



FIFA LABORATORY TEST REPORT

TM Football Turf I 2015
01.01.2015

Product	Act Sports #Fusion 60-140 SBR
FIFA Licensee	Act Global USA, Inc.
Test Institute	Sports Labs Ltd.

Test Number	127964
External Test Number	12589/6805
Date of Test	02.03.2023
Test Result	Passed
Quality Level	FIFA Quality & Quality PRO
Test Type	Initial



Licensee

Main Address

Name	Act Global USA, Inc.
Address	4201 West Parmer Lane, Suite B-175
ZIP / City	78727 / AUSTIN, TEXAS
Website	www.actglobal.com
Contact Email	
Contact Phone	

Test institute

Main Address

Name	Sports Labs Ltd.
Address	1 Adam Square Brucefield Industrial Park
ZIP / City	EH54 9DE / LIVINGSTON
Website	www.sportslabs.co.uk
Contact Email	info@sportslabs.co.uk
Contact Phone	+44/1506 44 755



Approval

Test Institute Director
Signature
Date

Sean Ramsay - Associate Director

02.03.2023

Test Institute Engineer
Signature
Date

Craig Melrose - Laboratory Manager

02.03.2023



1 – Test Results

Name	Comment	Result
1 - Summary		
Vertical ball rebound FIFA Quality		Passed
Vertical ball rebound FIFA Quality Pro		Passed
Angle ball rebound FIFA Quality		Passed
Angle ball rebound FIFA Quality Pro		Passed
Reduced ball roll FIFA Quality		Passed
Reduced ball roll FIFA Quality Pro		Passed
Shock absorption FIFA Quality		Passed
Shock absorption FIFA Quality Pro		Passed
Deformation FIFA Quality		Passed
Deformation FIFA Quality Pro		Passed
Rotational resistance FIFA Quality		Passed
Rotational resistance FIFA Quality Pro		Passed
Skin / surface friction		Passed
Skin abrasion		Passed
1 - Test Details Object		
Product Name		Act Sports #Fusion 60-140 SBR
Product ID		SP.34.2023-0009
Synthetic Turf System		Act Sports #Fusion 60-140
Performance infill		SBR
Stabilising infill		Sand 0510
Shock-pad or elastic layer		-
Sub-base composition		Rigid Engineered Base / Unbound aggregate
2 - Test Details Test Institute		
Date(s) of test		02.03.2023
Report created by		E Steyn
Laboratory Test report number		12589/6805
Test Institute Project number		12589
3 - Product Declaration (Manufacturer)		
Manufacturer		BFS Europe Domonech Hermanos
Tuft pattern		BFS A-Tuft



Name	Comment	Result
Yarn manufacturer yarn 1		BFS Supplier
Detailed tuft decitex (Dtex) [g/10000m]		2217 x 3 + 2217 x 3 + 5500 x 1
Product name, code yarn 1		Diamond 375 _
Pile yarn profile yarn 1		Diamond
Pile thickness (µ m) yarn 1		365.0
Pile colour (RAL) value 1 yarn 1		Field green
Pile colour (RAL) value 2 yarn 1		Lime green
Pile colour (RAL) value 3 yarn 1		-
Pile width (mm) yarn 1		1.10
Number of tufts/m ² yarn 1	ISO1773	8850.00
Pile length (mm) yarn 1	ISO 2549	60.00
Pile weight (g/m ²) yarn 1	ISO 8543	1510.00
Pile yarn characterization yarn 1		PE
Pile yarn dtex yarn 1		13300
Yarn manufacturer yarn 2		BFS Supplier
Product name, code yarn 2		Tape 5500 _
Pile yarn profile yarn 2		Rectangular
Pile thickness (µ m) yarn 2		115.0
Pile colour (RAL) value 1 yarn 2		Lime green
Pile colour (RAL) value 2 yarn 2		-
Pile colour (RAL) value 3 yarn 2		-
Pile width (mm) yarn 2		5.00
Number of tufts/m ² yarn 2	ISO1773	8850.00
Pile length (mm) yarn 2	ISO 2549	60.00
Pile weight (g/m ²) yarn 2	ISO 8543	630.00
Pile yarn characterization yarn 2		PE
Pile yarn dtex yarn 2		5500.0
Yarn manufacturer yarn 3		
Product name, code yarn 3		
Pile yarn profile yarn 3		
Pile thickness (µ m) yarn 3		
Pile colour (RAL) value 1 yarn 3		



