

## TEST REPORT

21-0636IT

Issued on September 16<sup>th</sup> 2022

CLIENT

ELASTRADE SRL

PRODUCT NAME

POWERFILL GREEN

PRODUCT TYPE

SBR

### Laboratory tests

Polymeric infill materials primarily used outdoor

#### Labosport Italia S.r.l

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## TEST LIST AND TESTING CONDITIONS

### § 6.3 Particle size distribution

Conditioning of the sample not required.

Test performed at a temperature of  $23\text{ °C} \pm 5\text{ °C}$ .

### **UNI EN 14955:2006 - Surfaces for sports areas - Determination of composition and particle shape of unbound mineral surfaces for outdoor sports areas**

Conditioning of the sample not required.

Test performed at a temperature of  $23\text{ °C} \pm 5\text{ °C}$ .

### § 6.5 Bulk density

Conditioning of the sample not required.

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

### **ISO 11358-2:2021 - Plastics — Thermogravimetry (TG) of polymers — Part 2: Determination of activation energy**

Test carried out by an external laboratory.

### § 7.1 Elastic properties

Conditioning of the sample for a minimum of 24 h at  $23\text{ °C} \pm 2\text{ °C}$ .

Test performed at a temperature of  $23\text{ °C} \pm 2\text{ °C}$ .

### **EN 17467:2022 - Surfaces for sports areas - Test method for the determination of the residual deformation of synthetic or organic infill granules after static load**

Conditioning of the sample for a minimum of 24 h at  $23\text{ °C} \pm 2\text{ °C}$ .

Test performed at a temperature of  $23\text{ °C} \pm 2\text{ °C}$ .

### § 7.4 Surface temperature during exposure to infra-red energy

Conditioning of the sample for a minimum of 24 h at  $23\text{ °C} \pm 2\text{ °C}$ .

Test performed at a temperature of  $23\text{ °C} \pm 2\text{ °C}$ .

### § 7.5 Resistance to melting / permanent agglomeration

Conditioning of the sample for a minimum of 24 h at  $23\text{ °C} \pm 2\text{ °C}$ .

Test performed at a temperature of  $23\text{ °C} \pm 2\text{ °C}$ .

### **EN 15051-1:2013 - Workplace exposure - Measurement of the dustiness of bulk materials - Part 1: Requirements and choice of test methods**

Test carried out by an external laboratory.

### § 7.7 Water infiltration

Conditioning of the sample not required.

Test performed at a temperature of  $23\text{ °C} \pm 5\text{ °C}$ .

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

Conditioning of the sample not required.

Test performed at a temperature of  $23\text{ °C} \pm 5\text{ °C}$ .

### § 9.1 PAH content

Test carried out by an external laboratory.

### **EN 71-3:2021 – Safety of toys - Part 3: Migration of certain elements**

Test carried out by an external laboratory

### § 9.3 Leaching of chemical elements through immersion in water

Test carried out by an external laboratory

## 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 prEN 15330-5 reported in the section "Test list and testing conditions".

## REFERENCE DOCUMENTS

prEN 15330-5:2022 - Surfaces for sport areas — Synthetic turf and textile sports surfaces

EN 933-1:2012 - Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method  
EN 933-2:2020 - Tests for geometrical properties of aggregates — Part 2: Determination of particle size distribution — Test sieves, nominal size of apertures  
EN 14955:2005 - Surfaces for sports areas — Determination of composition and particle shape of unbound mineral surfaces for outdoor sports areas  
EN 1097-3:1998 - Tests for mechanical and physical properties of aggregates — Part 3: Determination of loose bulk density and voids  
ISO 11358-2:2021 - Plastics — Thermogravimetry (TG) of polymers — Part 2: Determination of activation energy  
EN ISO 7500-1:2018 - Metallic materials - Calibration and verification of static uniaxial testing machines — Tension/compression testing machines — Calibration and verification of the force-measuring system  
EN 17467:2022 - Surfaces for sports areas — Test method for the determination of the residual deformation of synthetic or vegetal infill granules after static load  
EN 14810:2006 - Surfaces for sports areas — Determination of spike resistance  
EN 20105-A02:1994 - Textiles — Tests for colour fastness — Grey scale for assessing change in colour  
EN 15051-1:2013 - Workplace exposure — Measurement of the dustiness of bulk materials — Requirements and choice of test methods  
EN 12616:2013 - Surfaces for sports areas — Determination of water infiltration rate  
EN 14836:2018 - Surfaces for sports areas — Synthetic surfaces for outdoor sports areas — Test method for artificial weathering  
EN 1367-1:2007 - Tests for thermal and weathering properties of aggregates - Part 1: Determination of resistance to freezing and thawing  
EN 71-3:2019+A1:2021 - Safety of toys — Migration of certain elements  
CEN/TS 16384:2012 - Synthetic sport systems — Leaching test  
Commission Regulation (UE) 2021/1199 of 20th July 2021

## 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 ISO 11358-2, EN 15051-1, § 9.1 PAH content, EN 71-3, § 9.3 Leaching of chemical elements through immersion in water are carried out by an external laboratory, the other tests are carried out at Labosport Italia Srl premises.

