TEST REPORT

15-0039IT

Issued on March 24 2015

CLIENT

NEW TENNIS SYSTEM SRL

PRODUCT NAME

REDPLUS

CATEGORY

ARTIFICIAL TURF SYSTEM

Assessment of the Artificial Turf System in accordance with EN 15330-1:2013 as a surface designed primarily for tennis

The results are valid only for the complete system as described in this report.

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SUBJECT

Assessment of the Artificial Turf System in accordance with EN 15330-1:2013 surfaces for sports areas – synthetic turf and needle-punched surfaces primarily designed for outdoor use – Part 1 specification for synthetic turf.
This report describes the surface tested lists the tests undertaken; details the results obtained and compares the results to the requirements of EN 15330-1 for surfaces designed primarily for tennis.

REFERENCE STANDARDS AND REGULATIONS USED

EN 15330-1:2013 surfaces for sports areas – synthetic turf and needle-punched surfaces primarily designed for outdoor use – Part 1 specification for synthetic turf.

EN 1969:2001 Surfaces for sports areas – Determination of thickness of synthetic sports surfaces

EN 12230:2004 Surfaces for sports areas – Determination of tensile properties of synthetic sports surfaces

EN 14808:2006 Surfaces for sports areas – Determination of shock absorption

EN 12235:2013 Surfaces for sports areas – Determination of vertical ball behaviour

EN 15301-1:2007 Surfaces for sports areas – Determination of rotational resistance

EN 12616:2013 Surfaces for sports areas – Determination of water infiltration rate

EN 13865:2004 Surfaces for sports areas. Determination of angled ball behaviour. Tennis

EN 13672:2005 Surfaces for sports areas – Determination of resistance to abrasion of non-filled synthetic turf

EN 12228:2013 Surfaces for sports areas – Determination of joint strength of synthetic surfaces

EN 20105-A02:1996 Textiles – Tests for colour fastness – Grey scale for assessing change in colour

EN 14836:2006 Synthetic surfaces for outdoor sports areas – Exposure to artificial weathering

EN 13864:2004 Surfaces for sports areas – Determination of tensile strength of synthetic yarns

EN 13744:2005 Surfaces for sports areas – Procedure for accelerated ageing by immersion in hot water

EN 13817:2005 Surfaces for sports areas – Procedure for accelerated ageing by exposure to hot air

ISO 8543:1998 Textile floor coverings – Methods for determination of mass

ISO 1763:1986 Carpets – Determination of number of tufts and/or loops per unit length and per unit area

ISO 4919:2012 Carpets – Determination of tuft withdrawal force

ISO 2549:1972 Hand-knotted carpets – Determination of tuft leg length above the woven ground

ISO 11357-1:2009 Plastics – Differential scanning calorimetry (DSC) – Part.1: General principles

EN 933-1:2012 Tests for geometrical properties of aggregates – Determination of particle size distribution – Sieving method

EN 14955:2006 Surfaces for sports areas – Determination of composition and particle shape of unbound mineral surfaces for outdoor sports areas

EN 1097-3:1999 Tests for mechanical and physical properties of aggregates – Determination of loose bulk density and voids

EN 430:1995 Resilient floor coverings – Determination of mass per unit area

APPLICANT

COMPANY NAME	**NEW TENNIS SYSTEM SRL**
ADDRESS	Via Roma, 114 20873 Cavengao di B.za (MB)
COUNTRY	Italy

ACQUISITION DATA

DATE ORDER RECEIVED	January 26th 2015
DATE FIRST SPECIMEN RECEIVED	February 04th 2015
DATE LAST SPECIMEN RECEIVED	March 10th 2015
START DATE OF TESTS	February 04th 2015
END DATE OF TESTS	March 13th 2015

