

## TEST REPORT

**2023CN6049**

### DATE OF RECEPTION

14/10/2020

### DATE TESTS

Starting: 15/10/2020

Ending: 01/12/2020

### APPLICANT

HAINING RUNWU TEXTILE CO., LTD.  
Room 304, building10#, No.8 Haining Avenue,  
Haining Economic  
CN-314400  
HAINING

### IDENTIFICATION AND DESCRIPTION OF SAMPLES

#### REFERENCES

KNITTED FABRIC

According to information supplied by the customer:

Fabric reference: Knitted fabric

Others: Item number RWS-01(Fluorescent yellow) RWS-02(Fluorescent Orange)

Composition and percentage: 100% Polyester

Color: Fluorescent Yellow and Fluorescent Orange

Weight: 125 gsm

### 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.



## SAMPLE DESCRIPTION

### PHOTOGRAPHY



**Reference**  
KNITTED FABRIC

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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<sub>65</sub>

**Observant**

2°

**Measuring geometry**

45/0

**Specular component and UV filter**

Excluded

**Observation area**

Small

**Conditioning of samples**

<b>Initiation date</b>	28/10/2020	<b>End date</b>	30/11/2020
<b>Temperature</b>	(20 ± 2) °C	<b>Humidity</b>	(65 ± 5) %

**Test date**

<b>Initiation date</b>	03/11/2020	<b>End date</b>	30/11/2020
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**Number of measurements**

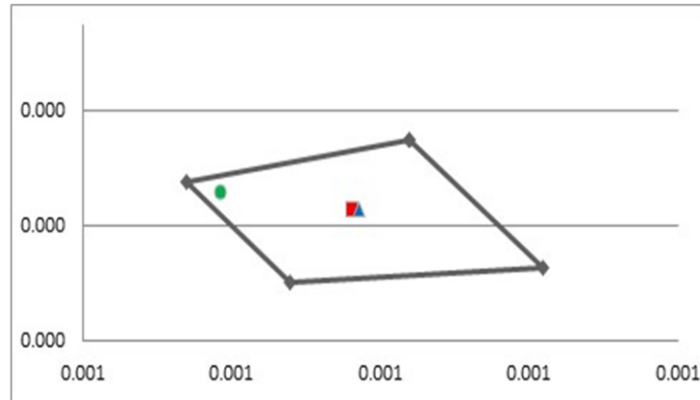
5

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## RESULTS

Reference  
KNITTED FABRIC (FLUOR ORANGE FABRIC)



Reference	x	y	Y minimum
◆ Coordinate 1	0,610	0,390	0,40
◆ Coordinate 2	0,535	0,375	
◆ Coordinate 3	0,570	0,340	
◆ Coordinate 4	0,655	0,345	
■ KNITTED FABRIC (FLUOR ORANGE FABRIC) (Original)	0,591	0,365	0,40
● KNITTED FABRIC (FLUOR ORANGE FABRIC) (After exposure to Xenon light)	0,547	0,371	0,43
▲ KNITTED FABRIC (FLUOR ORANGE FABRIC) (After 25 washing cycles 4N + F)	0,593	0,365	0,40
Uncertainty	0.4 %	0.5 %	1 %

### 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 0,40 specified in the Standard EN ISO 20471:2013/A1:2016.

**PASS**

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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<sub>65</sub>

**Observant**

2°

**Measuring geometry**

45/0

**Specular component and UV filter**

Excluded

**Observation area**

Small

**Conditioning of samples**

<b>Initiation date</b>	28/10/2020	<b>End date</b>	30/11/2020
<b>Temperature</b>	(20 ± 2) °C	<b>Humidity</b>	(65 ± 5) %

