

TEST REPORT

2020CN0217

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.
- DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING.
- DETERMINATION OF BREAKING STRENGTH AND ELONGATION.
- DETERMINATION OF TEAR RESISTANCE.
- WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE.
- DETERMINATION OF FLEX CRACKING AND CRACK GROWTH.
- PRE-TREATMENT*.
- WATER VAPOUR RESISTANCE.

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

2

Equipment

Wascator 13337E12 Wascator 13369E12

Dryer machine

ELECTROLUX ELECTROLUX
13427E12 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

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 machineJAMES 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

Equipment

Wascator 13370E12

Dryer machineELECTROLUX
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

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 343:2019, the dimensional change shall not exceed $\pm 3\%$, both in width warp and in length weft.

PASS

>>>



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 343:2019, the dimensional change shall not exceed $\pm 3\%$, both in width warp and in length weft.

PASS

>>>



RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard

EN ISO 1421:2016, Method 1

Apparatus

INSTRON Dynamometer

Conditioning date	07/05/2020	Test date	14/05/2020
Atmosphere for conditioning testing			
Temperature	(20±2) °C	Relative humidity	65±5
N° 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

Reference

Fabric POBFD3XY

Direction	Maximum average load (N)	C.V. (%)	Average elongation (%)	C.V. (%)
Lengthwise	898	7.0	27	5.0
	909		28	
	815 908		26 28	
	973		29	
	945		29	
Crosswise	770	2.0	35	2.0
	743		35	
	767 768		35 35	
	768		35	
	790		36	

Remark

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

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

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RESULTS

DETERMINATION OF TEAR RESISTANCE

Standard

EN ISO 4674-1:2016

Test procedure

Method A

Apparatus

INSTRON Dynamometer

Conditioning date

07/05/2020

Test date

14/05/2020

Atmosphere for conditioning testing
Temperature (20±2) °C

Relative humidity

(65±5) %

N° of specimens
Tested

5 for each direction

Rejected

0

State of the specimens

Conditioned

Reference

Fabric POBFD3XY

Tear	Average load (N)	C.V. (%)
Lengthwise	97	10.0
	100	
	90 90	
	78	
	85	
Crosswise	65	6.8
	58	
	68 62	
	59	
	63	

Remarks

The relative expanded uncertainty of Tear resistance is $\pm 7\%$ 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 343:2019

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

PASS

///



RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard

EN 20811:1992 (Obsolete)

Apparatus

Hydrostatic Head Tester

Conditioning date

06/05/2020

Test date

12/05/2020

Atmosphere for conditioning testing

Temperature

(20±2) °C

Relative humidity

(65±4) %

Water temperature

20 °C

Rate of increase of water pressure

10cmH₂O/min ((980±50) Pa/min)

The test equipment applies the water pressure to the exposed surface from below.

Surface exposed

External side

Reference

Fabric POBFD3XY

Specimen	Pressure (cm/H ² O)	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

11/05/2020

Test date

12/05/2020

Atmosphere for conditioning testing
Temperature

(20±2) °C

Relative humidity

(65±4) %

Water temperature

20 °C

Rate of increase of water pressure

 10cmH₂O/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 40°C, according to standard EN ISO 6330:2012, method 4N and type F drying (tumble dry)

Reference

Fabric POBFD3XY

Specimen	Pressure (cm/H ² O)	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	---	---	---	≥ 20000 Pa

CLASS 4

>>>



RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard

EN 20811:1992 (Obsolete)

Apparatus

Hydrostatic Head Tester

Conditioning date

06/05/2020

Test date

11/05/2020

Atmosphere for conditioning testing
Temperature

(20±2) °C

Relative humidity

(65±4) %

Water temperature

20 °C

Rate of increase of water pressure

 10cmH₂O/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 POBFD3XY

Specimen	Pressure (cm/H ² O)	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

07/05/2020

Used apparatus

Crumpleflex equipment

Reference

Fabric POBFD3XY

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. Depth of cracking	---
b. Number of cracks	---
c. Length of cracks	---
Delamination	Doesn't exist delamination

///



RESULTS

WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

Standard

EN 20811:1992 (Obsolete)

Apparatus

Hydrostatic Head Tester

Conditioning date

07/05/2020

Test date

12/05/2020

Atmosphere for conditioning testing
Temperature

(20±2) °C

Relative humidity

(65±4) %

Water temperature

20 °C

Rate of increase of water pressure

 10cmH₂O/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 POBFD3XY

Specimen	Pressure (cm/H ² O)	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 POBFD3XY

Test time

60 minutes

Used reagents

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

28/05/2020

Test date

02/06/2020

Atmosphere for conditioning testing

Temperature (20±2) °C

Relative humidity

(65±4) %

Water temperature

20 °C

Rate of increase of water pressure

10cmH₂O/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 POBFD3XY

Specimen	Pressure (cm/H ² O)	Pressure (Pa)	Less Pressure
Fuel	> 200	> 20000	> 20000
Fuel	> 200	> 20000	
Oil	> 200	> 20000	
Oil	> 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

WATER VAPOUR RESISTANCE

Standard

EN ISO 11092:2014

Date test

13/05/2020

Uncertainty of the measurement

0.24 m²Pa/W

Observation or deviation from the Standard

Apparatus

SKIN MODEL. Sweating guarded hotplate 12004I12

Test atmosphere

Temperature	(35.0 ± 0.5) °C
Relative humidity	(40 ± 3) %

Conditioning

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

Sample description

Yellow high-visibility softshell.

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 ² Pa/W)
Fabric POBFD3XY	Specimen 1	36,43
	Specimen 2	35,62
	Specimen 3	36,20
	Average	36,08

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 VAPOUR RESISTANCE

Standard

EN ISO 11092:2014

Date test

13/05/2020

Uncertainty of the measurement

0.24 m²Pa/W

Observation or deviation from the Standard

Apparatus

SKIN MODEL. Sweating guarded hotplate 12004I12

Test atmosphere

Temperature	(35.0 ± 0.5) °C
Relative humidity	(40 ± 3) %

Conditioning

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

Sample description

Blue softshell.

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 ² Pa/W)
Fabric POBFD3XY	Specimen 1	33,42
	Specimen 2	35,09
	Specimen 3	31,64
	Average	33,38

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



Lucia Martinez
Head of PPE and Ballistics department

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