



FIFA LABORATORY TEST REPORT

Manual 2015

Product name	Atomic Pro 60 20mm insitu
Product type (Field/Lines)	Field
FIFA Licensee	TigerTurf Ltd.
FIFA accredited Test Institute	Sports Labs Ltd.
Laboratory Test report number	17820/4201
Date of test	30.01.2017

Football Turf Laboratory Test Report

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1 – Introduction / The Process of certification

In order to be certified, football turf fields must reach the performance and quality criteria established to be as close as possible to playing characteristics of natural grass. To this end, each field must undergo four steps as outlined below:

- a thorough composition and resilience test of the product in the laboratory (step 1)
- the installation of the product as declared, applying the outlined procedures (step 2)
- a test of the final installation for the relevant characteristics of the field as a whole system (step 3)
- if successful, certification FIFA QUALITY or FIFA QUALITY PRO field (step 4)

After expiration of the certificate, the field can be retested (step 3/4)



Fig. 1.2 Approval process steps and the related documents / parties

Legend:



This process is part of the FIFA Quality Programme for Football Turf in order to

- replicate the playing qualities of good quality natural grass,
- create a playing environment that does not increase the risk of injury to players
- achieve adequate durability (providing it is properly maintained)

For more details on *FIFA Quality Programme for Football Turf* see www.fifa.com/quality.

This document covers the complete step 1, FIFA LABORATORY TESTS REPORT. Consider:

- Tests are performed on a representative sample of the manufacturer's sample delivered to the FIFA accredited test institutes
- The test report is only valid if reproduced in its entirety
- The results are only valid for the complete Football Turf (related product) as stated in 2.1
- The related product is eligible for undergoing a field test on a final installation.

IMPORTANT:

To reach FIFA QUALITY PRO (or QUALITY) field certification, as next steps

- the installation has to comply with the related Product Declaration / Method Statement (step 2)
- a successfully passed subsequent FIELD TEST (step 3/4)

This FIFA LABORATORY TEST REPORT may only be used in relationship to Football Turf fields that are going to be submitted for certification under the *FIFA Quality Programme of Football Turf*. Any other use of this report is a violation of the report's copy right which is held by FIFA and breaches the terms of the FIFA Quality Programme of Football Turf licensing agreement.

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2 – Test Object, Participants

2.1 Test Numbers

Report Identification	Laboratory Test report number	17820/4201
	Test Institute Project number	17820

2.2 Test Objects

	Product Name	Atomic Pro 60 20mm insitu
	Product Identification code	-
	Name of the synthetic turf system	Atomic Pro 60
	Performance infill	SBR
	Stabilising infill	Sand
	Shock-pad or elastic layer (if applicable)	20mm insitu
	Sub-base composition	Rigid engineered Base

2.3 Participants, Addresses

Applicant • FIFA preferred producer • Licensee 	Name	TigerTurf Ltd.			
	Address	TigerTurf Ltd.			
	Contact	Phone	+ 44 (0) 1299 407 351	email	d.hibbert@tigerturf.com
FIFA accredited Test Institute	Name	Sports Labs Ltd.			
	Address	Sports Labs Ltd., LIVINGSTON			
	Contact	Phone	+44 (0) 1506 444 755	email	sean@sportslabs.co.uk

3 – Test Conclusion, Product Approval

The presented Football Turf surface satisfies the FIFA LABORATORY TEST requirements of

FIFA QUALITY	Passed	«passed» or «failed»
FIFA QUALITY PRO	Passed	«passed» or «failed»
IMPORTANT: A successfully passed test of the final installation (FIFA FIELD TEST) is mandatory to obtain FIFA QUALITY / QUALITY PRO Certification!		

