



FIFA LABORATORY TEST REPORT

TM Football Turf | 2015
01.01.2015

Product	Pasto sintético tipo deportivo Qgrass 50mm *04mt *20mt
Test Institute	Sports Labs Ltd.
Test Number	127857
External Test Number	13142/8277
Date of Test	30.03.2023
Test Result	Passed
Quality Level	FIFA Quality
Test Type	Initial



Test institute


Main Address


Name	Sports Labs Ltd.
Address	1 Adam Square Brucefield Industrial Park
ZIP / City	EH54 9DE / LIVINGSTON
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Approval

Test Institute Director	Sean Ramsay - Associate Director
Signature	
Date	30.03.2023

Test Institute Engineer	Craig Melrose - Laboratory Manager
Signature	
Date	30.03.2023



1 – Test Results

Name	Comment	Result
1 - Summary		
Vertical ball rebound FIFA Quality		Passed
Angle ball rebound FIFA Quality		Passed
Reduced ball roll FIFA Quality		Passed
Shock absorption FIFA Quality		Passed
Deformation FIFA Quality		Passed
Rotational resistance FIFA Quality		Passed
Skin / surface friction		Passed
Skin abrasion		Passed
1 - Test Details Object		
Product Name		Bellin-DiamondD650130
Product ID		-
Synthetic Turf System		Bellin-DiamondD650130
Performance infill		SBR
Stabilising infill		Sand
Shock-pad or elastic layer		-
Sub-base composition		Rigid engineered base
2 - Test Details Test Institute		
Date(s) of test		30.03.2023
Report created by		E Steyn
Laboratory Test report number		13142/8277
Test Institute Project number		13142
3 – Product Declaration (Manufacturer)		
Manufacturer		BELLINTURF INDUSTRIAL (VIETNAM)CO.,LTD
Tuft pattern		Straight
Yarn manufacturer yarn 1		Consan
Product name, code yarn 1		Consan Diamond GFD2000, Consan Diamond GLE2000
Detailed tuft decitex (Dtex) [g/10000m]		2000 x 3 + 2000 x 3
Pile yarn profile yarn 1		Diamond
Pile thickness (µ m) yarn 1		260.0
Pile colour (RAL) value 1 yarn 1		6010



Name	Comment	Result
Pile colour (RAL) value 2 yarn 1		6025
Pile colour (RAL) value 3 yarn 1		-
Pile width (mm) yarn 1		1.50
Number of tufts/m ² yarn 1	ISO1773	8190.00
Pile length (mm) yarn 1	ISO 2549	50.00
Pile weight (g/m ²) yarn 1	ISO 8543	1160.00
Pile yarn characterization yarn 1		PE
Pile yarn dtex yarn 1		12000
Yarn manufacturer yarn 2		
Product name, code yarn 2		
Pile yarn profile yarn 2		
Pile thickness (μ m) yarn 2		
Pile colour (RAL) value 1 yarn 2		
Pile colour (RAL) value 2 yarn 2		
Pile colour (RAL) value 3 yarn 2		
Pile width (mm) yarn 2		
Number of tufts/m ² yarn 2	ISO1773	
Pile length (mm) yarn 2	ISO 2549	
Pile weight (g/m ²) yarn 2	ISO 8543	
Pile yarn characterization yarn 2		
Pile yarn dtex yarn 2		
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		



