FIFA Quality Programme for Football Turf

FIFA LABORATORY TEST REPORT

Manual 2012

Product name	TARGET PRO QS
FIFA Licensee	HEDEF SENTETIK SPOR ZEMINLERI
FIFA accredited Test Institute	Labosport Italia S.r.l.

Laboratory Test report number	16-0263IT
Date of test	16.03.2016

Football Turf Laboratory Test Report

1 – Introduction / Process Overview 3

2 – Test Object, Participants 4

2.1 Test numbers

2.2 Test Object, Product name, Identification codes

2.3 Parties involved, Addresses (turf manufacturer, test institute, certifying body)

3 – Test Conclusion, Product Approval 4

4 – Product Information / Specifications 5

4.1 Overview – a typical product composition

4.2 Artificial turf

4.3 Performance infill

4.4 Stabilising infill

4.5 Shockpad / elastic layer (where applicable)

4.6 Maintenance requirements

5 – Detailed Laboratory Test Results 10

5.1 Overview – ball and player to surface interactions

5.2 Product identification

5.3 Ball / surface interaction

5.4 Player / surface interaction

5.5 Environmental resistance (artificial, light, water)

5.6 Miscellaneous

5.7 Explanatory graphs / pictures

5.7.1 DSC (Differential Scanning Colorimetry) scans of pile yarn

5.7.2 a) Performance infill particle grading curve

5.7.2.b) Stabilising infill particle grading curve

5.7.3 TGA of performance infill

5.7.4 Unbound sub-base Composition

5.7.5 Simulated wear, photos before / after

Football Turf Laboratory Test Report

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 as 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:

LT FT Tests performed by FIFA accredited Test Institutes only

MS PD Originated by the manufacturer (FIFA licensee)

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 http://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 Recommended QUALITY PRO (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.

Football Turf Laboratory Test Report

2 – Test Object, Participants

2.1 Test Numbers

Report Identification	Laboratory Test report number	16-0263IT
	Test Institute Project number	16-0263IT

2.2 Test Objects

Product Name	TARGET PRO QS
Product Identification code	TRGPQS
Name of the synthetic turf system	TARGET PRO QS
Performance infill	BLACK SBR
Stabilising infill	SILICA SAND
Shock-pad or elastic layer (if applicable)	NONE
Sub-base composition	Rigid engineered Base

2.3 Participants, Addresses

Applicant • FIFA preferred producer • Licensee	Name	HEDEF SENTETIK SPOR ZEMINLERI			
	Address	HEDEF SENTETIK SPOR ZEMINLERI, USAK			
	Contact	Phone	+90 2163220055	email	funda@hedefsentetik.com.tr
FIFA accredited Test Institute	Name	Labosport Italia S.r.l.			
	Address	Labosport Italia S.r.l., CERNUSCO LOMBARDONE			
	Contact	Phone	+39 039 8946215	email	roberto.armeni@labosport.it

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	Davide Giorgini
	Position	Laboratory Manager
	Date	01.06.2016
Report approved by	Name	Roberto Armeni
	Position	Laboratory Director
	Date	01.06.2016

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:

