

Postal address RISE IVF AB Box 104 SE-431 22 MÖLNDAL Ph +46 (0)10 516 50 00		Visiting address Argongatan 30, SE- 431 53 MÖLNDAL Org. nr. 556053-1526 VAT no. SE556053-152601	
Client Coloreel Group AB Science Park 553 18 Jönköping	Client's ref. no.		
	Contact person Simon Utsel	Our ref. no. O100182-167857	

Object

Determination of various colour fastness tests on yarn in embroidered format and tensile strength of yarn.

Test material

1	Embroidered yarn made of polyester in colour black
2	Embroidered yarn made of polyester in colour magenta
3	Embroidered yarn made of polyester in colour yellow
4	Embroidered yarn made of polyester in colour cyan
5	Yarn in colour cyan

The test material was received from the client 2021-08-23

Procedure and results

Conditioning and testing climate according to SS-EN ISO 139:2005, (20 ±2) °C and (65 ±4) % RH, where nothing else is stated.

The colour fastness to laundering was determined according to SS-EN ISO 105-C06:2010.

Test method: C1M, 60 °C, D1M, (temperature changed from 70 °C to 95 °C) and

A1M, (temperature changed from 40 °C to 30 °C).

Souring treatment was not performed.

Detergent: ECE

Adjacent fabric: Multifibre TV

Date of test: 2021-09-07 and 2021-09-08

Table 1. Colour fastness to laundering, rating

Procedure: M60°C							
Test Material	Staining						Change in colour
	Triacetate	Cotton	Polyamide	Polyester	Acrylic	Viscose	
1	4-5	4-5	4	5	5	5	5
2	4-5	5	4-5	5	5	5	5
3	4-5	5	4-5	5	5	5	5
4	4-5	5	4	4-5	5	5	5
Procedure: M95°C							
1	3-4	4-5	3-4	4-5	4-5	5	5
2	3-4	4-5	3	3-4	4-5	4-5	5
3	3-4	4-5	3-4	4	4-5	4-5	5
4	3	4	2-3	3-4	4	4-5	5
Procedure: M30°C							
1	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5

Scale 1-5, where 5 is the best.

Measurement uncertainty: $\pm 1/2$ grade.

Uncertainty of measurement is based on the method of dissemination of interlaboratory trials and is stated as standard deviation.

Colour fastness to rubbing was determined according to SS-EN ISO 105-X12:2016.

The staining was assessed visually.

Used rubbing finger: Circular

Downward force of the rubbing finger: (9 ±0.2) N

Type of rubbing performed: Dry and wet

Up-take of soak: (95-100) %

Conditioning time before testing: Minimum 4 h

Date of test: 2021-09-08

Table 2. Colour fastness to rubbing, rating

Test Material	Dry staining		Wet staining	
	Length	Width	Length	Width
1	4-5	4-5	4-5	4-5
2	4-5	4-5	4-5	4-5
3	4-5	4-5	4-5	4-5
4	4-5	4-5	4-5	4-5

Scale 1-5, where 5 is the best.

Measurement uncertainty: ± 1/2 grade.

Uncertainty of measurement is based on the method of dissemination of interlaboratory trials and is stated as standard deviation.

The colour fastness to dry cleaning was determined according to SS-EN ISO 105-D01: 2010 (not an accredited method).

Adjacent fabric: Multifibre DW

Date of test: 2021-09-10--14

Table 3. Colour fastness to dry cleaning, rating.

Test Material/ Colour	Staining						Change in colour
	Acetate	Cotton	Polyamide	Polyester	Acrylic	Wool	
1	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5

Scale 1-5, where 5 is the best.

Measurement uncertainty: ± 1/2 grade.

Uncertainty of measurement is based on the method of dissemination of interlaboratory trials and is stated as standard deviation.

The colour fastness to artificial light was SS-EN ISO 105-B02:2014

Exposure conditions: A1 Normal

Test apparatus: Atlas Xenotest 440

Viewing conditions: Light Cabinet Ortospectra 120, D65

The exposure was discontinued when the light fastness rating 5 at the reference scale had been reached.

Date of test: 2021-08-31—09-13

Table 4. Colour fastness to light

Test material	Exposure method	Rating
1	2	4-5
2	2	>5
3	2	>5
4	2	>5

Scale 1-8, where 8 is the best.

