TEST REPORT

2021CN0052

DATE OF RECEPTION
21/01/2021

DATE TESTS
Starting: 21/01/2021
Ending: 01/03/2021

APPLICANT

WEST LAKE TECHNOLOGY CO., LTD.
Rm 12A, 8/F, Corporation Park, 11 On Lai Street
HONGKONG

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

IDENTIFICATION AND DESCRIPTION OF SAMPLES

REFERENCES
FABRIC HS-480PIP4Y

According to information supplied by the customer:

Fabric reference: HS-480PIP4Y
Composition: Aramid / Polyimide Blending
Weight: 480 gsm
Color: Silver
Others: Brand: HeatStopper

TESTS CARRIED OUT

- HEAT RESISTANCE.
- LIMITED FLAME SPREAD.
- 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.
- DETERMINATION OF FLEX ALUMINIUM.

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

ENAC ENSAYOS
Nº12 / LE025
Nº12 / LE427

SAMPLE DESCRIPTION

PHOTOGRAPHY

Reference (1)

Fabric HS-480PIP4Y

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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
As received

Tested material
Aluminized fabric with non-woven yellow inner face.

Reference
Fabric HS-480PIP4Y

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RESULTS

Fabric			
Flame	**Melting**	**Shrink (-)**	**Elongation (+)**
No	No	Lengthwise	-0,5 %
		Crosswise	-0,1 %
No	No	Lengthwise	-0,2 %
		Crosswise	-0,5 %
No	No	Lengthwise	-0,5 %
		Crosswise	-0,5 %

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%

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RESULTS

LIMITED FLAME SPREAD

Standard
EN ISO 15025:2016 (Method A)

Apparatus
Equipment for determination of limited flame spread 13008IE12

Test date
28/01/2021

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

Ambient conditions test
21,5ºC and 39,2% RH

Gas used
Propane gas

Deviation from the standard

Face exposed to the flame
Surfaces: Outer

Tested material
Aluminized fabric with non-woven yellow inner face.

Reference
Fabric HS-480PIP4Y

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RESULTS

Pre-Treatment As received

Specimen	**1**	**2**	**3**	**4**	**5**	**6**
Direction		Lengthwise			Crosswise	
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

Remark

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

PERFORMANCE LEVEL ACCORDING TO EN ISO 11612:2015	**A1**

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

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard
EN ISO 13934-1:2013

Apparatus
INSTRON Dynamometer

Conditioning date	22/02/2021	**Test date**	01/03/2021

Atmosphere for conditioning testing

Temperature	(20±2) ºC	**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

Nº of specimens

Tested	5 for each direction	**Rejected**	0
State of the specimens	Conditioned		

Reference
Fabric HS-480PIP4Y

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RESULTS

Direction	Maximum average load (N)	C.V. (%)	Average elongation (%)	C.V. (%)
Lengthwise	5300	0,0	9.0	0,6
	5300		9.0	
	5300 5300		9.0 9.0	
	5300		9.0	
	5300		9.0	
Crosswise	1800	3.0	13.0	3.6
	1900		13.0	
	1900 1900		12.5 13.0	
	1900		13.5	
	1900		12.5	

Remark

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

REQUISITE ACCORDING TO STANDARD EN ISO 11612:2015

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

PASS

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RESULTS

DETERMINATION OF TEAR RESISTANCE

Standard
EN ISO 13937-2:2000

Apparatus
INSTRON Dynamometer

Conditioning date 22/01/2021 **Test date** 28/01/2021

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

Reference
Fabric HS-480PIP4Y

Tear	Average load (N)		C.V. (%)
Lengthwise	260		
	350		
	310	330	15,0
	400		
	340		
Crosswise	210		
	200		
	190	190	8,6
	170		
	200		

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 warp direction.

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
80,50 kW/m^2

Pre-Treatment
As received

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

Ambient conditions test
21,0 ºC and 49,0 % RH

Deviation from the Standard

Test date
25/01/2021

Tested material
Aluminized fabric with non-woven yellow inner face.

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RESULTS

Reference	Specimen	Range HTI[a] 12 values(s)	Range HTI[a] 24 values(s)
Fabric HS-480PIP4Y	1	5,7	8,6
	2	5,1	8,0
	3	5,4	8,3
	Classification value	**5,1**	**8,0**
	Average	**5,4**	**8,3**

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.

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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
20,02 kW/m^2

Pre-Treatment
As received

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

Ambient conditions test
21,7 ºC and 37,6 % RH

Deviation from the Standard

Test date
01/02/2021

Tested material
Aluminized fabric with non-woven yellow inner face.

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RESULTS

Reference	Fabric HS-480PIP4Y		
Specimen	Heat transfer index RHTI 12(s)	Heat transfer index RHTI 24(s)	TF(%)
1	36,8	71,6	9,5
2	35,5	68,0	10,2
3	35,0	66,7	10,4
Classification value	**35,0**	**66,7**	**10,4**
Average	**35,8**	**68,8**	**10,0**

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	C3

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

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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) ºC

Pouring angle
(60±1) º

Pouring height
(225±5) mm.

Test date
16/02/2021

Pre-Treatment
As received

Deviation from the Standard

Tested material
Aluminized fabric with non-woven yellow inner face.

Reference			Fabric HS-480PIP4Y		
Mass of metal used (g)	Mass of metal pouring (g)	Ignition	Puncture	Metal adhered to fabric	Assessment of PVC film
365	359	No	No	No	Not Damaged
365	358	No	No	No	Not Damaged
364	358	No	No	No	Not Damaged
365	359	No	No	No	Not Damaged

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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 TO STANDARD EN ISO 11612:2015	D3

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

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
16/02/2021

Pre-Treatment
As received

Deviation from the Standard

Tested material
Aluminized fabric with non-woven yellow inner face.

Reference		Fabric HS-480PIP4Y			
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
203	203	No	No	No	Not Damaged
203	203	No	No	No	Not Damaged

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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

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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 ± 2) ºC and (65 ± 5) % RH

Ambient conditions test
19,8 ºC and 49,3 % RH

Pretreatment
As received.

Deviation from the Standard

Test date
01/02/2021

Tested material
Aluminized fabric with non-woven yellow inner face.

Reference
Fabric HS-480PIP4Y

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RESULTS

Specimen	Contact temperature (ºC)	Threshold time (s)
1	250	10,43
2	250	10,64
3	250	10,55
Classification value	**250**	**10,4**
Average	**250**	**10,5**

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)
	Minimum Max.
F1	5,00 < 10,0
F2	10,0 < 15,0
F3	15,0

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RESULTS

DETERMINATION OF FLEX ALUMINIUM

Standard
EN ISO 11612:2015 Appendix A

Test initial anf finish date
26/01/2021 - 27/01/2021

Used apparatus
Mechanical aging equipment for aluminized materials 13028N01

Reference
Sample 1 Fabric HS-480PIP4Y

Nº of cycles	2.500

Observations

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Lucia Martinez
Head of PPE and Ballistics department

Digitally signed by ISABEL LLOPIS LUMBRERAS - NIF:21678551Q
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