



TESTING • CERTIFICATION • AUDITING

Confidential Report

Our Ref: 11/22314/A



1066

Notified Body
for PPE Directive,
Construction Products Regulation
& Marine Equipment Directive I.D.
No. 0338 & 0339

Date: 2nd November 2016

Our Ref: 11/22314/A/PJH

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Client: Wujiang Sunfeng Outdoor Textile Co. Ltd.
Nanxin Road
Wannan Village
Wanping Area
Taihu Xincheng
Wujiang
Suzhou
Jiangsu
CHINA

Job Title: Tests on coated material

Date of Receipt: 19th September 2016

Date of Test Start: 22nd September 2016

Description of Sample(s): One high-visibility yellow coloured, woven fabric, having a white reverse coating, identified as follows, was received for testing:

Product Name: 300D*300D Oxford 100% Polyester

Model Code: 300D*300D

Colour: Fluorescent Yellow

Fibre Content: 100% Polyester

Work Requested: We were asked to make the following tests as specified in ISO 20471: 2013, "High-visibility clothing. Test methods and requirements":

Chromaticity and luminance on new background material
Chromaticity and luminance after xenon test
Chromaticity and luminance after max number of wash cycles (5)
Colour fastness to rubbing
Colour fastness to perspiration
Colour fastness to laundering (domestic 40°C)
Dimensional change to washing (4N/A)
Tensile strength
Tear strength
Water vapour resistance



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Sample was identified as follows:

Product Name: 300D*300D Oxford 100% Polyester

Model Code: 300D*300D

Colour: Fluorescent Yellow

Fibre Content: 100% Polyester

Laboratory Work

Where appropriate, the tests were made in Standard Atmosphere ($65 \pm 4\%$ relative humidity at $20 \pm 2^\circ\text{C}$) the sample having been freely and continuously exposed to that atmosphere for at least 24 hours prior to testing. Specimens have been taken from the sample as described in the specified standards.

Colour performance requirements of new materials

Chromaticity and luminance of new material

Chromaticity and luminance after xenon

Chromaticity and luminance after maximum number of wash cycles (5)

Xenon fading was carried out according to ISO 105 - B02: 1994 Method 3. For yellow materials, exposure was continued until the blue scale control standard number 4 changed to step 4 of the grey scale.

The colour measurements obtained according to 7.2, (as new, after exposure) and also 7.5.1 of ISO 20471: 2013 (after max number of wash cycles), were plotted according to the co-ordinates specified in ISO 20471 Table 2.

Colour fastness of background material and all non-fluorescent material layers after test exposure

Colour fastness to rubbing

The colour fastness to dry rubbing of the sample was tested in accordance with ISO 105 - X12.

The staining of the sample was assessed in accordance with ISO 105 – A03, using grey scales: 5 represents no staining and 1 represents severe staining.



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Colour fastness to perspiration

The sample was tested in accordance with ISO 105 - E04.

The change in colour of the specimen and the staining of the adjacent fabric, Multifibre DW, were assessed in accordance with ISO 105 – A02 and ISO 105 – A03, using grey scales: 5 represents no change of colour or staining and 1 represents severe change of colour or staining.

Colour fastness to laundering

The sample was tested in accordance with ISO 105 – C06 (Test A2S at 40°C) with additional steel balls.

A souring treatment was not conducted. The ECE Phosphate Reference Detergent was used. The change in colour of the specimens and the staining of the adjacent fabric, Multifibre DW, were assessed in accordance with ISO 105 – A02 and ISO 105 – A03, using grey scales; 5 represents no change of colour or staining and 1 represents severe change of colour or staining.

Dimensional change of background material and non-fluorescent material

Dimensional stability to domestic washing was tested according to ISO 13688: 1998.

Three specimens were washed in accordance with ISO 6330: 2012, "Textiles - Domestic washing and drying procedures for textile testing". Washing was carried out according to procedure 4N (40°C, normal agitation) and drying according to Procedure A – Line dry for five cycles. Dimensional change was determined according to ISO 5077: 2008.

A Wascator FOM71 machine (Type A automatic, front loading horizontal drum type) was used, with ECE reference detergent plus sodium perborate and bleach activator, and a total mass of 2 kg, which was made up of the specimens and 100 % knitted polyester ballast.

The average dimensional change (%) in the length and width directions has been given to the nearest 0.5 % as required by the standard.



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Mechanical properties of background materials

Tensile strength of coated fabrics and laminates

Tensile strength was measured in accordance with ISO 1421: 1998, Method 1.

Five specimens were prepared in each direction, each 50 mm wide and long enough to enable a gauge length of 200 mm to be used. The tests were made on a Testometric C.R.E. machine fitted with flat faced jaws operating at a rate of extension of 100 mm per minute. A pre-tension of 5 Newtons was employed.