Measuring uncertainty: $\pm \frac{1}{2}$ rating

Uncertainty of measurement is based on the method of dissemination of inter laboratory trials and is stated as standard deviation.

Colour fastness to hypochlorite was determined according to SS-EN 20 105-N01:1995

(not an accredited method).

The hypochlorite solution was prepared with Sodium hypochlorite solution

Neutralizing solution: Hydrogen peroxide solution

Date of test: 2021-09-14

Table 5. Colour fastness to hypochlorite bleaching, rating

Test material	Colour change
1	5
2	5
3	5
4	5

Scale 1-5, where 5 is the best.

Measurement uncertainty: $\pm \frac{1}{2}$ grade.

Uncertainty of measurement is based on the method of dissemination of interlaboratory trials and is stated as standard deviation.

The colour fastness to water was determined according to SS-EN ISO 105-E01: 2013.

Adjacent fabric: Multifibre DW.

The test material was wetting out

Position of the test device: Horizontal

Colour assessment: Visual

Deviations from the standard: none

Date of test: 2021-09-09--14

Table 6. Colour fastness to water, rating

Test Material	Staining						Change in colour
	Acetate	Cotton	Polyamide	Polyester	Acrylic	Wool	
1	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5

Scale 1-5, where 5 is the best.

Measurement uncertainty: $\pm 1/2$ grade.

Uncertainty of measurement is based on the method of dissemination of interlaboratory trials and is stated as standard deviation.

Colour fastness to perspiration was determined according to SS-EN ISO 105-E04:2013.

Adjacent fabric: Multifibre DW

The test material was wetting out.

Position of the test device: Horizontal

Colour assessment: Visual.

Deviations from the standard: none

Date of test: 2021-09-09--14

Table 7. Colour fastness to perspiration, rating

Test Material	Staining												Change in colour	
	Acetate		Cotton		Polyamide		Polyester		Acrylic		Wool			
	pH 5.5	pH 8.0	pH 5.5	pH 8.0	pH 5.5	pH 8.0	pH 5.5	pH 8.0	pH 5.5	pH 8.0	pH 5.5	pH 8.0		
1	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	5	5	5	5	5	5	5	5	5	5	5	5	5	5
3	5	5	5	5	5	5	5	5	5	5	5	5	5	5
4	5	5	5	5	5	5	5	5	5	5	5	5	5	5

Skala 1-5, där 5 är bäst.

Mätosäkerhet: $\pm 1/2$ hårdighetsklass.

Mätosäkerheten grundas på metodens spridning vid provningsjämförelser och anges som en standardavvikelse.

Breaking force of yarn was determined according to EN-ISO 2062:2009 (not an accredited method).

Tensile tester: Instron 5699, CRE-type

Test method: C

Range: (0-50) N

Gauge length: 250 mm

Rate of displacement: 250 mm/min

Pretension: 0.5cN/Tex (checked approximately with 5 m yarn)

Type of clamp: Unlined flat-faced.

Date of test: 2021-09-08.

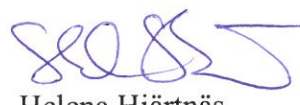
Table 8. Breaking force [N]

Test material 6	Maximum load [N]	Tensile at max load [%]
Specimen 1	12.3	13.7
Specimen 2	11.8	12.3
Specimen 3	10.9	10.4
Specimen 4	10.7	9.7
Specimen 5	13.0	13.4
Specimen 6	11.2	10.2
Specimen 7	11.4	10.4
Specimen 8	11.8	11.6
Specimen 9	12.1	12.4
Specimen 10	11.3	10.7
Specimen 11	11.0	10.6
Specimen 12	11.4	11.7
Specimen 13	12.2	13.4
Specimen 14	12.2	13.3
Specimen 15	11.0	10.3
Specimen 16	11.5	10.6
Specimen 17	11.9	11.5
Specimen 18	12.0	11.8
Specimen 19	11.6	10.4
Specimen 20	12.0	12.2
Mean value	11.6	11.5

All results relate only to the material tested.

Mölndal, 2021-09-14
RISE IVF AB
Textile Materials and Products


Ann Stare
Technical Reviewer


Helena Hjärtnäs
Project leader