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<b>Initiation date</b>	03/11/2020	<b>End date</b>	30/11/2020
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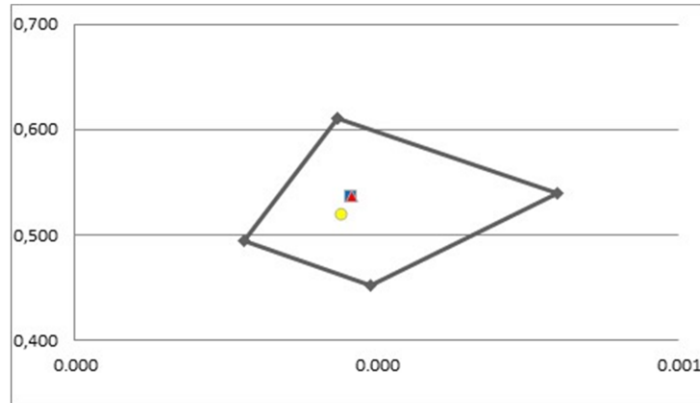
5

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## RESULTS

Reference  
KNITTED FABRIC (FLUOR YELLOW FABRIC)



Reference	x	y	Y minimum
◆ Coordinate 1	0,387	0,610	0,70
◆ Coordinate 2	0,356	0,494	
◆ Coordinate 3	0,398	0,452	
◆ Coordinate 4	0,460	0,540	
■ KNITTED FABRIC (FLUOR YELLOW FABRIC) (Original)	0,392	0,535	0,81
● KNITTED FABRIC (FLUOR YELLOW FABRIC) (After exposure to Xenon light)	0,388	0,518	0,74
▲ KNITTED FABRIC (FLUOR YELLOW FABRIC) (After 25 washing cycles 4N + F)	0,392	0,537	0,82
Uncertainty	0.4 %	0.5 %	1 %

### 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**

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## RESULTS

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

**Standard**

ISO 6330:2012

**Standard deviation**

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**Reference**

Sample1 KNITTED FABRIC

**Units**

1

**Equipment** Wascator 13370E12**Dryer machine** ELECTROLUX  
13426E12**Washing procedure** 4N **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	0,030 Kg	1,900 Kg of Polyester	Wascator 13370E12

**Start and finish date**

28/10/2020 - 02/11/2020

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## RESULTS

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

**Standard**

ISO 6330:2012

**Standard deviation**

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**Reference**

Sample1 KNITTED FABRIC

**Units**

1

**Equipment** Wascator 13492E12

**Dryer machine** ELECTROLUX  
13430E12

**Washing procedure** 4N **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	0,03 Kg	1,95 Kg of Polyester	Wascator 13492E12

**Start and finish date**

30/10/2020 - 04/11/2020

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## RESULTS

### COLOUR FASTNESS TO RUBBING

**Standard**

ISO 105-X12:2016

**Apparatus**

Crockmeter

**Starting test date**

28/10/2020

**Ending test date**

02/11/2020

**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
KNITTED FABRIC YELLOW HV FABRIC	Lengthwise	4-5
	Crosswise	4-5
KNITTED FABRIC ORANGE HV 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**

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## RESULTS

### COLOUR FASTNESS TO PERSPIRATION

**Standard**

EN ISO 105-E04:2013

**Apparatus**

Perspirometer

**ALKALINE SOLUTION**

Aparatus Code 02022104 (sweat basic)

<b>REFERENCE</b>	KNITTED FABRIC	
<b>CHANGE IN COLOUR</b>	FLUOR YELLOW FABRIC	
	<b>STAINING</b>	
5	<b>Cotton</b>	<b>Polyester</b>
	4-5	4-5
<b>REFERENCE</b>	KNITTED FABRIC	
<b>CHANGE IN COLOUR</b>	FLUOR ORANGE FABRIC	
	<b>STAINING</b>	
5	<b>Cotton</b>	<b>Polyester</b>
	4-5	4-5

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## RESULTS

### ACID SOLUTION

Aparatus Code 02054I04 (sweat acid)