PRODUCT DESCRIPTION

Surface Name	**REDPLUS**		
ARTIFICIAL GRASS			
Carpet Name / Pile height	**Tangoturf**		**20.0**mm
Threads per tuft / Tufts per 10cm. - Monofilament	**-**	**-**	
Nr. of tufts / Tufts per 10cm. - Fibrillated	**1**	**11.8**	
Tuft Pattern	**Straight**		
Pile Yarn / Manufacturer	**Taperslide XT**	**Tencate Thiolon BV**	
Primary Backing / Manufacturer	**Gback**	**Tencate Thiobac BV**	
Coating / Joint type	**Latex**	**Bonded**	
Adhesive Manufacturer / Q.ty	**Chimiver Panseri Spa**	**280**g/ml	
Tape / Manufacturer	**Typar**	**Lastimma**	
INFILL			
Performance Infill Type:			kg/m²
Stabilising Infill Type: **Red Clay**	**Terre Davis sas**	**Red Plus**	**21.0** kg/m²
Approx. total infill depth (mm)	**19**		
SHOCKPAD			
Commercial Name	**-**		
Manufacturer	**-**		
Type	**-**		
Thickness / Mass per unit area	-mm	**-** kg/m²	

LABORATORY TEST RESULTS

Property	Test method	Test condition	Units	Requirements	Mean result	Pass / fail
SYSTEM						
Vertical ball rebound	EN 12235	Dry	%	>80	**96**	**Pass**
		Wet			**98**	**Pass**
Angled ball behaviour	EN 13865	Dry	-	15 - 55	**17**	**Pass**
Angled ball behaviour	Table 1	-	-	Surface pace classification	**Slow**	
Shock absorption	EN 14808	Dry	%	No requirements	**17**	**Pass**
		Wet			**15**	**Pass**
Rotational resistance	EN 15301-1 (Dimpled sole)	Dry	Nm	25 – 50	**25**	**Pass**
		Wet			**25**	**Pass**
Abrasion resistance	EN 13672	Dry	%	≤2%	**NA**	
Water permeability	EN 12616	New	mm/h	≥ 500	**519**	**Pass**
Tuft withdrawal force	ISO 4919	New	N	≥ 30	**54**	**Pass**
Tuft withdrawal force	ISO 4919	Water aged	N	≥ 30	**59**	**Pass**

Property	Test method	Test condition	Units	Requirements	Mean result	Pass/ fail
JOINTS						
Joint strength (stitched)	EN 12228 – Met. A	Unaged	N/mm	≥ 1000/100mm	-	
		Aged (EN 13744)			-	
Joint strength (bonded)	EN 12228 – Met. B	Unaged		≥ 60/100mm	**104**	**Pass**
		Aged (EN 13744)		≥ 75% unaged sample	**93**	**Pass**
SHOCKPAD						
Tensile strength (shockpad/e-layer)	EN 12230	Unaged	N/mm	> 0.15 MPa	-	
			MPa		-	
		Air aged	N/mm		-	
			MPa		-	
Shock absorption	EN 14808	Unaged	%	-	-	
YARN						
Colour change (pile yarn)	EN ISO 20105-A02	Artificial weathering (EN 14836: 2005)	Grey scale	≥ 3	**Red: 4-5** : :	**Pass**
Tensile strength (pile yarn)	EN 13864	Artificial weathering (EN 14836: 2005) Unaged comparison	% difference	≤ 50	**Red: 40.6%** : :	**Pass**

IDENTIFICATION TEST RESULTS

Characteristic	Test method	Results	Manufacturer declaration	Variation	Pass/ fail
ARTIFICIAL TURF					
Mass per unit area	ISO 8543	**2056** g/ m²	**1900** g/ m²	**8.2 %**	**Pass**
Tuft per unit area	ISO 1763	**14632** m²	**15150** m²	**-3.4 %**	**Pass**
Pile length	ISO 2549	**20.4** mm	**20.0** mm	**2 %**	**Pass**
Pile weight	ISO 8543	**691** g/ m²	**700** g/ m²	**-1.3 %**	**Pass**
Pile Dtex	-	**9201** Dtex	**8500** Dtex	**8.2 %**	**Pass**
Gauge	ISO 1763	**5/16** Inches	**5/16** Inches	**-**	**Pass**
Tensile properties Manufactoring direction	ISO 13934-1	**17**N/mm	**-** N/mm	**Requirement** ≥ 15 N/mm	**Pass**
Tensile properties Across **m**anufactoring direction	ISO 13934-1	**19**N/mm	**-** N/mm	**Requirement** ≥ 15 N/mm	**Pass**
Tensile properties Difference	EN 15330-1	**12 %**	**- %**	**Requirement** ≤30% of the highest value	**Pass**
Water permeability	EN 12616	**5315** mm/h	**-** mm/h	**Requirement** ≥ 500 mm/h	**Pass**

