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Nº12 / LE025
Nº12 / LE427
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TEST REPORT

Nº 2014CN0097

DATE OF RECEPTION: 28/05/2014

DATE TEST: Starting: 13/05/2014
Ending: 08/07/2014

APPLICANT

Shanghai XM Group LTD
Room 2403,88 Guangxin Road
CN-200063 Shanghai

Att. Anna

DESCRIPTION AND IDENTIFICATION OF SAMPLES

SAMPLES REFERENCED:

-"FABRIC GEFEST".

Reference: GEFEST
Content: 100% cotton 420gsm Satin 4/1FR
Code: 100C-420FR-S
Colour: Black
Part Number: FRL-013-WD
Roll Number: 76

TESTS CARRIED OUT

- HEAT RESISTANCE
- LIMITED FLAME SPREAD
- DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING
- DETERMINATION OF BREAKING STRENGTH AND ELONGATION
- DETERMINATION OF TEAR RESISTANCE / Standard
- DETERMINATION OF PH VALUE
- METHOD OF DETERMINING HEAT TRANSMISSION ON EXPOSURE TO FLAME
- RADIANT HEAT
- ASSESSMENT OF RESISTANCE OF MATERIALS TO MOLTEN METAL SPLASH
- CONTACT HEAT
- SMALL MOLTEN METAL SPLASH
- VERTICAL RESISTANCE

ATTACHED --- SAMPLE(S) SEALED

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RESULTS

HEAT RESISTANCE

Standard
ISO 17493:2000

Apparatus
Air stove

Temperature
(180 ± 5) ºC

Deviation from the Standard

Test uncertainty
± 0,6 %

Pre-treatment
5 washing cycles at 60ºC, according to the standard ISO 6330:2012, method 6N and F drying (tumble dryer)

Material tested
Main fabric

Reference		FABRIC GEFEST	
Flame	**Melting**	**Shrink**	
No	No	Warp Weft	-0,3 % -0,2 %
No	No	Warp Weft	-0,4 % -0,3 %
No	No	Warp Weft	-0,6 % -0,4 %

PERFORMANCE LEVEL ACCORDING TO UNE-EN ISO 11612:2010	PASS

Requisites to meet according to UNE-EN ISO 11612:2010

a) No layer can ignite.
b) No layer can melt.
c) No layer shrinks more than 5%.

RESULTS

LIMITED FLAME SPREAD

Standard

UNE-EN ISO 15025:2003 (Method A)

Apparatus

Equipment for determination of limited flame spread 13008IE12

Original and pre-treatment test date

16/06/2014-16/06/2014

Conditioned

24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Original and pre-treatment ambient conditions test

23,2ºC and 50,0% HR-23,5ºC and 49,5% HR

Gas used

Propane

Deviation from the standard

Face exposed to the flame

Outer surface

Material tested

Principal fabric

Test uncertainty

± 0,29 s

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RESULTS

Reference FABRIC GEFEST

Pre-Treatment Original fabric

Specimen	1	2	3	4	5	6
Direction	Warp			Weft		
Flaming to top or either side edge	No	No	No	No	No	No
Post- After flame (s)	0,15	0,20	0,14	0,19	0,20	0,17
Post- Afterglow (s)	0,00	0,00	0,00	0,00	0,00	0,00
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 60ºC, according to standard ISO 6330:2012, method 6N 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
Post- After flame (s)	0,20	0,20	1,20	0,23	0,17	0,61
Post- Afterglow (s)	0,00	0,00	0,00	0,00	0,00	0,00
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 UNE-EN ISO 11612:2010	A1

PERFORMANCE LEVEL ACCORDING UNE-EN ISO 11611:2008	A1

Requisites to be met according to UNE-EN ISO 11612:2010 and UNE-EN ISO 11611:2008

a) No specimen shall give flaming to top or either side edge.
b) No specimen shall give hole formation in any layer.
c) No specimen shall give flaming or molten debris.
d) The mean value of after flame time shall be ≤ 2 s.
e) The mean value of afterglow time shall be ≤ 2 s.