Report originated by	Name	Craig Melrose	
	Position	Laboratory Coordinator	
	Date	30.01.2017	
Report approved by	Name	Sean Ramsay	
	Position	Laboratory Director	
	Date	30.01.2017	

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4 – Product Information / Specifications

4.1 Overview – a typical product composition

The basic structure and composition of artificial turf varies. To reach the goal of defined quality and specific functional performances, a set of the relevant parameters for the products / materials used was defined. Materials / products typically used are as follows:

TYPICAL ASSEMBLING PROCESS

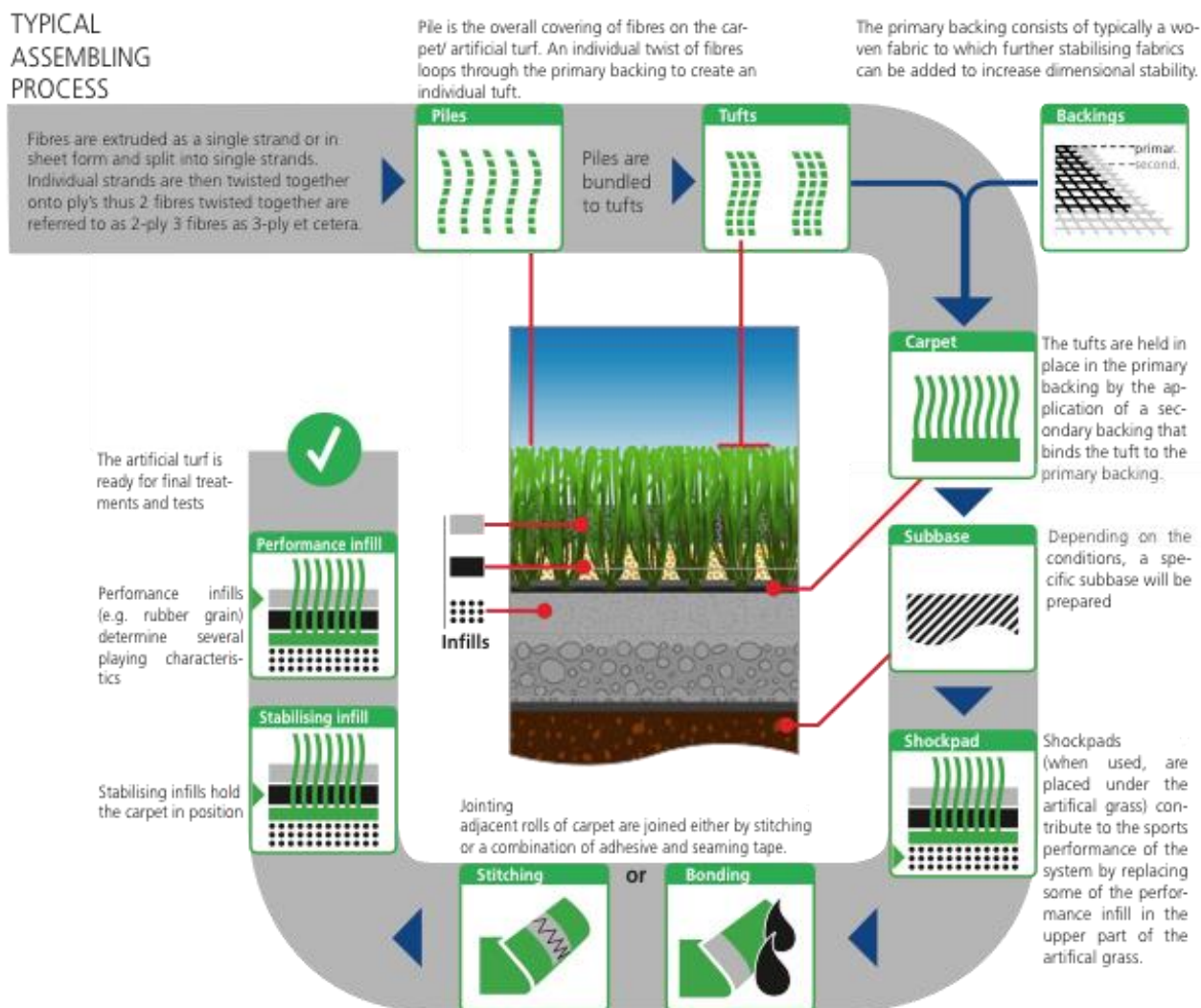


Fig. 1.3 Products / materials used to build up artificial turf

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4 – Product Information / Specifications

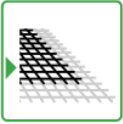
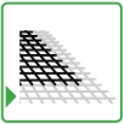


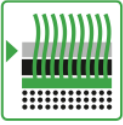
4.2 Artificial turf (1/2)

