TEST REPORT

2022CO0124

DATE OF RECEPTION
13/01/2022

DATE TESTS
Starting: 13/01/2022
Ending: 26/01/2022

APPLICANT

MADURA COATS PRIVATE LIMITED
144 M.G. ROAD BENGALURU
IN-560001 BANGALORE

Att. JITENDRA SHUKLA

IDENTIFICATION AND DESCRIPTION OF SAMPLES

REFERENCES
FABRIC FU50073

TESTS CARRIED OUT

- PHOTOGRAPHY.
- 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.
- CHARGE DECAY.

AITEX - Plaza Emilio Sala, 1 - E-03801 ALCOY (Alicante) SPAIN Tel.:+34 96 554 22 00 www.aitex.es info@aitex.es

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

RESULTS

PHOTOGRAPHY

Reference

FABRIC FU50073

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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 FU50073

Units 1
Equipment Wascator 13369E12
Dryer machine ELECTROLUX 13425E12

Washing procedure 6N **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	0,96 Kg	1,00 Kg of Polyester	Wascator 13369E12

Start and finish date
17/01/2022 - 18/01/2022

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

Tested material
Orange woven fabric

Reference
FABRIC FU50073

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RESULTS

Fabric			
Flame	**Melting**	**Direction**	**Shrink(-) / Elongation(+)**
No	No	Warp	-1,7 %
		Weft	-1,8 %
No	No	Warp	-2,2 %
		Weft	-1,7 %
No	No	Warp	-1,6 %
		Weft	-1,7 %

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

Original and after pre-treatment test date
18/01/2022 - 19/01/2022

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

Original and after pre-treatment ambient conditions test
19,7ºC and 22,9% RH - 23,8ºC and 29,2% RH

Gas used
Propane gas

Deviation from the standard

Face exposed to the flame
Outer surface

Tested material
Orange woven fabric.

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

Reference
FABRIC FU50073

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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 60ºC, according to standard EN ISO 6330:2012, method 6N 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

Requisites 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, except for an interlining that is used for specific protection other than heat and flame protection
c) No specimen shall give flaming or molten debris
d) The afterflame time is ≤ 2 s
e) The afterglow time is ≤ 2 s

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RESULTS

LIMITED FLAME SPREAD

Standard

EN ISO 15025:2016 (Method B)

Apparatus

Equipment for determination of limited flame spread 13008IE12

Original and after pre-treatment test date

18/01/2022 - 19/01/2022

Conditioned

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

Original and after pre-treatment ambient conditions test

20,0ºC and 20,9% HR - 23,7ºC and 30,4% HR

Gas used

Propane gas

Deviation from the standard

Face exposed to the flame

Edge: Hemmed specimen

Tested material

Orange woven fabric

Test uncertainty

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

Reference

FABRIC FU50073

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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
Afterflame 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

Pre-Treatment 5 washing cycles at 60ºC, according to the 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
Afterflame 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

PERFORMANCE LEVEL ACCORDING EN ISO 11612:2015	A2

Requisites to be met according to EN ISO 11612:2015

a) No specimen shall give flaming to top or either side edge
b) No specimen shall give flaming or molten debris
c)The afterflame time is ≤ 2 s
d) The afterglow time is ≤ 2 s

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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 14/01/2022 **Ending test date** 26/01/2022

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 (13369E12)

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(13425E12)

Uncertainty of test (% of the measured value)
± 0.4 %

Tested material
Orange woven fabric

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RESULTS

Reference	Specimen	Direction	Dimensional change (%)
FABRIC FU50073	1	Warp	-5,0
		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 ± 3%, both in width warp and in length weft.

NO PASS

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RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard
EN ISO 13934-1:2013

Apparatus
INSTRON Dynamometer

Conditioning date	18/01/2022	**Test date**	24/01/2022

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		

Previous treatment
5 washing cycles at 60ºC, according to standard EN ISO 6330:2012, method 6N and type F drying (tumble dry)

Reference
FABRIC FU50073

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RESULTS

Direction	Maximum average load (N)	Average elongation (%)
	758,5	21,1
Lengthwise	800,0	20,8
	788,6	20,8
	785,3	20,9
	812,2	21,1
Average (N)	790	21,0
CV (%)	2,5	0,8

Direction	Maximum average load (N)	Average elongation (%)
	566,8	12,7
Crosswise	542,1	12,3
	550,0	12,0
	542,7	12,4
	544,5	12,1
Average (N)	550	12,5
CV (%)	1,9	2,2

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 18/01/2022 **Test date** 20/01/2022

