TEST REPORT

2021CN0918

DATE OF RECEPTION
07/09/2021

DATE TESTS
Starting: 07/09/2021
Ending: 21/09/2021

APPLICANT

KUNSHAN SUNSHINETEX NEW MATERIAL CO. LTD.
No. 417 Sanxiang Road
CN-215300 Kunshan
JIANGSU

IDENTIFICATION AND DESCRIPTION OF SAMPLES

REFERENCES
FABRIC POBFC3DY-1

According to information supplied by the customer:

Fabric reference: POBFC3DY-1
Composition and percentage: 98% Polyester, 2% Carbon and 60% Protex, 40% Cotton
Color: Fluo Yellow / Fluo Orange

TESTS CARRIED OUT

- PHOTOGRAPHY.
- PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING.
- DETERMINATION OF COORDINATES (X,Y,Y).
- COLOUR FASTNESS TO RUBBING.
- COLOUR FASTNESS TO PERSPIRATION.
- COLOUR FASTNESS TO DOMESTIC AND COMMERCIAL LAUNDERING.
- WATER VAPOUR RESISTANCE.
- WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE.
- DETERMINATION OF FLEX CRACKING AND CRACK GROWTH.
- PRE-TREATMENT*.
- HEAT RESISTANCE.
- LIMITED FLAME SPREAD.
- DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING.
- DETERMINATION OF BREAKING STRENGTH AND ELONGATION.
- DETERMINATION OF TEAR RESISTANCE.
- DETERMINING OF HEAT TRANSMISSION ON EXPOSURE TO FLAME.
- RADIANT HEAT.
- ASSESSMENT OF RESISTANCE OF MATERIALS TO MOLTEN METAL SPLASH.

AITEX - Plaza Emilio Sala, 1 - E-03801 ALCOY (Alicante) SPAIN Tel.:+34 96 554 22 00 www.aitex.es info@aitex.es

*Tests marked with * are not included within the scope of the ENAC accreditation*

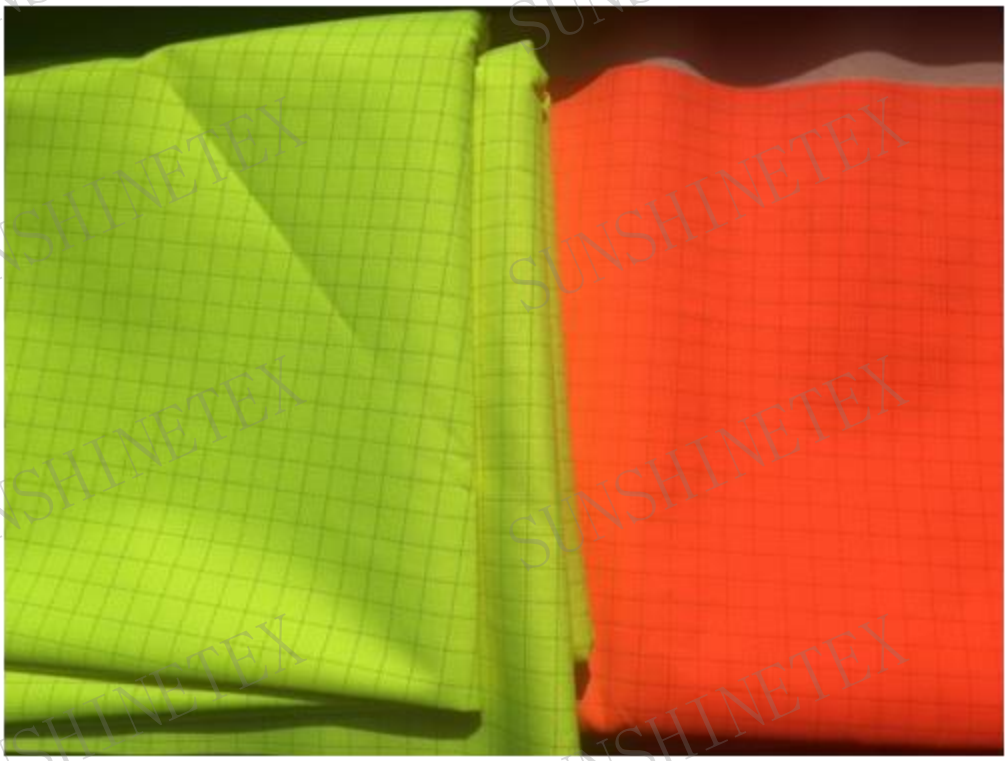
Asociación de Investigación de la Industria Textil – C.I.F.: G03182870

ENSAYOS Nº12 / LE025 Nº12 / LE427

- CONTACT HEAT.
- SMALL MOLTEN METAL SPLASHES.
- VERTICAL RESISTANCE.
- CHARGE DECAY.
- PUNCTURE RESISTANCE.
- RESISTANCE OF MATERIALS TO PENETRATION BY LIQUID.
- DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS.
- ELECTRIC ARC TEST.
- MEANING OF COLOUR FASTNESS APPRAISAL EVALUATED WITH GREY SCALE.

RESULTS

PHOTOGRAPHY



Reference

Fabric POBFC3DY-1

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RESULTS

PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING

Standard
ISO 6330:2012

Standard deviation

Reference
Sample1 Fabric POBFC3DY-1

Units 1
Equipment Wascator 13370E12
Dryer machine ELECTROLUX 13426E12

Washing procedure 4N **Washing cycles** 5

Drying procedure
F (tumble dryer)

Washing powder
ECE detergent 98 + sodium perborate + TAED

Units	Dry mass of the samples	Counterweight mass	Equipment
1	0,020 Kg	1,900 Kg of Polyester	Wascator 13370E12

Start and finish date
11/08/2021 - 12/08/2021

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RESULTS

PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING

Standard
ISO 6330:2012

Standard deviation

Reference
Sample1 Fabric POBFC3DY-1

Units 1
Equipment Wascator 13492E12
Dryer machine ELECTROLUX 13430E12

Washing procedure 4N **Washing cycles** 25

Drying procedure
F (tumble dryer)

Washing powder
ECE detergent 98 + sodium perborate + TAED

Units	Dry mass of the samples	Counterweight mass	Equipment
1	0,08 Kg	1,92 Kg of Polyester	Wascator 13492E12

Start and finish date
09/09/2021 - 14/09/2021

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RESULTS

PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING

Standard
ISO 6330:2012

Standard deviation

Reference
Sample1 Fabric POBFC3DY-1

Units 1
Equipment Wascator 13337E12
Dryer machine ELECTROLUX 13428E12

Washing procedure 4N **Washing cycles** 25

Drying procedure
F (tumble dryer)

Washing powder
ECE detergent 98 + sodium perborate + TAED

Units	Dry mass of the samples	Counterweight mass	Equipment
1	0.06 Kg	1,95 Kg of Cotton / Polyester	Wascator 13337E12

Start and finish date
09/09/2021 - 14/09/2021

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RESULTS

DETERMINATION OF COORDINATES (x,y,Y)

Standard
EN ISO 105 J01:1999
Publication CIE 15

Apparatus
Konica Minolta ((0921E06) 400nm-700nm)

Illuminant
D_{65}

Observant
2º

Measuring geometry
45/0

Specular component and UV filter
Excluded

Observation area
Small

Conditioning of samples

Initiation date	10/08/2021	**End date**	26/08/2021
Temperature	(20 ± 2) ºC	**Humidity**	(65 ± 5) %

Test date

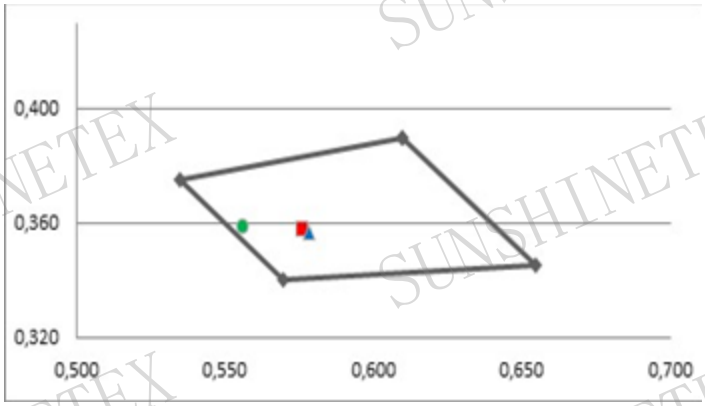
Initiation date	12/08/2021	**End date**	26/08/2021

Number of measurements
5

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RESULTS

Reference
Fabric POBFC3DY-1 (ORANGE FABRIC)



Reference	x	y	Y minimum
♦ Coordinate 1	0,610	0,390	0,40
♦ Coordinate 2	0,535	0,375	
♦ Coordinate 3	0,570	0,340	
♦ Coordinate 4	0,655	0,345	
■ Fabric POBFC3DY-1 (Original)	0,576	0,357	0,49
● Fabric POBFC3DY-1 (After exposure to Xenon light)	0,556	0,359	0,54
▲ Fabric POBFC3DY-1 (After 5 washing cycles 4N + F)	0,578	0,357	0,49
Uncertainty	0.4 %	0.5 %	1 %

REQUISITE

The chromatic coordinates must be situated within the area defined by the coordinates specified in the Standard EN ISO 20471:2013/A1:2016 and the luminance factor shall exceed 0,40 specified in the Standard EN ISO 20471:2013/A1:2016.