Manufacturer		TigerTurf			
Tuft pattern		Straight			
Pile yarns		Yarn A	Yarn B	Yarn C	Standard Test Method
Yarn Manufacturer		TenCate	-	-	
Product name, code		XWR	-	-	
Pile yarn profile		See details below	See details below	See details below	—
Pile thickness [μ m]		365 micron	-	-	—
Pile colour [RAL]	1	6010 (Olive Green)	-	-	—
	2	6025 (Field Green)	-	-	—
	3	-	-	-	—
Pile width [mm]		1.05 mm	-	-	—
No of tufts/m²		8320 /m2	-	-	ISO1773
Pile length [mm]		60 mm	-	-	ISO 2549
Pile weight [g/m²]		1373 g/m2	-	-	ISO 8543
Pile yarn characterization		PE Mono	-	-	—
Pile yarn dtex		14,750	-	-	—

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4 – Product Information / Specifications

4.2 Artificial turf (2/2)			
	Primary backing	Product name / code	D06
		Manufacturer	Thiobac
	Re- enforcement scrim	Product name / code	-
		Manufacturer	-
	Secondary backing	Product name / code	LC7884
		Manufacturer	ILC
		Dry application rate [g/m ²]	600 g/m ²
	Carpet	Minimum tuft withdrawal force [N]	30 N
		Carpet mass per unit area [g/m ²]	2381 g/m ²
	Method of jointing		
	Bonded joints	Adhesive brand name	Sports fix Multi Purpose
		Adhesive manufacturer	EnviroStick
		Application rate [g/lm]	-
		Jointing film brand name	LMP Grade
		Jointing film manufacturer	EnviroStick
	Stitched seams	Tread brand name/product code	-
		Tread manufacturer	-
		Stitch rate [stitch per lm]	-

4.3 Performance infill			
		Specifications	Standard Test Method
	Product name / code	SBR	
	Manufacturer	Genan	
	Material type	SBR granules	
	Material grading	0.8 - 2.5 mm	
	Particle shape	Irregular	prEN 14955
	Particle size range	0.8 - 2.5 mm	EN 933-Part 1
	Bulk density [g/cm³]	0.45 Mg/m ³	EN 1097-3
	Application rate [kg/m²]	12 kg/m ²	

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4 – Product Information / Specifications

4.4 Stabilising infill

	Specifications	Standard Test Method
Product name / code	2EW	
Manufacturer	Garside Sands	
Material type	Silica Sand	
Material grading	0.315- 0.8 mm	
Particle shape	Sub angular/rounded (B2)	prEN 14955
Particle size [range]	0.315- 0.8 mm	EN 933-Part 1
Bulk density [g/cm³]	1.51 Mg/m ³	EN 1097-3
Application rate [kg/m²]	28 kg/m ²	



4.5 Shockpad / elastic layer*

	Specifications	Standard Test Method
Product name / code	20mm in-situ	
Manufacturer	Tiger Turf	
Type	In situ	
Composition**	PU Bound SBR Rubber Granules	
Bulk density [g/cm³]	0.065 g/cm ³	
Thickness	20 mm	EN 1979
Shock absorption [%]	49 %	FIFA 4a
Deformation	5.0 mm	FIFA 5a
Tensile strength [N]	> 0.15 MPa	
Mass per unit area [kg/m²]	13 kg/m ²	



* if part of system supplied

** type, rubber granule grading, binder content, etc

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4 – Product Information / Specification

4.6 Maintenance requirements (recommendations)

Equipment / material		Remarks
Tractor Unit		Purpose - the power unit that pulls the maintenance tools over the field
Drag	Brush	A maintenance attachment that re-distributes the infill and brings the fibres into a more upright position
	Mat	A maintenance tool used to re-distribute infill
Ball roll ramp		A testing device used to assess the speed of a football over the surface

Maintenance logbook		Is used to record all the maintenance activities that take place on the Football Turf Surface
Top up infill materials		to top up penalty spot and corner areas
...		For further maintenance requirements, please consult the manufacturer's recommendations for your specific system



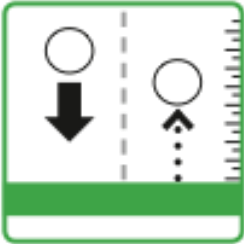
FIFA Licensee's comments / hints

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5 – Detailed Laboratory Test Results

5.1 Overview – ball and player to surface interactions

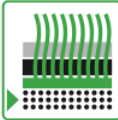
How is the field to play? By means of the following 8 parameters, this question can be answered very well. Furthermore, some values allow conclusions regarding maintenance in order to keep the field in top shape.