Name	Comment	Result
Pile yarn dtex yarn 3		
Primary backing Product name, code		Double PP cloth
Primary backing Manufacturer		Jinda Fabric Co., Ltd., Yizheng
Re-enforcement scrim Product name, code		Mesh fabric
Re-enforcement scrim Manufacturer		Sweet Fabric Co., Ltd.
Secondary backing Product name, code		SBR Latex
Secondary backing Manufacturer		TRINSEO
Secondary backing Dry application rate (g/m ²)		1200.0
Carpet Minimum tuft withdrawal force (N)		40
Carpet Carpet mass per unit area [g/m ²]		2605.0
Method of jointing		Bonded
Bonded joints Adhesive brand name		Mapei
Bonded joints Adhesive manufacturer		Mapei construction materials (Guangzhou) co ., LTD
Bonded joints Application rate (g/m)		400g/lm
Bonded joints Jointing film brand name		Fule
Bonded joints Jointing film manufacturer		Fule adhesive Co ., LTD
Stitched seams Tread brand name/product code		
Stitched seams Tread manufacturer		
Stitched seams Stitch rate (stitch per lm)		
Performance Infill Product name, code		SBR
Performance Infill Manufacturer		Various
Performance Infill Material grading		0.8 - 2.5 mm
Performance Infill Particle shape	prEN 14955	Angular
Performance Infill Particle size range	EN 933-Part 1	0.8 - 2.5 mm
Performance Infill Bulk density (g/cm ³)	EN 1097-3	0.441
Performance Infill Application rate (kg/m ²)		16.0



Name	Comment	Result
Stabilising Infill Product name, code		Silica sand
Stabilising Infill Manufacturer		Various
Stabilising Infill Material type		Silica sand
Stabilising Infill Material grading		0.5 - 1.0 mm
Stabilising Infill Particle shape	prEN 14955	Rounded
Stabilising Infill Particle size range	EN 933-Part 1	0.5 - 1.0 mm
Stabilising Infill Bulk density (g/cm ³)	EN 1097-3	1.49
Stabilising Infill Application rate (kg/m ²)		7.0
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	38
Rotational Resistance Initial Wet (Quality)	27 - 48 Nm	35
Rotational Resistance after simulated wear 6'000 cycles (5*)	27 - 48 Nm	39
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		35.0
Performance infill Thermographic analysis		65.0



Name	Comment	Result
Inorganic [%] - Product Declaration		
Performance infill Thermographic analysis Elastomer [%] - Product Declaration		62.0
4 – Product Identification		
Artificial Turf Carpet mass per unit area [g/m ²]		2713
Artificial Turf Tufts per unit area [m ²]		8173
Artificial Turf Pile length above backing [mm]		50.0
Artificial Turf Pile weight [g/m ²]		1127
Detailed tuft decitex (Dtex) [g/10000m]		2049 x 3 + 2056 x 3
Artificial Turf Water permeability of carpet [mm/h]		1571
Artificial Turf Free pile height		15
Performance infill Particle size range [mm]		0.8 - 2.5 mm
Performance infill Particle shape		A2
Performance infill Bulk density [g/cm ³]		0.442
Performance infill Infill depth [mm]		30
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		



Name	Comment	Result
Vertical Ball Rebound Initial Dry (Quality)	0.6 - 1m	0.94
Vertical Ball Rebound Initial Wet (Quality)	0.6 - 1m	0.85
Vertical Ball Rebound after simulated wear 6'000 cycles (5*)	0.6 - 1m	1.00
Vertical Ball Rebound after simulated wear 6'000 cycles (20*)	0.6 - 1m	
Angle Ball Rebound Dry	45 - 70 %	56
Angle Ball Rebound Wet	45 - 80 %	65
Reduced Ball Roll Initial Dry (Quality)	4 - 10 m	7.9
Reduced Ball Roll after simulated wear 6'000 cycles (5*) Dry	4 - 12 m	8.7
Reduced Ball Roll after simulated wear 6'000 cycles (5*) Wet	4 - 12 m	8.9
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 %	63.1
Shock absorption Initial Wet (Quality)	57 - 68 %	61.0
Shock absorption after simulated wear 6'000 cycles (5*)	57 - 68 %	58.0
Shock absorption after simulated wear 6'000 cycles (20*)	57 - 68 %	
Shock absorption 50°C	57 - 68 %	64.30
Shock absorption -5°C	57 - 68 %	62.60
Other, detail		
5 – Test Results Player / Surface interaction		
Deformation Initial Dry (Quality)	4 - 11 mm	9.2
Deformation Initial Wet (Quality)	4 - 11 mm	8.6
Deformation after simulated wear 6'000 cycles (5*)	4 - 11 mm	7.9
Deformation after simulated wear 6'000 cycles (20*)	4 - 11 mm	
Skin / surface friction Dry	0.35 - 0.75 μ	0.72
Skin / surface friction Dry 3'000 cycles	0.35 - 0.75 μ	