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RESULTS

LIMITED FLAME SPREAD

Standard

UNE-EN ISO 15025:2003 (Method B)

Apparatus

Equipment for determination of limited flame spread 13008IE12

Original and pre-treatment test date

16/06/2014-16/06/2014

Conditioned

24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Original and pre-treatment ambient conditions test

24,2ºC and 47,5% HR-24,4ºC and 46,5% HR

Gas used

Propane

Deviation from the standard

Face exposed to the flame

Edge

Material tested

Principal fabric

Test uncertainty

± 0,29 s

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RESULTS

Reference FABRIC GEFEST

Pre-Treatment Original fabric

Specimen	1	2	3	4	5	6
Direction	Warp			Weft		
Flaming to top or either side edge	No	No	No	No	No	No
Post- After flame (s)	0,32	0,00	0,19	0,00	0,15	0,17
Post- Afterglow (s)	0,00	0,00	0,00	0,00	0,00	0,00
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 60ºC, according to standard ISO 6330:2012, method 6N 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
Post- After flame (s)	0,00	0,22	0,00	0,00	0,00	0,00
Post- Afterglow (s)	0,00	0,00	0,00	0,00	0,00	0,00
Loose waste	No	No	No	No	No	No
Inflammation of the filter paper detached from waste	No	No	No	No	No	No

Remark

The samples were not taken from the garment, these have been taken from tissue

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RESULTS

PERFORMANCE LEVEL ACCORDING UNE-EN ISO 11612:2010	A2

PERFORMANCE LEVEL ACCORDING UNE-EN ISO 11611:2008	A2

Requisites to be met according to UNE-EN ISO 11612:2010 and UNE-EN ISO 11611:2008

a) No specimen shall give flaming to top or either side edge.
b) No specimen shall give flaming or molten debris.
c) The mean value of after flame time shall be ≤ 2 s.
d) The mean value of afterglow time shall be ≤ 2 s.

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RESULTS

DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING

Standard

UNE-EN ISO 5077:2008 + ERRATUM:2008

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

Starting test date 06/06/2014 **Ending test date** 11/06/2014

Washing procedure

6N (T^a = 60 ± 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

Used equipment

02172E12

Detergent

98 ECE reference detergent without optical brightener.

Counterweight

Type III - 100% polyester

Number of washing cycles

5

Drying type

A3

Procedure F - Tumble dry

Uncertainly of test

± 0.3 %

Reference	Number of specimens	Direction	Dimensional change(%)
FABRIC GEFEST	2	Warp Weft	-3,0 -2,5

REMARK

Negative dimensional change indicates shrinkage

REQUISITE

In accordance with the Standard UNE-EN ISO 11612:2010 point (6.4.1), the dimensional change shall not exceed ±3%, both in width (warp) and in length (weft)

PASS

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RESULTADOS / *RESULTS*

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard

UNE-EN ISO 13934-1:2013

Apparatus

INSTRON Dynamometer

Gauge length

200 m

Rate of extension

100 mm/min

Pretension

Warp 5 N **Weft** 5 N

Atmosphere for conditioning and testing

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

Nº of specimens

Tested 5 for each direction **Rejected** 0

Pre-treatment

5 cycles of washing at 60 ºC according UNE-EN ISO 6330:2012, method 6N and tumble dry low

Reference	**FABRIC GEFEST**			
Direction	**Average load (N)**	**CV (%)**	**Elongation to the maximum load (%)**	**CV (%)**
Warp	1200	6.0	16.0	3.6
Weft	1100	4.0	17.5	3.2

REQUISITE ACCORDING TO STANDARD UNE-EN ISO 11611:2008

The material must resist a breaking load in both directions ≥ 400 N.

PASS

REQUISITE ACCORDING TO STANDARD UNE-EN ISO 11612:2010

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

PASS

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RESULTADOS / *RESULTS*

DETERMINATION OF TEAR RESISTANCE

Standard
UNE-EN ISO 13937-2:2001

Apparatus
INSTRON Dynamometer

Atmosphere for conditioning and testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Nº of specimens
Tested 5 for each direction **Rejected** 0

The calculation of averages has been made
For electronic device

Pre-treatment
5 cycles of washing at 60ºC, according to the standard UNE-EN ISO 6330:2012, method 6N and tumble dry low

Reference	Tear	Average load (N)	CV (%)
FABRIC GEFEST	Warp	37	2,2
	Weft	55	2,3

REQUISITE ACCORDING TO STANDARD UNE-EN ISO 11611:2008

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

PASS

REQUISITE ACCORDING TO STANDARD UNE-EN ISO 11612:2010

The external material must resist a determination of tear resistance in both directions ≥ 15 N.