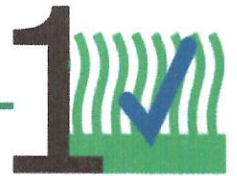
Name	Comment	Result
Pile colour (RAL) value 2 yarn 3		
Pile colour (RAL) value 3 yarn 3		
Pile width (mm) yarn 3		
Number of tufts/m ² yarn 3	ISO1773	
Pile length (mm) yarn 3	ISO 2549	
Pile weight (g/m ²) yarn 3	ISO 8543	
Pile yarn characterization yarn 3		
Pile yarn dtex yarn 3		
Primary backing Product name, code		Multilayer interlaced stabilized fabric / 100% PP, UV stabilized
Primary backing Manufacturer		BFS Supplier
Re-enforcement scrim Product name, code		N/A
Re-enforcement scrim Manufacturer		N/A
Secondary backing Product name, code		Polyurethane Sport
Secondary backing Manufacturer		BFS Europe Domonech Hermanos
Secondary backing Dry application rate (g/m ²)		700.0
Carpet Minimum tuft withdrawal force (N)		50
Carpet Carpet mass per unit area [g/m ²]		3055.0
Method of jointing		Bonded
Bonded joints Adhesive brand name		Sports Glue
Bonded joints Adhesive manufacturer		Various
Bonded joints Application rate (g/m)		200 - 300
Bonded joints Jointing film brand name		Non-woven web
Bonded joints Jointing film manufacturer		Diverse
Stitched seams Tread brand name/product code		N/A
Stitched seams Tread manufacturer		N/A
Stitched seams Stitch rate (stitch per lm)		
Performance Infill Product name, code		SBR



Name	Comment	Result
Performance Infill Manufacturer		Various
Performance Infill Material grading		0.8 - 2.5 mm
Performance Infill Particle shape	prEN 14955	Angular cut, medium sphericity
Performance Infill Particle size range	EN 933-Part 1	0.8 - 2.5 mm
Performance Infill Bulk density (g/cm ³)	EN 1097-3	0.450
Performance Infill Application rate (kg/m ²)		16.0
Stabilising Infill Product name, code		Sand 0510
Stabilising Infill Manufacturer		Nature
Stabilising Infill Material type		Hydro classified, clean dried silica sand
Stabilising Infill Material grading		0.5 - 1.0 mm
Stabilising Infill Particle shape	prEN 14955	Round, grained
Stabilising Infill Particle size range	EN 933-Part 1	0.5 - 1.0 mm
Stabilising Infill Bulk density (g/cm ³)	EN 1097-3	1.47
Stabilising Infill Application rate (kg/m ²)		16.0
Shockpad, E-layer Product name, code		-
Shockpad, E-layer Manufacturer		
Shockpad, E-layer Composition		
Shockpad, E-layer Bulk density (g/cm ³)		
Shockpad, E-layer Thickness	EN 1969	
Shockpad, E-layer Shock absorption (%)	FIFA 4a	
Shockpad, E-layer Deformation	FIFA 5a	
Shockpad, E-layer Tensile strength (MPa)		
Shockpad, E-layer Mass per unit area (kg/m ²)		
Other, detail		
3 - Test Results Player / Surface Interaction		
Rotational Resistance Initial Dry (Quality)	27 - 48 Nm	37
Rotational Resistance Initial Dry (Pro)	32 - 43 Nm	37



Name	Comment	Result
Rotational Resistance Initial Wet (Quality)	27 - 48 Nm	34
Rotational Resistance Initial Wet (Pro)	32 - 43 Nm	34
Rotational Resistance after simulated wear 3'000 cycles (5*)	32 - 43 Nm	38
Rotational Resistance after simulated wear 3'000 cycles (20*)	32 - 43 Nm	
Rotational Resistance after simulated wear 6'000 cycles (5*)	27 - 48 Nm	43
Rotational Resistance after simulated wear 6'000 cycles (20*)	27 - 48 Nm	
3 – Test Results Product identification field product		
Performance infill Thermographic analysis Organic [%] - Product Declaration		65.0
Performance infill Thermographic analysis Elastomer [%] - Product Declaration		60.0
Performance infill Thermographic analysis Inorganic [%] - Product Declaration		35.0
4 – Product Identification		
Artificial Turf Carpet mass per unit area [g/m ²]		3209
Artificial Turf Tufts per unit area [m ²]		8812
Artificial Turf Pile length above backing [mm]		59.0
Artificial Turf Pile weight [g/m ²]		2124
Detailed tuft decitex (Dtex) [g/10000m]		2265 x 3 + 2198 x 3 + 5704 x 1
Artificial Turf Water permeability of carpet [mm/h]		1864
Artificial Turf Free pile height		18
Performance infill Particle size range [mm]		0.8 - 2.5 mm
Performance infill Particle shape		A2
Performance infill Bulk density [g/cm ³]		0.437
Performance infill Infill depth [mm]		32