Name	Comment	Result
Skin / surface friction Dry 6'000 cycles	0.35 - 0.75 μ	0.62
Skin abrasion Dry	\pm 30 %	23
Skin abrasion Dry 3'000 cycles	\pm 30 %	
Skin abrasion Dry 6'000 cycles	\pm 30 %	20
6 – Environmental impact (artificial, light, water)		
Pile yarn 1 Colour change after artificial weathering	\geq Grey scale 3	4 - 5
Pile yarn 2 Colour change after artificial weathering	\geq Grey scale 3	5
Pile yarn 3 Colour change after artificial weathering	\geq Grey scale 3	
Pile yarn 1 Peak Breakage Force before artificial weathering		16.40
Pile yarn 1 Peak Breakage Force after artificial weathering		12.9
Pile yarn 1 Peak Breakage Force Green Reference value before artificial weathering		16.90
Pile yarn 1 Peak Breakage Force Variation after weathering from Green Reference value	Change \leq 25 %	23.70
Pile yarn 2 Peak Breakage Force before artificial weathering		16.90
Pile yarn 2 Peak Breakage Force after artificial weathering		12.8
Pile yarn 2 Peak Breakage Force Green Reference value before artificial weathering		16.90
Pile yarn 2 Peak Breakage Force Variation after weathering from Green Reference value	Change \leq 25 %	24.30
Pile yarn 3 Peak Breakage Force before artificial weathering		
Pile yarn 3 Peak Breakage Force after artificial weathering		
Pile yarn 3 Peak Breakage Force Green Reference		



Name	Comment	Result
value before artificial weathering		
Pile yarn 3 Peak Breakage Force Variation after weathering from Green Reference value	Change \leq 25 %	
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	955
Stitched joints Strength un-aged	\geq 1000N/100mm	
Stitched joints Strength water aged	\geq 1000N/100mm	
Bonded joints Strength un-aged	\geq 75/100mm	113
Bonded joints Strength water aged	\geq 75/100mm	110
Carpet tuft Withdrawal force un-aged	\geq 40N	72
Carpet tuft Withdrawal force water aged	\geq 40N	59
Heat Category	for information	Category 2 - 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		Joint results taken from FIFA Test Number 126493 (External Test Number 12599/6840 dated 19.12.2022.
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		\geq 1.5%

