TEST REPORT

2024CN0986

DATE OF RECEPTION
Date Format: dd/MM/yyyy 19/08/2024

DATE TESTS
Starting: 04/09/2024
Ending: 17/09/2024

APPLICANT

KUNSHAN SUNSHINETEX NEW MATERIAL Co. Ltd.
No. 417 Sanxiang Road ndustry Zone
CN-215300 Kunshan (JIANGSU)
China

Att. Yao

IDENTIFICATION AND DESCRIPTION OF SAMPLES

Reference by AITEX	Reference by customer	AITEX sample description
2024CN0798-S01	POBFD3XY	Fabric *Fabric*

TESTS CARRIED OUT

- PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING.
- DETERMINATION OF HEAT RESISTANCE 180ºC.
- DETERMINATION OF DIMENSIONAL CHANGE IN WASHING AND DRYING.
- DETERMINATION OF MASS PER UNIT AREA USING SMALL SAMPLES.
- ELECTRIC ARC TEST.
- LIMITED FLAME SPREAD.
- ELECTROSTATIC PROPERTIES: MEASUREMENT OF ELECTRICAL RESISTANCE THROUGH A MATERIAL (VERTICAL RESISTANCE).

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

DESCRIPTION OF SAMPLES

Reference by AITEX*:* 2024CN0798-S01

Reference by customer*:*

POBFD3XY

AITEX sample description*:*

Fabric

Information supplied by the customer

0.8% Polyamide,32.9% cotton, 48.2% modacrylic, 18.1% polyester
Weight: 380gsm
Color: Grey/Navy/Black/HV-yellow/HV-orange

AITEX Subsamples	Subsample Description
2024CN0798-S01_P1	POBFD3XY Fabric After 5 cycles
2024CN0798-S01.1_P1	Fabric c/ Hi Vis Yellow After 5 cycles

EXECUTIVE SUMMARY

	Reference	Test/Standard	Result
EN 61482-2:2020	2024CN0798-S01.1_P1	ELECTRIC ARC TEST **EN 61482-1-2:2014 pto 4.1**	APC 1
	2024CN0798-S01_P1	DETERMINATION OF HEAT RESISTANCE 180ºC **ISO 17493:2016**	PASS
		DETERMINATION OF DIMENSIONAL CHANGE IN WASHING AND DRYING **EN ISO 5077:2008**	PASS
		DETERMINATION OF MASS PER UNIT AREA USING SMALL SAMPLES **EN 12127:1997 Pto.8.3**	TESTED
		LIMITED FLAME SPREAD **EN ISO 15025:2016 Met.A**	PASS
		ELECTROSTATIC PROPERTIES: MEASUREMENT OF ELECTRICAL RESISTANCE THROUGH A MATERIAL (VERTICAL RESISTANCE) **EN 1149-2:1997**	PASS

REQUIREMENT SUMMARY

DETERMINATION OF HEAT RESISTANCE 180ºC

REQUIREMENT ACCORDING EN 61482-2:2020

Fabric

No layer can melt and/or drip.

At 180ºC not layer shrink by more than 5%.

Not layer must ignite.

DETERMINATION OF DIMENSIONAL CHANGE IN WASHING AND DRYING

REQUIREMENT ACCORDING EN 61482-2:2020

The dimensional change shall not exceed ± 3%, both in width warp and in length weft.

The dimensional change of knitted fabrics shall not exceed ±5%, both in width Crosswise and in length Lengthwise.

ELECTRIC ARC TEST

REQUIREMENT ACCORDING EN 61482-1-2:2014 - MATERIAL

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 (Eit - tmax) are below corresponding Stoll values, and all four heat curves Eit (t) of transmitted energy are at any moment of time “t” of the exposure period below Stoll curve.

