Centro Tecnológico
das Indústrias Têxtil
e do Vestuário
de Portugal

REPORT
Nº 11933/2017 - 1

LABORATÓRIOS - V.N.FAMALICÃO

IPAC acreditação
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Request Nr.: 11186/2017 **Date of Reception :** 2017/11/13

Observations

Samples reference - Your reference

18615/2017 - Col: Navy

Tests required

Tests according EN ISO 11612
3/1 S Twill ref. Arwowear T2 Flame Pro Composition: 100% Cotton Colour: Navy - 260 g/m²

COMMENTS

See last page

- The tests were performed between the following dates: 2017/11/13 and 2017/12/05.

V.N.FAMALICÃO, 05th December 2017

LABORATORY
COORDINATOR

(Engª Suzana Blattmann)

NOTES:
- These results were obtained according to the proceedings referred in the Quality Manual of CITEVE and concern only the samples submitted to testing (above mentioned).
- Any part of this report cannot be reproduced without the prior permission of CITEVE.
- The tests signalled by * are not included in the scope of accreditation of this laboratory
- q.l - quantification limit d.l. - detection limit n.d. - not detected
- Samples are stored for 6 months after the date of entry, except for chemical products that are stored for a month.

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Sample Ref.	**Your ref.**	**Sample description**
18615 /2017 -	Col: Navy -	1 Sample of 3/1 S Twill

Test/Standard: ***TEAR STRENGTH / EN ISO 13937-2:2000***

Results

	After treatment (see washing)
Warp - Ind. values	26
	28
	28
	27
	27
Warp - Mean value (N)	27
Uncertainty (N)	±3,4
Weft - Ind. values	30
	30
	30
	30
	31
Weft - Mean value (N)	30
Uncertainty (N)	±4,5
Number of tests rejected -	0
Reasons for tests rejected -	Not applicable

Test Conditions

Mean values calculated by electronic device
Number of the specimens - 10
Type of clamps - flats, 25 mm x 75 mm

Test/Standard: ***TENSILE STRENGTH (STRIP METHOD) / ISO 13934-1:2013***

Results

	After treatment (See washing)
MAXIMUM FORCE	
Warp - Ind. values	860
	890
	850
	870
	890

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Warp - Mean value (N)	870
Uncertainty (N)	± 99
Weft - Ind. values	610
	590
	590
	560
	610
Weft - Mean value (N)	590
Uncertainty (N)	± 71
ELONGATION AT MAXIMUM FORCE	
Warp - Ind. values	19,5
	20,0
	19,0
	19,5
	20,0
Warp - Mean value (%)	19,5
Uncertainty (%)	± 2,3
Weft - Ind. values	13,0
	13,0
	12,5
	12,0
	12,5
Weft - Mean value (%)	12,5
Uncertainty (%)	± 1,4

Test Conditions

Number of specimens tested - 10 (total)
Width of specimens - 50 mm
Gauge length - 200 mm
Pretension (N) - 5
State of specimens - conditioned
Rate of extension - 100 mm/min
Conditioned Atmosphere:
20+/-2ºC and 65+/-4% R.H.

Test/Standard: ***DIMENSIONAL STABILITY TO DOMESTIC WASHING AND DRYING / ISO 5077:2007***

Results

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Wales/length/warp (Ind. value) -	-3,0
	-2,7
	-2,5
Mean value (%)	-2,7
Courses/width/weft (ind. value %) -	-0,7
	-1,6
	-0,7
Mean value (%)	-1,0
Uncertainty	
Wales/length/warp (%) -	± 0,48
Courses/width/weft (%) -	± 0,46

Test Conditions

Washing machine: Type A	
Washing programme:(ISO6330:2012) -	4N (40ºC)
Total load (kg): 2	
Type of load used:	Type I (100% cotton)
Detergent used: Ref 2 (ECE)	
Sodium perborate+TAED	
Drying method:	Line dry
Number of washing and drying cycles: 5	
Number of specimens tested: 3	
Note: the signal + means extension and the signal - means shrinkage.	

