aitex
textile research institute

ENAC
ENSAYOS
Nº12 / LE025
Nº12 / LE427

TEST REPORT

2019CN0430

DATE OF RECEPTION
19/06/2019

DATE TESTS
Starting: 25/06/2019
Ending: 17/07/2019

APPLICANT

IDENTIFICATION AND DESCRIPTION OF SAMPLES

REFERENCES
FABRIC JT006 TRICOT WITH ANTISTATIC

According to information supplied by the customer:

Fabric reference: JT006 TRICOT WITH ANTISTATIC
Composition and percentage: 98% Polyester and 2% Antistatic
Colour: Hi-vis Yellow

TESTS CARRIED OUT

- DETERMINATION OF COORDINATES (x,y,Y)
- PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING.
- COLOUR FASTNESS TO RUBBING.
- COLOUR FASTNESS TO PERSPIRATION.
- COLOUR FASTNESS TO DOMESTIC AND COMMERCIAL LAUNDERING
- DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING.
- BURSTING RESISTANCE.
- WATER VAPOUR RESISTANCE.
- MEANING OF COLOUR FASTNESS APPRAISAL EVALUATED WITH GREY SCALE.

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

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RESULTS

DETERMINATION OF COORDINATES (X,Y,Y)

Standard
EN ISO 105 J01:1999
Publication CIE 15

Apparatus
Konica Minolta ((0921E06) 400nm-700nm)

Illuminant
D_{65}

Observant
2°

Measuring geometry
45/0

Specular component and UV filter
Excluded

Observation area
Small

Conditioning of samples

Initiation date	25/06/2019	**End date**	11/07/2019
Temperature	(20 ± 2) °C	**Humidity**	(65 ± 5) %

Test date

Initiation date	27/06/2019	**End date**	11/07/2019

Number of measurements
5

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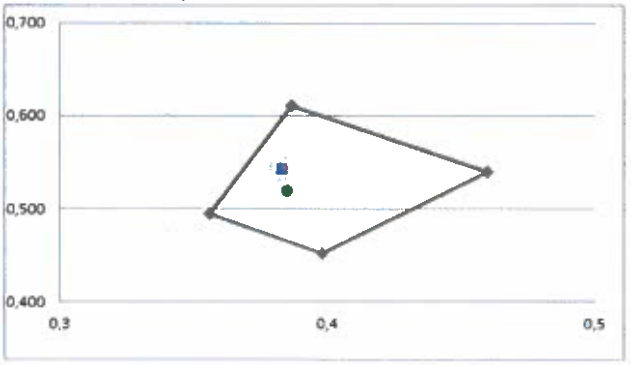
RESULTS

Reference
Fabric JT006 Tricot with antistatic
(FLUOR YELLOW FABRIC)



Reference	x	y	Y minimum
♦ Coordinate 1	0,3870	0,6100	0,7000
♦ Coordinate 2	0,3560	0,4940	
♦ Coordinate 3	0,3980	0,4520	
♦ Coordinate 4	0,4600	0,5400	
■ FABRIC JT006 TRICOT WITH ANTISTATIC (FLUOR YELLOW FABRIC) (Original)	0,3835	0,5425	0,9012
● FABRIC JT006 TRICOT WITH ANTISTATIC (FLUOR YELLOW FABRIC) (After exposure to Xenon light)	0,3853	0,5193	0,8126
▲ FABRIC JT006 TRICOT WITH ANTISTATIC (FLUOR YELLOW FABRIC) (After 25 washing cycles 6N + F)	0,3827	0,5440	0,9289
Uncertainly	± 2 %	± 1 %	± 4 %

REQUISITE

The chromatic coordinates must be situated within the area defined by the coordinates specified in the Standard EN ISO 20471:2013 + A1:2016 and the luminance factor shall exceed 0,70 specified in the Standard EN ISO 20471:2013 + A1:2016.

PASS

RESULTS

PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING

Standard
ISO 6330:2012

Standard deviation

Reference
Sample1 FABRIC JT006 TRICOT WITH ANTISTATIC

Units 1

Equipment Wascator 13471E05

Dryer machine JAMES HEAL
13473E05

Washing procedure 6N **Washing cycles** 25

Drying procedure
F (tumble dryer)

Washing powder
ECE detergent 98 + sodium perborate + TAED

Units	Dry mass of the samples	Counterweight mass	Equipment
1	0,008 Kg	1,900 Kg of Polyester	Wascator 13471E05

Start and finish date
28/06/2019 - 03/07/2019

RESULTS

PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING

Standard
ISO 6330:2012

Standard deviation

Reference
Sample1 FABRIC JT006 TRICOT WITH ANTISTATIC

Units 1
Equipment Wascator 04123E12
Dryer machine ACCUDRY
13379E12

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	0,01 Kg	2,00 Kg of Polyester	Wascator 04123E12

Start and finish date
27/06/2019 - 02/07/2019

RESULTS

PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING

Standard
ISO 6330:2012

Standard deviation

Reference
Sample1 FABRIC JT006 TRICOT WITH ANTISTATIC

Units 1

Equipment Wascator 13369E12

Dryer machine ELECTROLUX 13425E12

Washing procedure 6N **Washing cycles** 25

Drying procedure
F (tumble dryer)

Washing powder
ECE detergent 98 + sodium perborate + TAED

Units	Dry mass of the samples	Counterweight mass	Equipment
1	0,010 Kg	1,900 Kg of Polyester	Wascator 13369E12

Start and finish date
28/06/2019 - 03/07/2019

RESULTS

COLOUR FASTNESS TO RUBBING

Standard
ISO 105-X12:2016

Apparatus
Crockmeter

Starting test date
26/06/2019

Ending test date
17/07/2019

Conditioning time
> 4 H

Atmosphere for conditioning and testing

Temperature	(20±2) °C
Relative Humidity	(65±2) %Hr

Pin
Cylindrical

Applied force
(9 ± 0,2) N

REFERENCE	DIRECTION	DRY STAINING
Fabric JT006 Tricot with antistatic YELLOW FABRIC	Lengthwise	4-5
	Crosswise	4-5

REQUISITE
The limit set by the Standard EN ISO 20471:2013/A1:2016 for colour fastness to rubbing, is 4, in dry rubbing.