Name	Comment	Result
Performance infill Thermographic analysis organic [%]		65
Performance infill Thermographic analysis inorganic [%]		35
Stabilising infill Particle size range [mm]		0.5 - 1.0 mm
Stabilising infill Particle shape		C2
Stabilising infill Bulk density [g/cm ³]		1.53
Shock pad / E-layer Shock absorption [%]	if part of supplied system	
Shock pad / E-layer Deformation	if part of supplied system	
Shock pad / E-layer Thickness	if part of supplied system	
Other, detail		
5 - Test Results Ball / Surface interaction		
Vertical Ball Rebound Initial Dry (Quality)	0.6 - 1m	0.84
Vertical Ball Rebound Initial Dry (Pro)	0.6 - 0.85m	0.84
Vertical Ball Rebound Initial Wet (Quality)	0.6 - 1m	0.83
Vertical Ball Rebound Initial Wet (Pro)	0.6 - 0.85m	0.83
Vertical Ball Rebound after simulated wear 3'000 cycles (5*)	0.6 - 0.85m	0.85
Vertical Ball Rebound after simulated wear 6'000 cycles (5*)	0.6 - 1m	0.95
Vertical Ball Rebound after simulated wear 3'000 cycles (20*)	0.6 - 0.85m	
Vertical Ball Rebound after simulated wear 6'000 cycles (20*)	0.6 - 1m	
Angle Ball Rebound Dry	45 - 80 %	51
Angle Ball Rebound Wet	45 - 80 %	69
Reduced Ball Roll Initial Dry (Quality)	4 - 10 m	5.9
Reduced Ball Roll Initial Dry (Pro)	4 - 8 m	5.9
Reduced Ball Roll after simulated wear 3'000 cycles (5*) Dry	4 - 8 m	5.9



Name	Comment	Result
Reduced Ball Roll after simulated wear 3'000 cycles (5*) Wet	4 - 8 m	6.1
Reduced Ball Roll after simulated wear 3'000 cycles (20*) Dry	4 - 8 m	
Reduced Ball Roll after simulated wear 3'000 cycles (20*) Wet	4 - 8 m	
Reduced Ball Roll after simulated wear 6'000 cycles (5*) Dry	4 - 12 m	5.7
Reduced Ball Roll after simulated wear 6'000 cycles (5*) Wet	4 - 12 m	5.9
Reduced Ball Roll after simulated wear 6'000 cycles (20*) Dry	4 - 12 m	
Reduced Ball Roll after simulated wear 6'000 cycles (20*) Wet	4 - 12 m	
Shock absorption Initial Dry (Quality)	57 - 68 %	64.8
Shock absorption Initial Dry (Pro)	62 - 68 %	64.8
Shock absorption Initial Wet (Quality)	57 - 68 %	65.0
Shock absorption Initial Wet (Pro)	62 - 68 %	65.0
Shock absorption after simulated wear 3'000 cycles (5*)	62 - 68 %	64.1
Shock absorption after simulated wear 3'000 cycles (20*)	62 - 68 %	
Shock absorption after simulated wear 6'000 cycles (5*)	57 - 68 %	62.4
Shock absorption after simulated wear 6'000 cycles (20*)	57 - 68 %	
Shock absorption 50°C	57 - 68 %	64.80
Shock absorption -5°C	57 - 68 %	63.50
Other, detail		
5 - Test Results Player / Surface interaction		
Deformation Initial Dry (Quality)	4 - 11 mm	9.5
Deformation Initial Dry (Pro)	4 - 10 mm	9.5
Deformation Initial Wet (Quality)	4 - 11 mm	9.9
Deformation Initial Wet (Pro)	4 - 10 mm	9.9



Name	Comment	Result
Deformation after simulated wear 3'000 cycles (5*)	4 - 10 mm	9.3
Deformation after simulated wear 3'000 cycles (20*)	4 - 10 mm	
Deformation after simulated wear 6'000 cycles (5*)	4 - 11 mm	8.8
Deformation after simulated wear 6'000 cycles (20*)	4 - 11 mm	
Skin / surface friction Dry	0.35 - 0.75 μ	0.73
Skin / surface friction Dry 3'000 cycles	0.35 - 0.75 μ	0.60
Skin / surface friction Dry 6'000 cycles	0.35 - 0.75 μ	0.61
Skin abrasion Dry	\pm 30 %	23
Skin abrasion Dry 3'000 cycles	\pm 30 %	22
Skin abrasion Dry 6'000 cycles	\pm 30 %	21
6 - Environmental impact (artificial, light, water)		
Pile yarn 1 Colour change after artificial weathering	\geq Grey scale 3	Diamond 375 _ Field Green 4 - 5
Pile yarn 2 Colour change after artificial weathering	\geq Grey scale 3	Diamond 375 _ Lime Green 4
Pile yarn 3 Colour change after artificial weathering	\geq Grey scale 3	Tape 5500 _ Lime Green 4
Pile yarn 1 Peak Breakage Force before artificial weathering		15.20
Pile yarn 1 Peak Breakage Force after artificial weathering		15.0
Pile yarn 1 Peak Breakage Force Green Reference value before artificial weathering		15.20
Pile yarn 1 Peak Breakage Force Variation after weathering from Green Reference value	Change \leq 25 %	1.30
Pile yarn 2 Peak Breakage Force before artificial weathering		15.20
Pile yarn 2 Peak Breakage Force after artificial weathering		15.3
Pile yarn 2 Peak Breakage Force Green Reference		15.20



