



FIFA LABORATORY TEST REPORT

Test manual 2015
01.01.2015

Product	Warrior 60/180 EPDM JB-G
FIFA Licensee	JUTA a.s.
Test Institute	Sports Labs Ltd.
Test Number	21916
External Test Number	17230/2772
Date of Test	26.03.2019
Test Result	Passed
Quality Level	FIFA Quality & Quality PRO
Test Type	Initial



Licensee

Main Address

Name	JUTA a.s.
Address	JUTA a.s. Dukelska 417
ZIP / City	544 01 / DVUR KRALOVÉ N. L.
Website	
Contact Email	
Contact Phone	

Test institute

Main Address

Name	Sports Labs Ltd.
Address	Sports Labs Ltd. 1 Adam Square Brucefield Industrial Park
ZIP / City	EH54 9DE / LIVINGSTON
Website	
Contact Email	
Contact Phone	



Approval

Test Institute Director	Sean Ramsay
Signature	
Date	26.03.2019

Test Institute Engineer	Craig Melrose
Signature	
Date	26.03.2019



1 – Test Results

Name	Comment	Result
1 - Summary		
Vertical ball rebound FIFA Quality		Passed
Vertical ball rebound FIFA Quality Pro		Passed
Angeled ball rebound FIFA Quality		Passed
Angeled 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		Warrior 60/180 EPDM JB-G
Product ID		Warrior 60/180
Synthetic Turf System		Warrior 60/180 EPDM JB-G
Performance infill		EPDM Jutafill Black/Grey
Stabilising infill		ST 06/12
Shock-pad or elastic layer		-
Sub-base composition		Rigid Engineered Base
2 - Test Details Test Institute		
Date(s) of test		26.03.2019
Report created by		Craig Melrose
Other Test Engineer on site		
Laboratory Test report number		17230/2772
Test Institute Project number		17230
3 – Product Declaration (Manufacturer)		



Name	Comment	Result
Manufacturer		JUTA a.s.
Tuft pattern		Straight 3/4"
Yarn manufacturer yarn 1		JUTA a.s.
Product name, code yarn 1		JUTAyarn MF PE 9900/3 fg TBFO P
Pile yarn profile yarn 1		T-Bone
Pile thickness (µ m) yarn 1		420.0
Pile colour (RAL) value 1 yarn 1		6002
Pile colour (RAL) value 2 yarn 1		
Pile colour (RAL) value 3 yarn 1		
Pile width (mm) yarn 1		2.30
Number of tufts/m2 yarn 1	ISO1773	9449.00
Pile length (mm) yarn 1	ISO 2549	60.00
Pile weight (g/m2) yarn 1	ISO 8543	1215.00
Pile yarn characterization yarn 1		PE
Pile yarn dtex yarn 1		9900
Yarn manufacturer yarn 2		JUTA a.s.
Product name, code yarn 2		JUTAyarn MF PE6000/4 og SLFO P
Pile yarn profile yarn 2		Super-lens
Pile thickness (µ m) yarn 2		275.0
Pile colour (RAL) value 1 yarn 2		6025
Pile colour (RAL) value 2 yarn 2		
Pile colour (RAL) value 3 yarn 2		
Pile width (mm) yarn 2		1.00
Number of tufts/m2 yarn 2	ISO1773	9449.00
Pile length (mm) yarn 2	ISO 2549	60.00
Pile weight (g/m2) yarn 2	ISO 8543	736.00



Name	Comment	Result
Pile yarn characterization yarn 2		PE
Pile yarn dtex yarn 2		6000.0
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		
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		JUTAbackTURF2x115+30
Primary backing Manufacturer		JUTA a.s.
Re-enforcement scrim Product name, code		-
Re-enforcement scrim Manufacturer		-
Secondary backing Product name, code		EUR1188GBBL
Secondary backing Manufacturer		EOC Belgium
Secondary backing Dry application rate (g/m ²)		950.0
Carpet Minimum tuft withdrawel force (N)		30
Carpet Carpet mass per unit area (g/m ²)		3161.0



