

LABORATÓRIOS - V.N.FAMALICÃO



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Request Nr.: 960/2018

Date of Reception : 2018/01/30

Observations

Samples reference - Your reference

1832/2018 - ArShirt Moda Pro

Tests required

Tests according EN ISO 11612

Knitted Fabric ref. ArShirt Moda Pro, Composition 60% Modacrylic 38% Cotton 2% Carbon, 200-220 g/m²
The results of tests dimensional stability, azo dyes and pH were transcribed from sample 1832/2018
from report nº 1475/2018-1.

COMMENTS

See last page

- The tests were performed between the following dates: 2018/01/30 and 2018/02/14.

V.N.FAMALICÃO, 16th February 2018

LABORATORY
COORDINATOR



(Eng^a Antónia Andrade)

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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<u>Sample Ref.</u>	<u>Your ref.</u>	<u>Sample description</u>
1832 /2018	ArShirt Moda Pro	1 Sample of knitted fabric

Test/Standard: BURSTING STRENGTH / EN ISO 13938-1:1999

Results

	After treatment (see washing)
Individual values	536 488 511 494 497
Mean bursting strength (kN/m ² =kPa)	505
Uncertainty (kN/m ² =kPa)	±74
Individual values	14 12 12 11 12
Mean height at burst (mm)	12
Uncertainty (mm)	±2,9

Test Conditions

Time to burst - 20+/-5s
Number of tested specimens - 5
State of test - conditioned
Tested area - 7,3 cm²
Equipment - Auto-Burst
Model M229

Test/Standard: DIMENSIONAL STABILITY TO DOMESTIC WASHING AND DRYING / ISO 6330:2012

Results

Specimen:	1	2	3
Wales/length/warp (mean value %) -	-0,3	-0,4	-0,6
Courses/width/weft (mean value %) -	-0,7	-0,4	-0,4
Uncertainty			
Wales/length/warp (mean value %) -	±0,91		
Courses/width/weft (mean value %) -	±0,88		

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Test Conditions

Washing machine: Type A
 Washing programme: (ISO 6330:2012): 4N (40°C)
 Total load (kg): 2
 Type of load used: Type III (100% polyester)
 Detergent used: Ref. 3 (ECE)
 Perborate de sodium + TAED
 Drying method: Drip 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: 4N (40°C)
 Total load (kg): 2
 Detergent used: ECE + Sodium Perborate
 +TAED
 Drying method: Drip line dry
 Number of washing and drying cycles: 5 wash/dry cycles
 Number of specimens tested: 1

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

Results

	After treatment (see washing)		
	1	2	3
Specimen:			
Variation on dimensions:			
Wales/length/warp (mean value %) -	-1,0	-0,9	-0,7
Courses/width/weft (mean value %) -	-0,7	-0,6	-0,9
Uncertainty			
Wales/length/warp (mean value %) -	±0,91		
Courses/width/weft (mean value %) -	±0,88		
Ignition:	No		
Melting (hole, dripping):	No		
Separation (splitting, delamination):	No		

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Test Conditions

Temperature of exposure:	180°C
Time of exposure:	5 min.
Dimensions of the specimens:	38cmX38cm
Number of specimens tested:	3
Note: the signal + means extension and the signal - means shrinkage.	

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

Results

Mean pH-value -	6,8
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Test Conditions

Type of solution used -	KCl
pH of the extracting solution -	5,9
Temperature of the extracting solution -	20 °C

Test/Standard: *AROMATIC AMINES FROM AZO COLORANTS (without extraction) / EN ISO 14362-1:2017*

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.)
4,4'-Methylene-bis-(2-chloraniline)	< 5 (q.l.)
4,4'-Oxydianiline	< 5 (q.l.)
4,4'-Thiodianiline	< 5 (q.l.)

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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.)

^aThese amines are reduced to o-toluidine and 2,4-Diaminotoluene.

^oThis amine is reduced to aniline and/or 1,4-phenylenediamine. If detected an additional test must be performed.