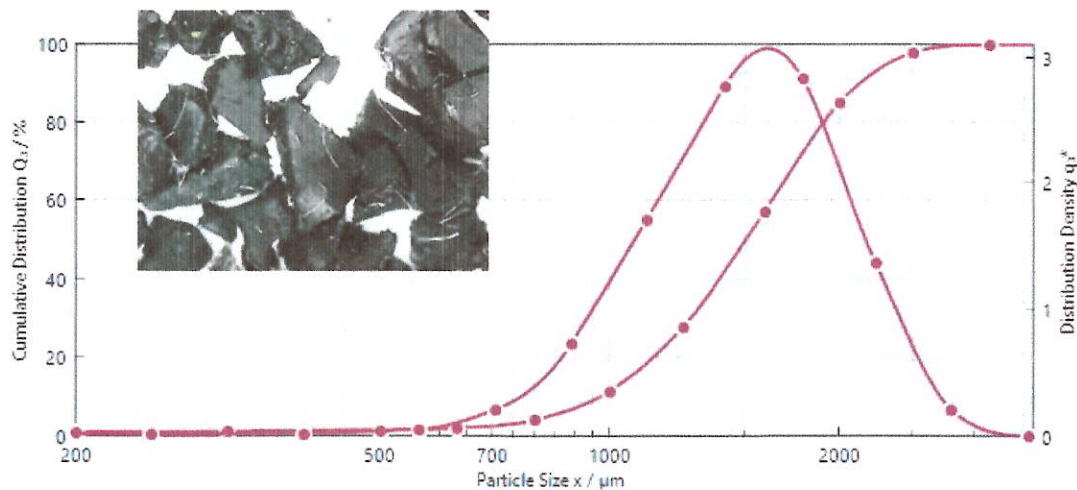
Name	Comment	Result
value before artificial weathering		
Pile yarn 2 Peak Breakage Force Variation after weathering from Green Reference value	Change \leq 25 %	0.70
Pile yarn 3 Peak Breakage Force before artificial weathering		54.90
Pile yarn 3 Peak Breakage Force after artificial weathering		48.7
Pile yarn 3 Peak Breakage Force Green Reference value before artificial weathering		54.90
Pile yarn 3 Peak Breakage Force Variation after weathering from Green Reference value	Change \leq 25 %	11.30
Polymeric infill Colour change after artificial weathering	\geq Grey scale 3	4 - 5
Polymeric infill Visual change in composition after artificial weathering	No change	No change
Complete system Water permeability	$>$ 180 mm/h	890
Stitched joints Strength un-aged	\geq 1000N/100mm	
Stitched joints Strength water aged	\geq 1000N/100mm	
Bonded joints Strength un-aged	\geq 75/100mm	175
Bonded joints Strength water aged	\geq 75/100mm	131
Carpet tuft Withdrawal force un-aged	\geq 40N	83
Carpet tuft Withdrawal force water aged	\geq 40N	83
Heat Category	for information	Category 3
7 - Miscellaneous (shock pad, sub-base - if part of the system)		
Shock Pad / E-layer tensile strength un-aged	\geq 0.15 MPa	
Sub-base Composition		
Sub-base Particle size range		
Sub-base Particle shape		
Sub-base Thickness		
Sub-base Compaction & test method		
Other, detail		



Name	Comment	Result
Turf Product Report Details		
Shockpad, E-layer Type Category		No Shockpad
Performance Infill Material type Category		End of Life Tires Infill (ELT)
Splash Characteristics Category		≥ 1.5%