Atmosphere for testing

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

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

The calculation of averages has been made
For electronic device

Gauge length
Lengthwise 100 mm **Crosswise** 100 mm

Previous treatment
5 washing cycles at 60ºC, according to standard EN ISO 6330:2012, method 6N and type F drying (tumble dry)

Reference
FABRIC FU50073

Direction	Maximum force	Medium force	C.V. (%)
Lengthwise	19,6 18,1 18,7 18,2 18,1	19	3,4
Crosswise	36,9 32,0 32,5 32,7 31,2	33	6,7

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

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RESULTS

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
79,96 kW/m^2

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

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

Ambient conditions test
20,3 ºC and 33,6 % RH

Deviation from the Standard

Test date
21/01/2022

Tested material
Orange woven fabric

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RESULTS

Reference	Specimen	Range HTI[a] 12 values(s)	Range HTI[a] 24 values(s)
FABRIC FU50073	1	3,9	5,5
	2	4,0	5,5
	3	3,8	5,4
	Classification value	**3,8**	**5,4**
	Average	**3,9**	**5,5**

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
19,84 kW/m^2

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

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

Ambient conditions test
22,5 ºC and 30,7 % HR

Deviation from the Standard

Test date
20/01/2022

Tested material
Orange woven fabric

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RESULTS

Reference	FABRIC FU50073		
Specimen	Heat transfer index RHTI 12(s)	Heat transfer index RHTI 24(s)	TF(%)
1	8,0	14,5	14,5
2	8,0	14,5	14,5
3	8,1	14,8	14,8
Classification value	**8,0**	**14,5**	**14,5**
Average	**8,0**	**14,6**	**14,6**

Remark

The uncertainty of the assay of Radiant heat is ±3% of the value measured, for a coverage factor of K=2 (95%).

PERFORMANCE LEVEL ACCORDANCE WITH STANDARD EN ISO 11612:2015 C1

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
Iron

Pouring temperature
(1400±20) ºC

Pouring angle
(75±1) º

Pouring height
(225±5) mm.

Test date
21/01/2022

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

Deviation from the Standard

Tested material
Orange woven fabric

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RESULTS

Reference			FABRIC FU50073		
Mass of metal used (g)	**Mass of metal pouring (g)**	**Ignition**	**Puncture**	**Metal adhered to fabric**	**Assessment of PVC film**
172	172	No	Yes	No	Damaged
162	162	No	Yes	No	Damaged
152	152	No	Yes	No	Damaged
147	147	No	Yes	No	Damaged
138	138	No	Yes	No	Damaged
128	128	No	Yes	No	Not Damaged
128	128	No	No	No	Not Damaged
128	128	No	No	No	Not Damaged
128	128	No	No	No	Not Damaged

Molten metal splashes index	(137.55-128.31)/2= 132.93 **133g**
Classification EN ISO 11612	E2

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	**E2**

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
22,5 ºC and 37,9 % RH

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

Deviation from the Standard

Test date
25/01/2022

Tested material
Orange woven fabric

Reference
FABRIC FU50073

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RESULTS

Specimen	Contact temperature (ºC)	Threshold time (s)
1	250	6,82
2	250	6,64
3	250	6,93
Classification value	**250**	**6,6**
Average	**250**	**6,8**

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 F1

Requirements according to standard EN ISO 11612:2015

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

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RESULTS

CHARGE DECAY

Standard
EN 1149-3:2004 (Method 2, induction charging)

Conditioned
24h environmental conditions to (23 ± 1) ºC and (25 ± 5) % RH

Ambient conditions test
23,1 ºC and 28,2 % RH

Test method used
Induction charge (Test method 2)

Potential applied
(1200 ± 50) V in 30 µs

Time measurement
30 s

Deviation from the Standard

Tested material
Orange woven fabric

Measurement uncertainty
Shielding factor: ± 0,02
t_{50}: ± 0,01 s

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RESULTS

Pre-Treatment

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

Reference	FABRIC FU50073	
Specimen	**Decay half time (s)** t_{50}	**Shielding factor (units)** **S**
1	< 0,01	0,33
2	< 0,01	0,31
3	< 0,01	0,32
Average	**< 0,01**	**0,32**

ACCORDING TO STANDARD EN 1149-5:2018	**PASS**

ACCEPTANCE CRITERION ACCORDING TO EN 1149-3:2004 AND EN 1149-5:2018, METHOD INDUCTION CHARGING

t_{50}< 4s or S > 0,2

Where, t_{50}= decay half time
S = shielding factor

Start and finish test date

18/01/2022 - 24/01/2022

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Begoña Pico
Head of Public Tenders Division

Digitally signed by BEGOÑA PICO MONLLOR - NIF:21647435L
Date: 2022.02.07 11:55:10 +01:00
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