PASS

RESULTS

COLOUR FASTNESS TO PERSPIRATION

Standard
EN ISO 105-E04:2013

Apparatus
Perspirometer

ALKALINE SOLUTION
Aparatus Code 02022I04 (sweat basic)

REFERENCE	Fabric JT006 Tricot with antistatic FLUOR YELLOW FABRIC	
CHANGE IN COLOUR	STAINING	
5	Cotton 4-5	Polyester 4-5

ACID SOLUTION
Aparatus Code 02054I04 (sweat acid)

REFERENCE	Fabric JT006 Tricot with antistatic FLUOR YELLOW FABRIC	
CHANGE IN COLOUR	STAINING	
5	Cotton 4-5	Polyester 4-5

REQUISITE
The limit set by the Standard EN ISO 20471:2013/A1:2016 for testing of colour fastness to perspiration, is 4 for degradation and 4 for staining

PASS

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RESULTS

COLOUR FASTNESS TO DOMESTIC AND COMMERCIAL LAUNDERING

Standard
EN ISO 105-C06:2010

Apparatus
Gyrowash

Test number
C1M

Temperature
60 °C

Steel balls
50

Detergent
Standardized ECE soap reference without optical or chemical whitener

Test piece drying in forced-air circulation dryer

REFERENCE	CHANGE IN COLOUR	STAINING	
		Cotton	Polyester
FABRIC JT006 TRICOT WITH ANTISTATIC YELLOW FABRIC	5	4-5	4-5

REQUISITE
The limit set by the Standard EN ISO 20471:2013/A1:2016 for testing of colour fastness to washing is 4-5 for degradation and 4 for staining.

PASS

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 27/06/2019 **Ending test date** 08/07/2019

Washing procedure
6N (T^a = 60 ± 3°C); 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 (04123E12)

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(13379E12)
Uncertainty of test (% of the measured value)
± 15 %

Tested material
Fluorescent yellow knitted fabric

Reference	Specimen	Direction	Dimensional change (%)
FABRIC JT006 TRICOT WITH ANTISTATIC	1	Lengthwise	0,0
		Crosswise	+ 1,0

REMARK
Negative dimensional change indicates shrinkage
Positive dimensional change indicates lengthening

REQUISITE
In accordance with the Standard EN ISO 20471:2013/A1:2016, the dimensional change of knitted fabrics shall not exceed ±5%, both in width Crosswise and in length Lengthwise.

PASS

RESULTS

BURSTING RESISTANCE

Standard

EN ISO 13938-1:2000

Apparatus

Autoburst SDL-ATLAS M-229

Atmosphere for conditioning and testing

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

Test conditions

Dry specimen

Test surface	7.3 cm^2	**Test duration**	(20±5) seg.

Nº of specimens

Tested	5	**Rejected**	0

Bursting in the proximity of the clamps

0

Observations

Breakage in a direction

Reference	Bursting distensión (mm)	Bursting strength (kPa)
FABRIC JT006 TRICOT WITH ANTISTATIC	**15.5**	**1. 1093.3 2. 1056.3 3. 1073.0 1065 4. 1056.3 5. 1044.3**

Remark

The relative expanded uncertainty of Bursting resistance according to standard EN ISO 13938-1:1999 is ±8% assay value of the measured, for a probability of coverage of 95%.

REQUISITE ACCORDING TO STANDARD EN ISO 20471:2013+A1:2016 POINT 5.5.1

The minimum bursting resistance has to be 100 kPa.

PASS

RESULTS

WATER VAPOUR RESISTANCE

Standard

EN ISO 11092:2014

Test date

17/7/2019

Uncertainty of the measurement

0.24 m^2Pa/W

Observation or deviation from the Standard

Apparatus

SKIN MODEL. Sweating guarded hotplate 12004I12

Test atmosphere

Temperature	(35.0 ± 0.5) °C
Relative humidity	(40 ± 3) %

Conditioning

Temperature	(35.0 ± 0.5) °C
Relative humidity	(40 ± 3) %
Time	24 hours

Sample description

Yellow knitted fabric.

Disposition test specimens

The inner face is in contact to the measurement surface.

Pre-treatment

Without pre-treatment.

RESULTS

Test results

Reference	Specimen	Water vapour resistance R_{et} (m^2Pa/W)
FABRIC JT006 TRICOT WITH ANTISTATIC	Specimen 1	2,21
	Specimen 2	2,29
	Specimen 3	2,32
	Average	2,27

According requirement of EN ISO 20471:2013+EN ISO 20471:2013/A1:2016 standard, water vapour resistance shall not be higher than 5 m^2 Pa/W.

PASS

RESULTS

MEANING OF COLOUR FASTNESS APPRAISAL EVALUATED WITH GREY SCALE

VALUE	MEANING
5	VERY GOOD-EXCELLENT
4	GOOD
3	FAIR-MODERATE
2	POOR BEHAVIOUR
1	VERY POOR

Lucia Martinez
Head of PPE and Ballistics department

Digitally signed by ISABEL LLOPIS LUMBRERAS - NIF 21678551Q
Date: 2019.07.23 12:35:06 +02:00
Reason: Autorizado
Location: Alcoy

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