2 – Test Images

Performance infill particle grading curve

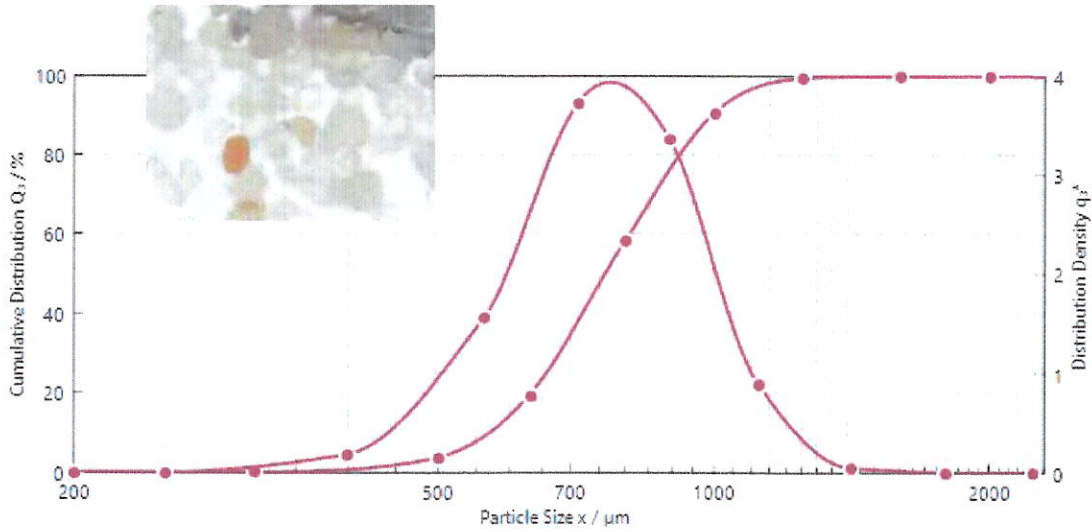


CUMULATIVE DISTRIBUTION

$x_0 / \mu\text{m}$	$Q_3 / \%$	$x_0 / \mu\text{m}$	$Q_3 / \%$				
18.62	0.02	800.00	4.10	13.17	0.001	709.93	0.207
63.00	0.22	1000.00	11.22	34.25	0.004	894.43	0.735
100.00	0.48	1250.00	27.70	79.37	0.013	1118.03	1.701
150.00	0.67	1600.00	57.28	122.47	0.011	1414.21	2.759
200.00	0.81	2000.00	84.70	173.21	0.011	1788.85	2.830
315.00	1.09	2500.00	97.90	251.00	0.014	2236.07	1.362
500.00	1.46	3150.00	100.00	396.86	0.019	2806.24	0.209
630.00	1.95	4000.00	100.00	561.25	0.049	3549.65	0.000



Stabilising infill particle grading curve

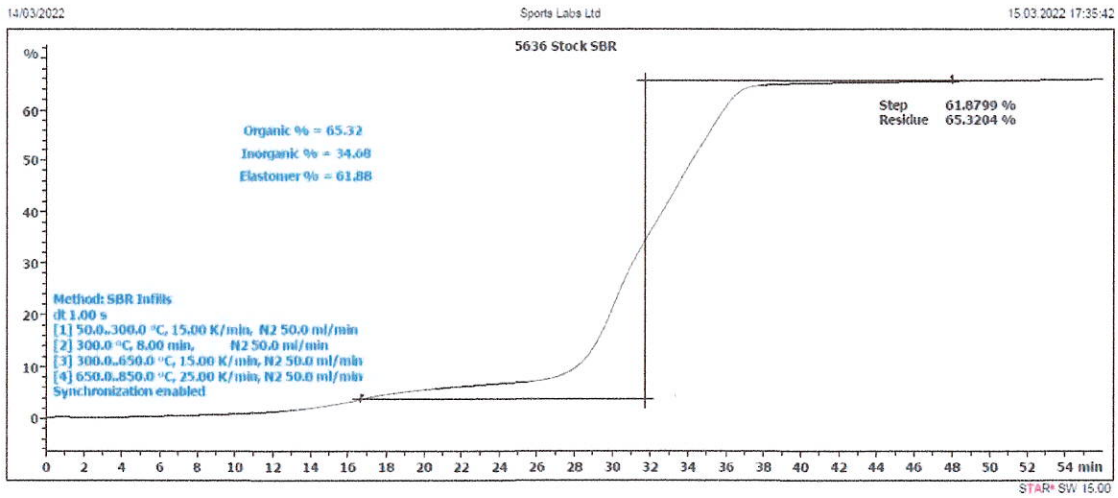


CUMULATIVE DISTRIBUTION

$x_0 / \mu\text{m}$	$Q_3 / \%$	$x_0 / \mu\text{m}$	$Q_3 / \%$				
18.62	0.01	630.00	19.53	13.17	0.000	561.25	1.562
63.00	0.07	800.00	58.23	34.25	0.001	709.93	3.730
100.00	0.13	1000.00	90.77	79.37	0.003	894.43	3.358
150.00	0.16	1250.00	99.46	122.47	0.001	1118.03	0.897
200.00	0.17	1600.00	99.96	173.21	0.001	1414.21	0.046
315.00	0.22	2000.00	100.00	251.00	0.003	1788.85	0.004
500.00	3.85	2500.00	100.00	396.86	0.181	2236.07	0.000