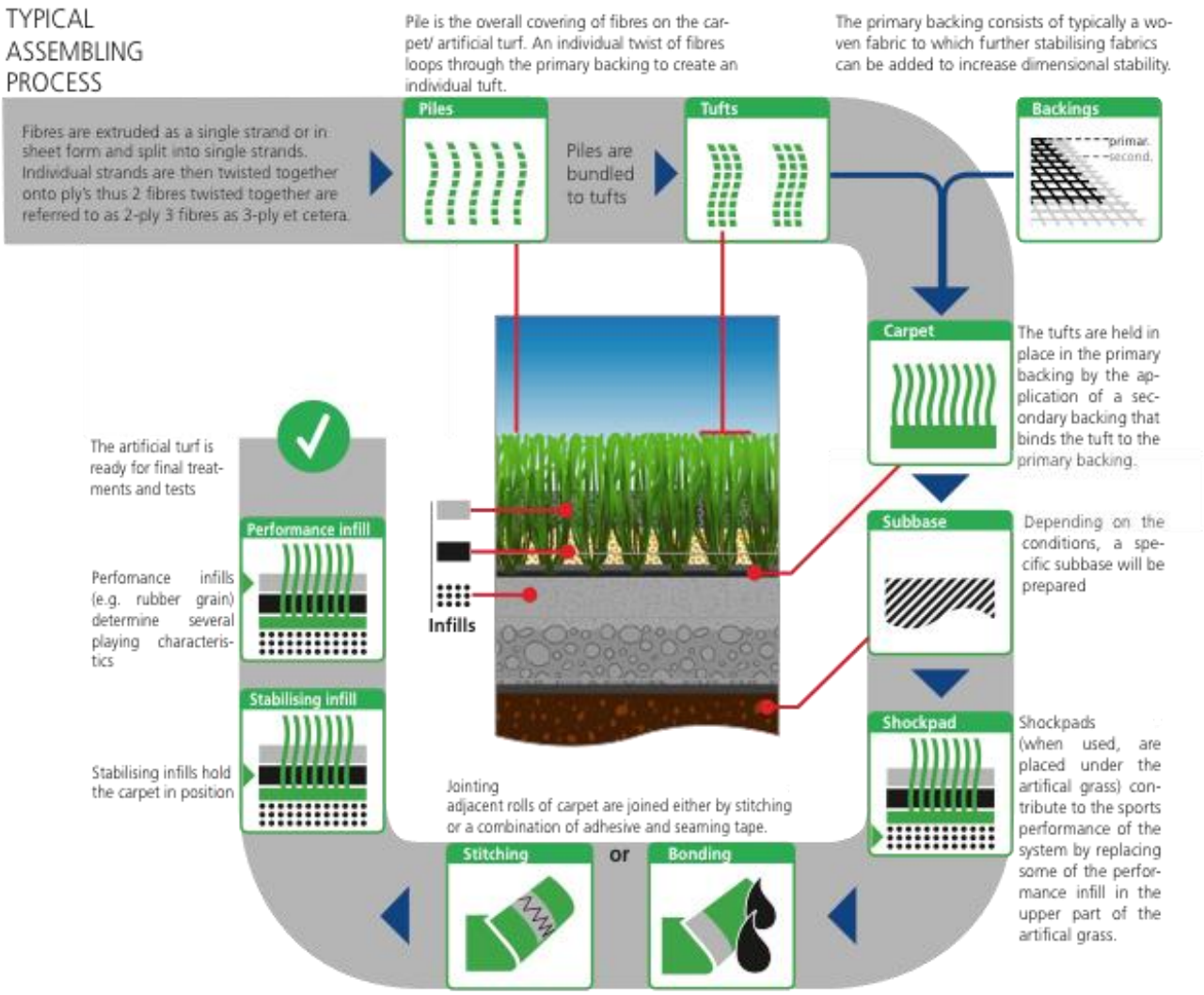


Fig. 1.3 Products / materials used to build up artificial turf

Football Turf Laboratory Test Report

4 – Product Information / Specifications

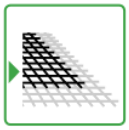
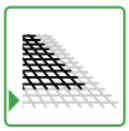
4.2 Artificial turf (1/2)

Manufacturer		HEDEF SENTETIK SPOR ZEMINLERI TEKSTIL INS.SAN.TIC.ITH.IHR.LTD.STI.			
Tuft pattern		STRAIGHT 5/8"			
Pile yarns		Yarn A	Yarn B	Yarn C	**Standard Test Method**
Yarn Manufacturer		GULSAN			
Product name, code		Sports 1300			
Pile yarn profile		SPINE			_
Pile thickness [μ m]		310			_
Pile colour [RAL]	**1**	6025			_
	2	6025			_
	3				_
Pile width [mm]					_
No of tufts/m²		9200			ISO1773
Pile length [mm]		57			ISO 2549
Pile weight [g/m²]		1440			ISO 8543
Pile yarn characterization		PE MONOFILAMENT			_
Pile yarn dtex		12000/6			_