Parameter	Comments / hints	Parameter	Comments / hints
1- Vertical ball rebound  The higher the value the higher the ball will rebound. The ball should not bounce too high or too low. Ball / surface interaction		5- Shock absorption  Shock absorbercy is an indicatic of how hard the field feels to th player. A value that is too lo indicates a hard field and cau: damage to player's joints too so and the surface is energy sappir resulting in increases in fatigu and over-use injuries. Player / surface interaction	
2- Angled ball rebound  Angled ball rebound is a combination of the hardness of the field and the resistance from the fibres to the ball and thus a high reading can come from a hard surface, or a low grip surface or a combination of both Ball / surface interaction		6- Deformation  A surface that deforms too much will result in overstretching of ligaments particularly the around the ankle. Player / surface interaction	
3- Ball roll  The higher the value the faster the ball will run over the surface. The ball should not be too fast or too slow. Ball / surface interaction			
4- Rotational resistance  This simulates the player's ability to alter direction, too high a value and stress can occur across knee ligaments, too low and the player will not be able to grip the surface and may slip causing ligament damage. Player / surface interaction			

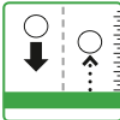
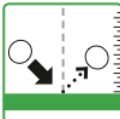
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5 – Detailed Test Results

5.2 Product identification

	Artificial Turf	Property		Test result
		Carpet mass per unit area [g/m²]		2258 g/m²
		Tufts per unit area [m²]		8127 /m²
		Pile length above backing [mm]		60 mm
		Pile weight [g/m²]		1392 g/m²
		Water permeability of carpet [mm/h]		2845 mm/hr
		Free pile height		18 mm
		Yarn cross section and thickness		See Annex
	Performance infill	Particle size range		0.63 - 2.5 mm
		Particle shape		A2
		Bulk density [g/cm³]		0.415 g/cm³
		Infill depth		20mm sand + 22mm SBR
		Thermographic analysis	% organic	64 %
			% inorganic	36 %
	Stabilising infill	Particle size range		0.315 - 0.8 mm
		Particle shape		C2
		Bulk density [g/cm³]		1.510 g/cm³
	Shockpad / elastic layer (if part of system supplied)	Shock absorption [%]		46 %
		Deformation		4 mm
		Thickness		20 mm

5.3 Ball / surface interaction

					FIFA Approval requirements		P = passed F = failed	
Property		Condition		Test Results	QUALITY	PRO	QUALITY	PRO
	Vertical ball rebound	Initial, un-aged	Dry	0.84	0.6 – 1m	0.6-0.85 m	Passed	Passed
			Wet	0.82			Passed	Passed
		After simulated wear	3'020 cycles	0.85				Passed
			6'020 cycles	0.93	0.6 – 1m		Passed	
	Angled ball rebound	Dry		48	45 – 80%	45 – 80%	Passed	Passed
		Wet		66			Passed	Passed

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	Reduced Ball roll	Initial, un-aged	Dry	5.9	4 – 10m	4 – 8m	Passed	Passed
		After simulated wear 3'020 cycles	Dry	6.4				Passed
			Wet	6.7				Passed
		After simulated wear 6'020 cycles	Dry	6.4	4 – 12m		Passed	
			Wet	6.9			Passed	