PASS

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RESULTS

DETERMINATION OF COORDINATES (x,y,Y)

Standard
EN ISO 105 J01:1999
Publication CIE 15

Apparatus
Konica Minolta ((0921E06) 400nm-700nm)

Illuminant
D_{65}

Observant
2º

Measuring geometry
45/0

Specular component and UV filter
Excluded

Observation area
Small

Conditioning of samples

Initiation date	15/09/2021	**End date**	21/09/2021
Temperature	(20 ± 2) ºC	**Humidity**	(65 ± 5) %

Test date

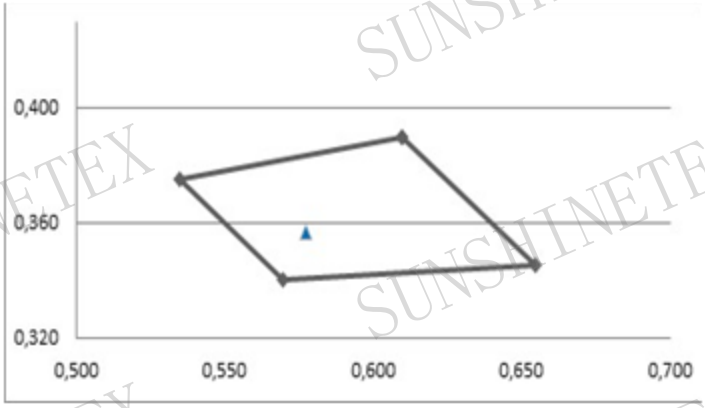
Initiation date	21/09/2021	**End date**	21/09/2021

Number of measurements
5

>>>

RESULTS

Reference
Fabric POBFC3DY-1 (ORANGE FABRIC)



Reference	x	y	Y minimum
♦ Coordinate 1	0,610	0,390	0,40
♦ Coordinate 2	0,535	0,375	
♦ Coordinate 3	0,570	0,340	
♦ Coordinate 4	0,655	0,345	
▲ Fabric POBFC3DY-1 (After 25 washing cycles 4N+F)	0,578	0,357	0,50
Uncertainty	0.4 %	0.5 %	1 %

REQUISITE

The chromatic coordinates must be situated within the area defined by the coordinates specified in the Standard EN ISO 20471:2013/A1:2016 and the luminance factor shall exceed 0,40 specified in the Standard EN ISO 20471:2013/A1:2016.

PASS

_____///

RESULTS

DETERMINATION OF COORDINATES (x,y,Y)

Standard
EN ISO 105 J01:1999
Publication CIE 15

Apparatus
Konica Minolta ((0921E06) 400nm-700nm)

Illuminant
D_{65}

Observant
2º

Measuring geometry
45/0

Specular component and UV filter
Excluded

Observation area
Small

Conditioning of samples

Initiation date	10/08/2021	**End date**	26/08/2021
Temperature	(20 ± 2) ºC	**Humidity**	(65 ± 5) %

Test date

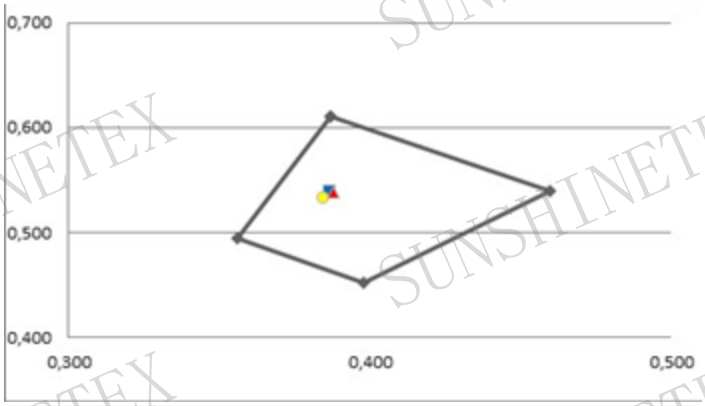
Initiation date	12/08/2021	**End date**	26/08/2021

Number of measurements
5

>>>

RESULTS

Reference
Fabric POBFC3DY-1 (YELLOW FABRIC)



Reference	x	y	Y minimum
♦ Coordinate 1	0,387	0,610	0,70
♦ Coordinate 2	0,356	0,494	
♦ Coordinate 3	0,398	0,452	
♦ Coordinate 4	0,460	0,540	
■ Fabric POBFC3DY-1 (YELLOW) (Original)	0,387	0,538	0,11
● Fabric POBFC3DY-1 (YELLOW) (After exposure to Xenon light)	0,385	0,533	1,03
▲ Fabric POBFC3DY-1 (YELLOW) (After 5 washing cycles 4N + F)	0,388	0,538	1,07
Uncertainty	0.4 %	0.5 %	1 %

REQUISITE

The chromatic coordinates must be situated within the area defined by the coordinates specified in the Standard EN ISO 20471:2013/A1:2016 and the luminance factor shall exceed 0,70 specified in the Standard EN ISO 20471:2013/A1:2016.

PASS

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RESULTS

DETERMINATION OF COORDINATES (x,y,Y)

Standard
EN ISO 105 J01:1999
Publication CIE 15

Apparatus
Konica Minolta ((0921E06) 400nm-700nm)

Illuminant
D_{65}

Observant
2º

Measuring geometry
45/0

Specular component and UV filter
Excluded

Observation area
Small

Conditioning of samples

Initiation date	15/09/2021	**End date**	21/09/2021
Temperature	(20 ± 2) ºC	**Humidity**	(65 ± 5) %

Test date

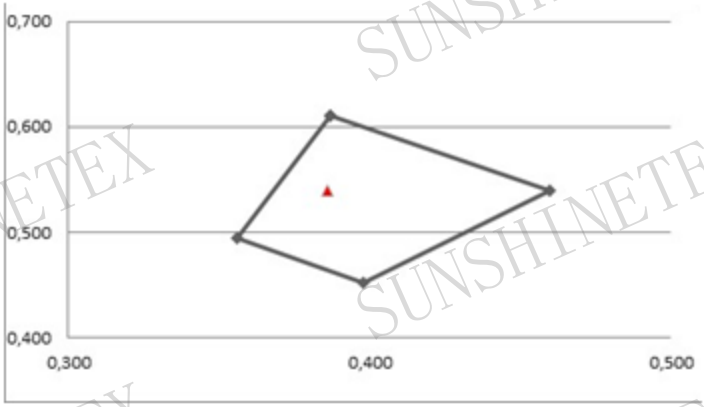
Initiation date	21/09/2021	**End date**	21/09/2021

Number of measurements
5

>>>

RESULTS

Reference
Fabric POBFC3DY-1 (YELLOW FABRIC)



Reference	x	y	Y minimum
♦ Coordinate 1	0,387	0,610	0,70
♦ Coordinate 2	0,356	0,494	
♦ Coordinate 3	0,398	0,452	
♦ Coordinate 4	0,460	0,540	
▲ Fabric POBFC3DY-1 (After 25 washing cycles 4N+F)	0,386	0,539	1,04
Uncertainty	0.4 %	0.5 %	1 %

REQUISITE

The chromatic coordinates must be situated within the area defined by the coordinates specified in the Standard EN ISO 20471:2013/A1:2016 and the luminance factor shall exceed 0,70 specified in the Standard EN ISO 20471:2013/A1:2016.

PASS

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RESULTS

COLOUR FASTNESS TO RUBBING

Standard
ISO 105-X12:2016

Apparatus
Crockmeter

Starting test date
10/08/2021

Ending test date
11/08/2021

Conditioning time
> 4 H

Atmosphere for conditioning and testing

Temperature	(20±2) ºC
Relative Humidity	(65±2) %Hr

Pin
Cylindrical

Applied force
(9 ± 0,2) N

REFERENCE	DIRECTION	DRY STAINING
Fabric POBFC3DY-1 YELLOW HV FABRIC	Warp	4-5
	Weft	4-5
Fabric POBFC3DY-1 ORANGE HV FABRIC	Warp	4-5
	Weft	4-5

REQUISITE
In accordance with Standard EN ISO 20471:2013/A1:2016, for colour fastness to rubbing, is 4, in dry rubbing.