Arc protection class	Current test kA
APC 1	**4 ± 5%**
APC 2	**7 ± 5%**

LIMITED FLAME SPREAD

REQUIREMENT ACCORDING EN 61482-2:2020

- No specimen shall permit any part of the lowest boundary of any flame to reach the upper or either vertical edge

- No specimen shall give flaming or molten debris

- No specimen shall give hole formation of 5 mm or greater in any direction

- Afterglow time shall be ≤ 2 s

- Afterflame time shall be ≤ 2 s

ELECTROSTATIC PROPERTIES: MEASUREMENT OF ELECTRICAL RESISTANCE THROUGH A MATERIAL (VERTICAL RESISTANCE)

REQUIREMENT ACCORDING EN 61482-2:2020

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

RESULTS

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

Standard

EN ISO 6330:2021

Test date

Start date 04/09/2024 **End date** 05/09/2024

Washing procedure

6N

Washing temperature

60ºC

Washing cycles

5

Dryer type

James Heal

Drying procedure

F (type A1 tumble drying)

Washing powder

Reference detergent 3

Reference

2024CN0798-S01

Units	Dry mass of the samples(Kg)	Counterweight mass*(Kg)*	Counterweight type	Equipment
1	1.8	0.2	Type III	WASCATOR
2	1.3	0.7	Type III	WASCATOR
3	1.75	0.25	Type III	WASCATOR
4	1.3	0.7	Type III	WASCATOR

The test was carried out at laboratory located at Carretera Banyeres 10 - 03802 Alcoi, Alicante

Reference by AITEX	Reference by customer
2024CN0798-S01	POBFD3XY

RESULTS

DETERMINATION OF HEAT RESISTANCE 180ºC

Standard

ISO 17493:2016

Equipment

Air stove

Test date

Start date 11/09/2024 **End date** 16/09/2024

Temperature

(180 ± 5)ºC

Length of the test

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

Uncertainty

± 1 %

Reference
2024CN0798-S01_P1

Ignition	Melting	Direction	Shrink*(-)* Elongation*(+)*
NO	NO	**Warp**	-3%
		Weft	-2%
NO	NO	**Warp**	-3%
		Weft	-2%
NO	NO	**Warp**	-3%
		Weft	-2%

The test was carried out at laboratory located at Carretera Banyeres 10 - 03802 Alcoi, Alicante

Reference by AITEX	Reference by customer
2024CN0798-S01_P1	POBFD3XY Fabric After 5 cycles

RESULTS

DETERMINATION OF DIMENSIONAL CHANGE IN WASHING AND DRYING

Standard

EN ISO 5077:2008

Preparation, marking and measuring of fabric specimens according to EN ISO 3759:2011

Start date 04/09/2024 **End date** 10/09/2024

Equipment

Wascator type A-Horizontal drum, front loading

Washing cycles

5

Uncertainty

± 0.4 %

Reference

2024CN0798-S01_P1

Specimen	Direction	Dimensional change (%)
1	WARP	-2.0
	WEFT	-1.0

Note

Positive dimensional change indicates lengthening. Negative dimensional change indicates shrinkage

The test was carried out at laboratory located at Carretera Banyeres 10 - 03802 Alcoi, Alicante

Reference by AITEX	Reference by customer
2024CN0798-S01_P1	POBFD3XY Fabric After 5 cycles

RESULTS

DETERMINATION OF MASS PER UNIT AREA USING SMALL SAMPLES

Standard

EN 12127:1997 Pto.8.3

Conditioned date

Start date 10/9/2024 **End date** 11/9/2024

Atmosphere for conditioning

Temperature (20 ± 2) ºC **Relative Humidity** (65 ± 4) %

Test date

Start date 10/09/2024 **End date** 11/09/2024

Reference

2024CN0798-S01_P1

Atmosphere for testing

Temperature (20,0± 2) ºC **Relative Humidity** (65,0 ± 4) %

Mass per unit area *(g/m²)*	C.V. (%)
429	0.9

The test was carried out at laboratory located at Carretera Banyeres 10 - 03802 Alcoi, Alicante

Reference by AITEX	Reference by customer
2024CN0798-S01_P1	POBFD3XY Fabric After 5 cycles

RESULTS

ELECTRIC ARC TEST

Standard	EN 61482-1-2: 2014 Pt 4.1 equivalent to IEC 61482-1-2: 2014 Pt 4.1
Principle of the Box test method for materials	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	Laminated woven fabric, yellow colour with a weight according to the customer of 380 (±5%) g/m²

Test conditions	
Class	1
Testing atmosphere	23,00 ºC 31,00% RH
Test current I_{class} for class 1	4 kA ± 5%
Calibration test current	3934,21 A
Average direct exposure incident energy E_{io}	137,33 kJ/m²
Arc duration	500 ms ± 5%
Average real arc duration	496,05 ms
Test voltage	400 V ± 5%
Average real test voltage	391,46 V
Average real Arc Energy W_{arc}	166,55 kJ
Gap between electrodes	(30 ± 1) mm
Distance between the electrodes and sample	(300 ± 5) mm