TGA of performance infill



Simulated wear - Before 1



Simulated wear - Before 2





Simulated wear - After 1



Simulated wear - After 2



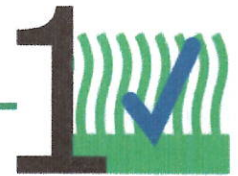


Simulated wear - After 3

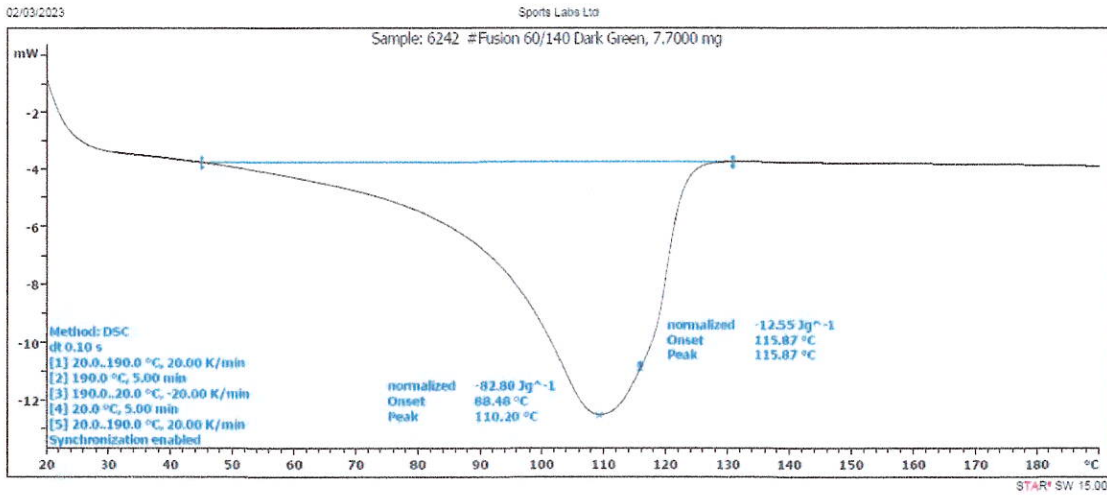


