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PREMISE

The laboratory Labosport Italia Srl is accredited by ACCREDIA with accreditation number 1427 L.

ACCREDIA is, for Italy, the body that verifies the technical and organizational competence of the laboratories in carrying out the tests and / or the calibrations. The accreditation is granted on compliance with the requirements established by the UNI CEI EN ISO / IEC 17025 and ACCREDIA requirements.

The accreditation is relative to the tests for which the Laboratory has requested and obtained accreditation and for this it ensures both the technical competence and the impartiality of the personnel and the adequacy of the equipment and the structure.

These skills are periodically verified through sample checks on the accredited tests and on the quality management system.

ACCREDIA guarantees that the laboratory is able to perform the tests subject to accreditation in accordance with the relevant standards or test methods but cannot be held responsible for the results of the tests themselves.

ACCREDIA accreditation is granted only for the testing and / or calibration activities carried out by the Laboratory. It therefore does not include other activities such as advice, and / or the expression of opinions based on the results of the tests and cannot be used for product certification.

The complete list of laboratory tests accredited by ACCREDIA is available on request at the Laboratory or at the following address: http://www.accredia.it

Test list and testing conditions

* § 6.1 Shock absorption

Conditioning of the sample for a minimum of 3 h at 23 °C \pm 2 °C. Test performed at a temperature of 23 °C \pm 2 °C.

* § 6.2 Vertical Deformation

Conditioning of the sample for a minimum of 3 h at 23 °C \pm 2 °C. Test performed at a temperature of 23 °C \pm 2 °C.

* § 6.3.1 Vertical water infiltration

Conditioning of the sample for a minimum of 3 h at 23 °C \pm 2 °C. Test performed at a temperature of 23 °C \pm 2 °C.

* § 6.3.2 Horizontal drainage

Conditioning of the sample for a minimum of 3 h at 23 °C \pm 2 °C. Test performed at a temperature of 23 °C \pm 2 °C.

* § 6.4 Tensile properties

Conditioning of the sample for a minimum of 24 h at 23 °C \pm 2 °C. Test performed at a temperature of 23 °C \pm 2 °C.

* § 6.5 Determination of dimensional stability

Conditioning of the sample for a minimum of 3 h at 23 °C \pm 2 °C. Test performed at a temperature of 23 °C \pm 2 °C.

* § 6.6 Resistance to dynamic fatigue by repeated pounding

Conditioning of the sample for a minimum of 3 h at 23 °C \pm 2 °C. Test performed at a temperature of 23 °C \pm 2 °C.

* § 6.7 Resistance to permanent deformation after short-term loading

Conditioning of the sample for a minimum of 16 h at 23 °C \pm 2 °C and a relative humidity of 50 % \pm 5 %. Test performed at a temperature of 23 °C \pm 2 °C and a relative humidity of 50 % \pm 5 %.

* § 6.8 Resistance to permanent deformation after static loading

Conditioning of the sample for a minimum of 16 h at 23 °C \pm 2 °C and a relative humidity of 50 % \pm 5 %. Test performed at a temperature of 23 °C \pm 2 °C and a relative humidity of 50 % \pm 5 %.

* § 6.9 Thermal conductivity

Test carried out by an external laboratory

EN 1969:2000 - Surfaces for sports areas - Thickness– Method A

Conditioning of the sample for a minimum of 3 h at 23 °C \pm 2 °C.

Test performed at a temperature of 23 °C \pm 2 °C and a relative humidity of 50 % \pm 5 %.







LAB Nº 1427 L

ISO 8543:2020 - solo Clause 6 – 7 - Textile floor coverings – Mass per unit area

Conditioning of the sample for a minimum of 16 h at 23 °C \pm 2 °C and a relative humidity of 50 % \pm 5 %. Test performed at a temperature of 23 °C \pm 2 °C and a relative humidity of 50 % \pm 5 %.

* § 9 Enviromental and toxicological properties

Test carried out by an external laboratory

* Test not subjet to Accredia accreditation

EXPANDED UNCERTAINTY

EN 1969:2000 - Surfaces for sports areas – Thickness – Method A

The expanded uncertainty is calculated as 0,1 mm.

The expanded uncertainty is calculated with a coverage factor (k) equal to 2, corresponding to a 95 % confidence level.

ISO 8543:2020 - solo Clause 6 – 7 - Textile floor coverings – Mass per unit area

The expanded uncertainty is calculated as 1 g.

The expanded uncertainty is calculated with a coverage factor (k) equal to 2, corresponding to a 95 % confidence level.