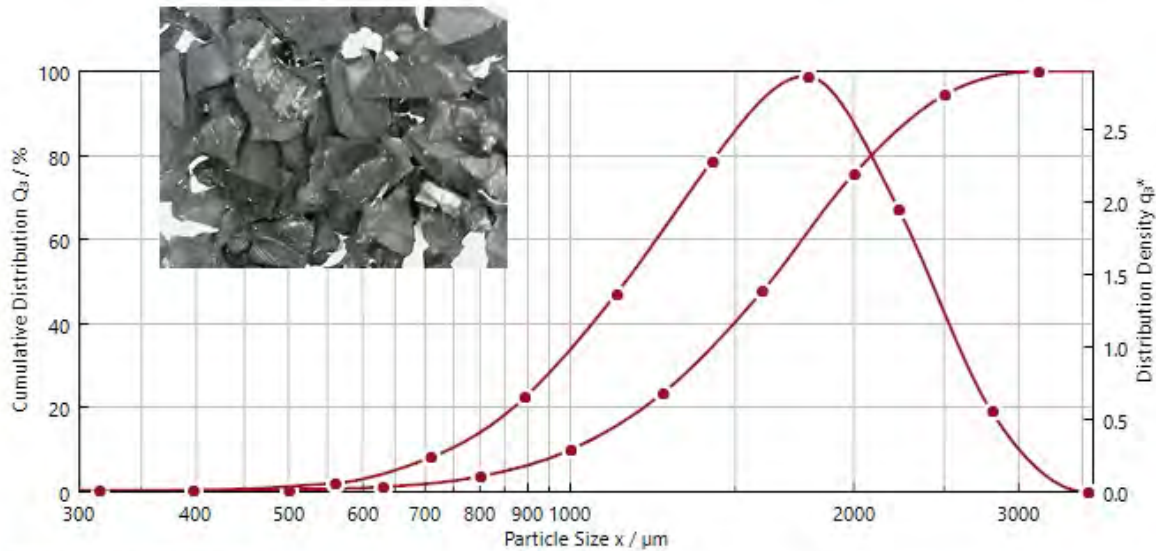


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2 – Test Images

Performance infill particle grading curve

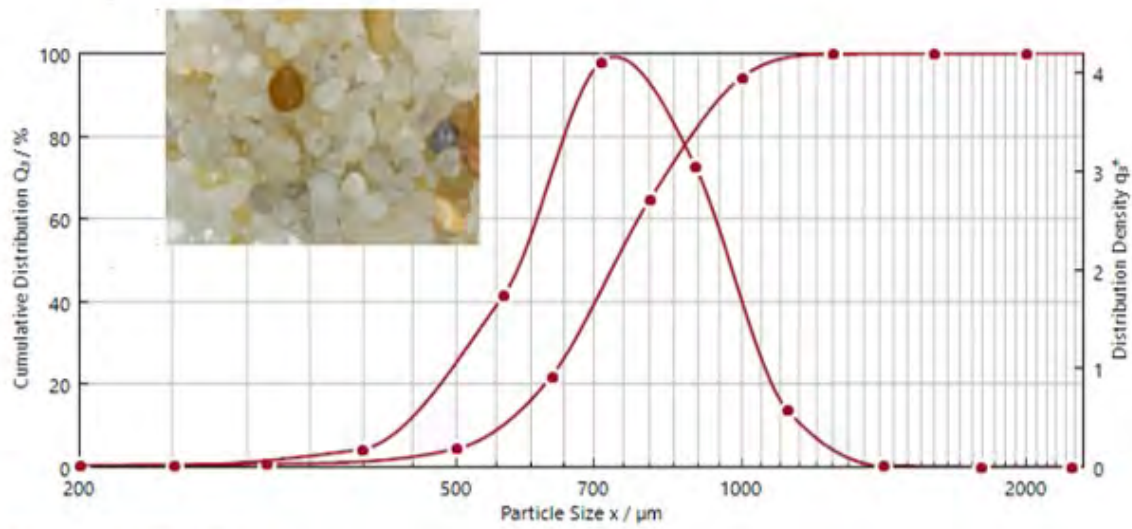


CUMULATIVE DISTRIBUTION

$x_o / \mu\text{m}$	$Q_3 / \%$	$x_o / \mu\text{m}$	$Q_3 / \%$				
18.62	0.01	800.00	3.72	13.17	0.000	709.93	0.240
63.00	0.13	1000.00	10.07	34.25	0.002	894.43	0.655
100.00	0.26	1250.00	23.32	79.37	0.006	1118.03	1.367
150.00	0.31	1600.00	47.78	122.47	0.003	1414.21	2.282
200.00	0.34	2000.00	75.57	173.21	0.002	1788.85	2.867
315.00	0.38	2500.00	94.43	251.00	0.002	2236.07	1.946
500.00	0.61	3150.00	100.00	396.86	0.011	2806.24	0.555
630.00	1.22	4000.00	100.00	561.25	0.061	3549.65	0.000