PASS

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RESULTS

DETERMINATION OF PH VALUE

Standard

UNE-EN ISO 3071:2006

Determination date

16/06/2014

Extractor solution

A - H_2O

pH Extractor solution

7,25

Temperature

25 ºC

Reference	pH	Uncertainty
FABRIC GEFEST	7.10	± 0.15

REQUISITE

In accordance with Standard UNE-EN ISO 11611:2008 point (6.11.2), the pH value shall be greater than 3.5, and less than 9.5

PASS

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RESULTS

METHOD OF DETERMINING HEAT TRANSMISSION ON EXPOSURE TO FLAME

Standard
ISO 9151:1995

Apparatus
Convective heat

Heat flux density
79,35 kW/m^2

Pre-Treatment
5 washing cycles at 60ºC, according to the standard ISO 6330:2012, method 6N and F drying (tumble dryer)

Conditioned
24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Ambient conditions test
24,0 ºC and 48,0 % HR

Deviation from the Standard

Test date
16/06/2014

Material tested
Principal fabric

Test uncertainty
± 0,36 s

RESULTS

Reference	Specimen	Range of HTI[a] 12 values (s)	Range of HTI[a] 24 values (s)
FABRIC GEFEST	1	6,4	8,5
	2	5,7	8,3
	3	5,4	8,0
	Result	**5,4**	**8,0**

PERFORMANCE LEVEL ACCORDING TO STANDARD UNE-EN ISO 11612:2010	B1

Results in according with standard UNE-EN ISO 11612:2010

Performance level	Range of HTI[a] 24 values (s)	
	Minimum	Maximum
B1	4,0	< 10,0
B2	10,0	< 20,0
B3	20,0	
	Heat transfer index, as defined in ISO 9151:1995	

Results have been obtained according a test method with pretenders only the classification of the materials, and are not necessary the application of the conditions

RESULTS

RADIANT HEAT

Standard
UNE-EN ISO 6942:2002

Apparatus
Equipment for the determination of radiant heat

Heat flux density
19,98 kW/m^2

Pre-Treatment
5 washing cycles at 60ºC, according to ISO 6330:2012, method 6N and F drying (tumble dryer)

Conditioned
24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 2 % HR

Ambient conditions test
23,5 ºC and 47,0 % HR

Deviation from the Standard

Test date
17/06/2014

Material tested
Principal fabric

Test uncertainty
± 0,34 s

Reference	FABRIC GEFEST		
Specimen	RHTI^a 12 (s)	RHTI^a 24 (s)	(RHTI^a 24 - RHTI^a 12) (s)
1	8,8	16,3	7,5
2	10,6	17,8	7,2
3	9,1	16,9	7,8
Results	**8,8**	**16,3**	**7,5**

RESULTS

PERFORMANCE LEVEL ACCORDANCE WITH UNE-EN ISO 11612:2010	C1

PERFORMANCE LEVEL ACCORDANCE WITH UNE-EN ISO 11611:2008	CLASS 2

Results in accordance with Standard UNE-EN ISO 11612:2010

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

Results in accordance with Standard UNE-EN ISO 11611:2008

Heat transfer index RHTI 24	Class 1	Class 2
RHTI 24	≥ 7s	≥ 16s

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RESULTS

ASSESSMENT OF RESISTANCE OF MATERIALS TO MOLTEN METAL SPLASH

Standard

UNE-EN ISO 9185:2008

Apparatus

Equipment for molten metal splashes test

Metal

Iron

Pouring temperature

1400 ºC ± 20 ºC

Pouring angle

75 º ± 1º

Pouring height

225 mm ± 5 mm

Pre-treatment

5 washing cycles at 60ºC, according to the standard ISO 6330:2012, method 6N and F drying (tumble dryer)