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5 – Detailed Test Results

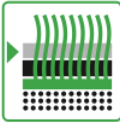
5.4 Player / surface interaction

				FIFA Approval requirements		P = passed F = failed	
Property	Condition		Test Results	QUALITY	QUALITY PRO	QUALITY	PRO
 Shock absorption	Initial, Un-aged	Dry	65	57 – 68%	62 – 68%	Passed	Passed
		Wet	65			Passed	Passed
	After simulated wear	3'020 cycles	65				Passed
		6'020 cycles	61			Passed	
	50°C		65	57 – 68%	62 – 68%	Passed	Passed
	– 5°C ⁽¹⁾		62			Passed	Passed
 Deformation	Initial	Dry	9.7	6 – 11mm	6 – 10mm	Passed	Passed
		Wet	9.8			Passed	Passed
	After simulated wear	3'020 cycles	9.6				Passed
		6'020 cycles	8.7	6 – 11mm		Passed	
 Rotational resistance	Initial	Dry	36	27–48Nm	32–43Nm	Passed	Passed
		Wet	38			Passed	Passed
	After simulated wear	3'020 cycles	40				Passed
		6'020 cycles	41	27–48Nm		Passed	
 Skin / surface friction	Dry		0.73	0.35 – 0.75 μ	0.35 – 0.75 μ	Passed	Passed
	Dry		19	$\pm 30 \%$	$\pm 30 \%$	Passed	Passed
Skin abrasion							

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5 – Detailed Test Results

5.5 Environmental impact (artificial, light, water)

					FIFA Requirements P= passed F= failed			
Property		Aspect		Condition	Test result		P/F	
	Pile yarns	Colour change	1	After artificial weathering	5	≥ Grey scale 3	Passed	
			2		4 - 5		Passed	
			3		-			
		Yarn tensile strength	1		3 %	Change ≤ 50%	Passed	
			2		1 %		Passed	
			3		-			
		Polymeric infill	Colour change		4 - 5	≥ Grey scale 3	Passed	
			Visual change in composition		No Change	No change	Passed	
		Complete system	Water permeability		N/A	1143 mm/hr	>180 mm/h	Passed
	Stitched joints	Strength	Un-aged	-	≥ 1000N/100mm			
			Water aged	-				
	Bonded joints	Strength	Un-aged	78 N/100mm	≥ 75N/100mm	Passed		
			Water aged	75 N/100mm		Passed		
	Carpet tuft	Withdrawal force	Un-aged	60 N	≥ 30N	Passed		
			Water aged	54 N		Passed		
	Heat	category		Category 2 - 3	Information			
	Splash	Splash characteristic		> 1.5 %	Information			

5.6 Miscellaneous

	Shockpad Elastic layer	Tensile strength	Un-aged	0.152 MPa	≥ 0.15 MPa	Passed
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5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.1 DSC (Differential Scanning Colorimetry) scans of pile yarn