Football Turf Laboratory Test Report

4 – Product Information / Specifications

4.2 Artificial turf (2/2)

	**Primary backing**	Product name / code	D12
		Manufacturer	TEN CATE THIOBAC
	Re- enforcement scrim	Product name / code	--
		Manufacturer	--
	**Secondary backing**	Product name / code	EOC 7363
		Manufacturer	EURO COMPOUND BELGIUM
		Dry application rate [g/m²]	1000GR/M2
	**Carpet**	Minimum tuft withdrawal force [N]	>45
		Carpet mass per unit area [g/m2]	2650
	**Method of jointing**		
	Bonded joints	Adhesive brand name	PEHLIVAN
		Adhesive manufacturer	PEHLIVAN KIMYA A.S. TURKIYE
		Application rate [g/lm]	160
		Jointing film brand name	POLYESTER BAND TURKIYE
		Jointing film manufacturer	SERTA TEKSTIL TURKIYE
	**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 granule	
Manufacturer	Granuflex	
Material type	SBR	
Material grading	1.0 - 3.5	
Particle shape	A2	prEN 14955
Particle size range	1.0 - 3.5	EN 933-Part 1
Bulk density [g/cm³]	0.45	EN 1097-3
Application rate [kg/m²]	+/- 15 kg/m2 = 30 mm	

Football Turf Laboratory Test Report

4 – Product Information / Specifications

4.4 Stabilising infill

	Specifications	Standard Test Method
Product name / code	Silica sand	
Manufacturer	local supplier	
Material type	Silica sand	
Material grading	0.2 - 1.0	
Particle shape	B2/C2	prEN 14955
Particle size [range]	0.2 - 1.0	EN 933-Part 1
Bulk density [g/cm³]	1.40	EN 1097-3
Application rate [kg/m²]	+/- 15 kg/m2 = 10 mm	

4.5 Shockpad / elastic layer*

	Specifications	Standard Test Method
Product name / code	---	
Manufacturer	---	
Type	---	
Composition**	---	
Bulk density [g/cm³]	---	
Thickness		EN 1979
Shock absorption [%]		FIFA 4a
Deformation		FIFA 5a
Tensile strength [N]		
Mass per unit area [kg/m²]		

* if part of system supplied
** type, rubber granule grading, binder content, etc

Football Turf Laboratory Test Report

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

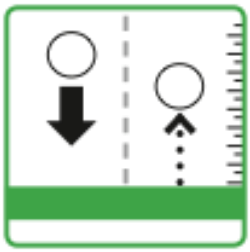
FIFA Licensee's comments / hints

Football Turf Laboratory Test Report

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
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
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
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

Parameter	Comments / hints
5- Shock absorption 	Shock absorbency 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 fatigue ar over-use injuries. Player / surface interaction
6- Deformation 	A surface that deforms too much will result in overstretching of ligaments particularly the around the ankle. Player / surface interaction
7.1- Linear friction Stud decelerat. value 	If when stopping, the player's ankle is subject to too high a deceleration, damage to the ankle can occur. Therefore too high a value will result in an increased risk to ankle injuries. Player / surface interaction
7.2- Linear friction Stud slide value 	A player needs to accelerate and decelerate rapidly. To achieve this effect the player needs to obtain grip from the surface. Too high a grip will lead to injury too low a grip will result in the boot slipping in the surface and the player cannot accelerate or decelerate safely. Player / surface interaction

Football Turf Laboratory Test Report

5 – Detailed Test Results

5.2 Product identification

	Property		Test result
Artificial Turf	Carpet mass per unit area [g/m²]		2585
	Tufts per unit area [m²]		9219
	Pile length above backing [mm]		56.1
	Pile weight [g/m²]		1381
	Water permeability of carpet [mm/h]		3808
	Yarn cross section and thickness		 302
Performance infill	Particle size range		1.25 - 4.0
	Particle shape		A2
	Bulk density [g/cm³]		0.46
	Thermographic analysis	% organic	62.1
		% inorganic	37.9
Stabilising infill	Particle size range		0.2 - 1.0
	Particle shape		B2-C2
	Bulk density [g/cm³]		1.47
Shockpad / elastic layer (if part of system supplied)	Shock absorption [%]		-
	Deformation		-
	Thickness		-

5.3 Ball / surface interaction

Property		Condition		Test Results	**FIFA** Approval requirements: Quality	**FIFA** Approval requirements: Quality Pro	**P** = passed **F** = failed: Quality	**P** = passed **F** = failed: Quality Pro
Vertical ball rebound		Initial, un-aged	Dry	0.76	0.6 –1m	0.6-0.85 m	Passed	Passed
			Wet	0.72			Passed	Passed
		After simulated wear	5'200 cycles	-				Passed
			20'200 cycles	0.85	0.6 – 1m		Passed	Passed
Angled ball rebound		Dry		54	45 – 80%	45 – 80%	Passed	Passed
		Wet		66			Passed	Passed
Ball roll		Dry		5.6	4 – 10m	4 – 8m	Passed	Passed
		Wet		5.7			Passed	Passed