Name	Comment	Result
Method of jointing		Bonded
Bonded joints Adhesive brand name		160 Turf Adhesive
Bonded joints Adhesive manufacturer		Forbo
Bonded joints Application rate (g/m)		500 - 1300 g/lm
Bonded joints Jointing film brand name		C145
Bonded joints Jointing film manufacturer		Kingsports BV
Stitched seams Tread brand name/product code		
Stitched seams Tread manufacturer		
Stitched seams Stitch rate (stitch per lm)		
Performance Infill Product name, code		EPDM Jutafill Black/Grey
Performance Infill Manufacturer		JUTA a.s.
Performance Infill Material type		EPDM
Performance Infill Material grading		1.6 - 3.2 mm
Performance Infill Particle shape	prEN 14955	A2
Performance Infill Particle size range	EN 933-Part 1	1.6 - 3.2 mm
Performance Infill Bulk density (g/cm ³)	EN 1097-3	0.590
Performance Infill Application rate (kg/m ²)		15.0
Stabilising Infill Product name, code		ST 06/12
Stabilising Infill Manufacturer		Sklopisek Strelec a.s.
Stabilising Infill Material type		Sand
Stabilising Infill Material grading		0.63 - 1.25 mm
Stabilising Infill Particle shape	prEN 14955	Round – C2
Stabilising Infill Particle size range	EN 933-Part 1	0.63 - 1.25 mm



Name	Comment	Result
Stabilising Infill Bulk density (g/cm ³)	EN 1097-3	1.50
Stabilising Infill Application rate (kg/m ²)		12.0
Shockpad, E-layer Product name, code		
Shockpad, E-layer Manufacturer		
Shockpad, E-layer Type		
Shockpad, E-layer Composition		
Shockpad, E-layer Bulk density (g/cm ³)		
Shockpad, E-layer Thickness	EN 1979	
Shockpad, E-layer Shock absorption (%)	FIFA 4a	
Shockpad, E-layer Deformation	FIFA 5a	
Shockpad, E-layer Tensile strength (N)		
Shockpad, E-layer Mass per unit area (kg/m ²)		
Other, detail		
4 – Product Identification		
Artificial Turf Carpet mass per unit area [g/m ²]		3254
Artificial Turf Tufts per unit area [m ²]		9529
Artificial Turf Pile length above backing [mm]		60.0
Artificial Turf Pile weight [g/m ²]		1962
Artificial Turf Water permeability of carpet [mm/h]		2711
Artificial Turf Free pile height		18
Performance infill Particle size range [mm]		1.25 - 3.35 mm
Performance infill Particle shape		A2
Performance infill Bulk density [g/cm ³]		0.607
Performance infill Infill depth [mm]		32



Name	Comment	Result
Performance infill Thermographic analysis organic [%]		41
Performance infill Thermographic analysis inorganic [%]		59
Stabilising infill Particle size range [mm]		0.63 - 1.25 mm
Stabilising infill Particle shape		C2
Stabilising infill Bulk density [g/cm ³]		1.45
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	0.80
Vertical Ball Rebound Initial Dry (Pro)	0.6 - 0.85m	0.80
Vertical Ball Rebound Initial Wet (Quality)	0.6 - 1m	0.74
Vertical Ball Rebound Initial Wet (Pro)	0.6 - 0.85m	0.74
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	0.90
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	



Name	Comment	Result
Angeled Ball Rebound Dry	45 - 80 %	51
Angeled Ball Rebound Wet	45 - 80 %	68
Reduced Ball Roll Initial Dry (Quality)	4 - 10 m	6.3
Reduced Ball Roll Initial Dry (Pro)	4 - 8 m	6.3
Reduced Ball Roll after simulated wear 3'000 cycles (5*) Dry	4 - 8 m	6.4
Reduced Ball Roll after simulated wear 3'000 cycles (5*) Wet	4 - 8 m	6.7
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	7.4
Reduced Ball Roll after simulated wear 6'000 cycles (5*) Wet	4 - 12 m	7.7
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 %	63.9
Shock absorption Initial Dry (Pro)	62 - 68 %	63.9
Shock absorption Initial Wet (Quality)	57 - 68 %	64.0
Shock absorption Initial Wet (Pro)	62 - 68 %	64.0
Shock absorption after simulated wear 3'000 cycles (5*)	62 - 68 %	62.1
Shock absorption after simulated wear 3'000 cycles (20*)	62 - 68 %	