## APPLICANT

Company	<b>ELASTRADE SRL</b>
Address	Via dei Termini, 18/A 24040 Osio Sopra (BG)

Country	Italy
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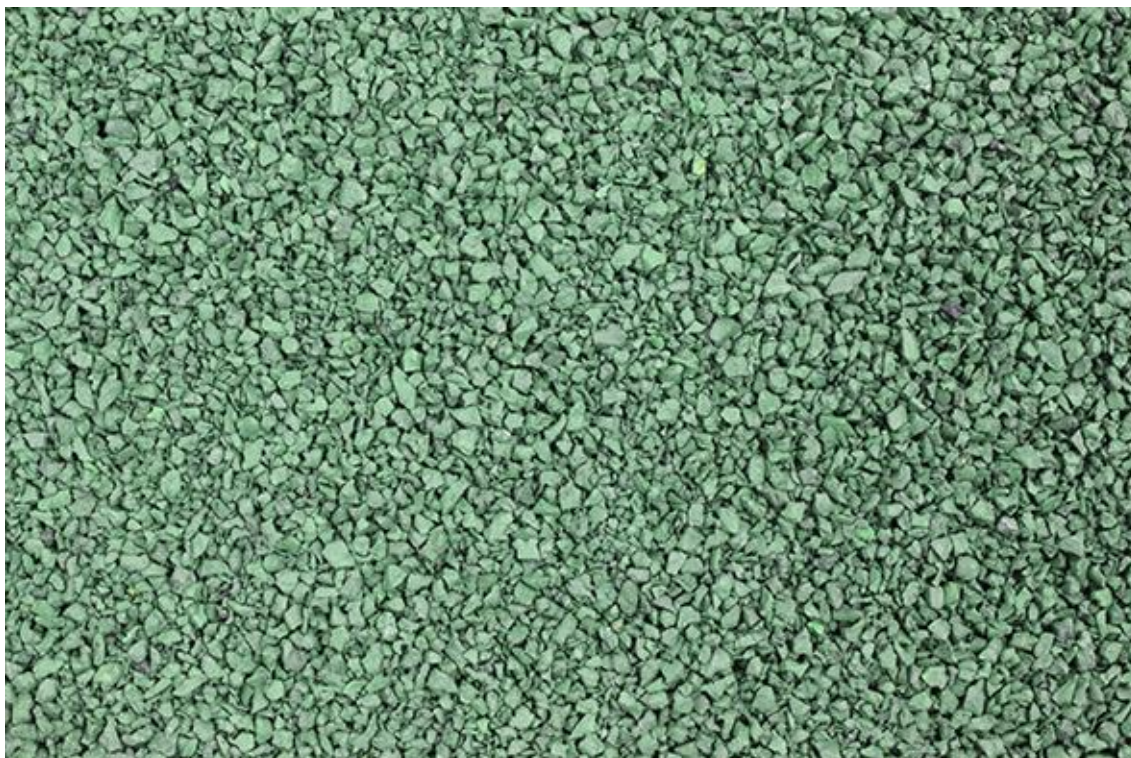
## ACQUISITION DATA

Order received on	September 9 <sup>th</sup> 2021
First sample received on	September 24 <sup>th</sup> 2021
Last sample received on	September 24 <sup>th</sup> 2021
Beginning of tests	September 28 <sup>th</sup> 2021
Ending of tests	September 9 <sup>th</sup> 2022