Test/Standard: **** WASHING / ISO 6330:2012***

Results

Test Conditions

Washing machine: Type A	
Washing programme (ISO 6330:2012):	4N (40ºC)
Total load (kg): 2	
Detergent used:IEC + Sodium Perborate +TAED	
Drying method:	Line dry
Number of washing and drying cycles:	5
Number of specimens tested:	1

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Test/Standard: ***CONVECTIVE HEAT RESISTANCE / ISO 17493:2000***

Results

	After treatment (See washing)		
Variation on dimensions:	1	2	3
Wales/length/warp (mean value %) -	-0,1	-0,1	-0,3
Courses/width/weft (mean value %) -	0,0	0,0	-0,2
Uncertainty			
Wales/length/warp (%) -	± 0,91		
Courses/width/weft (%) -	± 0,88		
Ignition:	No		
Melting (hole, dripping):	No		
Separation (splitting, delamination):	No		

Test Conditions

Temperature of exposure:	180ºC
Time of exposure:	5 min
Dimensions of the specimens:	40x40
Number of specimens tested:	3
Note: the signal + means extension and the signal - means shrinkage.	

Test/Standard: ***AROMATIC AMINES DERIVED FROM AZOCOLORANTS / EN 14362-1:2012***

Results

	Results in mg/kg
4-Aminobiphenyl	< 5 (q.l.)
Benzidine	< 5 (q.l.)
4-Chloro-o-toluidine	< 5 (q.l.)
2-Naphthylamine	< 5 (q.l.)
[a] o-Aminoazotoluene	< 5 (q.l.)
[a] 5-Nitro-o-toluidine	< 5 (q.l.)
4-Chloroaniline	< 5 (q.l.)
2,4-Diaminoanisole	< 5 (q.l.)
4,4'-Diaminodiphenylmethane	< 5 (q.l.)
3,3'-Dichlorobenzidine	< 5 (q.l.)
3,3'-Dimethoxybenzidine	< 5 (q.l.)
3,3'-Dimethylbenzidine	< 5 (q.l.)
4,4'-Methylene-di-o-toluidine	< 5 (q.l.)
p-Cresidine	< 5 (q.l.)

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4,4'-Methylene-bis-(2-chloraniline)	< 5 (q.l.)
4,4'-Oxydianiline	< 5 (q.l.)
4,4'-Thiodianiline	< 5 (q.l.)
o-Toluidine	< 5 (q.l.)
2,4-Diaminotoluene	< 5 (q.l.)
2,4,5-Trimethylaniline	< 5 (q.l.)
o-Anisidine	< 5 (q.l.)
2,4-Xylidine	< 5 (q.l.)
2,6-Xylidine	< 5 (q.l.)
º 4-Aminoazobenzene	< 5 (q.l.)

[a]These amines are reduced to o-toluidine and 2,4-Diaminotoluene.
[o]This amine is reduced to aniline and/or 1,4-phenylenediamine. If detected an additional test must be performed.

Quantification method: GC-MS
All positive result is confirmed by an additional method.

Test Conditions

Procedure: 9.2

Test/Standard: ***pH OF AQUEOUS EXTRACT / ISO 3071:2005***

Results

Mean pH-value -	4,9

Test Conditions

Type of solution used -	KCl
pH of the extracting solution -	5,7
Temperature of the extracting solution -	22 ºC

Test/Standard: ***CONTACT HEAT TRANSMISSION / EN ISO 12127-1: 2015***

Results

Threshold time, tt	
Individual values (s) :	5,9
	5,7
	5,5

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Mean value (s) :	5,7
Standard deviation (s) :	0,18
Uncertainty of measurement (s) :	± 0,40
Observed changes in the test specimens :	No changes

Test Conditions

Contact temperature (Tc) : 250ºC
Number of specimens: 5
State of specimens: After washed (see washing)