<b>REFERENCE</b>	KNITTED FABRIC	
<b>CHANGE IN COLOUR</b>	FLUOR YELLOW FABRIC	
	<b>STAINING</b>	
5	<b>Cotton</b>	<b>Polyester</b>
	4-5	4-5
<b>REFERENCE</b>	KNITTED FABRIC	
<b>CHANGE IN COLOUR</b>	FLUOR ORANGE FABRIC	
	<b>STAINING</b>	
5	<b>Cotton</b>	<b>Polyester</b>
	4-5	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**

A1M

**Temperature**

40 °C

**Steel balls**

10

**Detergent**

Standardized ECE soap reference without optical or chemical whitener

**Test piece drying in forced-air circulation dryer**

REFERENCE	CHANGE IN COLOUR	STAINING
KNITTED FABRIC YELLOW HV FABRIC	5	<b>Cotton Polyester</b> 4-5 4-5
KNITTED FABRIC ORANGE HV FABRIC	5	<b>Cotton Polyester</b> 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**

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## RESULTS

### DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING

**Standard**

EN ISO 5077:2008

**Standard deviation**

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**Preparation, marking and measuring of fabric specimens according to EN ISO 3759:2011****Starting test date** 28/10/2020 **Ending test date** 04/11/2020**Washing procedure**4N ( $T^a = 40 \pm 3^\circ\text{C}$ ; Total dry load test samples and the counterweight  $2 \pm 0.1$  Kg) according to ISO 6330:2012**Used apparatus**

Wascator type A-Horizontal drum, front loading (13492E12)

**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(13430E12)****Uncertainty of test (% of the measured value)** $\pm 15 \%$ **Tested material**

Fluorescent yellow and orange knitted fabric

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## RESULTS

Reference	Specimen	Direction	Dimensional change (%)	Direction	Average result - Dimensional change (%)
KNITTED FABRIC	1		-0,9		-1,5
			-0,9		
	2		-1,7		-1,0
			-1,1		

**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  $\pm 5\%$ , both in width Crosswise and in length Lengthwise.

**PASS**

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## RESULTS

### BURSTING RESISTANCE

#### Standard

EN ISO 13938-1:2019

#### Apparatus

Autoburst SDL-ATLAS

#### Conditioning date

#### Test date

#### Atmosphere for conditioning testing

Temperature (20±2) °C

Relative humidity (65±4) %

#### Test surface

50 cm<sup>2</sup>- 79.8 mm. in diameter

#### Test conditions

Dry specimens

#### Test duration

(20±5) s.

#### Number of specimens

Tested	5	Rejected	0
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#### Bursting in the proximity of the clamps

0

#### Observations

Breakage in a direction

#### Reference

KNITTED

Orange

FABRIC

Bursting distension	Bursting strength	
34,1	448,7	
	465,8	
	469,8	461,10
	459,4	
	461,8	

#### Remark

The relative expanded uncertainty of Bursting resistance according to standard EN ISO 13938-1:2019 is ±8% assay value of the measured, for a probability of coverage of 95%.

#### REQUISITE ACCORDING TO EN ISO 20471:2013/A1:2016

The minimum bursting resistance has to be ≥ 100 KPa.

**PASS**

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## RESULTS

### WATER VAPOUR RESISTANCE

**Standard**

EN ISO 11092:2014

**Test date**

1/12/2020

**Uncertainty of the measurement**0.24 m<sup>2</sup>Pa/W**Observation or deviation from the Standard**

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**Apparatus**

SKIN MODEL. Sweating guarded hotplate 12004I12

**Test atmosphere**

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

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

Yellow knitted fabric.

**Disposition test specimens**

The inner face is in contact to the measurement surface.

**Pre-treatment**

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## RESULTS

### Test results

Reference	Specimen	Water vapour resistance $R_{et}$ ( $m^2Pa/W$ )
KNITTED FABRIC	Specimen 1	1,51
	Specimen 2	1,49
	Specimen 3	1,50
	Average	1,50

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

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**Lucia Martinez**  
**Head of PPE and Ballistics department**

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