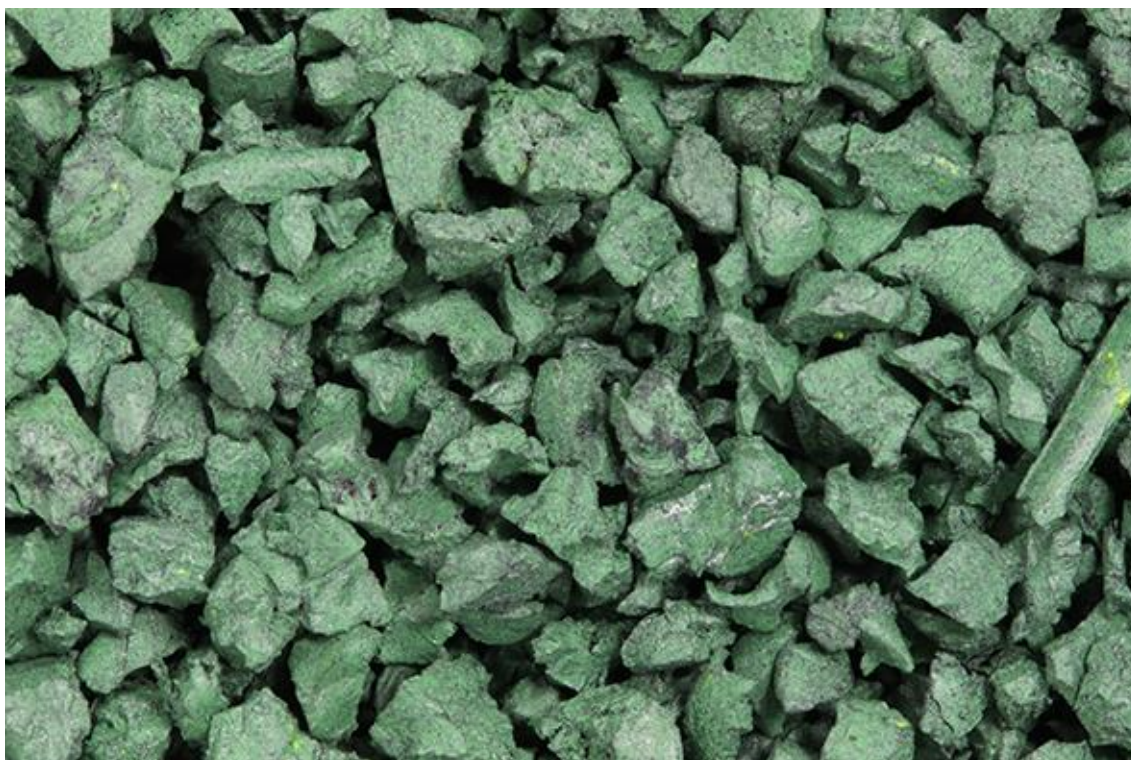
*PRODUCT IDENTIFICATION (INFORMATION DETECTED BY THE LABORATORY)*

Type of the product: SBR

Colour of the product: Green



*Generic image*



*Macro-image*

## PRODUCT IDENTIFICATION (INFORMATION PROVIDED BY THE CUSTOMER)

Property	Value
Chemical nature of the product	SBR
Colour of the product	Green
Bulk density	0,48 Mg/m <sup>3</sup>
Particle shape	A2
Particle size	d 0,8 mm – D 2,5 mm
Polymer characterisation	Organic: 65,6 %
	Inorganic: 34,4 %
	Rubber: 59,2 %

## TEST RESULTS

### § 6.3 Particle size distribution

	Particle size	Requirements	Pass / Fail
Unaged product (reference product)	d 0,8 mm – D 2,5 mm	At least 80 % of a production sample shall be equal to or greater than declared sieve (d) and no infill shall pass the next sieve down. At least 80 % of a production sample shall be equal to or smaller than declared sieve (D).	Pass
After durability test	d 0,8 mm – D 2,5 mm	At least 80 % of the infill within the d – D range of the reference sample	Pass
After freeze / thaw cycles	d 0,8 mm – D 2,5 mm	At least 80 % of the infill within the d – D range of the reference sample	Pass
After UVA + durability test	d 0,8 mm – D 2,5 mm	At least 80 % of the infill within the d – D range of the reference sample	Pass

Note
None.

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

	Particle shape	Requirements	Pass / Fail
Unaged product (reference product)	A2	Same shape of the manufacturer's product declaration	Pass
After durability test	A2	Same particle shape classification as the reference sample	Pass
After freeze / thaw cycles	A2	Same particle shape classification as the reference sample	Pass
After UVA + durability test	A2	Same particle shape classification as the reference sample	Pass

Note
None.

### § 6.5 Bulk density

	Bulk density		Requirements	Pass / Fail
Unaged product (reference product)	1) 0,49 Mg/m <sup>3</sup> 2) 0,49 Mg/m <sup>3</sup> 3) 0,49 Mg/m <sup>3</sup>	Mean: 0,49 Mg/m <sup>3</sup>	± 15 % of the manufacturer's product declaration	Pass
After durability test	1) 0,49 Mg/m <sup>3</sup> 2) 0,49 Mg/m <sup>3</sup> 3) 0,49 Mg/m <sup>3</sup>	Mean: 0,49 Mg/m <sup>3</sup>	± 15 % of the reference sample	Pass
After freeze / thaw cycles	1) 0,49 Mg/m <sup>3</sup> 2) 0,49 Mg/m <sup>3</sup> 3) 0,49 Mg/m <sup>3</sup>	Mean: 0,49 Mg/m <sup>3</sup>	± 15 % of the reference sample	Pass
After UVA + durability test	1) 0,49 Mg/m <sup>3</sup> 2) 0,49 Mg/m <sup>3</sup> 3) 0,49 Mg/m <sup>3</sup>	Mean: 0,49 Mg/m <sup>3</sup>	± 15 % of the reference sample	Pass

Note
None.