ELECTRIC ARC TEST

Electrodes type
Electrodes Cu/Al

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
13/09/2024 - 16/09/2024

Measurement uncertainty
The uncertainty of the test of Box test is ±5% of the value measured, for a coverage factor of K=2 (95%)

Observation or deviation of the standard

ELECTRIC ARC TEST

Testing date
16/09/2024

Reference
2024CN0798-S01.1_P1

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 > 5 mm	Visual	No	No	No	No
Melting through to the inner side	Visual	Not Applicable	Not Applicable	Not Applicable	Not Applicable
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

ELECTRIC ARC TEST

Reference
2024CN0798-S01.1_P1

COMPUTER OBTEINED DATA

Class 1				
Property	**Specimen 1**	**Specimen 2**	**Specimen 3**	**Specimen 4**
Transmitted incident energy E_{it}	40,06 kJ/m²	43,83 kJ/m²	38,40 kJ/m²	35,70 kJ/m²
Time to delta peak temperature t_{max}	29,96 s	29,96 s	29,83 s	29,83 s
Delta peak temperature ΔT_p	7,26 ºC	7,94 ºC	6,96 ºC	6,47 ºC
Differences ΔEi of the transmitted energy values to the Stoll limit value at t_{max}	-94,55 kJ/m²	-90,78 kJ/m²	-96,04 kJ/m²	-98,74 kJ/m²
Maximum difference between the transmitted energy E_{it} to the Stoll energy E_{iSTOLL} in t_i(1)	-45,06 kJ/m²	-45,43 kJ/m²	-45,92 kJ/m²	-45,84 kJ/m²
Excess of the Stoll curve by the heat curve of the transmitted incident energy E_{it} (t)	No	No	No	No

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.