Name	Comment	Result
Shock absorption after simulated wear 6'000 cycles (5*)	57 - 68 %	58.9
Shock absorption after simulated wear 6'000 cycles (20*)	57 - 68 %	
Shock absorption 50°C	57 - 68 %	63.30
Shock absorption -5°C	57 - 68 %	62.00
Deformation Initial Dry (Quality)	6 - 11 m	10.0
Deformation Initial Dry (Pro)	6 - 10 m	10.0
Deformation Initial Wet (Quality)	6 - 11 m	10.0
Deformation Initial Wet (Pro)	6 - 10 m	10.0
Deformation after simulated wear 3'000 cycles (5*)	6 - 10 m	8.3
Deformation after simulated wear 3'000 cycles (20*)	6 - 10 m	
Deformation after simulated wear 6'000 cycles (5*)	6 - 11 m	7.7
Deformation after simulated wear 6'000 cycles (20*)	6 - 11 m	
Rotational Resistance Initial Dry (Quality)	27 - 48 Nm	34
Rotational Resistance Initial Dry (Pro)	32 - 43 Nm	34
Rotational Resistance after simulated wear 3'000 cycles (5*)	32 - 43 Nm	35
Rotational Resistance after simulated wear 3'000 cycles (20*)	32 - 43 Nm	
Rotational Resistance after simulated wear 6'000 cycles (5*)	27 - 48 Nm	38
Rotational Resistance after simulated wear 6'000 cycles (20*)	27 - 48 Nm	
Other, detail		Wet Rotational Resistance = 32 Nm



Name	Comment	Result
5 – Test Results Player / Surface interaction		
Skin / surface friction Dry	0.35 - 0.75 μ	0.73
Skin / surface friction Dry 3'000 cycles	0.35 - 0.75 μ	0.69
Skin / surface friction Dry 6'000 cycles	0.35 - 0.75 μ	0.69
Skin abrasion Dry	\pm 30 %	-23
Skin abrasion Dry 3'000 cycles	\pm 30 %	-22
Skin abrasion Dry 6'000 cycles	\pm 30 %	-23
6 – Environmental impact (artificial, light, water)		
Pile yarn 1 Colour change after artificial weathering	\geq Grey scale 3	4
Pile yarn 2 Colour change after artificial weathering	\geq Grey scale 3	4
Pile yarn 3 Colour change after artificial weathering	\geq Grey scale 3	
Pile yarn 1 Yarn tensile strength after artificial weathering	Change \leq 50 %	6 %
Pile yarn 2 Yarn tensile strength after artificial weathering	Change \leq 50 %	1 %
Pile yarn 3 Yarn tensile strength after artificial weathering	Change \leq 50 %	
Polymeric infill Colour change after artificial weathering	\geq Grey scale 3	3
Polymeric infill Visual change in composition after artificial weathering	No change	No Change
Complete system Water permeability	> 180 mm/h	1571
Stitched joints Strength un-aged	\geq 1000N/100mm	
Stitched joints Strength water aged	\geq 1000N/100mm	
Bonded joints Strength un-aged	\geq 75/100mm	107
Bonded joints Strength water aged	\geq 75/100mm	79