PASS

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RESULTS

COLOUR FASTNESS TO PERSPIRATION

Standard
EN ISO 105-E04:2013

Apparatus
Perspirometer

ALKALINE SOLUTION
Aparatus Code 02022I04 (sweat basic)

REFERENCE	Fabric POBFC3DY-1 YELLOW HV		
CHANGE IN COLOUR	**STAINING**		
5	**Cotton** 4-5	**Polyester** 4-5	
REFERENCE	Fabric POBFC3DY-1 ORANGE HV		
CHANGE IN COLOUR	**STAINING**		
5	**Cotton** 4-5	**Polyester** 4-5	

>>>

RESULTS

ACID SOLUTION

Aparatus Code 02054I04 (sweat acid)

REFERENCE	Fabric POBFC3DY-1 YELLOW HV	
CHANGE IN COLOUR	**STAINING**	
5	**Cotton** 4-5	**Polyester** 4-5
REFERENCE	Fabric POBFC3DY-1 ORANGE HV	
CHANGE IN COLOUR	**STAINING**	
5	**Cotton** 4-5	**Polyester** 4-5

REQUISITE

In accordance with Standard EN ISO 20471:2013/A1:2016, for testing of colour fastness to perspiration, is 4 for degradation and 4 for staining

PASS

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RESULTS

COLOUR FASTNESS TO DOMESTIC AND COMMERCIAL LAUNDERING

Standard
EN ISO 105-C06:2010

Apparatus
Gyrowash

Test number
A1M

Temperature
40 ºC

Steel balls
10

Detergent
Standardized ECE soap reference without optical or chemical whitener

Test piece drying in forced-air circulation dryer

REFERENCE	CHANGE IN COLOUR	STAINING	
Fabric POBFC3DY-1 YELLOW HV FABRIC	5	**Cotton** 4-5	**Polyester** 4-5
Fabric POBFC3DY-1 ORANGE HV FABRIC	5	**Cotton** 4-5	**Polyester** 4-5

REQUISITE
The limit set by the Standard EN ISO 20471:2013/A1:2016 for testing of colour fastness to washing is 4-5 for degradation and 4 for staining.

PASS

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RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard
EN ISO 1421:2016, Method 1

Apparatus
INSTRON Dynamometer

Conditioning date 10/08/2021 **Test date** 17/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** 65±5

Nº of specimens
Tested 5 for each direction **Rejected** 0

Gauge length
200 mm

Test velocity
100 mm/min

Mounting Laxo

State of the specimens
Conditioned

Fabric POBFC3DY-1

Direction	Maximum average load (N)		C.V. (%)	Average elongation (%)		C.V. (%)
Lengthwise	689 767 824 833 749	773	8.0	15.0 17.0 18.0 18.0 16.0	17.0	7.0
Crosswise	602 647 711 700 662	665	7.0	20.0 21.0 22.0 22.0 21.0	21.0	5.0

Remark

The test procedure described in the two versions of the Standard (EN ISO 1421:1998 y EN ISO1421:2016) is the same

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RESULTS

REQUISITE ACCORDING TO STANDARD EN 343:2019

The material must resist a breaking load in both directions ≥ 450 N.For materials with an elongation of more than 50% this requirement is not applicable.

PASS

REQUISITE ACCORDING TO STANDARD EN ISO 20471:2013/A1:2016

The material must resist a breaking load in both directions ≥ 100 N.For materials with an elongation of more than 50% this requirement is not applicable.

PASS

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RESULTS

DETERMINATION OF TEAR RESISTANCE

Standard
EN ISO 4674-1:2016

Test procedure
Method A

Apparatus
INSTRON Dynamometer

Conditioning date 10/08/2021 **Test date** 06/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±5) %

Nº of specimens
Tested 5 for each direction **Rejected** 0

State of the specimens
Conditioned

Reference
Fabric POBFC3DY-1

Tear	Average load (N)		C.V. (%)
Warp	64 64 57 60 64	62	5.4
Weft	55 46 48 51 45	49	8.7

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RESULTS

Remark

The relative expanded uncertainty of Tear resistance is ±7% assay value of the measured, for a probability of coverage of 95%.

The test procedure described in the two versions of the Standard (EN ISO 4674:2003 and EN ISO 4674:2016) is the same.

REQUISITE ACCORDING TO STANDARD EN ISO 20471:2013 POINT 5.5.3

The external material must resist a determination of tear resistance in both directions ≥ 20 N.

PASS

REQUISITE ACCORDING TO STANDARD EN 343:2019

The external material must resist a determination of tear resistance in both directions ≥ 20 N.

PASS

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RESULTS

WATER VAPOUR RESISTANCE

Standard

EN ISO 11092:2014

Date test

21/09/2021

Uncertainty of the measurement

± 7% of the result for a coverage factor of K=2 (95%).

Observation or deviation from the Standard

Apparatus

12060IE05

Test atmosphere

Temperature	(35.0 ± 0.5) ºC
Relative humidity	(40 ± 3) %

Conditioning

Temperature	(35.0 ± 0.5) ºC
Relative humidity	(40 ± 3) %
Time	24 hours

Sample description

Yellow/orange laminate fabric

Disposition test specimens

The inner face is in contact to the measurement surface.

Pre-treatment

RESULTS

Test results

Reference	Specimen	Water vapour resistance R_{et} (m^2Pa/W)
Fabric POBFC3DY-1	**Specimen 1**	36,50
	Specimen 2	35,85
	Specimen 3	36,57
	Average	**36,31**

According to the requirements of standard EN 343:2019, water vapour resistance of all layers of the garment shall be in accordance with the following table:

CLASS 1	CLASS 2	CLASS 3	CLASS 4
$40 < R_{et}$	$25 < R_{et} \leq 40$	$15 < R_{et} \leq 25$	$15 \geq R_{et}$

CLASS 2

RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard
EN 20811:1992 (Obsolete)

Apparatus
Hydrostatic Head Tester

Conditioning date 10/08/2021 **Test date** 12/08/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Water temperature
20 ºC

Rate of increase of water pressure
10cmH_2O/min ((980±50) Pa/min)
The test equipment applies the water pressure to the exposed surface from below.

Surface exposed
External side

Reference
Fabric POBFC3DY-1

Specimen	Pressure (cmH_2O)	Pressure (Pa)	Less Pressure
1	> 200	> 20000	> 20000
2	> 200	> 20000	
3	> 200	> 20000	
4	> 200	> 20000	

Remark
The edition of the standard used, does not correspond to the latest version released.

REQUISITE ACCORDING TO STANDARD EN 343:2019

	CLASS 1	CLASS 2	CLASS 3	CLASS 4
Before pre-treatment	≥ 8000 Pa	---	---	---

CLASS 1

///

RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard
EN 20811:1992 (Obsolete)

Apparatus
Hydrostatic Head Tester

Conditioning date 12/08/2021 **Test date** 14/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Water temperature
20 ºC

Rate of increase of water pressure
10cmH_2O/min ((980±50) Pa/min)
The test equipment applies the water pressure to the exposed surface from below.

Surface exposed
External side

Previous treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference
Fabric POBFC3DY-1

Specimen	Pressure (cmH_2O)	Pressure (Pa)	Less Pressure
1	> 200	> 20000	> 20000
2	> 200	> 20000	
3	> 200	> 20000	
4	> 200	> 20000	

Remark
The edition of the standard used, does not correspond to the latest version released.

REQUISITE ACCORDING TO STANDARD 343:2019

	CLASS 1	CLASS 2	CLASS 3	CLASS 4
After pre-treatment	---	≥ 8000 Pa	≥ 13000 Pa	≥ 20000 Pa

CLASS 4

///

RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard
EN 20811:1992 (Obsolete)

Apparatus
Hydrostatic Head Tester

Conditioning date 10/08/2021 **Test date** 30/08/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Water temperature
20 ºC

Rate of increase of water pressure
10cmH_2O/min ((980±50) Pa/min)
The test equipment applies the water pressure to the exposed surface from below.

Surface exposed
External side

Abrasion Pre-treatment
According to standard EN 343:2019 punto 5.3

Reference
Fabric POBFC3DY-1

Specimen	Pressure (cmH_2O)	Pressure (Pa)	Less Pressure
1	> 200	> 20000	> 20000
2	> 200	> 20000	
3	> 200	> 20000	
4	> 200	> 20000	

Remark
The edition of the standard used, does not correspond to the latest version released.

REQUISITE ACCORDING TO STANDARD EN 343:2019

	CLASS 1	CLASS 2	CLASS 3	CLASS 4
After pre-treatment	---	≥ 8000 Pa	≥ 13000 Pa	≥ 20000 Pa

CLASS 4

///

RESULTS

DETERMINATION OF FLEX CRACKING AND CRACK GROWTH

Standard
ISO 7854:1997

Test date
11/08/2021

Used apparatus
Crumpleflex equipment

Reference
Fabric POBFC3DY-1

Test performance

Specimens	Direction	Flex cycles
4	Warp and Weft	9,000

Visual inspection after flex cycles

Material damage	No visible damage
Description of the damage	---
Cracking	No cracking
a. Depht of cracking b. Number of cracks c. Lenght of cracks	--- --- ---
Delamination	Doesn´t exist delamination

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RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard
EN 20811:1992 (Obsolete)

Apparatus
Hydrostatic Head Tester

Conditioning date 11/08/2021 **Test date** 14/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Water temperature
20 ºC

Rate of increase of water pressure
10cmH_2O/min ((980±50) Pa/min)
The test equipment applies the water pressure to the exposed surface from below.