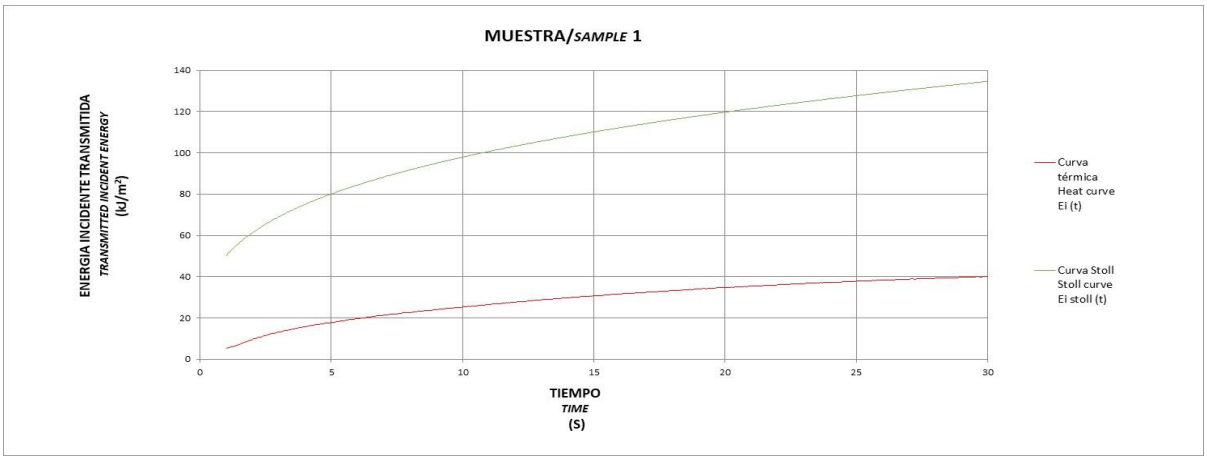
ELECTRIC ARC TEST

STOLL CURVES

Specimen 1

Reference

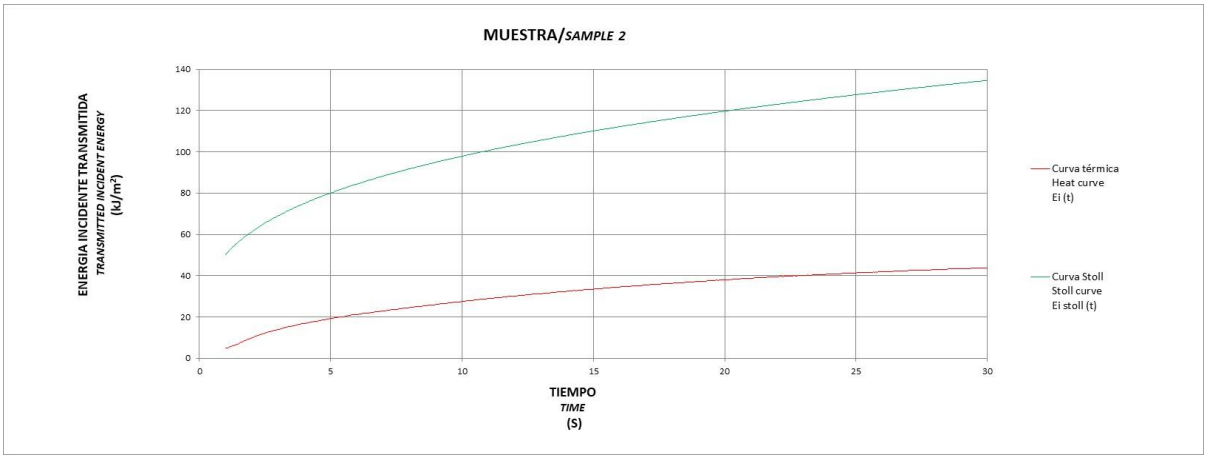
1- 2024CN0798-S01.1_P1



Specimen 2

Reference

2- 2024CN0798-S01.1_P1



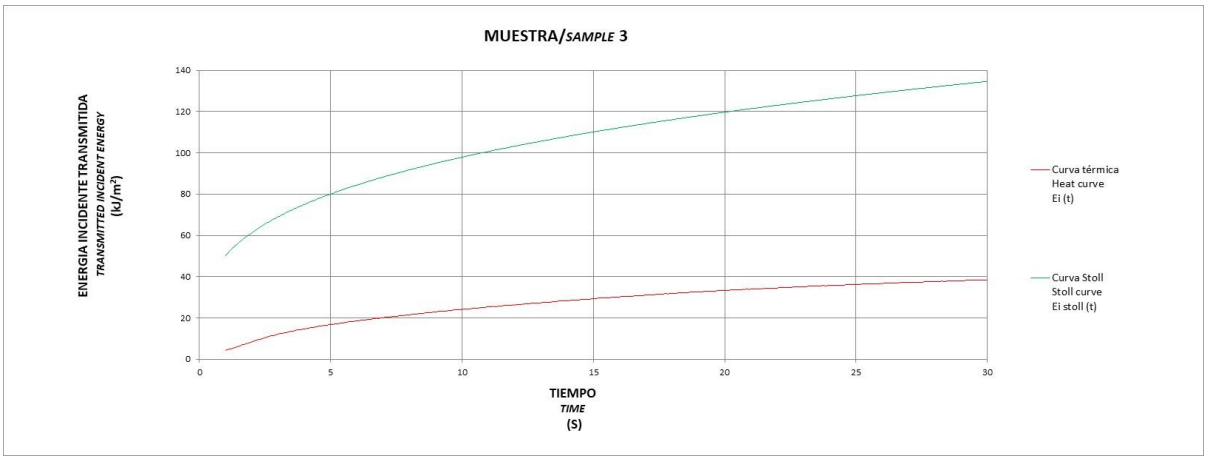
ELECTRIC ARC TEST

STOLL CURVES

Specimen 3

Reference

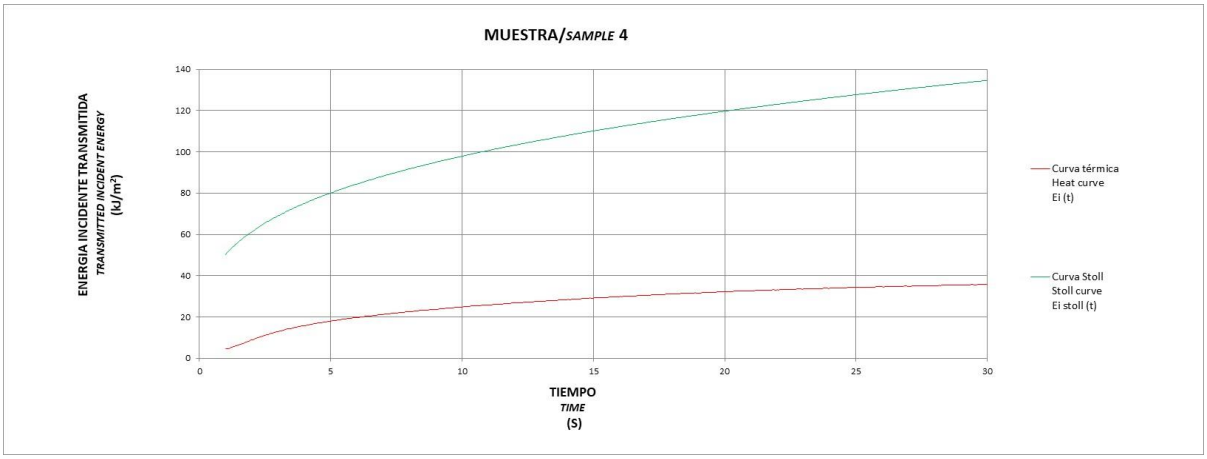
3- 2024CN0798-S01.1_P1



Specimen 4

Reference

4- 2024CN0798-S01.1_P1



ELECTRIC ARC TEST

Reference

2024CN0798-S01.1_P1

Original material

ELECTRIC ARC TEST

Reference

2024CN0798-S01.1_P1

Tested material

ELECTRIC ARC TEST

Reference

2024CN0798-S01.1_P1

Tested material

Remark

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

Reference by AITEX	Reference by customer
2024CN0798-S01.1_P1	Fabric c/ Hi Vis Yellow After 5 cycles

RESULTS

LIMITED FLAME SPREAD

Standard

EN ISO 15025:2016 Met.A

Equipment

Equipment for determination of limited flame spread

Test date

Start date 11/09/2024 **End date** 13/09/2024

Conditioned date

Start date 11/9/2024 **End date** 13/09/2024

Conditioned

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

Gas used

Propane gas

Face exposed to the flame

Outer

Reference

2024CN0798-S01_P1

Atmosphere for testing

Temperature 21,1 ºC **Relative Humidity** 59,2 %

Direction	Warp			Weft		
Flaming to top or either side edge	NO	NO	NO	NO	NO	NO
Post- After flame (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

Uncertainty