DECISIONAL CRITERIA

For all the tests in this report, the judgments are expressed by defining the data as compliant when the result, not considering the contribution of uncertainty, falls within the defined limits.

The level of risk associated with the defined criterion can reach, in the expression of the test result, up to 50%.

IMPORTANT INFORMATION

Reproduction of this test report is only authorized in its entirety.

The results are intended to be valid only for the surface tested as received.

The laboratory declines all responsibility for all information provided by the customer.

Subject

Determination of the parameters relating to the test methods listed in the FprEN 15330-4 reported in the section "Test list and testing conditions".

REFERENCE DOCUMENTS

FprEN 15330-4:2020 - Surfaces for sport areas – Syntetic turf and needle-punched surfaces primarily designed for outdoor use - Part 4: Specification for shockpads used whith syntetic turf, needle-punch and textile sport surface

CEN/TS 16717:2015 - Surfaces for sports areas - Method of test for the determination of shock absorption, vertical deformation and energy restitution using the advanced artificial athlete

prEN 12616:2022 - Surfaces for sports areas – Test method for the determination of vertical water infiltration and horizontal water flow rates

prEN 12230:2021 - Surfaces for sports areas – Test method for the determination of tensile properties of synthetic sports surfaces

EN 17326:2020 - Surfaces for sports areas - Determination of dimensional stability of shock pads used within sports systems

EN 17324:2020 - Surfaces for sports areas - Test method for the determination of the resistance to dynamic fatigue of shock pads and sports surfaces

EN 1969:2000 - Surfaces for sports areas - Determination of thickness of synthetic sports surfaces ISO 8543:2020 - Textile floor coverings - Methods for determination of mass

STORAGE TIMES

Documents are stored for 4 years and samples 1 month from the issue of the Test report.







SAMPLING

The sampling is carried out by the customer.

LOCATION OF PERFORMANCE OF THE TESTS

The test "§ 6.9 Thermal conductivity" and "§ 9 Environmental and toxicological properties" are carried out by an external laboratory, the other tests are carried out at Labosport Italia Srl premises.

Applicant

Company	TRE DI SRL.
Address	Via Colombare di Castiglione 81/E
	25015 Desenzano del Garda (BS)

Country

Italy

ACQUISITION DATA

Order received on	May C
First sample received on	May 2
Last sample received on	Augus
Beginning of tests	July 2
Ending of tests	Decer

Aay 09th 2022 Aay 25th 2022 August 22nd 2022 uly 28th 2022 December 01st 2022







PRODUCT IDENTIFICATION (INFORMATION PROVIDED BY THE CUSTOMER)

Property	Value
Chemical nature of the product	Polypropylene
Thickness	14,3 mm
Shock absorption	65 %
Vertical deformation	3,80 mm

PRODUCT IDENTIFICATION (INFORMATION DETECTED BY THE LABORATORY)

Type of the product: Polypropylene





Upper side





Section







TEST RESULTS

§ 6.1 Shock absorption

Test environment	Shock absor	rption	Permanent damage	Requirements	Pass / Fail
Standard laboratory conditions - dry - without load spreading plate	1) 65 % 2) 64 % 3) 65 % Variation: 1 %	Mean: 65 %	No	 Shock absorbtion ≥ 20 % Maximum variation between three test position ≤ 5 % No permanent damage 	Pass
Standard laboratory conditions - dry - with load spreading plate	1) 50 % 2) 48 % 3) 49 % Variation: 1 %	Mean: 49 %	No	 Shock absorbtion ≥ 30 % Maximum variation between three test position ≤ 5 % No permanent damage 	
Standard laboratory conditions - wet - with load spreading plate	1) 49 % 2) 49 % 3) 49 % Variation: 0 %	Mean: 49 %	No	 Shock absorbtion ≥ 30 % Maximum variation between three test position ≤ 5 % No permanent damage 	Pass
Accelerated air ageing - dry - with load spreading plate	1) 52 % 2) 51 % 3) 51 % Variation: 1 %	Mean: 51 %	No	 Shock absorbtion ≥ 30 % Maximum variation between three test position ≤ 5 % No permanent damage 	Pass
Elevated temperature (40 °C ± 2 °C) - dry - with load spreading plate	1) 56 % 2) 55 % 3) 55 % Variation: 1 %	Mean: 55 %	 Shock absorbtion ≥ 30 % Maximum variation between three test position ≤ 5 % No permanent damage 		Pass
Sub-ambient temperature (5 °C ± 2 °C) - dry - with load spreading plate	1) 50 % 2) 50 % 3) 51 % Variation: 1 %	Mean: 50 %	No	 Shock absorbtion ≥ 30 % Maximum variation between three test position ≤ 5 % No permanent damage 	Pass
Frozen (-5 °C ± 2 °C) - dry - with load spreading plate	1) 48 % 2) 48 % 3) 49 % Variation: 1 %	Mean: 48 %	No	 Shock absorbtion ≥ 30 % Maximum variation between three test position ≤ 5 % No permanent damage 	Pass

