

TEST REPORT

2020CN0213

DATE OF RECEPTION

30/04/2020

DATE TESTS

Starting: 06/05/2020

Ending: 02/06/2020

APPLICANT

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

IDENTIFICATION AND DESCRIPTION OF SAMPLES

REFERENCES

FABRIC POBFD3XY

According to information supplied by the customer:

Fabric reference: POBFD3XY

Composition and percentage: 56% Modacrylic, 43% Polyester and 1% Antistatic

Color: Fluo yellow, Fluo orange, Navy

Others: FR softshell

TESTS CARRIED OUT

- 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.

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



RESULTS

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

Standard

ISO 6330:2012

Standard deviation

Reference

Sample1 Fabric POBFD3XY

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	0,014 Kg	1,900 Kg of Polyester	Wascator 13370E12

Start and finish date

06/05/2020 - 07/05/2020

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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 POBFD3XY

Units

1

Equipment

Wascator 13470E05

Dryer machine

JAMES HEAL

13472E05

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	0,093 Kg	1,900 Kg of Polyester	Wascator 13470E05

Start and finish date

27/05/2020 - 28/05/2020

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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 POBFD3XY

Units	1	2
Equipment	Wascator 13337E12	Wascator 13369E12
Dryer machine	ELECTROLUX 13427E12	ELECTROLUX 13429E12

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	2.00 Kg	---	Wascator 13337E12
2	2.10 Kg	---	Wascator 13369E12

Start and finish date

07/05/2020 - 08/05/2020

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RESULTS

HEAT RESISTANCE

Standard

ISO 17493:2016

Apparatus

Air stove

Temperature

$(180 \pm 5) ^\circ\text{C}$

Length of the test

5 min (+0,15/-0) min

Deviation from the Standard

Pre-Treatment

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

Tested material

Orange woven fabric with grey fleece inner face.

Reference

Fabric POBFD3XY

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RESULTS

Fabric			
Flame	Melting	Shrink	Elongation
No	No	Warp	-2,6 %
		Weft	-3,9 %
No	No	Warp	-3,3 %
		Weft	-4,0 %
No	No	Warp	-3,0 %
		Weft	-4,0 %

Remark

The uncertainty of the assay of Heat Resistance is $\pm 19\%$ 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%

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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

08/05/2020 - 12/05/2020

Conditioned

24h in indoor ambient conditions at $(20 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \% \text{ RH}$

Original and after pre-treatment ambient conditions test

22,5°C and 51,4% RH - 22,6°C and 48,8% RH

Gas used

Propane gas

Deviation from the standard

Face exposed to the flame

Surfaces: Outer

Tested material

Orange woven fabric with grey fleece inner face.

Test uncertainty

$\pm 0,29 \text{ s}$

Reference

Fabric POBFD3XY

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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 40°C, 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

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RESULTS

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015	A1
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Requirements 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 |
| c) No specimen shall give flaming or molten debris |
| d) Afterflame time shall be ≤ 2 s |
| e) Afterglow time shall be ≤ 2 s |

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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

08/05/2020 - 12/05/2020

Conditioned

24h in indoor ambient conditions at $(20 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \% \text{ RH}$

Original and after pre-treatment ambient conditions test

22,5°C and 51,4% RH - 22,6°C and 49,2% RH

Gas used

Propane gas

Deviation from the standard

Face exposed to the flame

Surfaces: Inner

Tested material

Orange woven fabric with grey fleece inner face.

Test uncertainty

$\pm 0,29 \text{ s}$

Reference

Fabric POBFD3XY

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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 40°C, 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

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RESULTS

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015	A1
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Requirements 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
c) No specimen shall give flaming or molten debris
d) Afterflame time shall be ≤ 2 s
e) Afterglow time shall be ≤ 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

06/05/2020

Ending test date

28/05/2020

Washing procedure

4N ($T^a = 40 \pm 3^\circ\text{C}$; 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 (13337E12)

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(13427E12)
Uncertainty of test (% of the measured value)

$\pm 15 \%$

Tested material

Fluorescent orange woven fabric with grey fleece fabric on back side

Reference	Specimen	Direction	Dimensional change (%)
Fabric POBFD3XY	1	Warp	-1,5
		Weft	0,0

REMARK

Negative dimensional change indicates shrinkage

Positive dimensional change indicates lengthening

REQUISITE

In accordance with the Standard EN ISO 11612:2015, the dimensional change shall not exceed $\pm 3\%$, both in width warp and in length weft.

PASS

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RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard

EN ISO 13934-1:2013

Apparatus

INSTRON Dynamometer

Conditioning date

13/05/2020

Test date

20/05/2020

Atmosphere for conditioning testing

Temperature

(20±2) °C

Relative humidity

(65±4) %

Gauge length

Lengthwise

200 mm.

Crosswise

200 mm.

Test velocity

Lengthwise

100 mm/min

Crosswise

100 mm/min

Pretension

Lengthwise

5 N

Crosswise

5 N

N° of specimens

Tested

5 for each direction

Rejected

0

State of the specimens

Conditioned

Previous treatment

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

Reference

Fabric POBFD3XY

Direction	Maximum average load (N)	C.V. (%)	Average elongation (%)	C.V. (%)
Lengthwise	920	3.0	31.5	2.8
	940		32.5	
	900 920		30.5 31.5	
	960		32.5	
	890		31.0	
Crosswise	720	2.0	42.5	3.2
	730		43.5	
	750 740		44.0 44.0	
	740		45.0	
	760		46.0	

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

11/05/2020

Test date

18/05/2020

Atmosphere for conditioning testing

Temperature

(20±2) °C

Relative humidity

(65±5) %

N° 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 40°C, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference

Fabric POBFD3XY

Tear	Average load (N)	C.V. (%)
Lengthwise	30	8.7
	29	
	33 31	
	30	
	36	
Crosswise	30	14.0
	41	
	30 33	
	31	
	32	

Remark

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

Observation

The test was performed with specimens of great width (200x200) mm in both directions.