5.7.2 Performance infill particle grading curve / Stabilising infill particle grading curve

5.7.3 TGA (Thermo Gravimetric Analysis) of performance infill

5.7.4 Composition of unbound sub-base (if tested as part of system) Sub-base particle grading curve

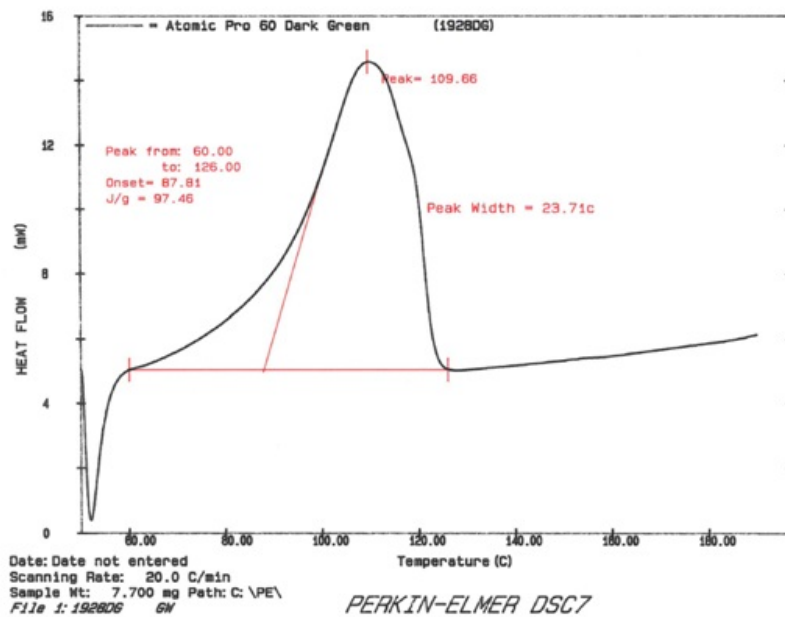
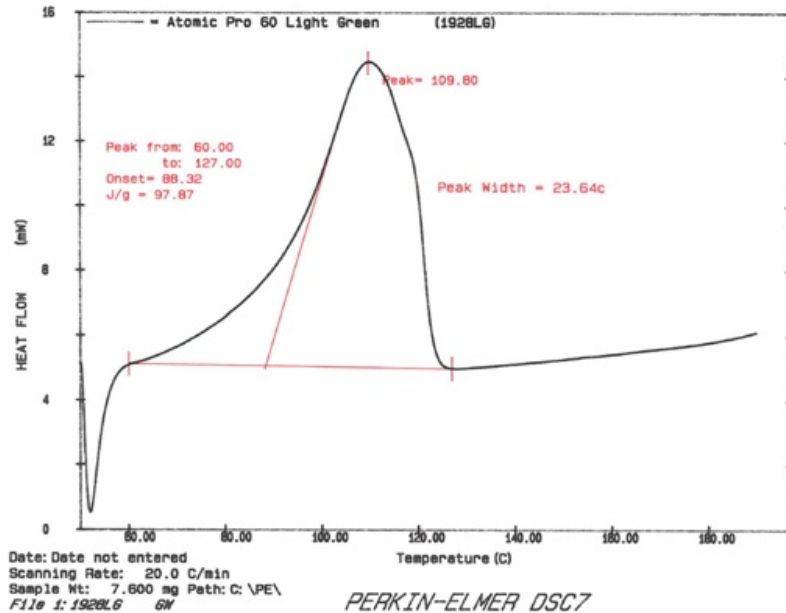
5.7.5 Simulated wear, photos before / after

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5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.1 DSC Differential Scanning Colorimetry scans of pile yarn



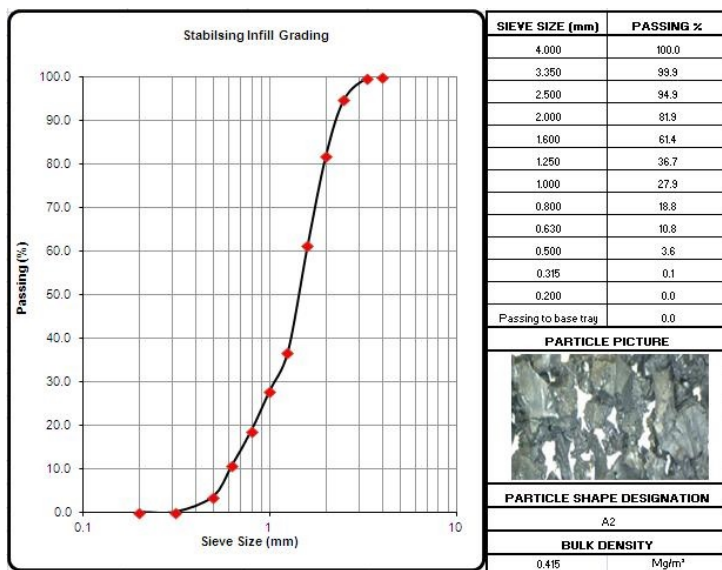
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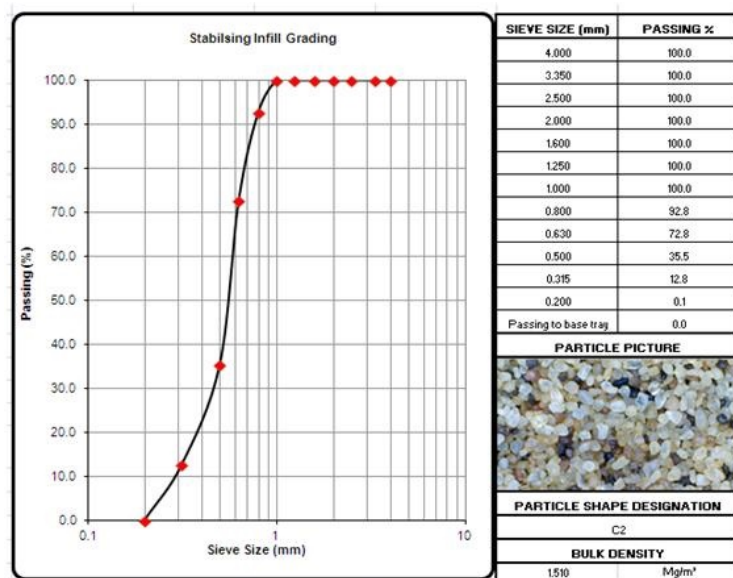
5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.2 a) Performance infill particle grading curve