Classification of shock absorption performance: Class C

Shock absorption (%)	Classification				
	. A	В			
≤ 29	Class A (-5°C to 40 °C)	Class A (+5°C to 40 °C)			
30 - 40	Class B (–5°C to 40 °C)	Class B (+5°C to 40 °C)			
41 - 50	Class C (-5°C to 40 °C)	Class C (+5°C to 40 °C)			
· 51 - 60	Class D (-5°C to 40 °C)	Class D (+5°C to 40 °C)			
≥ 61	Class E (-5°C to 40 °C)	Class E (+5°C to 40 °C)			







§ 6.2 Vertical Deformation

Test environment	Vertical Def	ormation	Requirements	Pass / Fail
Standard laboratory conditions – dry – without load spreading plate	1) 5,8 mm 2) 5,6 mm 3) 5,9 mm Variation: 0,2 mm	Mean: 5,8 mm	 Vertical deformation ± 2 mm of the declared value Maximum variation between three test position ≤ 2 mm 	Pass
Standard laboratory conditions – dry – with load spreading plate	1) 4,4 mm 2) 4,3 mm 3) 4,4 mm Variation: 0,1 mm	Mean: 4,4 mm	 Vertical deformation ± 2 mm of the declared value Maximum variation between three test position ≤ 2 mm 	Pass
Standard laboratory conditions – wet – with load spreading plate	1) 4,4 mm 2) 4,4 mm 3) 4,4 mm Variation: 0 mm	Mean: 4,4 mm	 Vertical deformation ± 2 mm of the declared value Maximum variation between three test position ≤ 2 mm 	Pass
Accelerated air ageing – dry – with load spreading plate	1) 5,1 mm 2) 5,1 mm 3) 5,0 mm Variation: 0,1 mm	Mean: 5,1 mm	 Vertical deformation ± 2 mm of the declared value Maximum variation between three test position ≤ 2 mm 	Pass
Elevated temperature (40 °C ± 2 °C) - dry - with load spreading plate	1) 5,4 mm 2) 5,4 mm 3) 5,4 mm Variation: 0 mm	Mean: 5,4 mm	 Vertical deformation ± 2 mm of the declared value Maximum variation between three test position ≤ 2 mm 	Pass
Sub-ambient temperature (5 °C ± 2 °C) - dry - with load spreading plate	1) 4,6 mm 2) 4,7 mm 3) 4,9 mm Variation: 0,2 mm	Mean: 4,7 mm	 Vertical deformation ± 2 mm of the declared value Maximum variation between three test position ≤ 2 mm 	Pass
Frozen (-5 °C ± 2 °C) - dry - with load spreading plate	1) 4,2 mm 2) 4,5 mm 3) 4,6 mm Variation: 0,2 mm	Mean: 4,4 mm	 Vertical deformation ± 2 mm of the declared value Maximum variation between three test position ≤ 2 mm 	Pass

Note

None.







§ 6.3.2 Horizontal drainage

Designed to provide horizontal drainage

Sample v	Sample width mm					Water collection in seconds			15		
	Tes	st 1	Tes	st 2	Tes	st 3	Tes	st 4	Tes	st 5	Mean
	grams	l/s*m	grams	l/s*m	grams	l/s*m	grams	l/s*m	grams	l/s*m	l/s*m
Sample 1	2733	0,911	2741	0,914	2728	0,909	2740	0,913	2731	0,910	0,912
Sample 2	2722	0,907	2735	0,912	2730	0,910	2739	0,913	2740	0,913	0,911
Sample 3	2719	0,906	2729	0,910	2732	0,911	2737	0,912	2731	0,910	0,910
Average of the three samples and the five measurements for each sample in grams of water							27	732			
Average of the three samples and the five measurements for each sample in I/s*m						0,9	911				
Requirem	n ent - ≥	0,1 /s*m								P	ass

Classification of horizontal drainage performance: HD 4

Class	Horizontal drainage per unit width (l /s/m)
HD 1	0,1 - 0,25
HD 2	> 0,25 - 0,4
HD 3	> 0,4 - 0,55
HD 4	> 0,55