Results are reported as required by the standard.

Tear resistance of coated fabrics and laminates

Tear resistance was measured in accordance with ISO 4674-1: 2003, Method A, "Rubber- or plastics-coated fabrics -- Determination of tear resistance -- Part 1: Constant rate of tear methods".

Five specimens were prepared in each direction as described in the standard. The tests were made on a Testometric CRE machine fitted with flat faced jaws, set 100 mm apart and operating at a traverse rate of 100 mm per minute.

Water vapour resistance

Background material made from coated fabrics or laminates

The water vapour resistance (R_{et}) of the sample was determined following the procedure described in ISO 11092: 1993, Textiles – Determination of physiological properties – Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test)", also known as "skin model".

Prior to testing the sample was freely and continuously exposed to an atmosphere of 40 ± 3 % relative humidity at 35 ± 2 °C for at least 12 hours for specimens ≤ 5 mm and 24 hours for specimens > 5 mm.

The measuring unit and thermal guard are contained within a test enclosure having an air temperature of 35 °C and relative humidity of 40 %. An electrically heated porous plate is covered by a water-vapour permeable but liquid-water impermeable membrane. Water is fed to the heated plate by a dosing device and the water evaporates and passes through the membrane as vapour. Air flows across and parallel to the plates upper surface at a speed of 1 m/s. The test specimen is placed on the membrane and the heat flux required to maintain a constant temperature at the plate is a measure of the rate of water evaporation. From this, the water vapour resistance of the test specimen is determined.

A specimen for test, measuring 300 mm x 300 mm, was placed on the porous plate and covering the thermal guard. The specimen was taped at the edges to prevent wrinkling.

Specimens were tested with the reverse of the fabric (i.e. the side facing the skin during wear) to the measuring plate.



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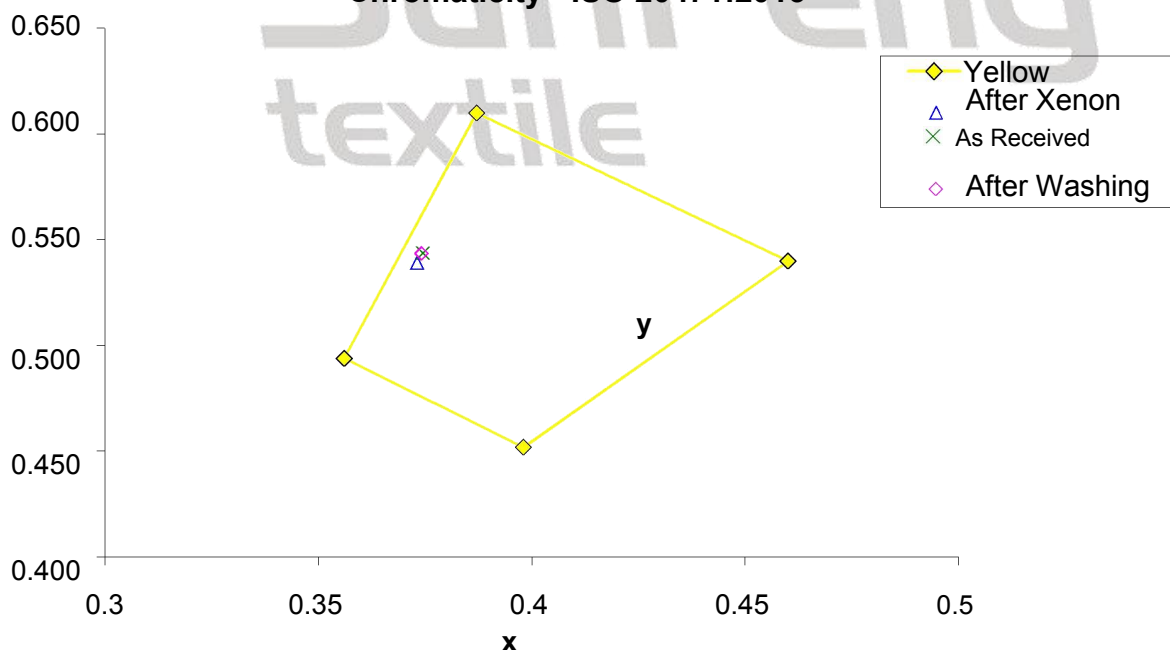
RESULTS

Chromaticity and Luminance Factor

Specification	Minimum Luminance Factor $\beta_{\min}$	Within coordinates	
		x	y
Fluorescent yellow	0.70	0.387	0.610
		0.356	0.494
		0.398	0.452
		0.460	0.540