5.7.2 b) Stabilising infill particle grading curve



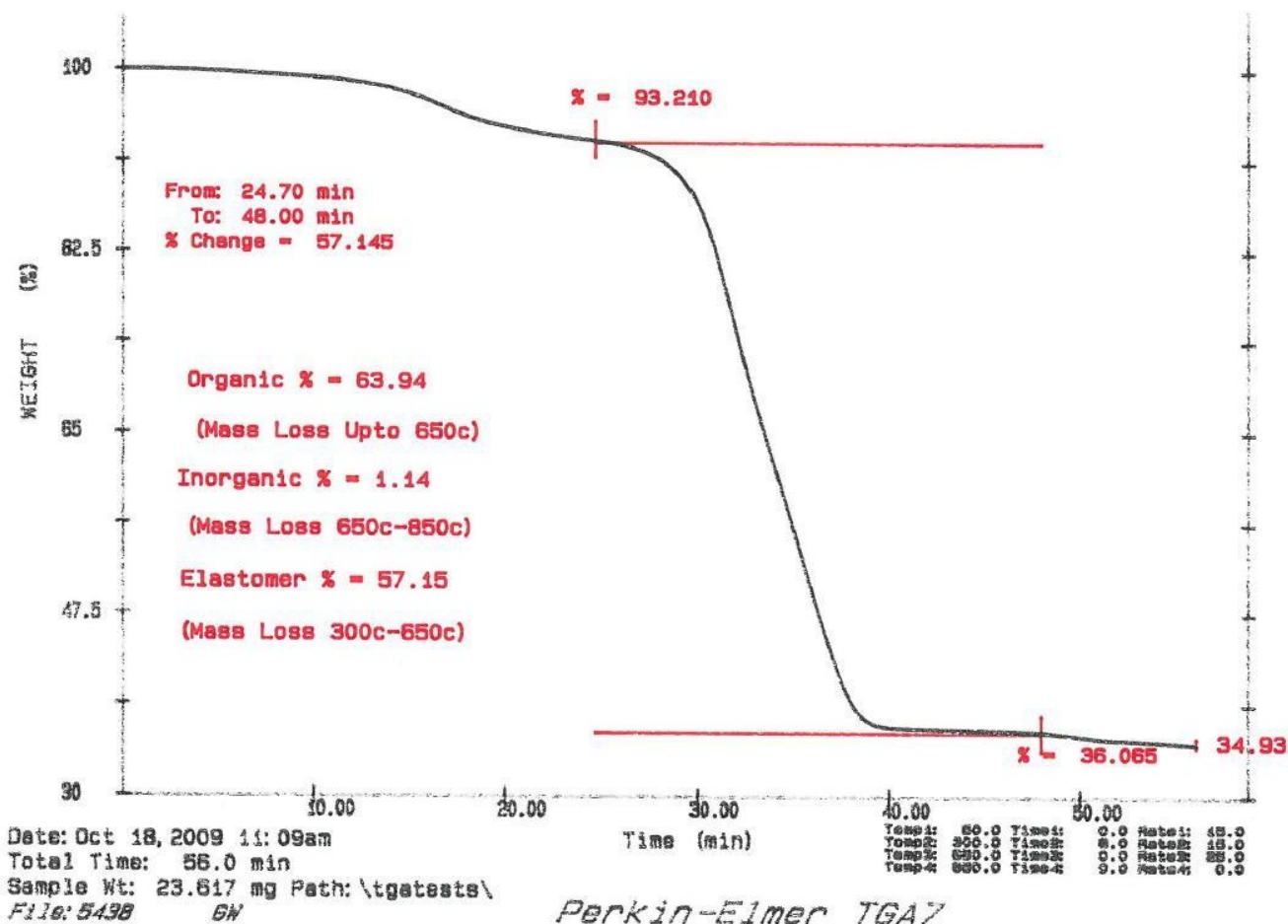
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5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.3 TGA of performance infill