Football Turf Laboratory Test Report

5 – Detailed Test Results

5.4 Player / surface interaction

Property		Condition		Test Results	**FIFA** Approval requirements: Quality	**FIFA** Approval requirements: Quality Pro	**P** = passed **F** = failed: Quality	**P** = passed **F** = failed: Quality Pro
	**Shock absorption**	Initial, Un-aged	Dry	64	55 – 70%	60 – 70%	Passed	Passed
			Wet	65			Passed	Passed
		After simulated wear	5'200 cycles	-				
			20'200 cycles	61	55 – 70%		Passed	Passed
		40°C		67		60 – 70%	Passed	Passed
		– 5°C[1]		69			Passed	Passed
	**Deformation**	Initial	Dry	10.0	4 – 11mm	4 – 10mm	Passed	Passed
			Wet	10.0			Passed	Passed
		After simulated wear	5'200 cycles	-				
			20'200 cycles	8.0	4 – 11mm		Passed	Passed
	**Rotational resistance**	Initial	Dry	34	25–50Nm	30–45Nm	Passed	Passed
			Wet	32			Passed	Passed
		After simulated wear	5'200 cycles	-				
			20'200 cycles	40	25–50Nm		Passed	Passed
	**Linear friction**	Stud deceleration value	Dry	5.1	3.0 – 7.0g	3.0 – 5.5g	Passed	Passed
			Wet	4.8			Passed	Passed
		Stud slide value	Dry	200	120 – 220	130 – 210	Passed	Passed
			Wet	196			Passed	Passed
	**Skin / surface friction**	Dry		0.73	0.35 – 0.75 μ	0.35 – 0.75 μ	Passed	Passed
	Skin abrasion	Dry		29	± 30 %	± 30 %	Passed	Passed

Football Turf Laboratory Test Report

5 – Detailed Test Results

5.5 Environmental impact (artificial, light, water)

Property		Aspect		Condition	Test result	FIFA Requirements P= passed F= failed	P/F
	**Pile yarns**	Colour change	1	After artificial weathering	Green 1 - 4	≥ Grey scale 3	Passed
			2		Green 2 - 4		Passed
			3		-		
		Yarn tensile strength	1		Green 1 -5%	Change ≤ 50%	Passed
			2		Green 2 -8.9%		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	2566	>180 mm/h	Passed
	**Stitched joints**	Strength		Un-aged	-	≥ 1000N/100mm	
				Water aged	-		
	**Bonded joints**	Strength		Un-aged	50	≥ 25N/100mm	Passed
				Water aged	66		Passed
	**Carpet tuft**	Withdrawal force		Un-aged	47	≥ 30N	Passed
				Water aged	55		Passed