Surface exposed
External side

Pre-treatment Bending
According to standard EN ISO 7854:1997 Method C

Reference
Fabric POBFC3DY-1

Specimen	Pressure (cmH_2O)	Pressure (Pa)	Less Pressure
1	> 200	> 20000	> 20000
2	> 200	> 20000	
3	> 200	> 20000	
4	> 200	> 20000	

Remark
The edition of the standard used, does not correspond to the latest version released.

REQUISITE ACCORDING TO STANDARD EN 343:2019

	CLASS 1	CLASS 2	CLASS 3	CLASS 4
After pre-treatment	---	≥ 8000 Pa	≥ 13000 Pa	≥ 20000 Pa

CLASS 4

_____///

RESULTS

PRE-TREATMENT*

Reference
Fabric POBFC3DY-1

Test time
60 minutes

Used reactives
Oil, Fuel.

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RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard
EN 20811:1992 (Obsolete)

Apparatus
Hydrostatic Head Tester

Conditioning date 07/09/2021 **Test date** 08/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Water temperature
20 ºC

Rate of increase of water pressure
10cmH_2O/min ((980±50) Pa/min)
The test equipment applies the water pressure to the exposed surface from below.

Surface exposed
External side

Pre-treatment with Fuel oil and Oils
According EN 343:2019 point 5.5

Reference
Fabric POBFC3DY-1

Specimen	Pressure (cmH_2O)	Pressure (Pa)	Less Pressure
Fuel	> 200	> 20000	> 20000
Fuel	> 200	> 20000	
Aceite	> 200	> 20000	
Aceite	> 200	> 20000	

Remark
The edition of the standard used, does not correspond to the latest version released.

REQUISITE ACCORDING TO STANDARD EN 343:2019

	CLASS 1	CLASS 2	CLASS 3	CLASS 4
After pre-treatment	---	≥ 8000 Pa	≥ 13000 Pa	≥ 20000 Pa

CLASS 4

///

RESULTS

HEAT RESISTANCE

Standard
ISO 17493:2016

Apparatus
Air stove

Temperature
(180 ± 5) ºC

Length of the test
5 min (+0,15/-0) min

Deviation from the Standard

Pre-Treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Tested material
Fluorescent orange woven fabric and white knitted fabric.

Reference
Fabric POBFC3DY-1

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RESULTS

Fabric			
Flame	Melting	Direction	Shrink(-) / Elongation(+)
No	No	Warp	-2,9 %
		Weft	-3,8 %
No	No	Warp	-3,2 %
		Weft	-3,6 %
No	No	Warp	-2,9 %
		Weft	-3,4 %

Remark

The uncertainty of the assay of Heat Resistance is ±12% of the value measured, for a coverage factor of K=2 [95%].

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015	**PASS**

PERFORMANCE LEVEL ACCORDING TO IEC 61482-2:2018	**PASS**

Requirements to meet according to EN ISO 11612:2015 - IEC 61482-2:2018, point 4.3.1

No layer can ignite
No layer can melt
No layer shrinks more than 5%

_____///

RESULTS

LIMITED FLAME SPREAD

Standard
EN ISO 15025:2016 (Method A)

Apparatus
Equipment for determination of limited flame spread 13008IE12

Original and after pre-treatment test date
18/08/2021 - 18/08/2021

Conditioned
24h in indoor ambient conditions at (20 ± 2) ºC and (65 ± 5) % RH

Original and after pre-treatment ambient conditions test
22,5ºC and 56,1% RH - 22,5ºC and 58,1% RH

Gas used
Propane gas

Deviation from the standard

Face exposed to the flame
Outer surface

Tested material
Fluorescent orange woven fabric and white knitted fabric.

Test uncertainty
The uncertainty of the assay of limited flame spread is ±2% of the value measured, for a coverage factor of K=2 (95%).

Reference
Fabric POBFC3DY-1

>>>

RESULTS

Pre-Treatment As received

Specimen	1	2	3	4	5	6
Direction		Warp			Weft	
Flaming to top or either side edge	No	No	No	No	No	No
After flame time (s)	0	0	0	0	0	0
Afterglow time (s)	0	0	0	0	0	0
Melting	No	No	No	No	No	No
Loose waste	No	No	No	No	No	No
Inflammation of the filter paper detached from waste	No	No	No	No	No	No
Hole formation	No	No	No	No	No	No

Pre-Treatment 5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Specimen	1	2	3	4	5	6
Direction		Warp			Weft	
Flaming to top or either side edge	No	No	No	No	No	No
After flame time (s)	0	0	0	0	0	0
Afterglow time (s)	0	0	0	0	0	0
Melting	No	No	No	No	No	No
Loose waste	No	No	No	No	No	No
Inflammation of the filter paper detached from waste	No	No	No	No	No	No
Hole formation	No	No	No	No	No	No

>>>

RESULTS

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015	A1

PERFORMANCE LEVEL ACCORDING TO EN ISO 11611:2015	A1

PERFORMANCE LEVEL ACCORDING IEC 61482-2:2018	PASS

Requisites to be met according to standard EN ISO 11612:2015 and EN ISO 11611:2015

a) No specimen must ignite toward the top or toward the edges
b) No specimen shall give hole formation of 5 mm or greater in any direction, except for an interlining that is used for specific protection other than heat and flame protection
c) No specimen shall give flaming or molten debris
d) The afterflame time is ≤ 2 s
e) The afterglow time is ≤ 2 s

Requisites to be met according to IEC 61482-2:2018, point 4.3.3.2. Table 1 – Single-layer material

a) No specimen shall permit any part of the lowest boundary of any flame to reach the upper or either vertical edge.
b) No specimen shall give flaming or molten debris.
c) No specimen shall give hole formation of 5 mm or greater in any direction.
d) The afterglow time is ≤ 2 s
e) The afterflame time is ≤ 2 s

_____///

RESULTS

LIMITED FLAME SPREAD

Standard

EN ISO 15025:2016 (Method B)

Apparatus

Equipment for determination of limited flame spread 13008IE12

Original and after pre-treatment test date

25/08/2021 - 24/08/2021

Conditioned

24h in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Original and after pre-treatment ambient conditions test

23,8ºC and 52,4% HR - 23,2ºC and 54,0% HR

Gas used

Propane gas

Deviation from the standard

Face exposed to the flame

Edge: Hemmed fabric specimen

Tested material

Fluorescent orange woven fabric and white knitted fabric in the inner face

Test uncertainty

The uncertainty of the assay of limited flame spread is ±2% of the value measured, for a coverage factor of K=2 (95%).

Reference

Fabric POBFC3DY-1

>>>

RESULTS

Pre-Treatment As received

Specimen	1	2	3	4	5	6
Direction		Warp			Weft	
Flaming to top or either side edge	No	No	No	No	No	No
Afterflame time (s)	0	0	0	0	0	0
Afterglow time (s)	0	0	0	0	0	0
Melting	No	No	No	No	No	No
Loose waste	No	No	No	No	No	No
Inflammation of the filter paper detached from waste	No	No	No	No	No	No

Pre-Treatment 5 washing cycles at 40ºC, according to the standard ISO 6330:2012, method 4N and F drying (tumble dryer)

Specimen	1	2	3	4	5	6
Direction		Warp			Weft	
Flaming to top or either side edge	No	No	No	No	No	No
Afterflame time (s)	0	0	0	0	0	0
Afterglow time (s)	0	0	0	0	0	0
Melting	No	No	No	No	No	No
Loose waste	No	No	No	No	No	No
Inflammation of the filter paper detached from waste	No	No	No	No	No	No

PERFORMANCE LEVEL ACCORDING EN ISO 11612:2015	**A2**

PERFORMANCE LEVEL ACCORDING EN ISO 11611:2015	**A2**

Requisites to be met according to EN ISO 11612:2015 and EN ISO 11611:2015

a) No specimen shall give flaming to top or either side edge
b) No specimen shall give flaming or molten debris
c)The afterflame time is ≤ 2 s
d) The afterglow time is ≤ 2 s

_____///

RESULTS

DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING

Standard
EN ISO 5077:2008

Standard deviation

Preparation, marking and measuring of fabric specimens according to EN ISO 3759:2011
Starting test date 10/08/2021 **Ending test date** 18/08/2021

Washing procedure
4N (T^a = 40 ± 3ºC; Total dry load test samples and the counterweight 2 ± 0.1 Kg) according to ISO 6330:2012

Used apparatus
Wascator type A-Horizontal drum, front loading (13474E05)

Detergent
98 ECE reference detergent without optical brightener.