Simulated wear - After 4



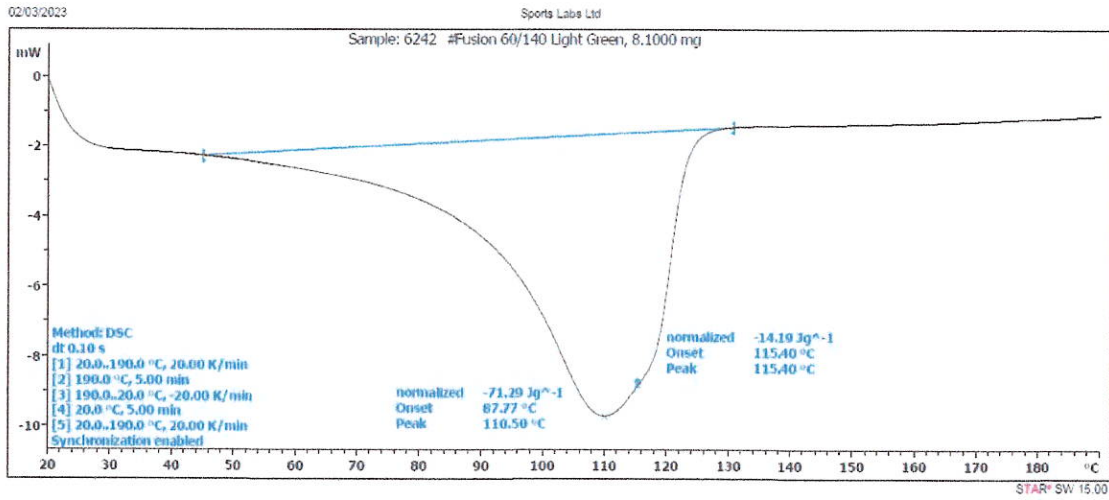


Yarn Characteristics DSC





Yarn Characteristics DSC - 2

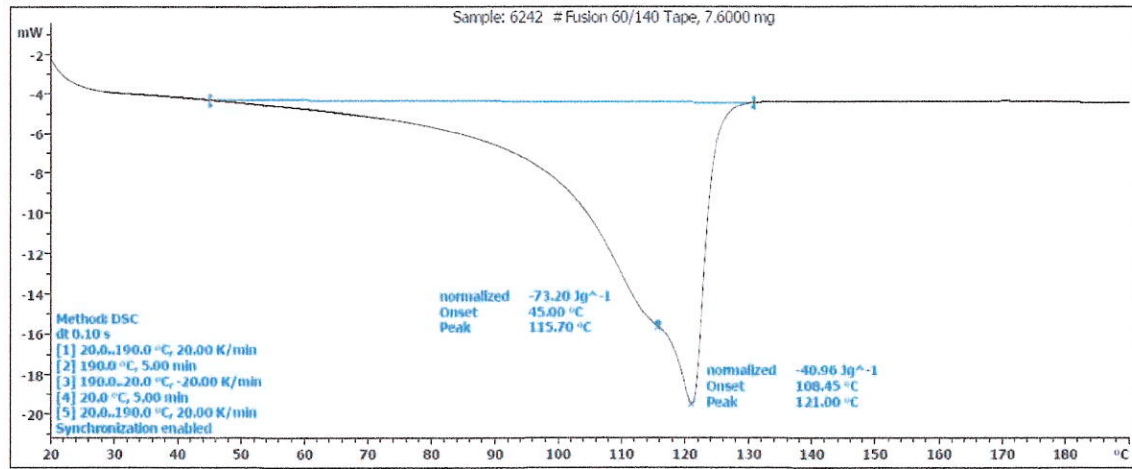




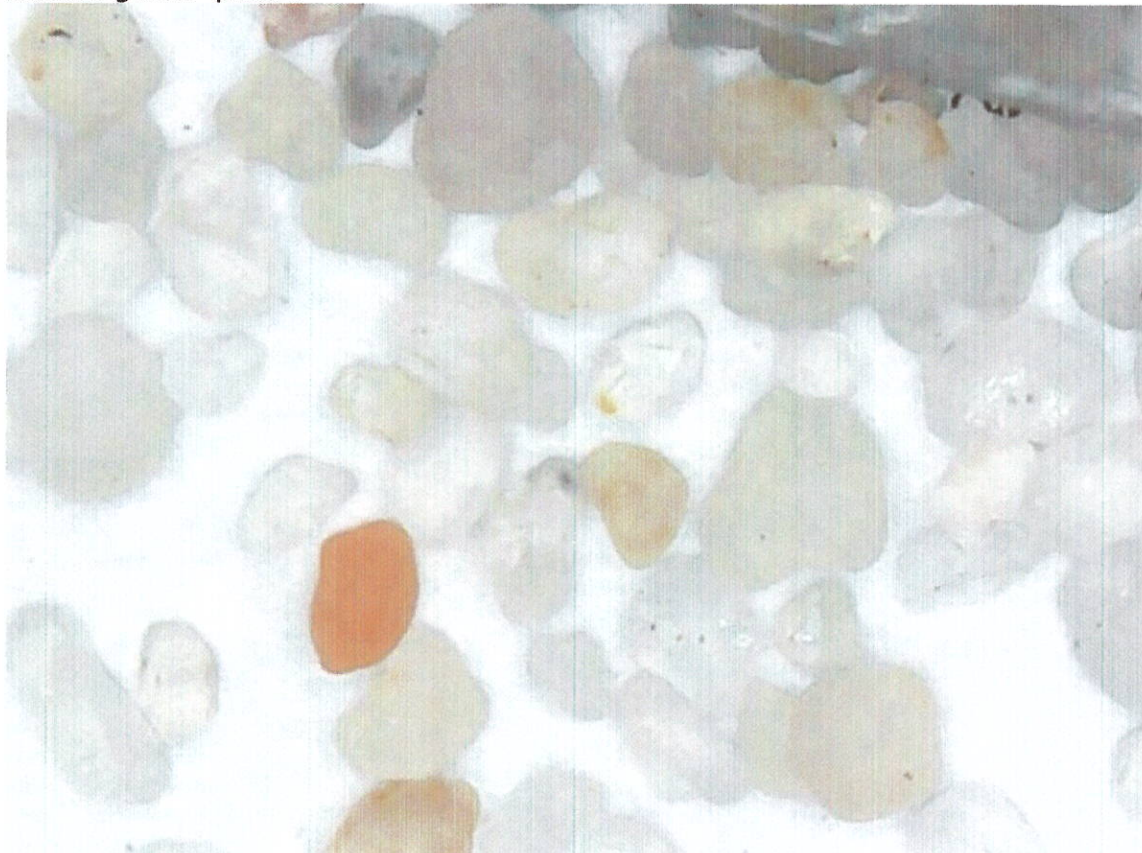
Yarn Characteristics DSC - 3