Stabilising infill particle grading curve

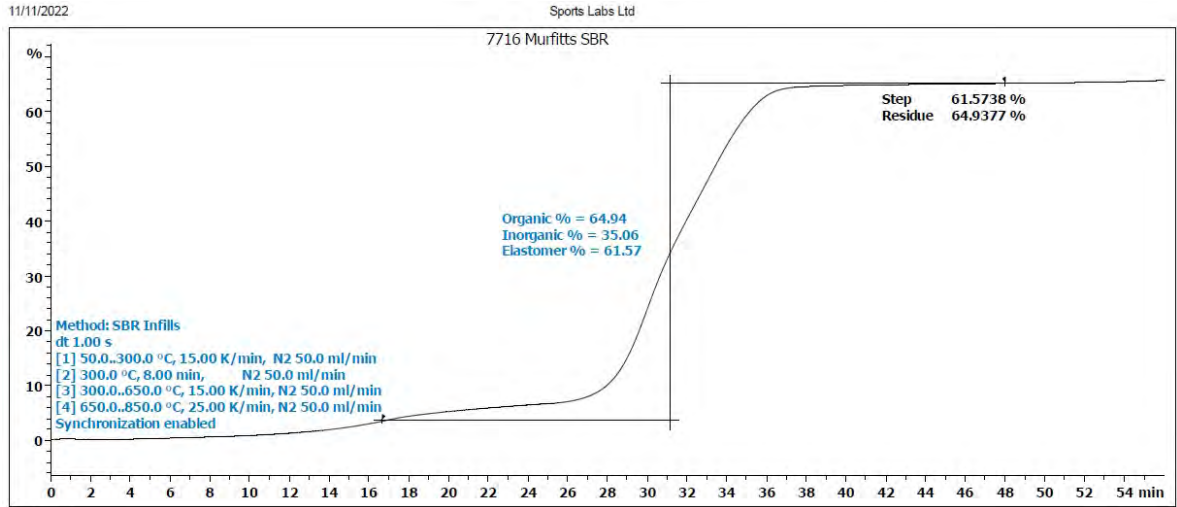


CUMULATIVE DISTRIBUTION

$x_0 / \mu\text{m}$	$Q_3 / \%$	$x_0 / \mu\text{m}$	$Q_3 / \%$				
18.62	0.01	630.00	21.98	13.17	0.000	561.25	1.749
63.00	0.11	800.00	64.59	34.25	0.002	709.93	4.107
100.00	0.28	1000.00	94.18	79.37	0.008	894.43	3.054
150.00	0.39	1250.00	99.84	122.47	0.007	1118.03	0.584
200.00	0.48	1600.00	99.97	173.21	0.007	1414.21	0.012
315.00	0.81	2000.00	100.00	251.00	0.017	1788.85	0.003
500.00	4.42	2500.00	100.00	396.86	0.180	2236.07	0.000