REQUISITE ACCORDING TO STANDARD EN ISO 11612:2015

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

PASS

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RESULTS

DETERMINING OF HEAT TRANSMISSION ON EXPOSURE TO FLAME

Standard

ISO 9151:2016

Apparatus

Convective heat

Heat flux density

80,15 kW/m²

Pre-Treatment

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

Conditioned

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

Ambient conditions test

23,5 °C and 44,8 % RH

Deviation from the Standard

Test date

12/05/2020

Tested material

Orange woven fabric with grey fleece inner face.

_____>>>



RESULTS

Reference	Specimen	Range HTI ^a 12 values(s)	Range HTI ^a 24 values(s)
Fabric POBFD3XY	1	5,0	7,0
	2	5,0	7,1
	3	5,1	7,2
	Classification value	5,0	7,0
	Average	5,0	7,1

Remark

The uncertainty of the assay of Convective heat is $\pm 4\%$ 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.

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RESULTS

RADIANT HEAT

Standard

EN ISO 6942:2002, method B

Apparatus

Equipment for the determination of radiant heat

Heat flux density

19,99 kW/m²

Pre-Treatment

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

Conditioned

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

Ambient conditions test

23,5 °C and 44,9 % RH

Deviation from the Standard

Test date

12/05/2020

Tested material

Orange woven fabric with grey fleece inner face.

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RESULTS

Reference	Fabric POBFD3XY		
Specimen	Heat transfer index RHTI 12(s)	Heat transfer index RHTI 24(s)	TF(%)
1	17,5	29,3	28,0
2	17,7	29,6	27,8
3	17,5	29,3	27,8
Classification value	17,5	29,3	28,0
Average	17,6	29,4	27,9

Mark

The uncertainty of the assay of Radiant heat is $\pm 6\%$ of the value measured, for a coverage factor of $K=2$ (95%).

PERFORMANCE LEVEL ACCORDANCE WITH STANDARD EN ISO 11612:2015 C2

Results in accordance with Standard EN ISO 11612:2015

Performance level	Range of RHTI ^a 24 values	
	Minimum	Maximum
C1	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

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RESULTS

ASSESSMENT OF RESISTANCE OF MATERIALS TO MOLTEN METAL SPLASH

Standard

EN ISO 9185:2007

Apparatus

Equipment for molten metal splashes test

Metal

Aluminium

Pouring temperature

(780±20) °C

Pouring angle

(60±1) °

Pouring height

(225±5) mm.

Test date

21/05/2020

Pre-Treatment

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

Deviation from the Standard

Tested material

Orange woven fabric with grey fleece inner face.

Reference			Fabric POBFD3XY		
Mass of metal used (g)	Mass of metal pouring (g)	Ignition	Puncture	Metal adhered to fabric	Assessment of PVC film
364	358	No	Yes	Yes	Damaged
213	207	No	Yes	Yes	Damaged
111	107	No	No	No	Not Damaged
112	107	No	No	No	Not Damaged
111	106	No	No	No	Not Damaged
111	106	No	No	No	Not Damaged

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RESULTS

Note

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

PERFORMANCE LEVEL ACCORDING TO STANDARD EN ISO 11612:2015	D1
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Results interpretation according to standard EN ISO 11612:2015

Performance levels	Molten aluminum
	Min. Max.
D1	100 < 200
D2	200 < 350
D3	350

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RESULTS

CONTACT HEAT

Standard

EN ISO 12127-1:2015

Apparatus

ÖTI CONTACT HEAT PROTECTION TESTER

Conditioned

24h in indoor ambient conditions at $(20 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \% \text{ RH}$

Ambient conditions test

23,3 °C and 47,7 % RH

Pretreatment

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

Deviation from the Standard

Test date

12/05/2020

Tested material

Orange woven fabric with grey fleece inner face.

Test uncertainty

$\pm 0,13 \text{ s}$

Reference

Fabric POBFD3XY

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RESULTS

Specimen	Contact temperature (°C)	Threshold time (s)
1	250	23,3
2	250	23,3
3	250	23,3
Classification value	250	23,3
Average	250	23,3

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015 F3

Requirements according to standard EN ISO 11612:2015

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

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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 06/05/2020 Ending test date 28/05/2020

Washing procedure

4N ($T^a = 40 \pm 3^\circ\text{C}$; 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 (13370E12)

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(13426E12)
Uncertainty of test (% of the measured value)

$\pm 15 \%$

Tested material

Blue woven fabric with grey fleece fabric on back side

Reference	Specimen	Direction	Dimensional change (%)
Fabric POBFD3XY	1	Warp	-1,5
		Weft	-1,0

REMARK

Negative dimensional change indicates shrinkage

Positive dimensional change indicates lengthening

REQUISITE

In accordance with the Standard EN ISO 11612:2015, the dimensional change shall not exceed $\pm 3\%$, both in width warp and in length weft.

PASS

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Lucia Martinez
Head of PPE and Ballistics department

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