Test Conditions

Procedure: 10.2

Detection method:GC-MS

Quantification method:GC-MS or LC-MS

Confirmation method:LC-DAD or LC-MS

Detection limit: 1,5 mg/kg

Test/Standard: BURNING BEHAVIOUR / ISO 15025:2016

Results

Test / specimens:	Original			After washed		
	1	2	3	1	2	3
WARP/ LENGTH	1	2	3	1	2	3
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					
For procedure A						
Hole develops:	No	No	No	No	No	No
Number of holes (for multilayers):	N/A					
Hole(s) developed in which layer(s):	N/A					
Size of the largest hole (mm):	N/A					

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For procedure B

The layers were tested separately or together (for multilayers): N/A
The damage/char length (mm): N/A

WEFT/ WIDTH

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					
For procedure A						
Hole develops:	No	No	No	No	No	No
Number of holes (for multilayers):	N/A					
Hole(s) developed in which layer(s):	N/A					
Size of the largest hole (mm):	N/A					
For procedure B						
The layers were tested separately or together (for multilayers):	N/A					
The damage/char length (mm):	N/A					

Note:

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

Test Conditions

Test procedure: Surface ignition (A)
The surface exposed towards the flame:
Right side
Type of gas used: Propane
Flame application time: 10s
Environmental conditions of test:
(23±5)°C and 15% to 80% R.H.
Technique used to attach fabrics:
support on pins

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Size of specimens: (200 x 160) mm
State of specimens: As received and
after washed (see washing)
Conditioning: 24h at (20±2)°C 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) :

9,6
10,1
10,6

Mean value (kW/m²) : 10,1

Heat transmission factor - TF

Individual values :

0,5
0,5
0,5

Mean value : 0,5

Time for a 12°C temperature raise

Individual values (s) :

8,6
8,4
7,8

Radiant heat transfer index (RHTI 12)

Mean value (s): 8,3
Uncertainty of measurement (s): ± 2,0

Time for a 24°C temperature raise

Individual values (s) :

15,5
15,0
14,1

Radiant heat transfer index (RHTI 24)

Mean value (s): 14,9
Uncertainty of measurement (s): ± 1,9

RHTI 24 - RHTI 12

Individual values (s) :

6,9
6,6
6,3

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Mean value (s) :	6,6
Uncertainty of measurement (s):	± 1,2

Test Conditions

Incident heat flux density (kW/m ²):	20
Number of specimen tested: 3	
State of specimens: After washed (see washing)	
Test atmosphere: 15°C-35°C	

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

Results

Time for a 24°C temperature rise	
Individual values (s) :	6,8 6,6 7,0
Heat tranfer index HTI24 (s) :	6,8
Uncertainty of measurement (s):	± 0,81
Time for a 12°C temperature rise	
Individual values (s) :	4,6 4,4 4,6
Heat tranfer index HTI12 (s) :	4,5
Uncertainty of measurement (s):	± 0,54
HTI24 - HTI12 (s) :	2,3
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

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Gas used: Propane

Conditioning: 24h at $(20\pm 2)^{\circ}\text{C}$ and
 $(65\pm 5)\%$ R.H.

Environmental test conditions:

18°C and 44% RH

State of specimens: After washed (see
washing) and conditioned.

COMMENTS

The sample our ref. 960/2018 is according EN ISO 11612:2015 in bursting strength (488 kPa \pm 74 kPa, minimum requirement 200 kPa), dimensional stability to domestic washing and drying (after 5 cycles 4N (40°C) Drip line dry: wales $-0,6\% \pm 0,91\%$ and courses $-0,7\% \pm 0,88\%$; maximum requirement $\pm 5\%$), heat resistance (180°C : wales $-1,0\% \pm 0,91\%$ and courses $-0,9\% \pm 0,88\%$, maximum shrinkage requirement 5%), burning behaviour (limited flame spread - CODE LETTER A1, requirement: 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 and afterglow time ≤ 2 s), protection against heat and fire: source of radiant heat (CODE LETTER C1, RHTI24 = $14,1\text{s} \pm 1,9\text{s}$, requirement code letter C1 RHTI24: $7,0\text{s} - < 20,0\text{s}$), protection against heat and fire exposure (CODE LETTER B1, HTI24= $6,6\text{s} \pm 0,81\text{s}$, requirement code letter B1 HTI24: $4,0\text{s} - < 10,0\text{s}$), 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 960-2018 sample 1832-2018