Method used

Slope: 0,6 %

Water details

The water used for the test was from the main supply at a temperature 12 $^\circ C$

Instrument used









§ 6.3.1 Vertical water infiltration

Designed to allow the vertical flow of water

Sample 1	Sample 2	Sample 3	Result (mean value)	Requirement	Pass / Fail
1) 27354 mm/h 2) 29441 mm/h 3) 28475 mm/h Mean: 28423 mm/h	1) 31018 mm/h 2) 32167 mm/h 3) 32464 mm/h Mean: 31883 mm/h	1) 34059 mm/h 2) 36957 mm/h 3) 39931 mm/h Mean: 36982 mm/h	32429 mm/h	≥ 500 mm/h	Pass

Note			
None.			

EN 1969:2000 - Surfaces for sports areas - Thickness- Method A

Tests have been carried out at a temperature of 23,5 $^\circ C$ and at a relative humidity of 52,6 %. Test has been carried out on July 28th 2022.

Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Mean
15,32 mm	15,19 mm	15,08 mm	15,26 mm	15,59 mm	15,3 mm

Note	
None.	

§ 6.4 Tensile properties

Type of shockpad: Shockpad with slots, groves, or holes, or with tangled filament or net core

	Tensile strenght (0°)	Tensile strenght (90°)	
Sample 1	7105 kPa	kPa	
Sample 2	7696 kPa	kPa	
Sample 3	7479 kPa	kPa	
Mean - kPa	7427 kPa	kPa	
Mean - MPa	7,43 MPa	MPa	
otal Mean - MPa 7,43 MPa			
Requirement - \geq 0,5 kN/mm ² for shockpad with slots, groves, or holes, or with tangled filament or net core			

Note

The tests were carried out only on the longitudinal specimens with respect to the direction of manufacture because, given the characteristics of the product, it is impossible to cut the transverse specimens with respect to the direction of manufacture.







§ 6.5 Determination of dimensional stability

	Value	Permanent damage after 30 min	Requirements	Pass / Fail
Maximum value of bowing or curling	Sample 1: 0 mm Sample 2: 0 mm Sample 3: 0 mm	No	≤ 5 mm and no permanent damage	Pass

§ 6.6 Resistance to dynamic fatigue by repeated pounding

	Value	Change in thickness	Requirements	Pass / Fail
Thickness after	15,1 mm	1,3 %	≤ 15 % of the thickness before conditioning	Pass
ageing EN 17324		0,2 mm	Maximum loss of thickness ≤ 1,5 mm	

	Value	Change in shock absportion	Permanent damage	Requirements	Pass / Fail
Shock absorption after ageing EN 17324 without load spreading plate	64 %	1 %	No	≥ 20 % Maximum loss of shock absorption ≤ 5 % No permanent damage	Pass
N .					

Note	
None.	

§ 6.7 Resistance to permanent deformation after short-term loading

	Value Permanent damage after 90 minutes		Requirements	Pass / Fail
Permanent deformation after 30 min	Sample 1: 0,686 mm Sample 2: 0,733 mm Sample 3: 0,295 mm Mean: 0,57 mm	No	-	_
Permanent deformation after 1 h	Sample 1: 0,466 mm Sample 2: 0,494 mm Sample 3: 0,231 mm Mean: 0,40 mm	No	≤ 1 mm No permanent damage	Pass

 \S 6.8 Resistance to permanent deformation after static loading







	Value	Permanent damage after 72 h	Requirements	Pass / Fail
Permanent deformation after 30 min	Sample 1: 1,849 mm Sample 2: 1,723 mm Sample 3: 1,759 mm Mean: 1,78 mm	No	-	_
Permanent deformation after 1 h	Sample 1: 1,705 mm Sample 2: 1,613 mm Sample 3: 1,692 mm Mean: 1,67 mm	No -		_
Permanent deformation after 6 h	Sample 1: 1,665 mm Sample 2: 1,521 mm Sample 3: 1,476 mm Mean: 1,55 mm	No	-	-
Permanent deformation after 24 h	Sample 1: 1,661 mm Sample 2: 1,483 mm Sample 3: 1,332 mm Mean: 1,49 mm	No	-	-
Permanent deformation after 72 h	Sample 1: 1,648 mm Sample 2: 1,463 mm Sample 3: 1,321 mm Mean: 1,48 mm	No	≤ 1,5 mm No permanent damage	Pass

§ 6.9 Thermal conductivity

Thermal conductivity

0,065 W/m·K

Note

We would like to point out that on the one hand the thickness of this specimen is not uniform and that on the other hand the cavities of this element are large in size, which forced us to encapsulate it in a plastic film. The extrapolation in thermal resistance value should therefore be done with great caution.