Counterweight
Type III - 100% polyester

Number of washing cycles
5

Dryer type
A3

Procedure F – Tumble dry(13475E05)

Uncertainty of test (% of the measured value)
± 0.5 %

Tested material
Fluorescent orange woven fabric

Reference	Specimen	Direction	Dimensional change (%)
Fabric POBFC3DY-1	1	Warp	-1,5
		Weft	-0,5

REMARK
Negative dimensional change indicates shrinkage
Positive dimensional change indicates lengthening

>>>

RESULTADOS / *RESULTS*

REQUISITE

In accordance with the Standard EN ISO 20471:2013/A1:2016, the dimensional change of knitted fabrics shall not exceed ±5%, both in width Crosswise and in length Lengthwise.

PASS

REQUISITE

In accordance with the Standard EN ISO 11612:2015, the dimensional change of knitted fabrics shall not exceed ±5%, both in width Crosswise and in length Lengthwise.

PASS

REQUISITE

In accordance with the Standard EN ISO 11611:2015, the dimensional change of knitted fabrics shall not exceed ±5%, both in width Crosswise and in length Lengthwise.

PASS

REQUISITE

In accordance with the Standard EN 343:2019, the dimensional change of knitted fabrics shall not exceed ±5%, both in width Crosswise and in length Lengthwise.

PASS

REQUISITE

In accordance with the Standard IEC 61482-2:2018, the dimensional change of knitted fabrics shall not exceed ±5%, both in width Crosswise and in length Lengthwise.

PASS

_____///

RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard
EN ISO 13934-1:2013

Apparatus
INSTRON Dynamometer

Conditioning date 12/08/2021 **Test date** 17/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Gauge length
Warp 200 mm. **Weft** 200 mm.

Test velocity
Warp 100 mm/min **Weft** 100 mm/min

Pretension
Warp 5 N **Weft** 5 N

Nº of specimens
Tested 5 for each direction **Rejected** 0
State of the specimens Conditioned

Previous treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference
Fabric POBFC3DY-1

Direction	Maximum average load (N)	C.V. (%)	Average elongation (%)	C.V. (%)
Warp	820 740 810 790 760 820	4.8	21 20 20 20 21 20	4.0
Weft	670 650 600 620 680 480	13.0	20 20 18 19 20 15	11.0

>>>

RESULTADOS / *RESULTS*

Remark

The relative expanded uncertainty of Tensile strength resistance is ±5% assay value of the measured, for a probability of coverage of 95%.

The test procedure described in the two versions of the Standard (EN ISO 13934-1:1999 and EN ISO 13934-1:2013) is the same.

REQUISITE ACCORDING TO STANDARD EN ISO 11611:2015

The material must resist a breaking load in both directions ≥ 400 N.

PASS

REQUISITE ACCORDING TO STANDARD EN ISO 11612:2015

The external material must resist a breaking load in both directions ≥ 300 N.

PASS

REQUISITE ACCORDING TO STANDARD IEC 61482-2:2018

The woven or laminated outer material must have a tensile strength of at least 400 N for a weight greater than 220 g/m^2 or at least 250 N for a weight of 220 g/m^2 or less, in both directions

PASS

REQUISITE ACCORDING TO STANDARD EN 13034:2005+A1:2009

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>30N	> 60N	> 100N	> 250N	> 500N	> 1000N

LEVEL 4

_____///

RESULTS

DETERMINATION OF TEAR RESISTANCE

Standard
EN ISO 13937-2:2000

Apparatus
INSTRON Dynamometer

Conditioning date 13/08/2021 **Test date** 17/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±5) %

Nº of specimens
Tested 5 for each direction **Rejected** 0

The calculation of averages has been made
For electronic device

Previous treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference
Fabric POBFC3DY-1

Tear	Average load (N)	C.V. (%)
Warp	41 40 38 38 36 38	4.8
Weft	27 29 24 26 25 25	7.3

Remark
The relative expanded uncertainty of Tear resistance is ±3.9% assay value of the measured, for a probability of coverage of 95%.

>>>

RESULTS

REQUISITE ACCORDING TO STANDARD EN ISO 11611:2015

The material must resist a breaking load in both directions ≥ 15 N.

PASS

REQUISITE ACCORDING TO STANDARD EN ISO 11612:2015

The material must resist a breaking load in both directions ≥ 10 N.

PASS

REQUISITE ACCORDING TO STANDARD IEC 61482-2:2018

The woven outer material shall have a tear resistance of at least 15 N for weight higher than 220 g/m^2 or at least 10 N for a weight of 220 g/m^2 or less, in both directions

PASS

_____///

RESULTS

DETERMINING OF HEAT TRANSMISSION ON EXPOSURE TO FLAME

Standard
ISO 9151:2016

Apparatus
Convective heat

Heat flux density
79,47 kW/m^2

Pre-Treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F (tumble dry)

Conditioned
24h in indoor ambient conditions at (20 ± 2) ºC and (65 ± 5) % RH

Ambient conditions test
22,8 ºC and 51,9 % RH

Deviation from the Standard

Test date
19/08/2021

Tested material
Fluorescent orange woven fabric and white knitted fabric.

>>>

RESULTS

Reference	Specimen	Range values(s) HTI[a] 12	Range values(s) HTI[a] 24
Fabric POBFC3DY-1	1	5,9	8,0
	2	5,9	8,1
	3	5,5	7,5
	Classification value	**5,5**	**7,5**
	Average	**5,8**	**7,9**

Remark

The uncertainty of the assay of Convective heat is ±4% of the value measured, for a coverage factor of K=2 (95%).

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015	B1

Results in according with standard EN ISO 11612:2015

Performance level	Range of HTI[a] 24 values (s) Minimum Maximum
B1	4,00 < 10,0
B2	10,0 < 20,0
B3	20,0

[a]: Heat transfer index, as defined in ISO 9151:1995

These results have been obtained according by a test method intended solely to rank the material and are not necessarily applicable to actual fire conditions.

_____///

RESULTS

RADIANT HEAT

Standard
EN ISO 6942:2002, method B

Apparatus
Equipment for the determination of radiant heat

Heat flux density
20,06 kW/m^2

Pre-Treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Conditioned
24h in indoor ambient conditions at (20 ± 2) ºC and (65 ± 5) % RH

Ambient conditions test
26,8 ºC and 48,4 % HR

Deviation from the Standard

Test date
16/08/2021

Tested material
Fluorescent orange woven fabric and white knitted fabric.

>>>

RESULTS

Reference	Fabric POBFC3DY-1		
Specimen	Heat transfer index RHTI 12(s)	Heat transfer index RHTI 24(s)	TF(%)
1	10,0	17,0	47,1
2	9,7	16,7	47,1
3	9,9	17,0	46,4
Classification value	**9,7**	**16,7**	**47,1**
Average	**9,9**	**16,9**	**46,9**

Remark

The uncertainty of the assay of Radiant heat is ±3,5% of the value measured, for a coverage factor of K=2 (95%).

PERFORMANCE LEVEL ACCORDANCE WITH STANDARD EN ISO 11612:2015	C1

PERFORMANCE LEVEL ACCORDING TO STANDARD EN ISO 11611:2015	CLASS 2

Results in accordance with Standard EN ISO 11612:2015

Performance level	Range of RHTI[a] 24 values
C1	Minimum Maximum 7,0 < 20,0
C2	20,0 < 50,0
C3	50,0 < 95,0
C4	95,0

Heat transfer index, as defined in EN ISO 6942:2002

Results in accordance with Standard EN ISO 11611:2015

Heat transfer index	Class 1	Class 2
RHTI 24	≥ 7 s	≥ 16 s

_____///

RESULTS

ASSESSMENT OF RESISTANCE OF MATERIALS TO MOLTEN METAL SPLASH

Standard
EN ISO 9185:2007

Apparatus
Equipment for molten metal splashes test

Metal
Iron

Pouring temperature
(1400±20) ºC

Pouring angle
(75±1) º

Pouring height
(225±5) mm.

Test date
19/08/2021

Pre-Treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Deviation from the Standard

Tested material
Fluorescent orange woven fabric and white knitted fabric.

Reference			Fabric POBFC3DY-1		
Mass of metal used (g)	**Mass of metal pouring (g)**	**Ignition**	**Puncture**	**Metal adhered to fabric**	**Assessment of PVC film**
202	202	No	No	No	Not Damaged
202	202	No	No	No	Not Damaged
202	202	No	No	No	Not Damaged
203	203	No	No	No	Not Damaged

>>>

RESULTS

Note

The uncertainty of the assay of resistance to molten splashes is ±1% of the value measured, for a coverage factor of K=2 (95%).