### § 7.1 Elastic properties

	Result	Classification - Range
Unaged product (reference product)	35 %	Medium elasticity - > 20 % ≤ 40 %
After artificial weathering (UVA)	34 %	-
Requirement: ± 5 % of the reference product	Pass	

Note
None.

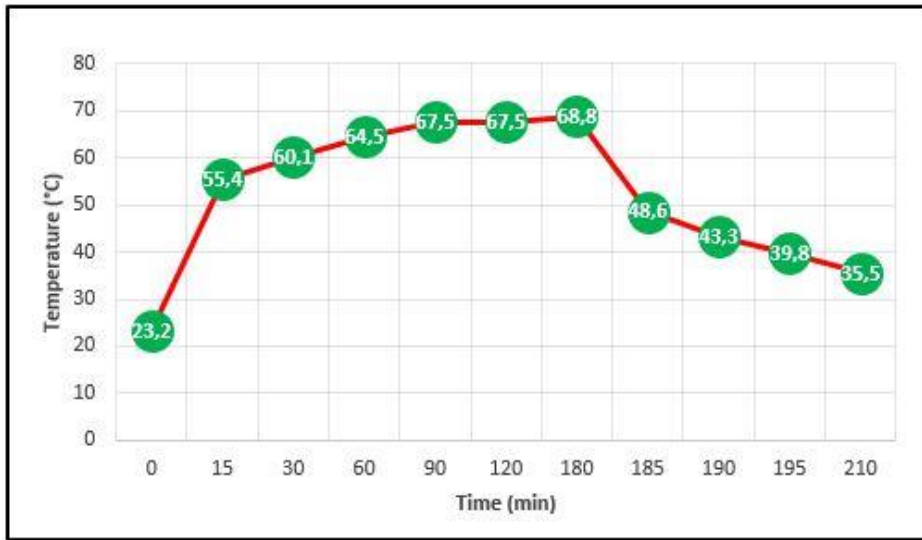
### EN 17467:2022 - Surfaces for sports areas - Test method for the determination of the residual deformation of synthetic or organic infill granules after static load

Result	7,8 %
Requirement: ≤ 50 %	Pass
Visual inspection	No visible variation
Requirement: the granule shall not be agglomerated and shall no be visible signs of oil secretion	Pass

Note
None.

§ 7.4 Surface temperature during exposure to infra-red energy

Result	Class - Temperature range
68,8 °C	3 - > 65 °C



Surface temperature's graph

Note
None.

§ 7.5 Resistance to melting / permanent agglomeration

Result	Class - Temperature range
140 °C - 0 % of agglomerated product	3 - ≥ 120 °C

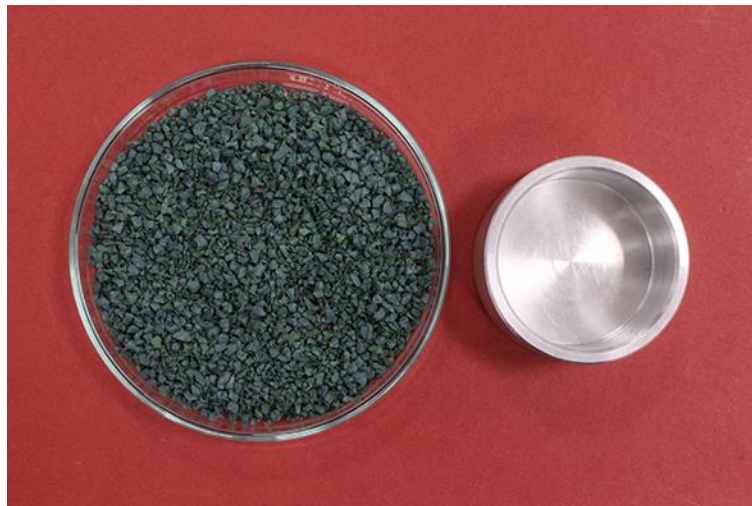


Image of the tested sample

Note
None.