Characteristic	Test method	Results	Manufacturer declaration	Variation	Pass/ fail
YARN					
Yarn characterisation DSC	ISO11357-1	**PE**	**PE**	**-**	**Pass**
Color (RAL)	RAL	**8004**	**8004**	**-**	**Pass**
PERFORMANCE INFILL					
Particle size	EN 933 - 1	mm	mm	**-**	
Particle shape	EN 14955			**-**	
Bulk density	EN 1097-3	g/ m^3	g/ m^3	**%**	
Color (RAL)	RAL		**-**	**-**	
STABILISING INFILL					
Particle size	EN 933 - 1	**0.0 - 1.25** mm	**0.0 - 1.6** mm	**-**	**Pass**
Particle shape	EN 14955	**B2-B3-C3**	**B2-B3-C3**	**-**	**Pass**
Bulk density	EN 1097-3	**1.10** g/ cm^3	**1.10** g/ cm^3	**0 %**	**Pass**
SHOCKPAD					
Thickness	EN 1969	**-** mm	**-** mm	**- %**	
Mass per unit area	EN 430	**-** g/ m^2	**-** g/ m^2	**- %**	
PERMITTED VARIATION ±10% OF MANUFACTURER DECLARATION					

INFILL DEPTH AND FREE PILE MEASUREMENTS

Description	Condition	Units	Measurements
Sand depth	New	mm	**19**
Rubber depth			**-**
Free pile height			**1**