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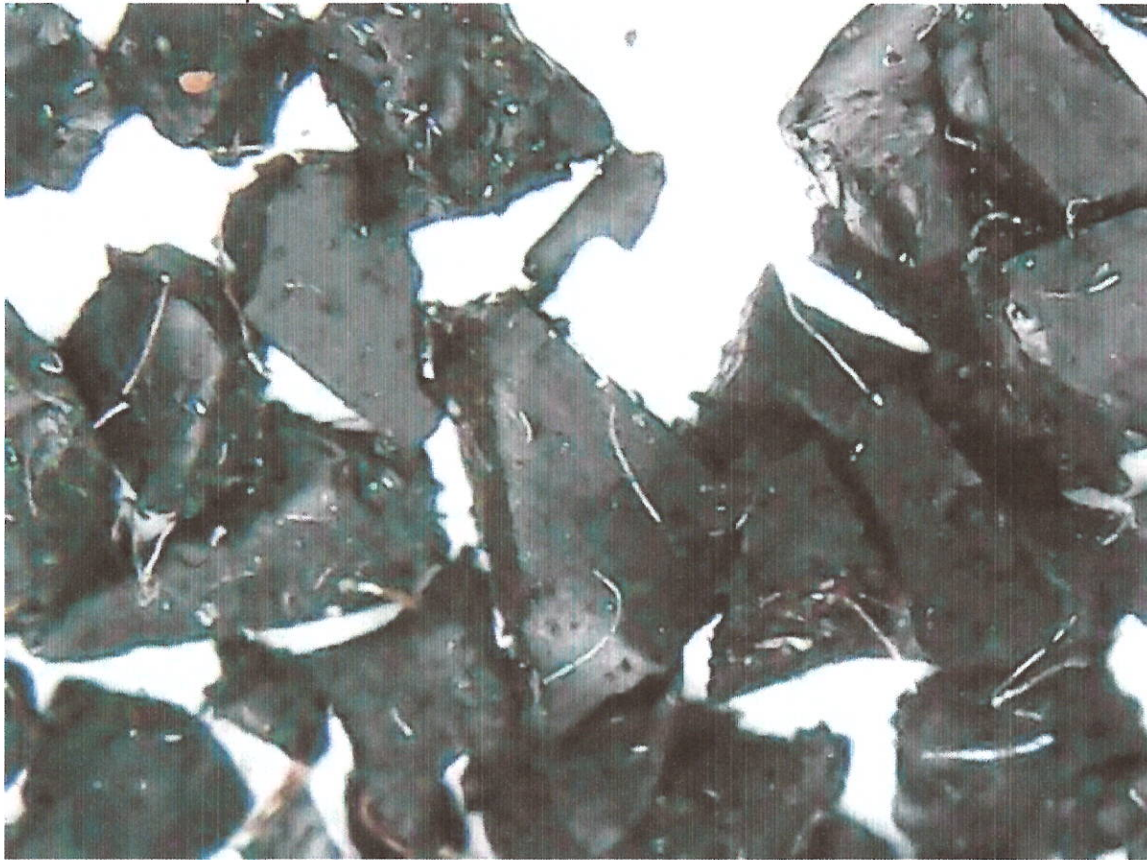
Sports Labs Ltd



Stabilising Infill - picture



Performance Infill - picture

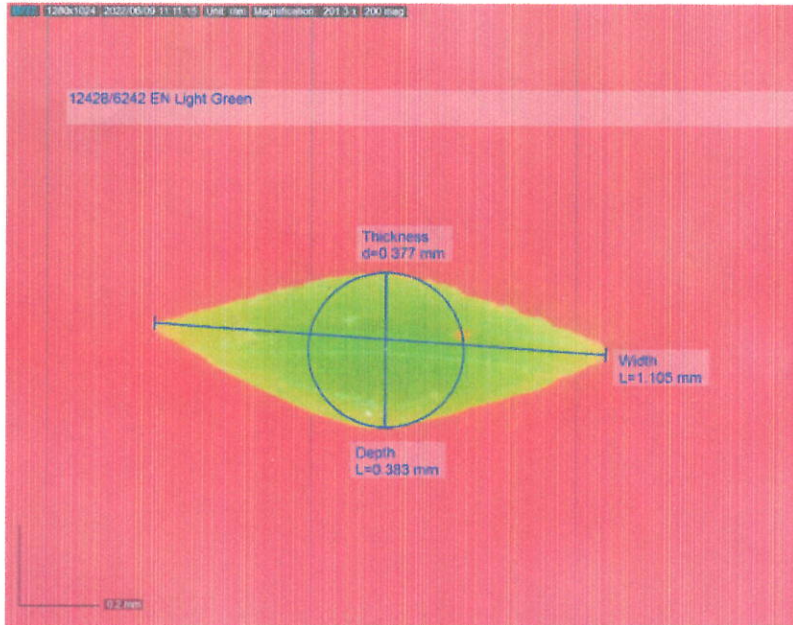


Cross-section Yarn 1





Cross-section Yarn 2





Cross-section Yarn 3