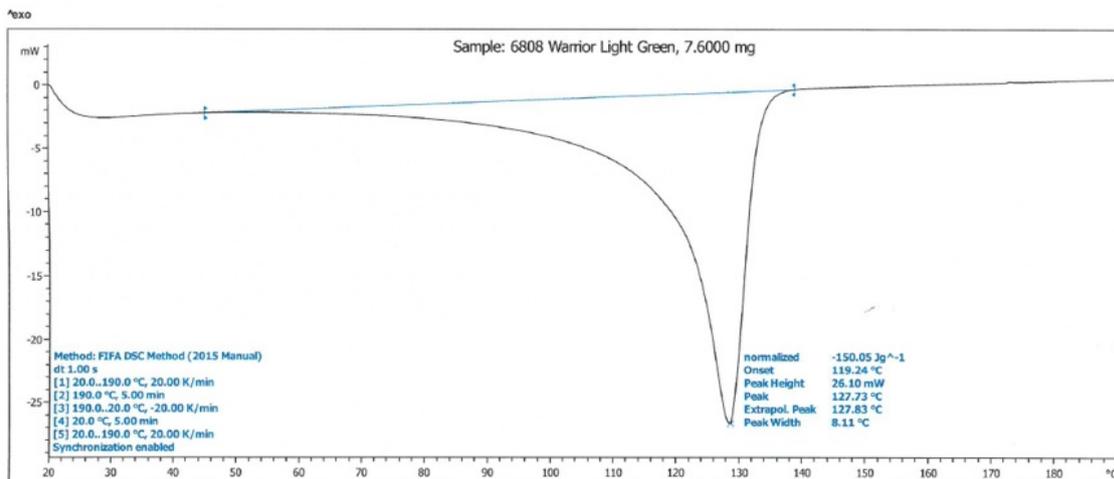
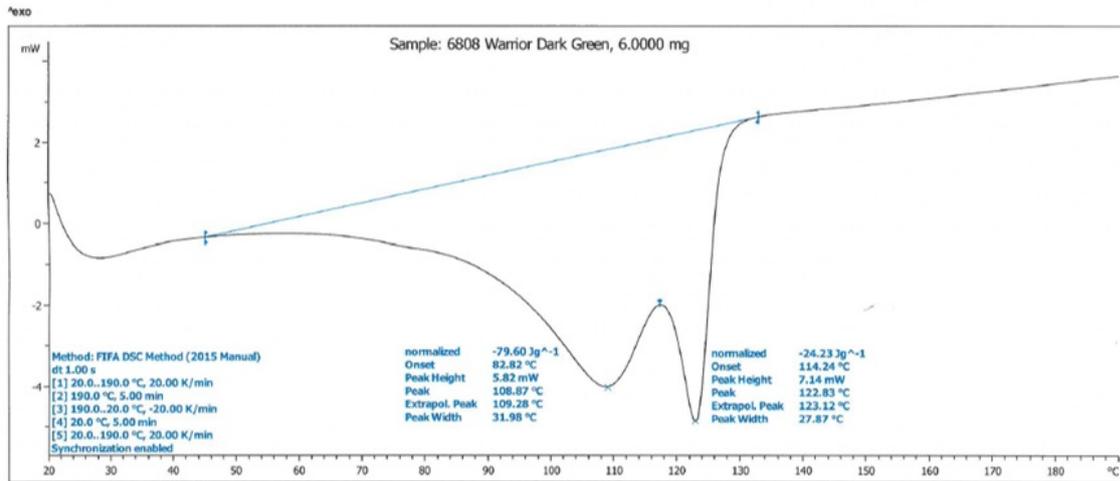


Name	Comment	Result
Carpet tuft Withdrawal force un-aged	≥ 30N	62
Carpet tuft Withdrawal force water aged	≥ 30N	62
Heat Category	for information	Category 3
Splash Characteristics	for information	< 1.5 %
7 - Miscellaneous (shock pad, sub-base - if part of the system)		
Shock Pad / E-layer tensile strength un- aged	≥ 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		