TEST PERFORMANCE CONDITIONS IN LABORATORY

Air temperature	Relative humidity
23°C ± 2°C	50% ± 5%

STORAGE TIMES

Storage of documents 4 years and samples 1 month from the issue of the report

SAMPLING

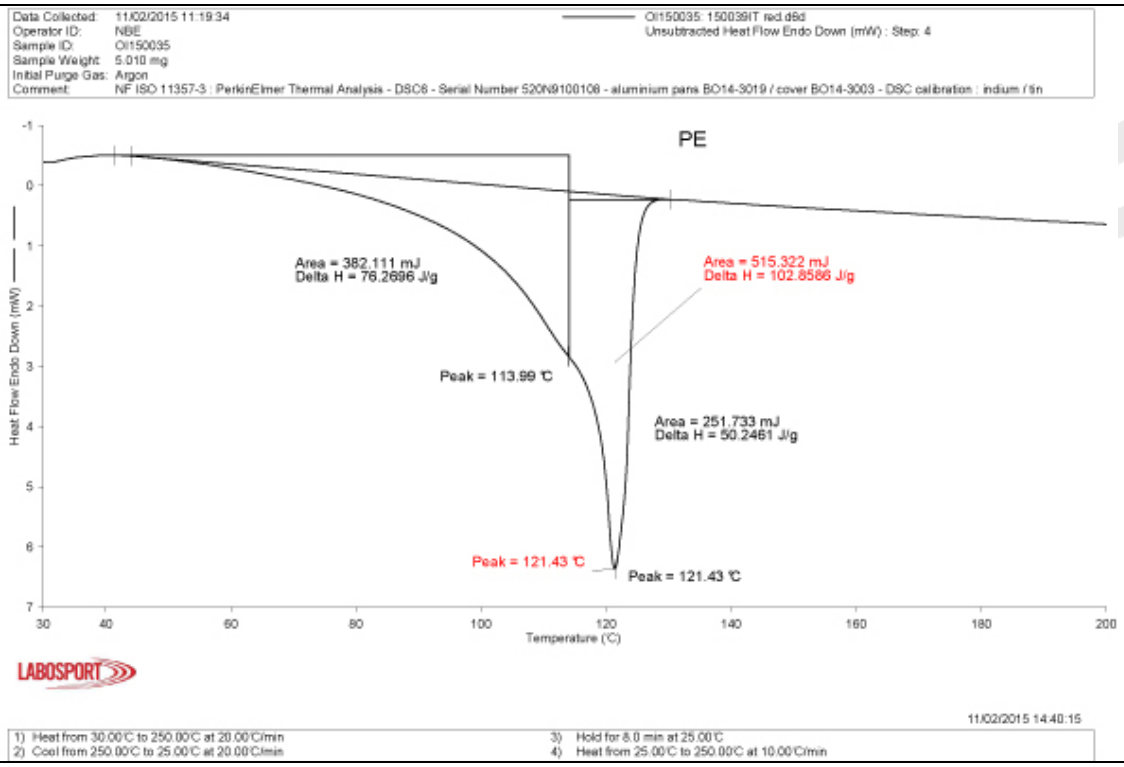
Sampling carried out by the customer

PILE YARN

PROFILE / THICKNESS

WIDTH

DSC ANALYSIS Red YARN



DSC ANALYSIS YARN

DSC ANALYSIS YARN

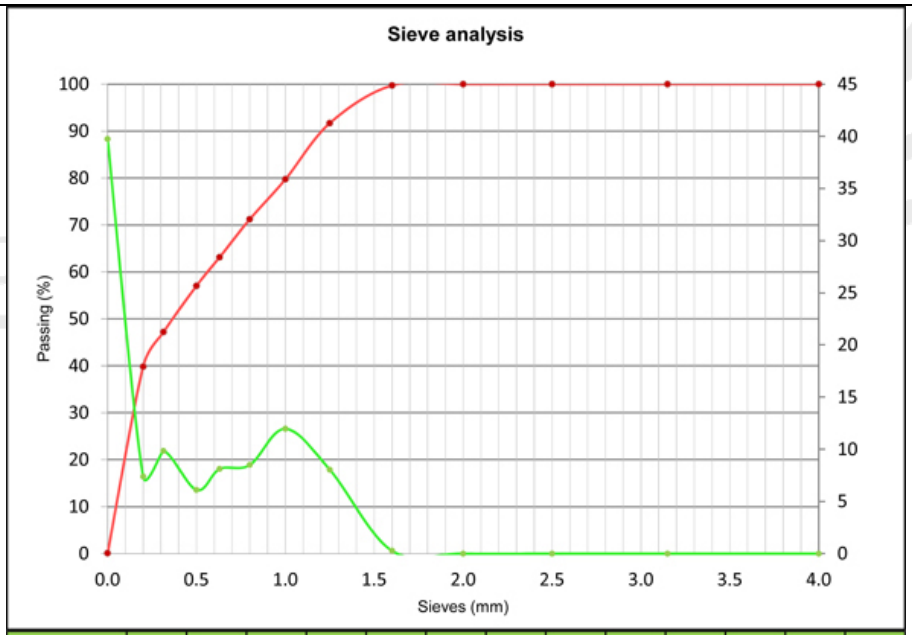
PARTICLE GRADING

TGA ANALYSIS

% organic **% inorganic**

STABILISING INFILL

PARTICLE GRADING



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 (%)	40	7	10	6	8	8	12	8	0	0	0	0	0
Passing (%)	0	40	47	57	63	71	80	92	100	100	100	100	100

SHOCKPAD

SIDE - A

SIDE - B

SYSTEM PHOTOGRAPHS

DRY
GENERAL VIEW

CLOSE UP


CONCLUSIONS

The synthetic turf sports surface **REDPLUS** has been found to fully comply with the laboratory test requirements of EN 15330-1:2013 surfaces for sports areas – synthetic turf and needle-punched surfaces primarily designed for outdoor use – Part 1 specification for synthetic turf when tested as a surface designed primarily for tennis.

REPORTED BY

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Roberto Armeni

Synthetic Surface Manager
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