Deviation from the Standard

Reference	FABRIC GEFEST			
Mass of metal pouring (g)	Ignition	Puncture	Metal adhered to fabric	Assessment of PVC film
209,3	No	No	No	Not damaged
207,8	No	No	No	Not damaged
205,9	No	No	No	Not damaged
205,4	No	No	No	Not damaged
206,4	No	No	No	Not damaged
206,8	No	No	No	Not damaged
206,7	No	No	No	Not damaged
205,7	No	No	No	Not damaged

PERFORMANCE LEVEL ACCORDING WITH UNE-EN ISO 11612:2010 E3

Results interpretation according to UNE-EN ISO 11612:2010

Performance levels	Molten iron (g)	
	Min.	Max.
E1	60	< 120
E2	120	< 200
E3	200	

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RESULTS

CONTACT HEAT

Standard
ISO 12127-1:2007

Apparatus
ÖTI CONTACT HEAT PROTECTION TESTER

Conditioned
24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Ambient conditions test
21,1 ºC and 49,5 % HR

Pre-treatment
5 washing cycles at 60ºC, according to standard ISO 6330:2012, method 6N and F drying (tumble dryer)

Deviation from the Standard

Test date
17/06/2014

Material tested
Principal fabric

Test uncertainty
± 0,13 s

Reference	FABRIC GEFEST	
Specimen	**Contact temperature Tc (ºC)**	**Threshold time T (s)**
1	250,0	7,65
2	250,0	7,66
3	250,0	7,54
Result	**250,0**	**7,5**

RESULTS

PERFORMANCE LEVEL ACCORDING TO STANDARD UNE-EN ISO 11612:2010	F1

Requisites according to standard UNE-EN ISO 11612:2010

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

RESULTS

SMALL MOLTEN METAL SPLASH

Standard
ISO 9150:1988

Apparatus
Equipment for small molten metal splash

Conditioned
24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Pre-Treatment
5 washing cycles at 60ºC, according to standard ISO 6330:2012, method 6N and F drying (tumble dryer)

Ambient conditions test
24,6 ºC and 48,5 % HR

Deviation from the Standard

Test date
18/06/2014

Material tested
Principal fabric

Test uncertainty
± 2 drops

Reference	Specimen	Nº of drops
FABRIC GEFEST	1	> 25
	2	25
	3	> 25
	4	25
	5	25
	6	> 25
	7	> 25
	8	> 25
	9	> 25
	10	> 25
	Average	**> 25**

Class 2

RESULTS

OBSERVATIONS

The Nº of drops is the necessary to increase 40ºC in the back side of the material.

Requisites to be met according UNE-EN ISO 11611:2008 point 6.8

Class 1	Minimum 15 drops
Class 2	Minimum 25 drops

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RESULTS

VERTICAL RESISTANCE

Standard

UNE-EN 1149-2:1998

Conditioned

24h. in indoor ambient conditions at 20 ± 2 ºC and 85 ± 5 % HR

Ambient conditions test

20,5 ºC and 83,7 % HR

Radius of the inner electrode

50,4 mm

Inner radius of the outer electrode

69,2 mm

Outer radius of the outer electrode

89,0 mm

Contact pressure

2,25 kPa

Potential applied

100 V

Current measurement after

15 s

Test date

16/06/2014

Test uncertainty

± 14,27 Ω

Pre-treatment

5 washing cycles at 60ºC, according to standard ISO 6330:2012, method 6N and F drying (tumble dryer)

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RESULTS

Reference	Specimen	Vertical Resistance (Ohm)	
FABRIC GEFEST	1	$3{,}36 \cdot 10^{8}$	$\mathbf{1{,}78 \cdot 10^{8}}$
	2	$1{,}24 \cdot 10^{8}$	
	3	$8{,}87 \cdot 10^{7}$	
	4	$1{,}33 \cdot 10^{8}$	
	5	$2{,}08 \cdot 10^{8}$	

ACCORDING TO STANDARD UNE-EN ISO 11611:2008	PASS

Requirement

According to the Standard UNE-EN ISO 11611:2008, the vertical electric resistance must be upper than $10^{5}\Omega$

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Lucia Martinez
Responsable departamento EPI´s
Head of PPE´s department

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