5.6 Miscellaneous

	**Shockpad Elastic layer**	Tensile strength	Un-aged	-	≥ 0.15 MPa	

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

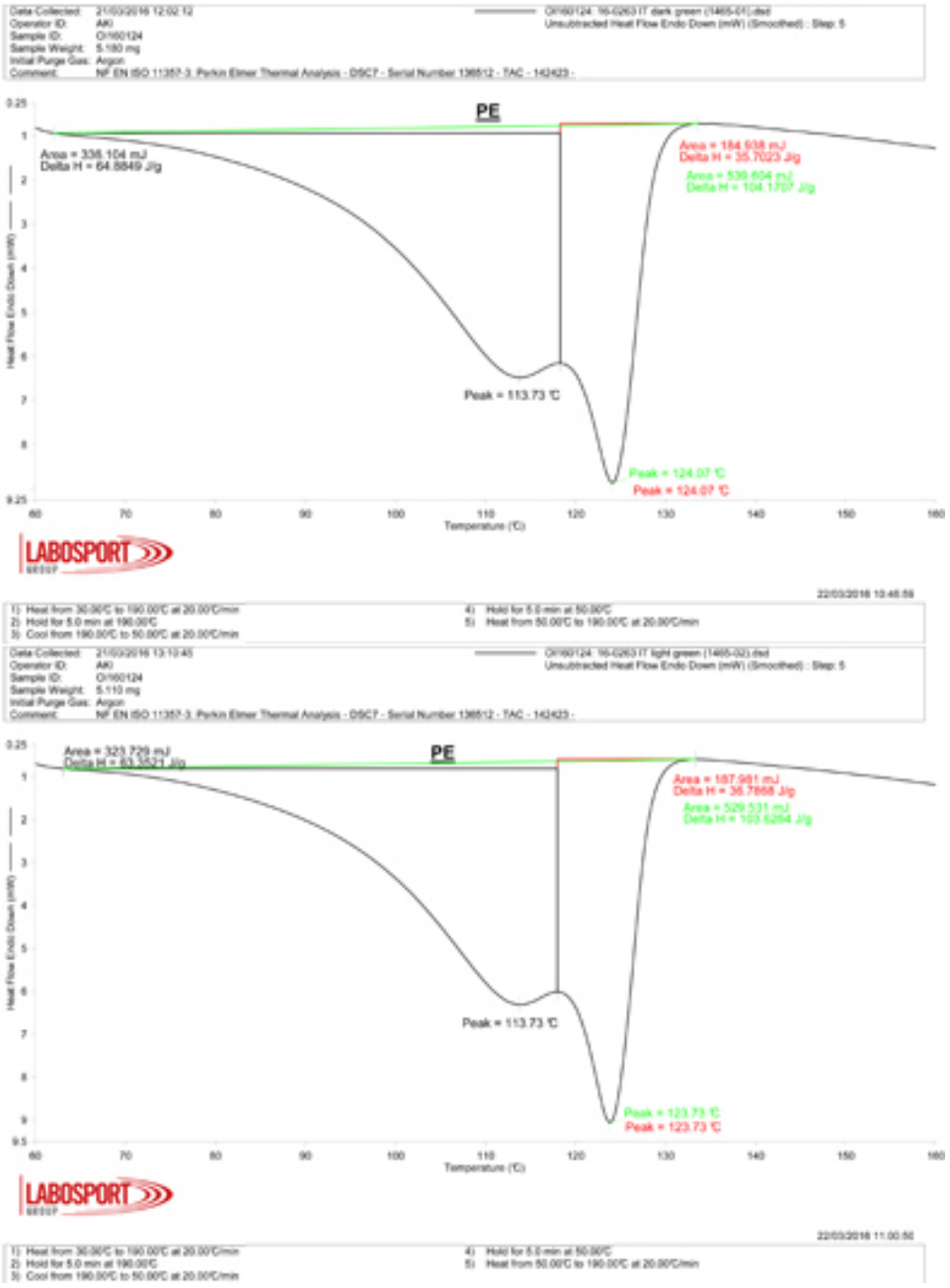
5.7.5 Simulated wear, photos before / after

Football Turf Laboratory Test Report

5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.1 DSC Differential Scanning Colorimetry scans of pile yarn



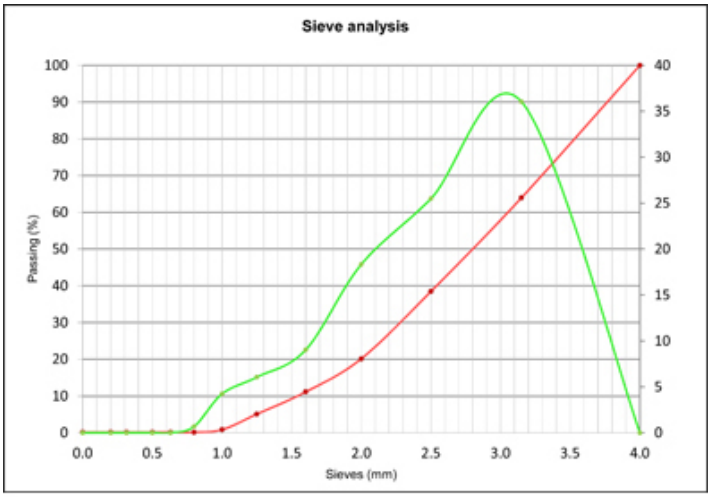
Comments:

Football Turf Laboratory Test Report

5 – Detailed Test Results

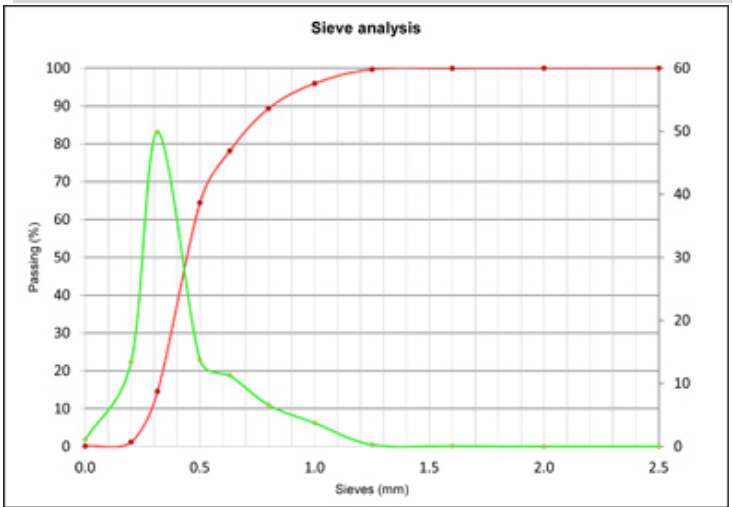
5.7 Explanatory graphs / pictures

5.7.2 a) Performance infill particle grading curve



Sieves (mm.)	0	0.2	0.315	0.5	0.63	0.8	1	1.25	1.6	2	2.5	3.15	4.00
Refusal (%)	0	0	0	0	0	1	4	6	9	18	25	36	0
Passing (%)	0	0	0	0	0	0	1	5	11	20	38	64	100

5.7.2 b) Stabilising infill particle grading curve



Sieves (mm.)	0	0.2	0.315	0.5	0.63	0.8	1	1.25	1.6	2	2.5
Refusal (%)	1	13	50	14	11	7	4	0	0	0	0
Passing (%)	0	1	15	64	78	89	96	100	100	100	100

Comments:

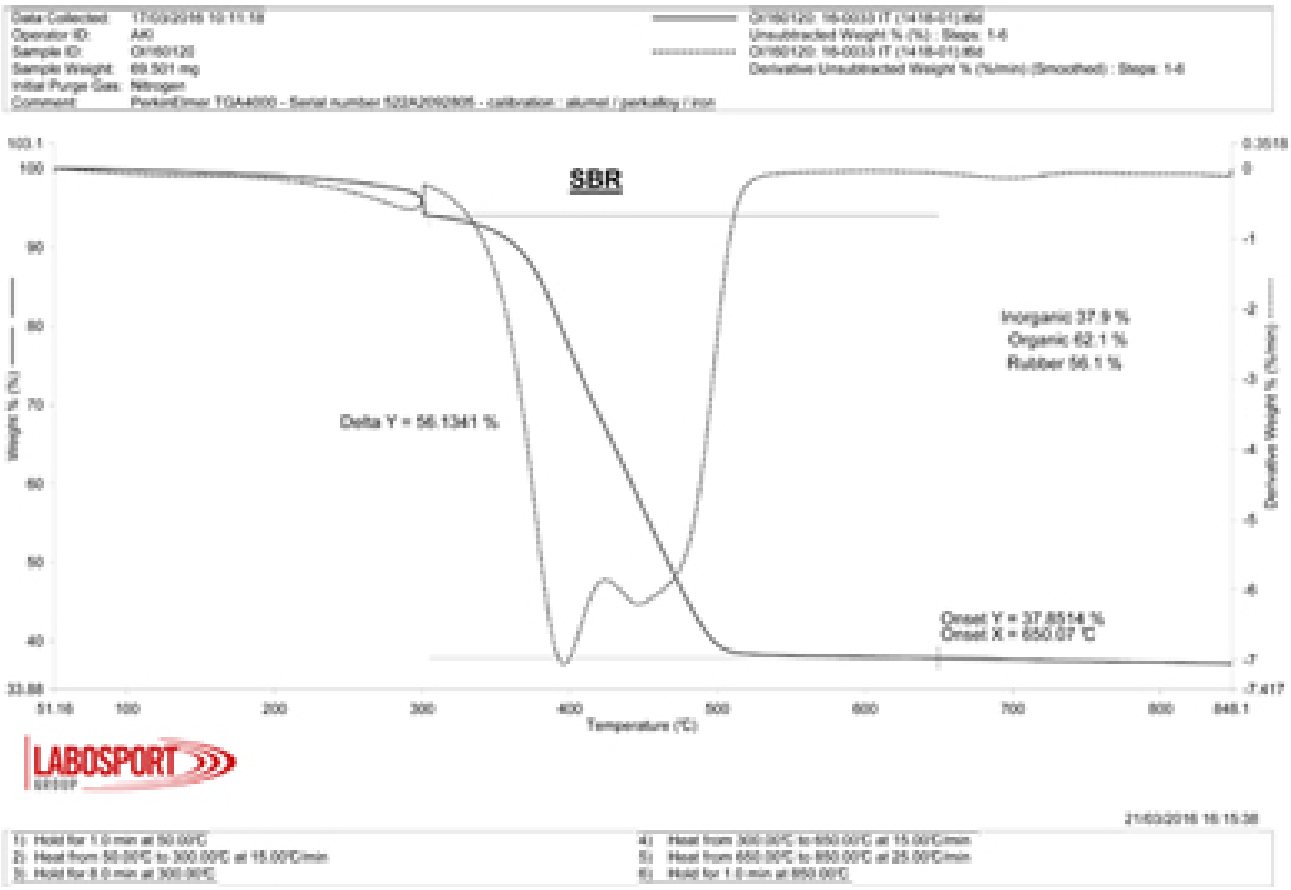
UVA report of the performance infill was provided by the customer.

