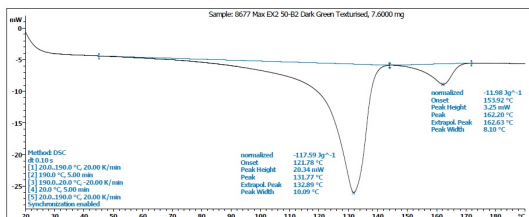


Yarn 2 DSC

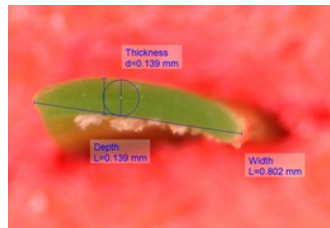


Yarn 2 cross section

Yarn 03 - Emerald - Flat				
Test	Result	Declaration	Permitted Variance	Test Status
Thickness – Cross Section (nm)	139	140	≥ 90%	Pass
Thickness – Width (mm)	0.8	0.8	≥ 90%	Pass
Thickness - Depth (mm)	0.14	0.14	≥ 90%	Pass
dTex (dTex)	2,514	2,750	± 10%	Pass
DSC - Peak 01 (°C)	131.77	130	± 3°C	Pass
DSC - Peak 02 (°C)	162.2	162	± 3°C	Pass



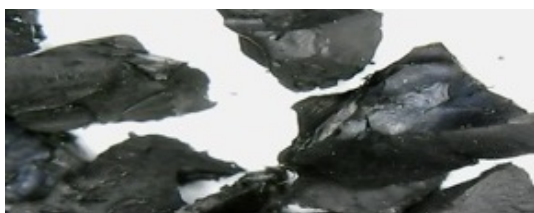
Yarn 3 DSC



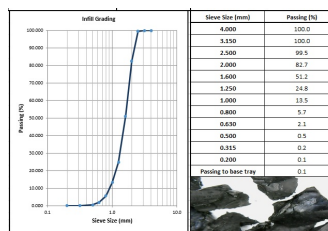
Yarn 3 cross section



Infill 01 - SBR - Black - Performance				
Test	Result	Declaration	Permitted Variance	Test Status
Shape	A2 - Angular - Medium sphericity	B2 - Irregular - Medium sphericity	Same shape	Pass
Size	0.63 - 2	0.5 - 2.5	± 1 Sieve Size	Pass
Bulk Density	0.44	0.48	± 15%	Pass
% Organic	0.64	0.63	± 10%	Pass



Infill 1

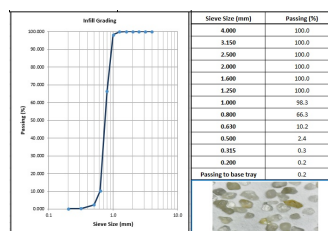


Infill 1 Grading

Infill 02 - sand - Natural - Stabilising				
Test	Result	Declaration	Permitted Variance	Test Status
Shape	C2 - Round - Medium sphericity	B2 - Irregular - Medium sphericity	Same shape	Pass
Size	0.5 - 1	0.5 - 1	± 1 Sieve Size	Pass
Bulk Density	1.52	1.46	± 15%	Pass
% Organic	0	0	± 10%	N/a



Infill 2



Infill 2 Grading

Shockpad				
Test	Result	Declaration	Permitted Variance	Test Status
Thickness	40	40	≥ 90%	Pass
Shock Absorption	0.74	0.75	± 5%	Pass
Deformation	12.1	12.1	± 10%	Pass
Energy Restitution	0.35	-	-	N/a
Mass per unit area	1.5	1.5	± 10%	Pass
Tensile strength	0.19	-	≥ 0.15Nm	Pass



Shockpad

## Laboratory Tests

### Skin Interaction Tests

Test	Result	Requirement	Test Status
Skin/Surface Friction	0.72	0.35 - 0.75 $\mu$	Pass
Skin Abrasion	23%	$\pm$ 30%	Pass

### Unaged Carpet Strength Tests

Test	Result	Requirement	Test Status
Parallel to Stitching	30	25 N/mm	Pass
Perpendicular to Stitching	25	25 N/mm	Pass

### Unaged Joint Strength

Test	Result	Requirement	Test Status
Stitched	0	2500 N/100mm	N/a
Bonded	2,542	2500 N/100mm	Pass
Peel	85	25 N/mm	Pass

### Aged Joint Strength

Test	Result	Requirement	Test Status
Stitched	0	2500 N/100mm	N/a
Bonded	2,502	2500 N/100mm	Pass
Peel	83	25 N/mm	Pass

### Unaged Tensile Strength

Test	Result	Requirement	Test Status
Yarn 01	20.29	$\geq$ 8N (mono), $\geq$ 30 (fibb)	Pass
Yarn 02	19.14	$\geq$ 8N (mono), $\geq$ 30 (fibb)	Pass
Yarn 03	8.3	$\geq$ 8N (mono), $\geq$ 30 (fibb)	Pass

### Aged Strength Tests

Test	Result	Requirement	Test Status
Yarn 01	18.23	>50% of unaged	Pass
Yarn 02	17.03	>50% of unaged	Pass
Yarn 03	6.9	>50% of unaged	Pass



# Comments