Test/Standard: ***BURNING BEHAVIOUR / ISO 15025:2016***

Results

	Original			After washed		
Test / specimens:	1	2	3	1	2	3
WARP/ LENGTH for procedure A						
Flaming reaches the upper edge or either vertical edge of the specimen:	No	No	No	No	No	No
Afterflame time (s):	0	0	0	0	0	0
Uncertainty of measurement (%):	± 15			± 15		
Afterglow spreads beyond the flame spread area into the undamaged area:	No	No	No	No	No	No
Afterglow time (s):	0	0	0	0	0	0
Uncertainty of measurement (%):	± 15			± 15		
Occurrence of melting:	No	No	No	No	No	No
Occurrence of debris:	No	No	No	No	No	No
Debris ignites the filter paper (flaming debris) or melts:	No	No	No	No	No	No
The seams thread remains intact:	N/A			N/A		
Hole develops:	No	No	No	No	No	No
Number of holes (for multilayers):	N/A			N/A		
Hole(s) developed in which layer(s):	N/A			N/A		
Size of the largest hole (mm):	N/A			N/A		
WARP/ LENGTH for procedure B						
Flaming reaches the upper edge or either vertical edge of the specimen:	No	No	No	No	No	No
Afterflame time (s):	0	0	0	0	0	0
Uncertainty of measurement (%):	± 15			± 15		
Afterglow spreads beyond the flame	No	No	No	No	No	No
spread area into the undamaged area:	No	No	No	No	No	No

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Afterglow time (s):	0	0	0	0	0	0					
Uncertainty of measurement (%):	± 15			± 15							
Occurrence of melting:	No	No	No	No	No	No					
Occurrence of debris:	No	No	No	No	No	No					
Debris ignites the filter paper (flaming debris) or melts:	No	No	No	No	No	No					
The seams thread remains intact:	N/A			N/A							
The layers were tested separately or together (for multilayers):	N/A			N/A							
The damage/char length (mm):	78	105	80	85	92	110					
WEFT/ WIDTH for procedure A											
Flaming reaches the upper edge or either vertical edge of the specimen:	No	No	No	No	No	No					
Afterflame time (s):	0	0	0	0	0	0					
Uncertainty of measurement (%):	± 15			± 15							
Afterglow spreads beyond the flame spread area into the undamaged area:	No	No	No	No	No	No					
Afterglow time (s):	0	0	0	0	0	0					
Uncertainty of measurement (%):	± 15			± 15							
Occurrence of melting:	No	No	No	No	No	No					
Occurrence of debris:	No	No	No	No	No	No					
Debris ignites the filter paper (flaming debris) or melts:	No	No	No	No	No	No					
The seams thread remains intact:	N/A			N/A							
Hole develops:	No	No	No	No	No	No					
Number of holes (for multilayers):	N/A			N/A							
Hole(s) developed in which layer(s):	N/A			N/A							
Size of the largest hole (mm):	N/A			N/A							
WEFT/ WIDTH for procedure B											
Flaming reaches the upper edge or either vertical edge of the specimen:	No	No	No	No	No	No					
Afterflame time (s):	0	0	0	0	0	0					
Uncertainty of measurement (%):	± 15			± 15							
Afterglow spreads beyond the flame spread area into the undamaged area:	No	No	No	No	No	No					
Afterglow time (s):	0	0	0	0	0	0					
Uncertainty of measurement (%):	± 15			± 15							
Occurrence of melting:	No	No	No	No	No	No					
Occurrence of debris:	No	No	No	No	No	No					
Debris ignites the filter paper (flaming debris) or melts:	No	No	No	No	No	No					
The seams thread remains intact:	N/A			N/A							
The layers were tested separately or together (for multilayers):	N/A			N/A							

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The damage/char length (mm):	96 100 91 95 95 92

Note:
"0" means did not ignite
N/A - Not applicable

Test Conditions

Test procedure: Surface ignition (A) and
Bottom edge ignition (B)
The surface exposed towards the flame:
Right side
Type of gas used: Propane
Flame application time: 10s
Environmental conditions of test:
(23±5)ºC and 15% to 80% R.H.
Technique used to attach fabrics:
support on pins
Size of specimens:
Surface ignition: (200 x 160) mm
Botton edge ignition: (200 x 80) mm
State of specimens: As received and
after washed (see washing)
Conditioning: 24h at (20±2)ºC and
(65±5)% R.H.