TGA of performance infill





Simulated wear - Before 1





Simulated wear - Before 2





Simulated wear - After 1



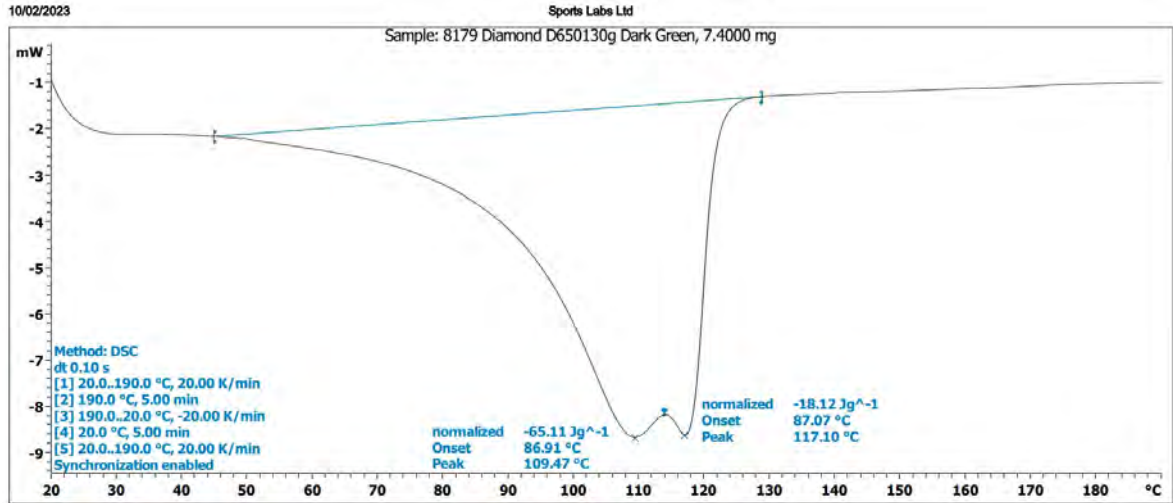


Simulated wear - After 2



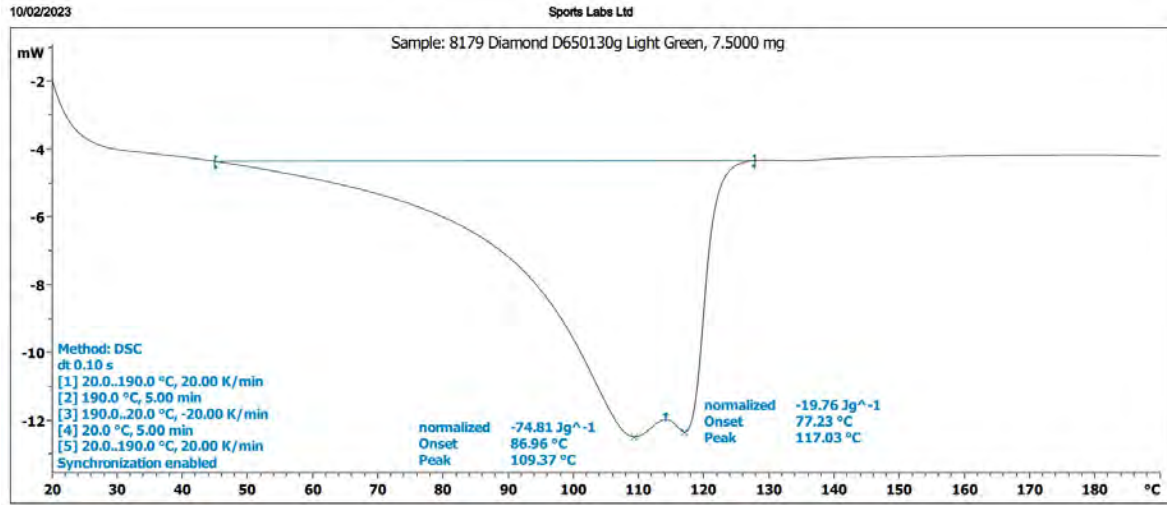


Yarn Characteristics DSC





Yarn Characteristics DSC - 2



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Stabilising Infill - picture



Performance Infill - picture





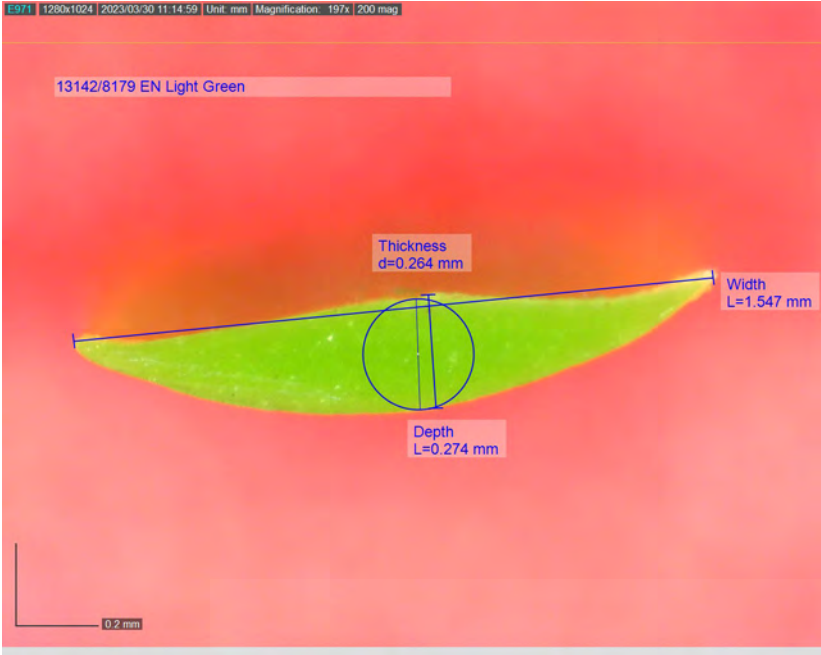
Cross-section Yarn 1



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Cross-section Yarn 2



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