Football Turf Laboratory Test Report

5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.3 TGA of performance infill



Comments:

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

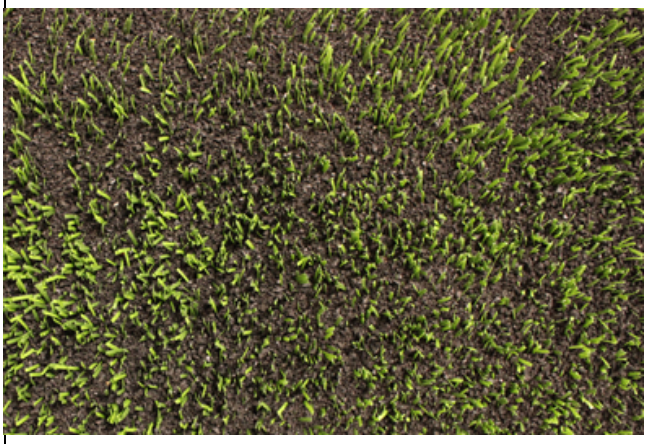
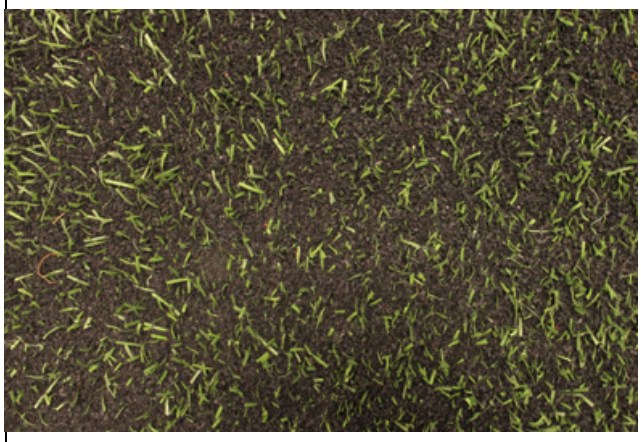
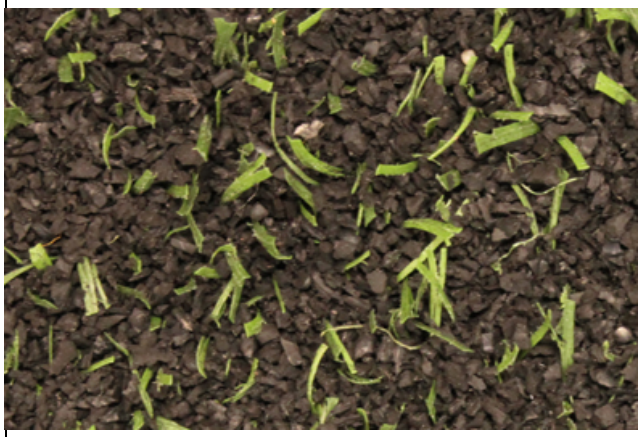
Comments:

Football Turf Laboratory Test Report

5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.5 Simulated wear (photos before / after wear) Page: 1

Before wear	After wear
	
	

Football Turf Laboratory Test Report

5 – Detailed Test Results

5.7 Explanatory graphs / pictures

5.7.5 Simulated wear (photos before / after wear) Page: 2

Before wear	After wear