PERFORMANCE LEVEL ACCORDING WITH STANDARD EN ISO 11612:2015	E3

Results interpretation according to EN ISO 11612:2015

Performance levels	Molten iron	
	Min.	Max.
E1	60	< 120
E2	120	< 200
E3	200	

///

RESULTS

CONTACT HEAT

Standard
EN ISO 12127-1:2015

Apparatus
ÖTI CONTACT HEAT PROTECTION TESTER

Conditioned
24h in indoor ambient conditions at (20 ± 2) ºC and (65 ± 5) % RH

Ambient conditions test
24,5 ºC and 42,5 % RH

Pretreatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Deviation from the Standard

Test date
16/08/2021

Tested material
Fluorescent orange woven fabric and white knitted fabric.

Reference
Fabric POBFC3DY-1

>>>

RESULTS

Specimen	Contact temperature (ºC)	Threshold time (s)
1	250	11,34
2	250	11,48
3	250	11,34
Classification value	**250**	**11,3**
Average	**250**	**11,4**

Test uncertainty

The uncertainty of the assay of contact heat test is ±2% of the value obtained for a coverage factor of K=2 (95%).

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015 F2

Requirements according to standard EN ISO 11612:2015

Performance levels	Threshold time (s)
F1	Minimum 5,00 Max. < 10,0
F2	10,0 < 15,0
F3	15,0

///

RESULTS

SMALL MOLTEN METAL SPLASHES

Standard
ISO 9150:1988

Apparatus
Equipment for small molten metal splashes

Conditioned
24h in indoor ambient conditions at (20 ± 2) ºC and (65 ± 5) % RH

Pre-Treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Ambient conditions test
21,0 ºC and 51,0 % RH

Test date
14/09/2021

Tested material
Fluorescent orange woven fabric and white knitted fabric.

Weight of material as tested
307 g/m^2

Observations

Deviation from the Standard

>>>

RESULTS

Referencia	Specimen	Nº of drops
Fabric POBFC3DY-1	1	33
	2	31
	3	30
	4	30
	5	34
	6	34
	7	35
	8	32
	9	32
	10	33
	Clasification value	**30**
	Average	**32**

Remark

The uncertainty of the assay of resistance to molten splashes is ±7% of the value measured, for a coverage factor of K=2 (95%).

ACCORDING TO STANDARD EN ISO 11611:2015	CLASS 2

Remark

The Nº of drops is the necessary to increase 40ºC in the back side of the material

Requirements to be met according EN ISO 11611:2015 point 6.8

Class 1	Minimum 15 drops
Class 2	Minimum 25 drops

The specimen must not ignite

_____///

RESULTS

VERTICAL RESISTANCE

Standard
EN 1149-2:1997

Conditioned
24h in indoor ambient conditions at (20 ± 2) ºC and (85 ± 5) % RH according to standard EN ISO 11611:2015

Ambient conditions test
20,0 ºC and 84,8 % RH

Radius of the inner electrode
50,4 mm

Inner radius of the outer electrode
69,2 mm

Outer radius of the outer electrode
89,0 mm

Contact pressure
2,25 kPa

Potential applied
100 V

Current measurement after
15 s

Test date
24/08/2021

Tested material
Fluorescent orange woven fabric and white knitted fabric in the inner face.

>>>

RESULTS

Deviation from the standard

Pre-Treatment

5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference

Fabric POBFC3DY-1

Specimen	Vertical Resistance (Ohm)
1	$2{,}31 \cdot 10^{8}$
2	$3{,}11 \cdot 10^{8}$
3	$9{,}00 \cdot 10^{8}$
4	$7{,}87 \cdot 10^{8}$
5	$7{,}14 \cdot 10^{8}$
Classification value	**$2{,}31 \cdot 10^{8}$**
Average (Ohm)	**$5{,}89 \cdot 10^{8}$**

The uncertainty of the assay of Vertical Resistance is ±20% of the value measured, for a coverage factor of K=2 (95%)

ACCORDING TO STANDARD EN ISO 11611:2015 PASS

REQUISITE

According to the Standard EN ISO 11611:2015, the vertical electric resistance must be upper than $10^{5}\Omega$, under an applied potential of (100 ± 5) V

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RESULTS

CHARGE DECAY

Standard
EN 1149-3:2004 (Method 2, induction charging)

Conditioned
24h environmental conditions to (23 ± 1) ºC and (25 ± 5) % RH

Ambient conditions test
23,0 ºC and 25,3 % RH

Test method used
Induction charge (Test method 2)

Potential applied
(1200 ± 50) V in 30 µs

Time measurement
30 s

Deviation from the Standard

Tested material
Fluorescent orange woven fabric and white knitted fabric.

Measurement uncertainty
Shielding factor: ± 0,02
t_{50}: ± 0,01 s

>>>

RESULTS

Pre-Treatment

5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference	Fabric POBFC3DY-1	
Specimen	**Decay half time (s)** t_{50}	**Shielding factor (units)** **S**
1	< 0,01	0,96
2	< 0,01	0,96
3	< 0,01	0,95
Average	**< 0,01**	**0,96**

ACCORDING TO STANDARD EN 1149-5:2018	**PASS**

ACCEPTANCE CRITERION ACCORDING TO EN 1149-3:2004 AND EN 1149-5:2018, METHOD INDUCTION CHARGING

t_{50}< 4s or S > 0,2

Where, t_{50}= decay half time
S = shielding factor

Start and finish test date

12/08/2021 - 17/08/2021

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RESULTS

DETERMINATION OF TEAR RESISTANCE

Standard
EN ISO 9073-4:1997

Apparatus
INSTRON Dynamometer

Conditioning date 13/08/2021 **Test date** 06/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±2) %

Nº of specimens
Tested 5 for each direction **Rejected** 0

The calculation of averages has been made
For electronic device

Previous treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference
Fabric POBFC3DY-1

Tear	Average load (N)		C.V. (%)
Lengthwise	41.22 48.96 48.78 49.06 45.36	46.68	7.33
Crosswise	50.34 49.49 49.83 51.37 46.12	49.43	4.01

REQUISITE ACCORDING TO STANDARD EN 13034:2005+A1:2009

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>10N	> 20N	> 40N	> 60N	> 100N	> 150N

PERFORMANCE LEVEL 3

>>>

RESULTS

PUNCTURE RESISTANCE

Standard
EN 863:1995

Apparatus
INSTRON Dynamometer

Conditioning date 12/08/2021 **Test date** 17/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±5) %

Type of fabric
Woven fabric

Previous treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference	Maximum force (N)	Average resistance (N)
Fabric POBFC3DY-1	54,05 45,29 45,89 38,57 49,43	46,65

Remark
The relative expanded uncertainty of puncture resistance is ±11% assay value of the measured, for a probability of coverage of 95%.

REQUISITE ACCORDING TO STANDARD EN 13034:2005+A1:2009

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>5N	> 10N	> 50N	> 100N	> 150N	> 250N

PERFORMANCE LEVEL 2

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RESULTS

RESISTANCE OF MATERIALS TO PENETRATION BY LIQUID

Standard

EN ISO 6530:2005, EN 13034:2005+A1:2009

Atmosphere for conditioning and testing

Temperature (20±2) ºC **Relative Humidity (RH)** (65±5) %

Flow

10 ml in 10 s

Mass per unit area approximate of the sample tested

Does not provided by the customer

Pre-treatment

5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N; and F

Reference

Fabric POBFC3DY-1

Measurement uncertainty

Test liquid	Penetration index (%)[1]	Repellency index (%)[1]
Sulphuric Acid 30%	±0.3	±0.3
Sodium Hydroxide 10%	±1.1	±1.1
O-Xylene	±5.0	±7.8
1-Butanol	±5.8	±5.4

[1] On the measured value

Material tested

Laminated woven fabric, orange colour (inner face of knitted fabric, white colour)

Test date

26/08/2021 – 30/08/2021

>>>

RESULTS

1. Test liquid Sulphuric Acid 30%
Trade name SCHARLAU (Ref: AC20791000)
Boiling point 336.85 ºC
Evaporative losses prevision None

Direction	Specimen	Penetration index (%)		Repellency index (%)		Absorption index (%)	
Warp	1	0.0		99.6		0.4	
	2	0.0	0.0	99.7	99.6	0.3	0.4
	3	0.0		99.7		0.3	
Weft	1	0.0		99.3		0.7	
	2	0.0	0.0	99.4	99.3	0.6	0.7
	3	0.0		99.3		0.7	

CLASSIFICATION ACCORDING TO EN 14325:2004
Class according to repellency index: **3**
Class according to penetration index: **3**

2. Test liquid Sodium Hydroxide 10 %
Trade name MERCK (Ref: 1055881000)
Boiling point 1390 ºC
Evaporative losses prevision None

Direction	Specimen	Penetration index (%)		Repellency index (%)		Absorption index (%)	
Warp	1	0.0		99.9		0.1	
	2	0.0	0.0	99.9	99.9	0.1	0.1
	3	0.0		99.9		0.1	
Weft	1	0.0		99.4		0.6	
	2	0.0	0.0	99.9	99.4	0.1	0.6
	3	0.0		99.8		0.2	

CLASSIFICATION ACCORDING TO EN 14325:2004
Class according to repellency index: **3**
Class according to penetration index: **3**