Comments:

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5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.4 Sub base (if tested as part of system)

	Composition	-
	Particle size range	-
	Particle shape	-
	Thickness	-
	Compaction & test method	-

Sub-base particle grading curve

Comments:

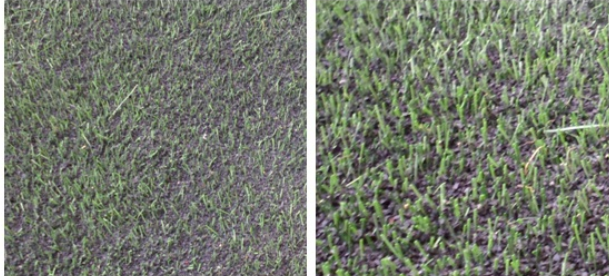
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5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.5 Simulated wear (photos before / after wear)

Page: 1

Before wear	After wear
Pre Wear  	3005 Lisport Cycles  
	6005 Lisport Cycles  

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5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.5 Simulated wear (photos before / after wear)

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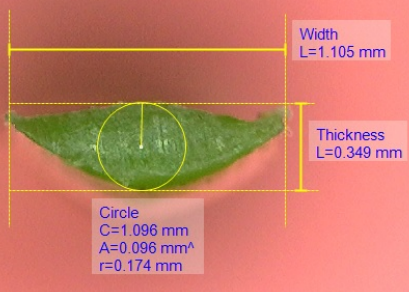
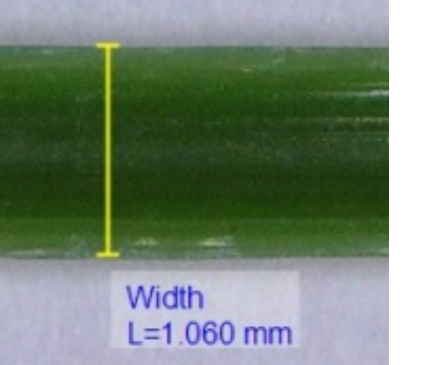
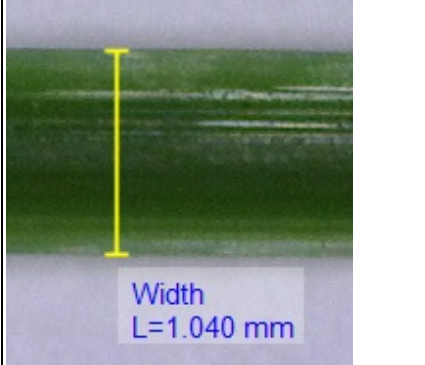
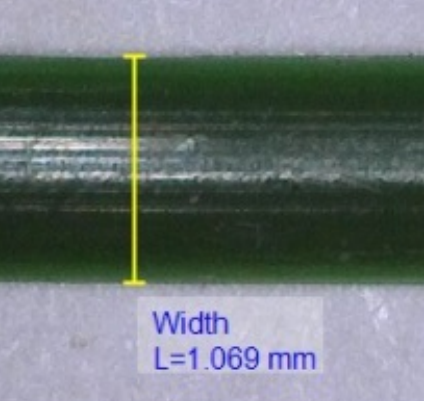
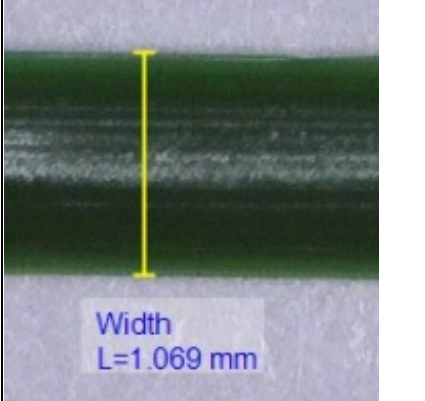
Before wear	After wear

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5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.5 Yarn characteristics

		
		
Cross-section Yarn 3	Side A Yarn 3	Side B Yarn 3

Details of dimension measurements

LG - 349 micron, 1.1 mm, diameter of circle 348 micron, DG - 351 micron, 1.1 mm, diameter of circle 342 micron