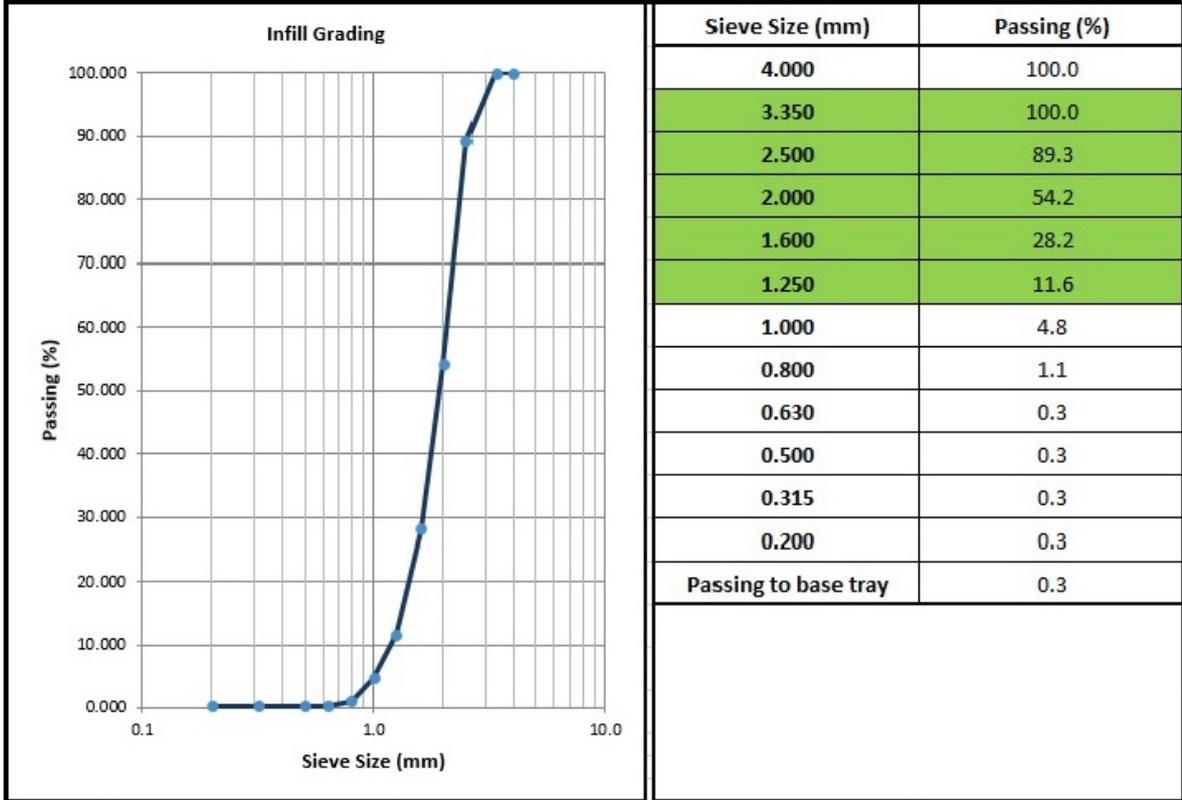
2 – Test Images

DSC Diff. Scan. Colorimetry scans of pile yarn



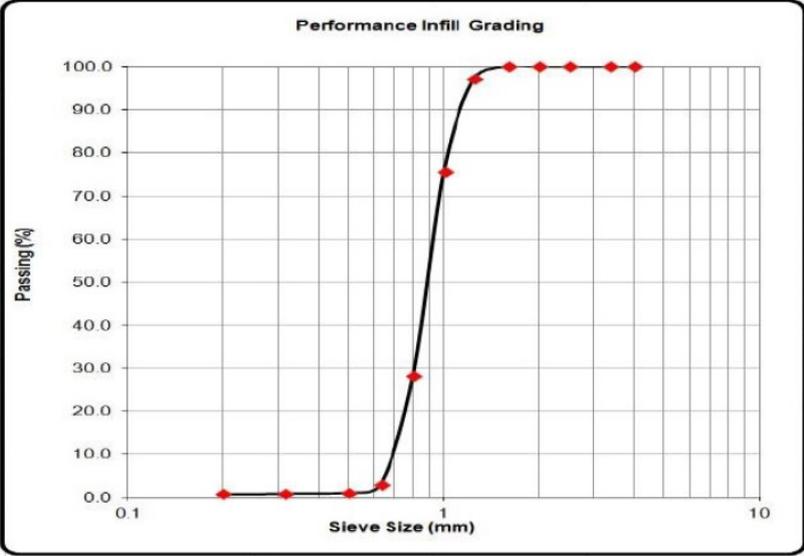


Performance infill particle grading curve





Stabilising infill particle grading curve

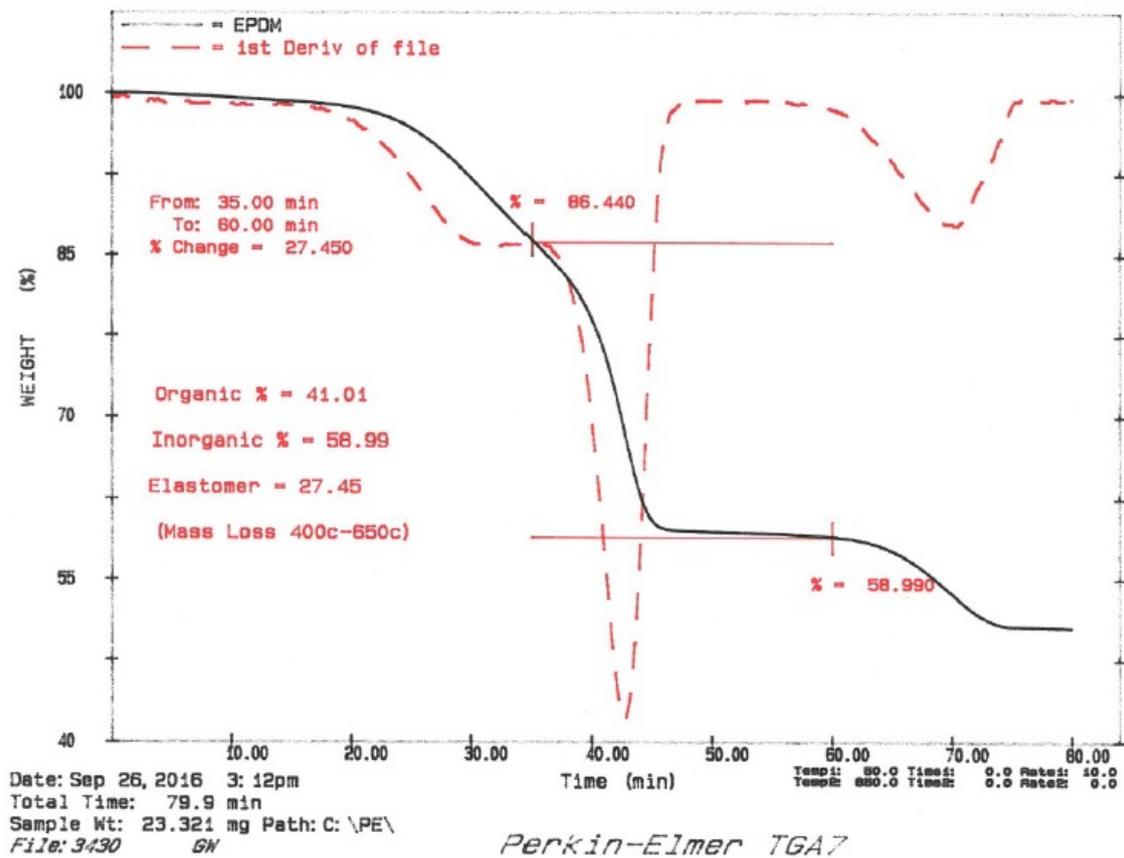


SIEVE SIZE (mm)	PASSING %
4.000	100.0
3.350	100.0
2.500	100.0
2.000	100.0
1.600	100.0
1.250	97.2
1.000	75.7
0.800	28.1
0.630	3.0