EN 15051-1:2013 - Workplace exposure - Measurement of the dustiness of bulk materials - Part 1: Requirements and choice of test methods – Method A

Inhalable dustiness mass fraction	42,8 mg/kg	Thoracic dustiness mass fraction	5,9 mg/kg	Respirable dustiness mass fraction	0 mg/kg
Result (category of dustiness)			Very low		
Requirement: Very Low or Low classification			Pass		

Table 1 — Dustiness classification for rotating drum method

Category of dustiness	Inhalable dustiness mass fraction, $w_{I,A}$ mg/kg	Thoracic dustiness mass fraction, $w_{T,A}$ mg/kg	Respirable dustiness mass fraction, $w_{R,A}$ mg/kg
Very low	< 300	< 80	< 10
Low	300 to 650	80 to 300	10 to 60
Moderate	> 650 to 3 000	> 300 to 1 000	> 60 to 210
High	> 3 000	> 1 000	> 210

<b>Note</b>
None.

§ 7.7 Water infiltration

A 300mm diameter single cylinder Infiltrometer was used for the test. The sample is closed by pressure between two rubber gaskets by tightening the appropriate bolts.

The water temperature used during the test is 17,1 °C. The surface temperature of the sample is 23,2 °C.

The test was performed on March 4<sup>th</sup> 2022.

Test 1	Test 2	Test 3	Mean value
20867 mm/h	22699 mm/h	25415 mm/h	22845 mm/h
Requirement: > 500 mm/h		Pass	

<b>Note</b>
None.

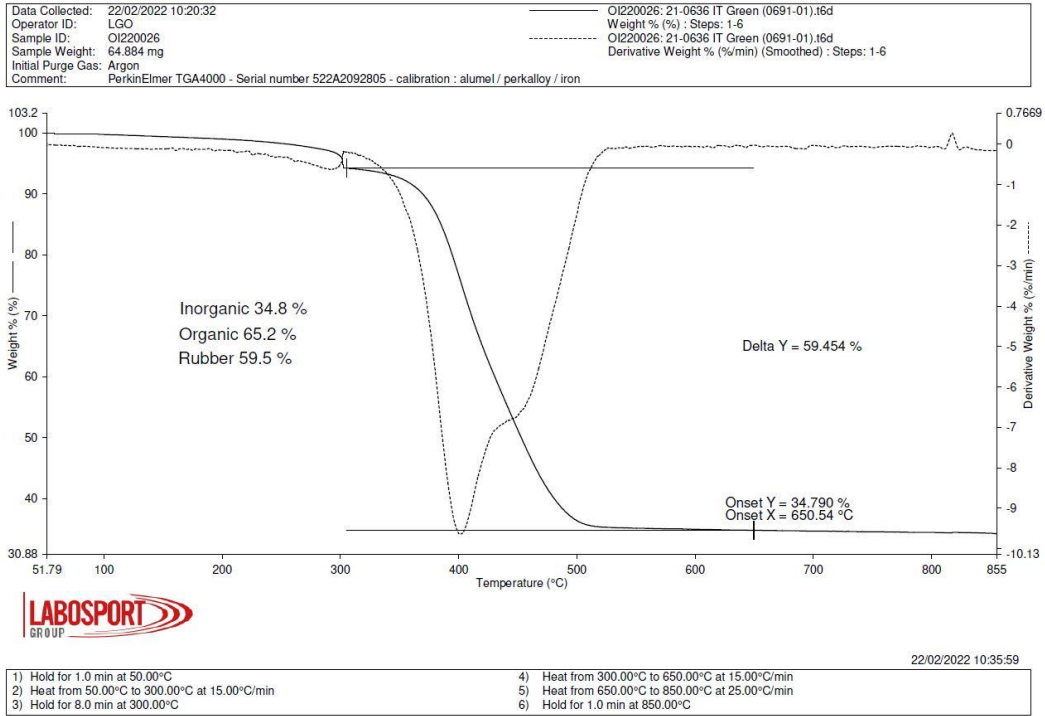
EN 20105-A02:1996 – Textiles - Tests for colour fastness - Grey scale for assessing change in colour

After artificial weathering (UVA)	3
After durability test	3
Requirement – Grey scale $\geq 3$	Pass

<b>Note</b>
None.