The uncertainty of the assay of limited flame spread is ± 2% of the value measured

The test was carried out at laboratory located at Carretera Banyeres 10 - 03802 Alcoi, Alicante

Reference by AITEX	Reference by customer
2024CN0798-S01_P1	POBFD3XY Fabric After 5 cycles

RESULTS

ELECTROSTATIC PROPERTIES: MEASUREMENT OF ELECTRICAL RESISTANCE THROUGH A MATERIAL (VERTICAL RESISTANCE)

Standard

EN 1149-2:1997

Atmosphere for conditioning

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

Contact pressure

2.25 kPa

Potential applied

(100 ± 5) *v*

Current measurement after

(15 ± 1) s

Uncertainty

±20% of the obtained value

Reference

2024CN0798-S01_P1

Test date

Start date 11/09/2024 **End date** 17/09/2024

Atmosphere for testing

Temperature 19,9 ºC **Relative Humidity** 64,6 %

Specimen	Vertical resistance (Ohm)
1	$4{,}69 \cdot 10^{8}$
2	$4{,}12 \cdot 10^{8}$
3	$4{,}73 \cdot 10^{8}$
4	$1{,}73 \cdot 10^{9}$
5	$7{,}46 \cdot 10^{8}$
Classification value	$\mathbf{4{,}12 \cdot 10^{8}}$
Average (Ohm)	$\mathbf{7{,}66 \cdot 10^{8}}$

The test was carried out at laboratory located at Carretera Banyeres 10 - 03802 Alcoi, Alicante

Reference by AITEX	Reference by customer
2024CN0798-S01_P1	POBFD3XY Fabric After 5 cycles

Lucia Martinez
Head of PPE and Ballistics department

Date: 30/09/2024 18:01:36
Digitally Signed by:LUCIA MARTINEZ MOLTO - NIF:21651425F

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