>>>

RESULTS

3. Test liquid O-Xylene
Trade name SCHARLAU (Ref: XI00252500)
Boiling point 139 ºC
Evaporative losses prevision None

Direction	Specimen	Penetration index (%)		Repellency index (%)		Absorption index (%)	
Warp	1	0.0		92.8		7.2	
	2	0.0	0.0	93.8	92.8	6.2	7.2
	3	0.0		93.5		6.5	
Weft	1	0.0		93.8		6.2	
	2	0.0	0.0	94.4	93.8	5.6	6.2
	3	0.0		94.2		5.8	

CLASSIFICATION ACCORDING TO EN 14325:2004
Class according to repellency index: **2**
Class according to penetration index: **3**

4. Test liquid 1-Butanol
Trade name SCHARLAU (Ref: AL01732500)
Boiling point 117.88 ºC
Evaporative losses prevision None

Direction	Specimen	Penetration index (%)		Repellency index (%)		Absorption index (%)	
Warp	1	0.0		99.3		0.7	
	2	0.0	0.0	99.1	99.1	0.9	0.9
	3	0.0		99.1		0.9	
Weft	1	0.0		99.3		0.8	
	2	0.0	0.0	99.0	99.0	1.0	1.0
	3	0.0		99.4		0.6	

CLASSIFICATION ACCORDING TO EN 14325:2004
Class according to repellency index: **3**
Class according to penetration index: **3**

>>>

RESULTS

Classification of the repellency to the liquids according to standard EN 14325:2004

Class	Repellency index
3	> 95 %
2	> 90 %
1	> 80 %

Classification to the penetration by liquids according to standard EN 14325:2004

Class	Penetration index
3	< 1 %
2	< 5 %
1	< 10 %

ACCORDING TO STANDARD EN 13034:2005+A1:2009	PASS

REQUIREMENTS ACCORDING TO STANDARD EN 13034:2005+A1:2009

According to the Standard EN 13034:2005+A1:2009, for liquid repellency a performance level 3 shall be obtained for at least one of the chemicals referred to EN 14325:2004, and for resistance to penetration by liquids a performance level of at least 2 shall be obtained for at least one of the chemicals referred to EN 14325:2004.

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RESULTS

DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS

Standard
EN 530:2010 Method 2

Apparatus
Martindale Abrasion Tester

Conditioning date 12/08/2021 **Test date** 20/09/2021

Atmosphere for conditioning testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Testing conditions
Rubbing against abradant paper 00

Testing pressure
9kPa

Type of fabric
Woven fabric

End point
Two broken threads

Technical characteristics of the sample
Not indicated by the client

Previous treatment
5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N and type F drying (line dry)

Reference
Fabric POBFC3DY-1

Specimens	Nº of cycles (n)
1	n > 2000
2	n > 2000
3	n > 2000
4	n > 2000

Remarks
The end test is performed by visual inspection.
The number of cycles corresponding to the rupture of the specimen.
The performance level is among the most unfavorable value of the pieces tested

REQUISITE ACCORDING STANDARD EN 13034:2005+A1:2009

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
> 10 cycles	> 100 cycles	> 500 cycles	> 1000 cycles	> 1500 cycles	> 2000 cycles

PERFORMANCE LEVEL	6

_____///

RESULTS

ELECTRIC ARC TEST

Standard	EN 61482-1-2: 2014 equivalent to IEC 61482-1-2: 2014
Principle of the Box test method	Determine the behaviour of materials against to thermal risk when exposed to heat energy from electric arc with specific characteristics Materials performance for this procedure is determined from the amount of the heat transmitted through the specimen and other thermal parameters
Sample type	Knitted fabric, orange colour with a weight does not provided by the customer

Test conditions	
Class	Class 1
Testing atmosphere	24,98 ºC 44,16 % RH
Test current I_{class} for class 1	4 kA ± 5%
Calibration test current	4019,85 A
Average direct exposure incident energy E_{io}	125,64 kJ/m^2
Arc duration	500 ms ± 5%
Average real arc duration	478,1 ms
Test voltage	400 V ± 5%
Average real test voltage	388,73 V
Average real Arc Energy W_{arc}	172,21 kJ

>>>

RESULTS

ELECTRIC ARC TEST

Test conditions	
Gap between electrodes	(30 ± 1) mm
Distance between the electrodes and sample	(300 ± 5) mm

Electrodes type

Electrodes Cu/Al

Measurement uncertainty

Temperature 17% of the measured value in ºC

Equivalent energy 17% of the measured value in kJ/m^2

Time ± 0,390 s

Technician performing the test

David Lazaro

Person verifying the test report

Lucía Martinez

Pre-treatment

5 washing cycles at 40ºC, according to standard EN ISO 6330:2012, method 4N; and F drying

Pre-conditioning of the test specimens

24h. in indoor ambient conditions between (18-28)ºC and between (45-75)% RH

Starting and ending pre-conditioning date

24/08/2021 - 27/08/2021

Observation or deviation of the standard

>>>

RESULTS

ELECTRIC ARC TEST

Testing date 27/08/2021
Reference Fabric POBFC3DY-1

VISUALLY OBTEINED DATA

Property	Measurement	Specimen 1	Specimen 2	Specimen 3	Specimen 4
	Class	1	1	1	1
Burning time	Video	0,00 s	0,00 s	0,00 s	0,00 s
Hole formation >5mm	Visual	No	No	No	No
Melting through to the inner side	Visual	No	No	No	No
Embrittlement	Visual	No	No	No	No
Damage on the outside	Visual	No	No	No	No
Charring on the outside	Visual	Yes	Yes	Yes	Yes
Dripping	Visual	No	No	No	No
Shrinkage	Calculated	No	No	No	No

>>>

RESULTS

ELECTRIC ARC TEST

Reference
Fabric POBFC3DY-1

COMPUTER OBTEINED DATA

Class 1				
Property	**Specimen 1**	**Specimen 2**	**Specimen 3**	**Specimen 4**
Transmitted incident energy E_{it}	50,77 kJ/m^2	54,79 kJ/m^2	62,28 kJ/m^2	53,26 kJ/m^2
Time to delta peak temperature t_{max}	29,83 s	29,96 s	29,96 s	29,96 s
Delta peak temperature ΔT_p	9,20 ºC	9,92 ºC	11,28 ºC	9,65 ºC
Differences ΔEi of the transmitted energy values to the Stoll limit value at t_{max}	-83,67 kJ/m^2	-79,82 kJ/m^2	-72,33 kJ/m^2	-81,35 kJ/m^2
Maximum difference between the transmitted energy E_{it} to the Stoll energy E_{iSTOLL} in t_i (1)	-42,78 kJ/m^2	-41,35 kJ/m^2	-41,74 kJ/m^2	-42,44 kJ/m^2
Excess of the Stoll curve by the heat curve of the transmitted incident energy E_{it} (t)	No	No	No	No

>>>

RESULTS

ELECTRIC ARC TEST

Remark

t_i is the time where the difference between the transmitted incident energy E_{it} and the Stoll Energy E_{iSTOLL} is maximum.

(1) Interpretation: In negative value, a higher difference implies a better behavior. In positive value, a less difference implies a better behavior, considering that the material fails the test.

IN ACCORDANCE WITH THE ACEPTANCE CRITERIA ACCORDING TO EN 61482-1-2:2014, FOR CLASS 1

PASS

Requirement for the standard compliance EN 61482-1-2:2014

a) Burning time ≤ 5 s.
b) No melting through to the inner side.
c) No hole bigger than max. 5 mm. in any direction in the innermost layer.
d) All four pairs of values (E_{it} - t_{max}) are below corresponding Stoll values, and all four heat curves E_{it} (t) of transmitted energy are at any moment of time "t" of the exposure period below Stoll curve.