ISO 11358-2:2021 - Plastics — Thermogravimetry (TG) of polymers — Part 2: Determination of activation energy

Organic %	65,2 %
Inorganic %	34,8 %
Rubber %	59,5 %
Requirement: Rubber % $\pm$ 5 % absolute of the declared value	Pass



TGA graph

## SUMMARY TABLE OF TEST RESULTS

PROPERTIES	CONDITION	UNITS	RESULTS	REQUIREMENTS	PASS / FAIL
Particle size distribution	Unaged (reference product)	mm	d 0,8 - D 2,5	At least 80 % than declared value	Pass
	After durability test	mm	d 0,8 - D 2,5	At least 80 % than reference product	Pass
	After freeze / thaw cycles	mm	d 0,8 - D 2,5	At least 80 % than reference product	Pass
	After UVA + durability test	mm	d 0,8 - D 2,5	At least 80 % than reference product	Pass
Particle shape	Unaged (reference product)	-	A2	Same shape than declared valued	Pass
	After durability test	-	A2	Same shape than reference product	Pass
	After freeze / thaw cycles	-	A2	Same shape than reference product	Pass
	After UVA + durability test	-	A2	Same shape than reference product	Pass
Bulk density	Unaged (reference product)	Mg/m <sup>3</sup>	0,49	± 15 % of the declared value	Pass
	After durability test	Mg/m <sup>3</sup>	0,49	± 15 % of the reference product	Pass
	After freeze / thaw cycles	Mg/m <sup>3</sup>	0,49	± 15 % of the reference product	Pass
	After UVA + durability test	Mg/m <sup>3</sup>	0,49	± 15 % of the reference product	Pass
Elastic properties	Unaged (reference product)	%	35 Medium elasticity - >20 % ≤40 %	-	-
	After artificial weathering (UVA)	%	34	± 5 % of the reference product	Pass
Resistance to residual deformation after static load	Unaged	%	7,8	≤ 50 %	Pass
		-	No visible variation	no agglomerated granules, no iol secretion	Pass
Surface temperature during exposure to infra-red energy	Unaged	°C	68,8 3 - > 65 °C	-	-
Resistance to melting / permanent agglomeration	Unaged	°C	140 3 - > 120 °C	-	-
Inhalable dust content	Unaged	-	Very low	Very Low or Low	Pass
Water infiltration	Unaged	mm/h	22845	> 500	Pass

PROPERTIES	CONDITION	UNITS	RESULTS	REQUIREMENTS	PASS / FAIL
Colour fastness	After artificial weathering (UVA)	-	3	≥ 3	Pass
	After durability test	-	3	≥ 3	Pass
Polymer characterisation	Unaged	%	Organic: 65,2	-	-
		%	Inorganic: 34,8	-	-
		%	Rubber: 59,5	± 5 % of the declared value	Pass

### § 9.1 PAH content

POLYAROMATIC HYDROCARBON (PAH)	RESULTS	LIMIT
Benzo[a]pyrene (BaP)	0,33 mg/kg	The total extractable PAH8 content shall be less than 20 mg/kg
Benzo[e]pyrene (BeP)	0,50 mg/kg	
Benzo[a]anthracene (BaA)	0,51 mg/kg	
Chrysene (CHR)	0,25 mg/kg	
Benzo[b]fluoranthene (BbFA)	0,26 mg/kg	
Benzo[i]fluoranthene (BjFA)	0,26 mg/kg	
Benzo[k]fluoranthene (BkFA)	<0,2 mg/kg	
Dibenzo[a,h]anthracene (DBAhA)	<0,2 mg/kg	
Total extractable PAH8 content	<2,25 mg/kg	
Result of the test	Pass	