Test/Standard: ***PROTECTION AGAINST HEAT AND FIRE: SOURCE OF RADIANT HEAT / ISO 6942:2002***

Results

METHOD B

Transmitted heat flux - Qc	
Individual values (kW/m²) :	9,0
	8,9
	9,6
Mean value (kW/m²) :	9,2
Heat transmission factor - TF	
Individual values :	0,4
	0,4
	0,5
Mean value :	0,5

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Time for a 12ºC temperature raise	
Individual values (s) :	8,2
	8,4
	7,6
Radiant heat transfer index (RHTI 12)	
Mean value (s):	8,1
Uncertainty of measurement (s):	± 2,0
Time for a 24ºC temperature raise	
Individual values (s) :	15,6
	15,9
	14,5
Radiant heat transfer index (RHTI 24)	
Mean value (s):	15,3
Uncertainty of measurement (s):	± 1,9
RHTI 24 - RHTI 12	
Individual values (s) :	7,4
	7,5
	6,9
Mean value (s) :	7,3
Uncertainty of measurement (s):	1,3

Test Conditions

Incident heat flux density (kW/m²): 20
Number of specimen tested: 3
State of specimens: After washed (see washing)
Test atmosphere: 15ºC-35ºC

Test/Standard: ***PROTETION AGAINST HEAT AND FIRE - FLAME EXPOSURE / ISO 9151:2016***

Results

Time for a 24ºC temperature rise	
Individual values (s) :	6,4
	6,2
	6,4
Heat tranfer index HTI24 (s) :	6,3
Uncertainty of measurement (s):	± 0,75
Time for a 12ºC temperature rise	

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Individual values (s) :	4,4 4,4 4,6
Heat tranfer index HTI12 (s) :	4,5
Uncertainty of measurement (s):	± 0,53
HTI24 - HTI12 (s) :	1,9
Change in appearance :	Charring

These results have been obtained by a test method aimed solely at ranking the materials tested and are not necessarily applicable to actual fire conditions.

Test Conditions

Incident heat flux: (80±2) kW/m²
Calorimeter used: Method B
Gas used: Propane
Conditioning: 24h at (20±2)ºC and (65±5)% R.H.
Environmental test conditions: 20ºC and 47% R.H.
State of specimens: After washed (see washing) and conditioned.

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COMMENTS

The sample our ref. 18615/2017 is according EN ISO 11612:2015 in tear strength (warp 26N ±3,4N and weft 30N ±4,5N, minimum requirement 10N), tensile strength (warp 850N ±99N and weft 560N ±71N, minimum requirement 300N), dimensional stability to domestic washing and drying (after 5 cycles 4N (40ºC) Line dry: warp -3,0% ±0,48% and weft -1,6% ± 0,46%, maximum requirement ±3%), heat resistance (180ºC: warp -0,3% ±0,91% and weft -0,2% ± 0,88%, maximum shrinkage requirement 5%), contact heat transmission (CODE LETTER F1, threshold time= 5,5s ±0,40s, requirement to code letter F1 threshold time: 5,0s - <10,0s), burning behaviour (limited flame spread - CODE LETTER A1 and A2, requirement to procedure A: no specimen shall: suffer flaming to the top or either side edge, suffer hole, give flaming or molten debris and all specimens shall have after flame time <=2s and requirement to procedure B: no specimen shall: suffer flaming to the top or either side edge, give flaming or molten debris and all specimens shall have after flame time <=2s), protection against heat and fire: source of radiant heat (CODE LETTER C1, RHTI24 = 14,5s ±1,9s, requirement code letter C1 RHTI24: 7,0s - <20,0s), protection against heat and fire: flame exposure (CODE LETTER B1, HTI24= 6,2s ± 0,75s, requirement code letter B1 HTI24: 4,0s - <10,0s) and is according EN ISO 13688:2013 in aromatic amines derived from azocolorants (requirement not detectable) and pH of aqueous extract (requirement 3,5 to 9,5).

request 11186-2017 sample 18615-2017