Ref:	Result			Pass/Fail	
300D*300D Oxford 100% Polyester	Luminance Factor β	Chromaticity coordinates		Luminance	Coordinates
		x	y		
As received	1.09	0.374	0.544	Pass	Pass
After fading	1.07	0.373	0.539	Pass	Pass
After 5 wash cycles	1.10	0.374	0.544	Pass	Pass

Chromaticity - ISO 20471:2013



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RESULTS

Sample Ref. Product Name: 300D*300D Oxford 100% Polyester
Model Code: 300D*300D
Colour: Fluorescent Yellow
Fibre Content: 100% Polyester

Colour Fastness to Rubbing

	Specification	Result		Pass/Fail
		Length	Width	
Grade for dry rub	at least 4	5	5	Pass

Colour Fastness to Perspiration

S.D.C MULTIFIBRE TEST FABRIC (DW)

DW	DIACETATE	BLEACHED COTTON	NYLON 6.6	POLYESTER	ACRYLIC	WOOL	COLOUR CHANGE
pH 5.5	4-5	4-5	4	4	4-5	4-5	5
pH 8.0	4-5	4-5	4	4	4-5	4-5	5

	Specification	Result	Pass/Fail
Colour Change	at least 4	5	Pass
Staining	at least 4	4	Pass

Background Material

Colour Fastness to Laundering at 40°C

S.D.C MULTIFIBRE TEST FABRIC (DW)

DIACETATE	BLEACHED COTTON	NYLON 6.6	POLYESTER	ACRYLIC	WOOL	COLOUR CHANGE
4-5	4-5	4	4	4-5	4-5	5

	Specification	Result	Pass/Fail
Colour Change	at least 4 to 5	5	Pass
Staining	at least 4	4	Pass



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RESULTS

Sample Ref. Product Name: 300D*300D Oxford 100% Polyester
Model Code: 300D*300D
Colour: Fluorescent Yellow
Fibre Content: 100% Polyester

Dimensional change of background material and non-fluorescent material

Dimensional Change to Washing (4N/A)

	Specification	Result	Pass/Fail
Warp (%)	at most $\pm 3\%$	-0.5	Pass
Weft (%)	at most $\pm 3\%$	0.0	Pass

Note: - denotes shrinkage
+ denotes extension

Mechanical Properties

Tensile strength of coated fabrics and laminates

	Specification	Individual Results (N)					Mean (N)	Pass/Fail
Warp	minimum 100 N	1334.3	1437.2	1455.1	1435.8	1431.4	1419	Pass
Weft	minimum 100 N	1034.0	1061.9	1045.7	1061.6	1057.2	1052	Pass

Tear resistance of coated fabrics and laminates

Tearing Thro'	Specification	Individual Results (N)					Mean (N)	Pass/Fail
Warp	Minimum 20 N	229.59	230.32	226.36	219.33	248.37	230	Pass
Weft	Minimum 20 N	208.60	199.43	216.78	211.44	212.70	210	Pass



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RESULTS

Sample Ref. Product Name: 300D*300D Oxford 100% Polyester
Model Code: 300D*300D
Colour: Fluorescent Yellow
Fibre Content: 100% Polyester

Water vapour resistance for background materials made from coated fabrics or laminates

Specification	Class 1	Class 2	Class 3	Result	Class
Water Vapour Resistance, R_{et} ($m^2 \cdot Pa/W$)	R_{et} above 40	≥ 20 $R_{et} \leq 40$	$R_{et} \leq 20$	10.6	3

CONCLUSIONS

The sample submitted for testing, identified as "Product Name: 300D*300D Oxford 100% Polyester, Model Code: 300D*300D, Colour: Fluorescent Yellow, Fibre Content: 100% Polyester" meets the requirements of ISO 20471: 2013 for a background material made of a yellow woven reverse coated fabric, when tested as specified in this report.

Coated fabrics or laminates:

For water vapour resistance the sample may be classified as Class 3.

Uncertainty of measurement has not been taken into account when presenting the test result. The relevant uncertainty value is included as an annex which forms an integral part of the report.

Reported by:

Mr P Hutchings
Operational Head

Countersigned by:

Mr A Newton
Laboratory Technician

Enquiries concerning this report should be addressed to Customer Services.



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Annex

Summary of Uncertainty Budgets

Chromaticity and Luminance $\pm 0.8\%$

Colourfastness all tests $\pm \frac{1}{2}$ a grey scale unit

Dimensional Stability $\pm 3.5\%$

Tensile Strength $\pm 1.7\%$ for PP/PES/Nomex

$\pm 3.5\%$ for 100% Wool

$\pm 4.8\%$ for 100% Cotton

Tear Strength $\pm 2.6\%$ for PP/PES/Nomex

$\pm 4.1\%$ for 100% Wool

$\pm 5.2\%$ for 100% Cotton

Water vapour resistance (R_{et}) $\pm 8.0\%$

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textile



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