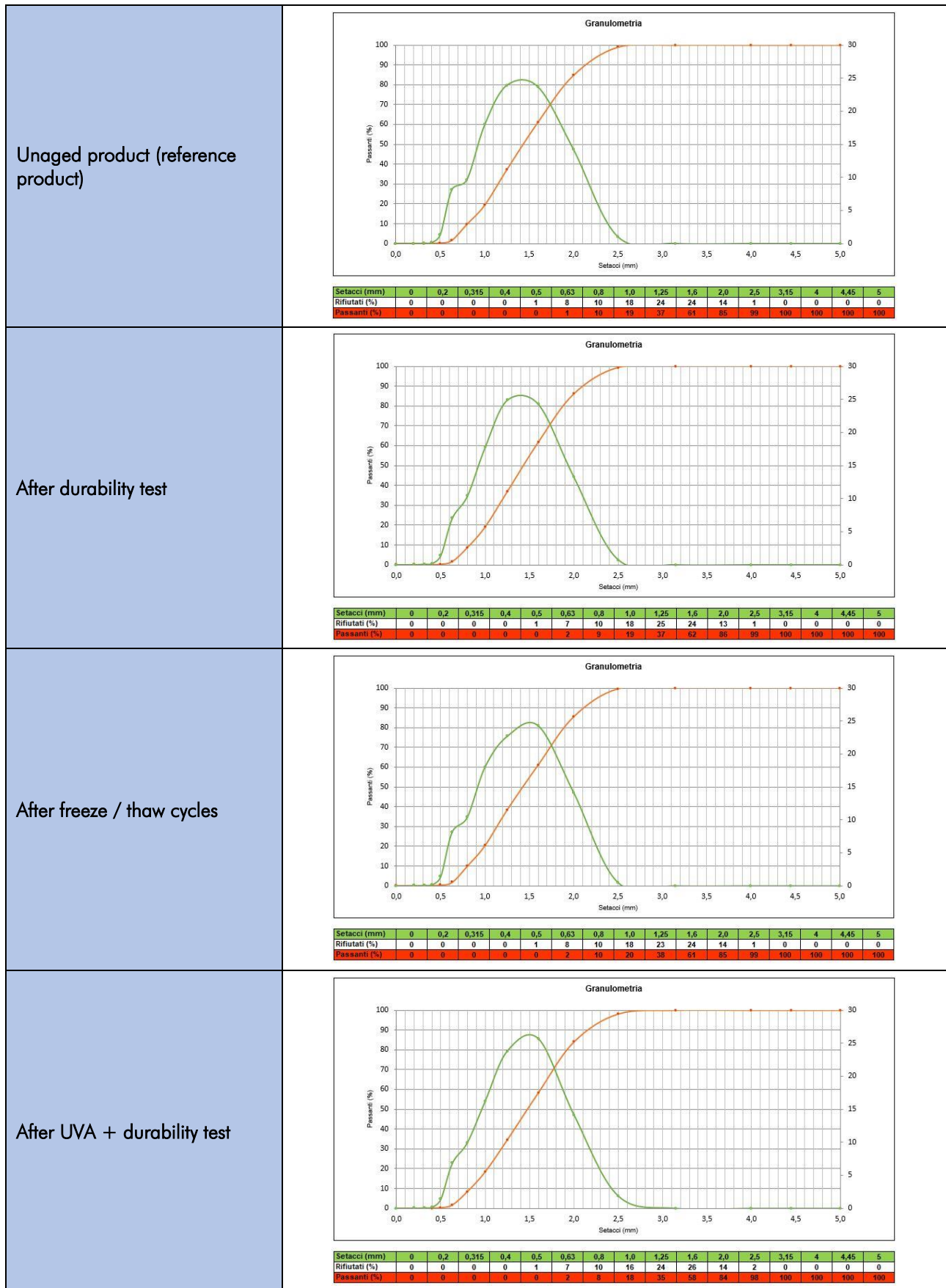
### EN 71-3:2021 – Safety of toys - Part 3: Migration of certain elements

ELEMENT	RESULTS	LIMIT (Category III)
Alluminium	4,5 mg/kg	70000 mg/kg
Antimony	<0,5 mg/kg	560 mg/kg
Arsenic	<0,5 mg/kg	47 mg/kg
Barium	<0,5 mg/kg	18750 mg/kg
Boron	<0,5 mg/kg	15000 mg/kg
Cadmium	<0,5 mg/kg	17 mg/kg
Chromium (III)	<0,5 mg/kg	460 mg/kg
Chromium (IV)	<0,2 mg/kg	0,2 mg/kg
Cobalt	<0,5 mg/kg	130 mg/kg
Copper	1,7 mg/kg	7700 mg/kg
Lead	<0,5 mg/kg	23 mg/kg
Manganese	2,2 mg/kg	15000 mg/kg
Mercury	<0,05 mg/kg	94 mg/kg
Nickel	<0,5 mg/kg	930 mg/kg
Selenium	<0,5 mg/kg	460 mg/kg
Strontium	<0,5 mg/kg	56000 mg/kg
Tin	<0,5 mg/kg	180000 mg/kg
Organic tin	<0,5 mg/kg	12 mg/kg
Zinc	55 mg/kg	46000 mg/kg
Result of the test	Pass	