0.500	1.1
0.315	0.8
0.200	0.8
Passing to base tray	0.8

PARTICLE PICTURE	
PARTICLE SHAPE DESIGNATION	
C2	
BULK DENSITY	
1.449	Mg/m³



TGA of performance infill



Simulated wear - Before 1

Pre-Wear



Simulated wear - After 1

3000 Lisport XL Cycles



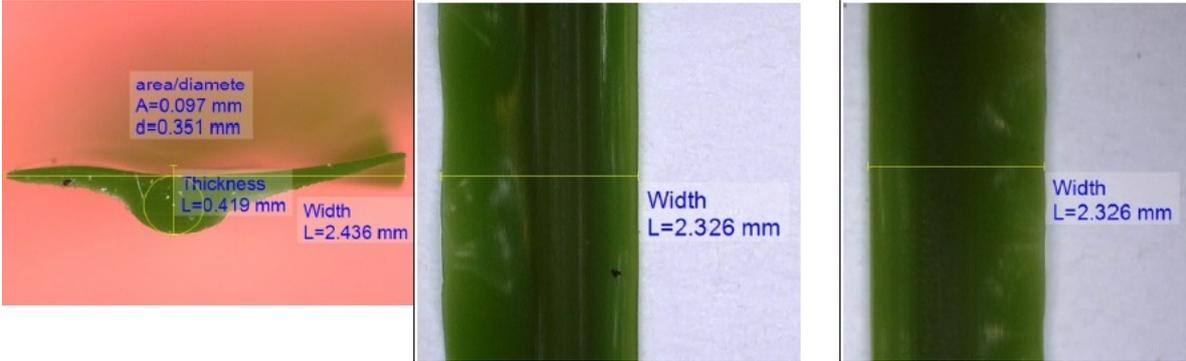
Simulated wear - After 2

6000 Lisport XL Cycles





Yarn Characteristics - 1





Yarn Characteristics - 2