ISO 8543:2020 - solo Clause 6 – 7 - Textile floor coverings – Mass per unit area

Tests have been carried out at a temperature of 22,8 $^{\circ}$ C and at a relative humidity of 50,2 %. Test has been carried out on December 01st 2022.

Sample 1	Sample 2	Sample 3	Sample 4	Mean	CV Coefficient of variation
1925 g/m ²	1911 g/m²	1932 g/m²	1904 g/m²	1918 g/m²	0,3 %

Note	
None.	







§ 9 Enviromental and toxicological properties

ELEMENT	RESULTS	LIMIT
Lead (Pb)	<0,005 mg/l	≤ 0,025 mg/l
Cadmium (Cd)	<0,001 mg/l	≤ 0,005 mg/l
Total chromium content (Cr)	0,006 mg/l	≤ 0,05 mg/l
Chromium VI (CrVI)	<0,008 mg/l	≤ 0,008 mg/l
Mercury (Hg)	0,00003 mg/l	≤ 0,001 mg/l
Zinc (Zn)	0,018 mg/l	≤ 0,5 mg/l
Tin (Sn)	<0,005 mg/l	≤ 0,04 mg/l
DOC (dissolved organically bound carbon)	17,8 mg/l	≤ 50 mg/l
EOX (extractible organic halides)	24 mg/kg	≤ 100 mg/kg
Result of the test	Pass	

STRUMENTS USED

\S 6.1 Shock absorption, \S 6.2 Vertical Deformation

Equipment	Manufacturer	Model	Technical sheet
Triple A	Labosport International	NA	STR140
Electronic	Labosport International	NA	STR168
Calibration jig	Labosport International	NA	STR194
Test jig	Labosport International	NA	STR227
Datalogger	Testo	177-H1	STR018

§ 6.3.2 Horizontal drainage

Equipment	Manufacturer	Model	Technical sheet
Horizontal water flow rate device	NA	NA	STR119

§ 6.3.1 Vertical water infiltration

Equipment	Manufacturer	Model	Technical sheet
Aluminum cylinder	Labosport International	Cylinder	STR311
Ruler	NA	NA	STR310
Stopwatch	NA	NA	STR023
Thermometer	Testo	720	STR302

EN 1969:2000 - Surfaces for sports areas - Thickness- Method A

Equipment	Manufacturer	Model	Technical sheet
Micrometer	Mitutoyo	ID-H0530/0560	STR300
Datalogger	Testo	177-H1	STR018

§ 6.4 Tensile properties

Equipment	Manufacturer	Model	Technical sheet
Dynamometer	Zwick/Roell	10kN ProLine	STR376
Load cell	Zwick/Roell	XForce P	STR375
Gauge	Mitutoyo	Absolute	STR270
Micrometer	Mitutoyo	ID-H0530/0560	STR300







Datalogger Testo	177-H1	STR018

§ 6.5 Determination of dimensional stability

Equipment	Manufacturer	Model	Technical sheet
Tape measure	Stanley	Powerlock-Classic	STR229

§ 6.7 Resistance to permanent deformation after short-term loading

Equipment	Manufacturer	Model	Technical sheet
Dynamometer	Zwick/Roell	10kN ProLine	STR376
Load cell	Zwick/Roell	XForce P	STR375
Timer	RS Component	NA	STR077
Micrometer	Mitutoyo	ID-H0530/0560	STR300

§ 6.8 Resistance to permanent deformation after static loading

Equipment	Manufacturer	Model	Technical sheet
Compression structure	Labosport International	NA	STR374
Timer	RS Component	NA	STR077
Micrometer	Mitutoyo	ID-H0530/0560	STR300

ISO 8543:2020 - solo Clause 6 – 7 - Textile floor coverings – Mass per unit area

Equipment	Manufacturer	Model	Technical sheet
Balance	Radwag	PS6000/C/1	STR043
Tape measure	Stanley	Powerlock Classic	STR229
Datalogger	Testo	177-H1	STR018

ADDITIONS, DEVIATIONS OR EXCLUSIONS FROM THE TEST METHOD

None.

COMMENTS RELATED TO TESTS

None.

ADDITIONAL INFORMATIONS

This report supersedes the report 22-0320IT issued on 22/09/2022.



Laboratory Director bertc

End of the Test Report ---