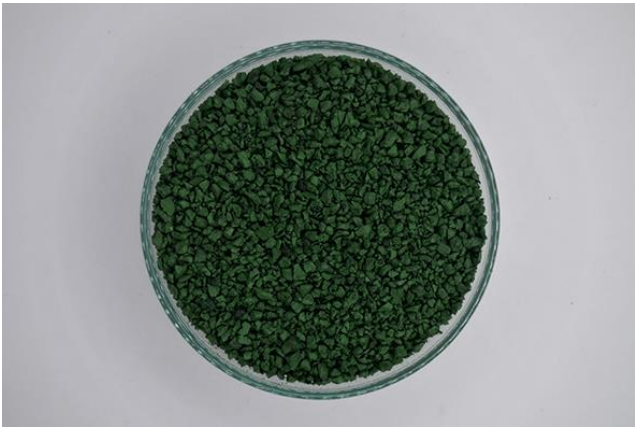


§ 9.3 Leaching of chemical elements through immersion in water

ELEMENT	RESULTS	LIMIT
Arsenic (As)	<0.003 mg/l	≤ 0,1mg/l
Barium (Ba)	<0.00005 mg/l	≤ 0,5 mg/l
Cadmium (Cd)	<0,001 mg/l	≤ 0,005 mg/l
Cobalt (Co)	<0.0004 mg/l	≤ 0,5 mg/l
Chromium VI (CrVI)	<0,008 mg/l	≤ 0,008 mg/l
Total chromium content (Cr)	<0,002 mg/l	≤ 0,05 mg/l
Molybdenum (Mo)	<0.0006 mg/l	≤ 0,5 mg/l
Nickle (Ni)	<0.005 mg/l	≤ 0,5 mg/l
Lead (Pb)	<0,005 mg/l	≤ 0,025 mg/l
Mercury (Hg)	0,00015 mg/l	≤ 0,001 mg/l
Tin (Sn)	<0,005 mg/l	≤ 0,04 mg/l
Vanadium (V)	<0.0002 mg/l	≤ 0,05 mg/l
Zinc (Zn)	0,14 mg/l	≤ 0,5 mg/l
DOC (dissolved organically bound carbon)	9,6 mg/l	≤ 50 mg/l
EOX (extractible organic halides)	<20 mg/kg	≤ 100 mg/kg
Result of the test	Pass	

## ANNEX 1: PARTICLE SIZE DISTRIBUTION GRAPH



ANNEX 2: SAMPLE PICTURES

<p>Unaged product (reference product)</p>	
<p>After durability test</p>	
<p>After freeze / thaw cycles</p>	
<p>After UVA + durability test</p>	

## STRUMENTS USED

### § 6.3 Particle size distribution

Equipment	Manufacturer	Model	Technical sheet
Vibrosifter	Matest	A059/12	STR002
Ventilated stove	Froilabo-Firlabo	AC60	STR003
Sieves	Matest	400mm	From STR240 to STR256 and STR043
Balance	Radwag	PS6000/C/1	STR043
Datalogger	Testo	177-H1	STR018

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

Equipment	Manufacturer	Model	Technical sheet
Microscope	Dino-Lite	AM7915MZT	STR037

### § 6.5 Bulk density

Equipment	Manufacturer	Model	Technical sheet
Balance	Radwag	PS6000/C/1	STR043
Alluminium cup	Labosport International	NA	STR304
Datalogger	Testo	177-H1	STR018

### § 7.1 Elastic properties

Equipment	Manufacturer	Model	Technical sheet
Dynamometer	Zwick/Roell	10kN ProLine	STR376
Load cell	Zwick/Roell	XForce P	STR375
Datalogger	Testo	177-H1	STR018

### EN 17467:2022 - Surfaces for sports areas - Test method for the determination of the residual deformation of synthetic or organic infill granules after static load

Equipment	Manufacturer	Model	Technical sheet
Dynamometer	Zwick/Roell	10kN ProLine	STR376
Load cell	Zwick/Roell	XForce P	STR375
Ventilated stove	Froilabo-Firlabo	AC60	STR003
Timer	RS Component	328-011	STR077
Datalogger	Testo	177-H1	STR018

### § 7.4 Surface temperature during exposure to infra-red energy

Equipment	Manufacturer	Model	Technical sheet
Cabinet	Labosport International	NA	STR378
Multi-channel datalogger	Graphtec	Midi ligger GL240	STR379

### § 7.5 Resistance to melting / permanent agglomeration

Equipment	Manufacturer	Model	Technical sheet
Dynamometer	Zwick/Roell	10kN ProLine	STR376
Load cell	Zwick/Roell	XForce P	STR375
Ventilated stove	Froilabo-Firlabo	AC60	STR003
Timer	RS Component	328-011	STR077
Datalogger	Testo	177-H1	STR018

**§ 7.7 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 20105-A02:1996 – Textiles - Tests for colour fastness - Grey scale for assessing change in colour**

Equipment	Manufacturer	Model	Technical sheet
Spectrophotometer	BYK-Gardner	Spectro guide	STR015
Datalogger	Testo	177-H1	STR018

**ADDITIONS, DEVIATIONS OR EXCLUSIONS FROM THE TEST METHOD**

None.

**COMMENTS RELATED TO TESTS**

None.

**ADDITIONAL INFORMATIONS**

None.



Laboratory Director  
Roberto Armeni

----- End of the Test Report -----