TEST REPORT

2021CN0694

DATE OF RECEPTION
28/07/2021

DATE TESTS
Starting: 28/07/2021
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 and 2% Carbon and 60% Protex and 40% Cotton
Color: Fluo Yellow / Fluo Orange

TESTS CARRIED OUT

- PHOTOGRAPHY.
- PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING.
- 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.
- CONTACT HEAT.

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

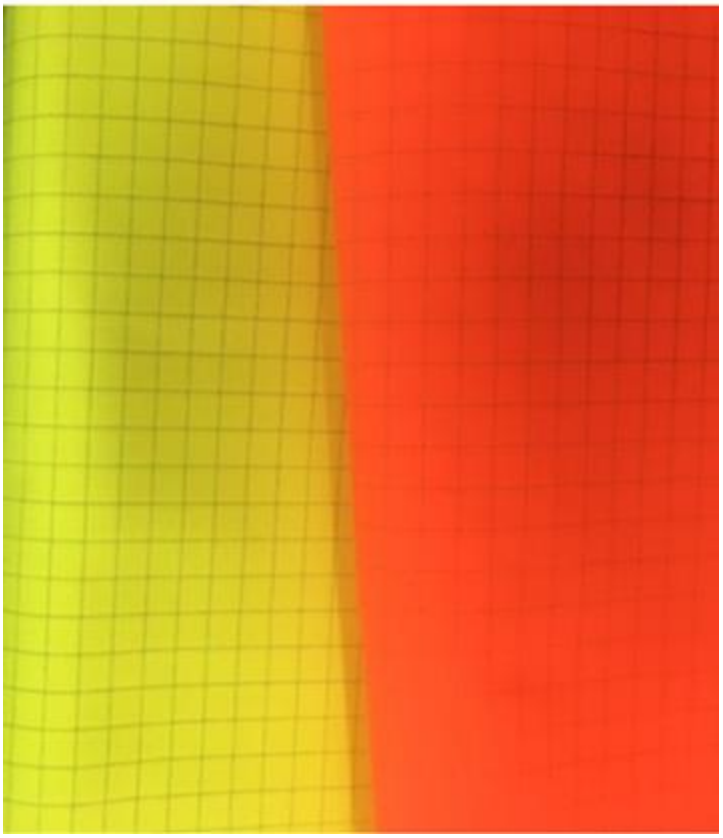
*Tests marked with * are not included within the scope of the ENAC accreditation*

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

ENAC ENSAYOS Nº12 / LE025 Nº12 / LE427

RESULTS

PHOTOGRAPHY



Reference

Fabric POBFC3DY-1

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	2
Equipment	Wascator 13474E05	Wascator 13151E12
Dryer machine	JAMES HEAL 13475E05	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	0,950 Kg	1,000 Polyester	Wascator 13474E05
2	1,911 Kg		Wascator 13151E12

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

_____///

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

_____///

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

_____>>>

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

Requirements to meet according to EN ISO 11612:2015

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

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

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

_____///

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

Requisites to be met according to EN ISO 11612:2015

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

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

_____///

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

>>>

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 11612:2015

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

PASS

_____///

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%.

REQUISITE ACCORDING TO STANDARD EN ISO 11612:2015
The material must resist a breaking load in both directions ≥ 10 N.

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 HTI[a] 12 values(s)	Range HTI[a] 24 values(s)
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**

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

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

_____///

Lucia Martinez
Head of PPE and Ballistics department

Digitally signed by ISABEL LLOPIS LUMBRERAS - NIF:21678551Q
Date: 2021.10.06 16:40:09 +02:00
Reason: Autorizado
Location: Alcoy

LIABILITY CLAUSES

1.- AITEX is liable only for the results of the methods of analysis used, as expressed in the report and referring exclusively to the materials or samples indicated in the same which are in its possession, the professional and legal liability of the Centre being limited to these. Unless otherwise stated, the samples were freely chosen and sent by the applicant.
2.- AITEX shall not be liable in any case of misuse of the test materials nor for undue interpretation or use of this document
3.- The Offer and / or Order to which the applicant gives approval through signature and seal, constitutes the Legally Executable Agreement in which AITEX is responsible for safeguarding and guaranteeing the absolute confidentiality of the management of all the information obtained or created during the performance of the contracted activities.
4.- In the eventuality of discrepancies between reports, a check to settle the same will be carried out in the head offices of AITEX. Also, the applicants undertake to notify AITEX of any complaint received by them as a result of the report, exempting this Centre from all liability if such is not done, the periods of conservation of the samples being taken into account.
5.- AITEX will provide at the request of the person concerned, the treatment of complaints procedure. In the event that you want to make it, direct it to: calidad@aitex.es.
6.- AITEX is not responsible for the information provided by customers, which is reflected in the Report, and may affect the validity of the results.
7.- AITEX is not responsible for an inadequate state of the sample received that could compromise the validity of the results, expressing such circumstance, in the test reports.
8.- AITEX may include in its reports, analyses, results, etc., any other evaluation which it considers necessary, even when it has not been specifically requested.
9.- When a Declaration of Conformity is requested, if not indicated otherwise, the decision rule will be applied according to ILAC-G8 & ISO 10576-1, in case of ambiguity, or indeterminacy
10.- The uncertainties of tests, which are made explicit in the Results Report, have been estimated for a k = 2 (95% probability of coverage). If not informed, they are available to the client in AITEX.
11. - The original materials and rests of samples, not subject to test, will be retained in AITEX during the twelve months following the issuance of the report, so that any check or claim which, in his case, wanted to make the applicant, should be exercised within the period indicated.
12.- This report may only be sent or delivered by hand to the applicant or to a person duly authorised by the same.
13.- The results of the tests and the statement of compliance with the specification in this report refer only to the test sample as it has been analyzed / tested and not the sample / item which has taken the test sample.
14.- The client must attend at all times, to the dates of the realization of the tests.
15.- According to Resolution EA (33) 31, the test reports must include the unique identification of the sample, and any brand or label of the manufacturer may be added. It is not allowed to re-issue test reports of untested sample names (references), they can only be re-issued for error correction or inclusion of omitted data that were already available at the time of the test. The laboratory can not assume responsibility for declaring that the product with the new trade name / trademark is strictly identical to the one originally tested; This responsibility belongs to the client.
16.- This report may not be partially reproduced without the written approval of the issuing laboratory.