>>>

RESULTS

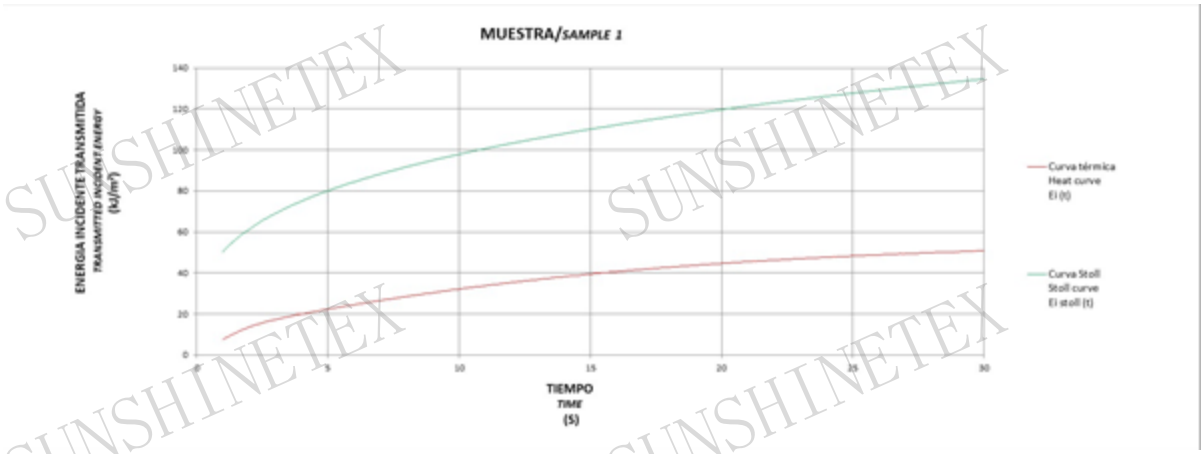
ELECTRIC ARC TEST

STOLL CURVES

Specimen 1

Reference

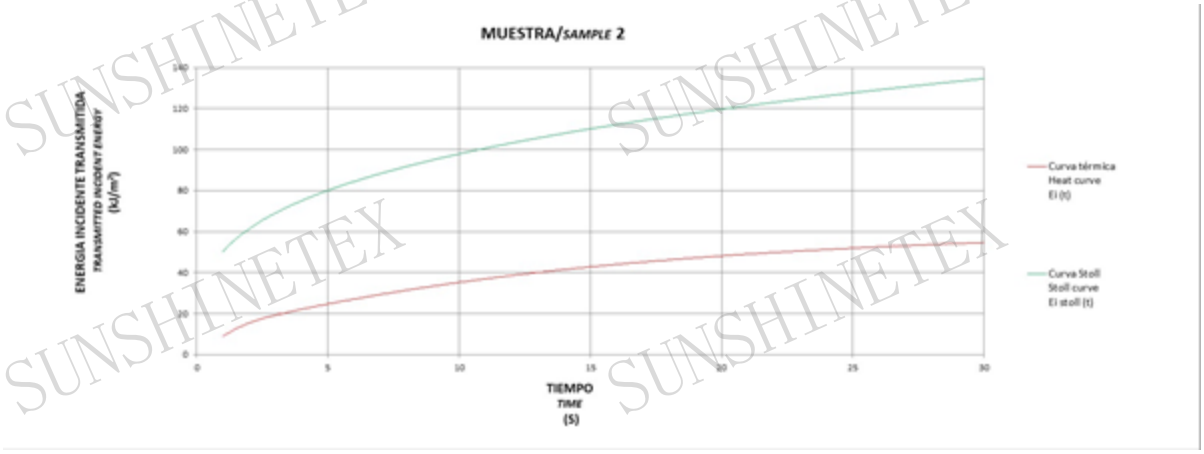
1- Fabric POBFC3DY-1



Specimen 2

Reference

2- Fabric POBFC3DY-1



_____>>>

RESULTS

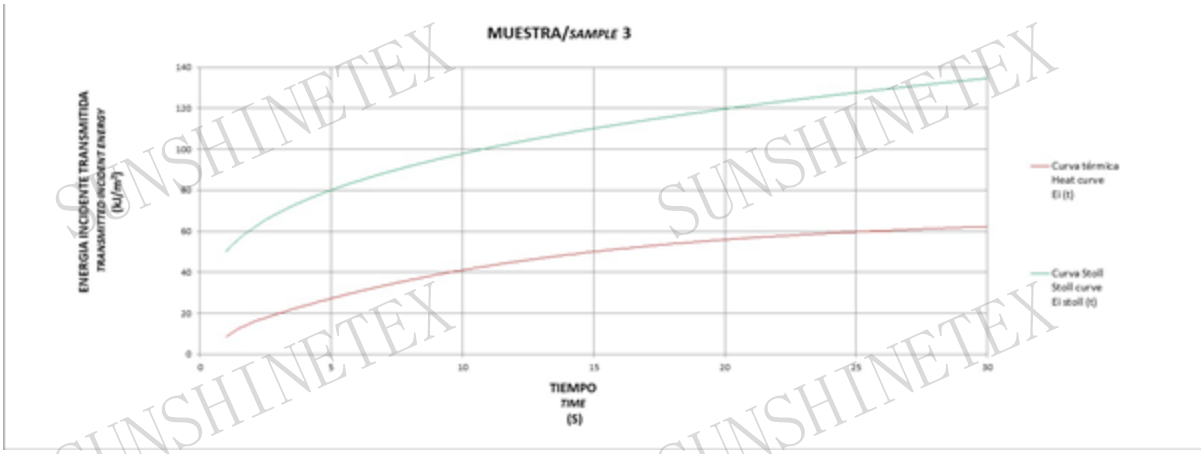
ELECTRIC ARC TEST

STOLL CURVES

Specimen 3

Reference

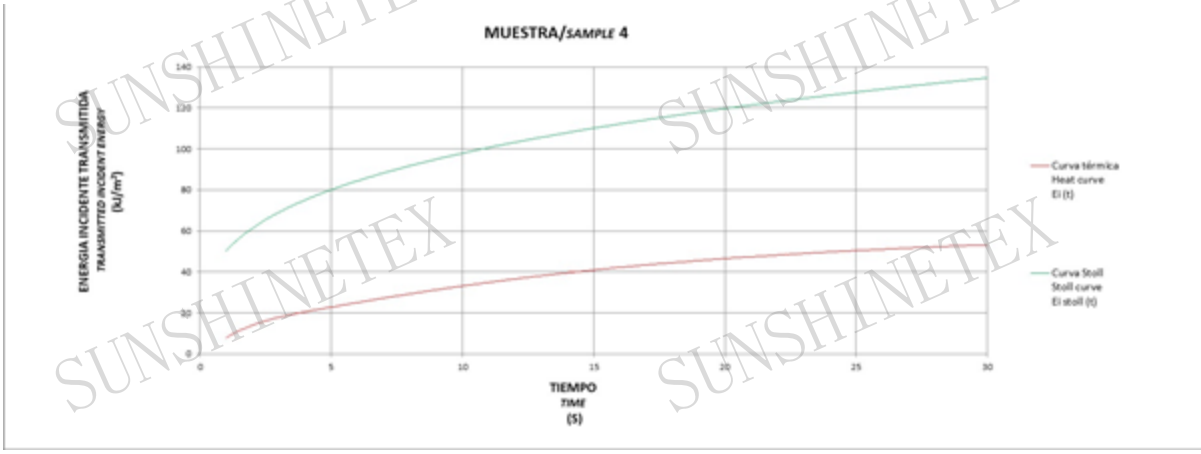
3- Fabric POBFC3DY-1



Specimen 4

Reference

4- Fabric POBFC3DY-1



>>>

RESULTS

ELECTRIC ARC TEST

Reference

Fabric POBFC3DY-1

Original material



Tested material



Remark

The electric arc test is performed in: Cr. Villaviciosa de Odón a Móstoles (M-856) Km. 1,5 Móstoles 28935.

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RESULTS

VERTICAL RESISTANCE

Standard
EN 1149-2:1997

Conditioned
24h in indoor ambient conditions at (23 ± 1) ºC and (25 ± 5) % RH according to standard EN 1149-5:2008

Ambient conditions test
23,0 ºC and 25,4

Radius of the inner electrode
50,4 mm

Inner radius of the outer electrode
69,2 mm

Outer radius of the outer electrode
89,0 mm

Contact pressure
2,25 kPa

Potential applied
100 V

Current measurement after
15 s

Test date
17/08/2021

Deviation from the standard

Tested material
Fluorescent orange woven fabric and white knitted fabric.

>>>

RESULTS

Pre-Treatment

5 washing cycles at 40ºC, according to the standard ISO 6330:2012, method 4N, F drying (tumble dryer)

Reference

Fabric POBFC3DY-1

Specimen	Vertical Resistance (Ohm)
1	$6{,}25 \cdot 10^{10}$
2	$4{,}73 \cdot 10^{11}$
3	$2{,}51 \cdot 10^{11}$
4	$2{,}43 \cdot 10^{11}$
5	$9{,}78 \cdot 10^{10}$
Classification value	**$6{,}25 \cdot 10^{10}$**
Average (Ohm)	**$2{,}25 \cdot 10^{11}$**

The uncertainty of the assay of Vertical Resistance is ±20% of the value measured, for a coverage factor of K=2 (95%)

ACCORDING TO STANDARD IEC 61482-2:2018 PASS

REQUIREMENT

According to the Standard IEC 61482-2:2018, point 4.3.2, the vertical resistance must be at least than $10^5\Omega$.

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RESULTS

MEANING OF COLOUR FASTNESS APPRAISAL EVALUATED WITH GREY SCALE

VALUE	MEANING
5	VERY GOOD-EXCELLENT
4	GOOD
3	FAIR-MODERATE
2	POOR BEHAVIOUR
1	VERY POOR

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SUNSHINETEX

Lucia Martinez
Head of PPE and Ballistics department

Digitally signed by ISABEL LLOPIS LUMBRERAS - NIF:21678551Q
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