



Textilní zkušební ústav, s.p.

KONFIDENCIALU

KOPIJA TKRA

*Handwritten signature*

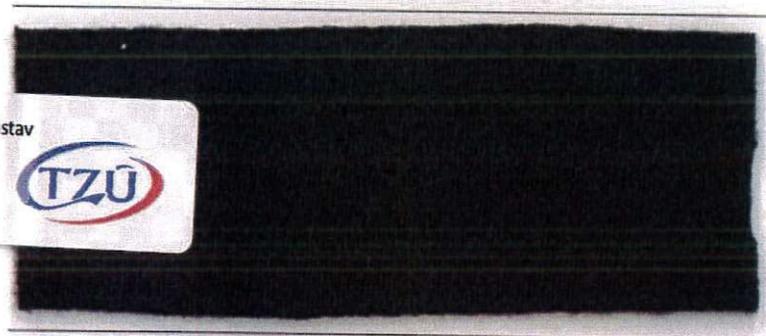
# TEST REPORT

AZL 23/ 0311-02

CUSTOMER:

**SAMPLE:** Material: Single Fleece Quality  
(according to the customer order) Colour: black

Textilní zkušební ústav  
Cejl 480/12  
602 00 Brno



**SUBJECT OF ASSESSMENT:** Tests according to request of the customer

**CONDITIONS OF APPLICATION OF THE TEST REPORT:**

Test Report contains results of the tests related to the submitted sample only. Sampling has been done by customer. The Report may not be reproduced in any way other than as a complete set. Reproduction of certain parts of the Report is subject to approval of the test laboratory, which has issued it. All information about subcontracted tests results or unaccredited test methods is presented in text part of the Test report.

**PREPARED BY:**  
**CHECKED BY:**  
**NUMBER OF PAGES:**

I. Tichá *Tichá*  
O. Kovářová *Kovářová*  
6

**DATE OF ACCEPTANCE:**  
17. 3. 2023

**DATE OF EXAMINATION:**  
20. 3. – 20. 4. 2023

**DATE OF ISSUE:**  
21. 4. 2023



+420 543 426 730  
+420 543 426 742  
<http://www.tzu.cz>  
[azl@tzu.cz](mailto:azl@tzu.cz)



## PROCEDURE OF ASSESSMENT

### ***Quantitative fibre composition***

was determined according to LST EN ISO 1833-2:2020

- pre-treatment of the sample: according to LST EN ISO 1833-1:2021, Annex A p. A.5.1.2.

Results: Content of analysed fibres as a percentage corrected using agreed allowances (Annex IX of the Regulation No. 1007/2011 of the European Parliament and of the Council)

### ***Mass per unit area***

was determined according to the LST EN 12127:1999

- Conditioning: relative humidity (65±4) %, temperature (20±2) °C
- Tested area: 100 cm<sup>2</sup>; Number of samples: 5

Results: Mass per unit area expressed in g.m<sup>-2</sup>

### ***Propensity to surface pilling, fuzzing or matting***

was determined according to ČSN EN ISO 12945-2:2021

- Conditioning: relative humidity (65±4) %; temperature (20±2) °C
- Pilling tester: Martindale
- Total load: (115±1) g
- Number of specimens tested / evaluators: 3 / 3

Abrasion method: standard wool fabric

Results: evaluation of surface change, assessed in degrees according to ČSN EN ISO 12945-4:2021.

### ***Propensity to surface pilling, fuzzing or matting***

was determined according to LST EN ISO 12945-1:2021\* – Pilling box method

- Conditioning: relative humidity (65±4) %, temperature (20±2) °C
- Pilling tester: ICI ( Pilling box "ORBITOR 516")
- Number of specimens tested / evaluators: 2+2 / 3
- Evaluated: 3600 rot, after 60 min

Results: evaluation of surface change according to LST EN ISO 12945-4:2021 in degrees unaccredited method

### ***Dimensional change after wet treatment/ washing and drying***

was evaluated according to LST EN ISO 5077:2008. The samples for evaluation were prepared according to LST EN ISO 3759:2011. Washing was carried out according to LST EN ISO 6330: 2012.

- Conditioning: relative humidity (65±4) %, temperature (20±2) °C (LST EN ISO 139: 2006)
- Sample preparation: LST EN ISO 3759: 2011 p. 6
- Specimen dimensions: 2 pcs, (500 x 500) mm
- Method: 4N (40±3) °C, Number of washing: 1x, number of samples: 2 ( 500x500 ) mm
- Washing machine: FOM-71MP, produced by Electrolux-Wascator – Lab, type A2
- Detergent: standard ECE reference phosphate-free detergent 98 without optical bleach - reference detergent no. 3
- Total mass of the specimens and loading fabric: 100% polyester jersey material, type III , 2 kg
- Drying: procedure F – tumble dry (60) °C, drying machine: WASCATOR T2130, type A1

Results: Dimensional change expressed in %





***Permeability of fabric to air***

was determined according to LST EN ISO 9237:1997

- Conditioning: relative humidity (65±4) %, temperature (20±2) °C
- THE FRAZIER 2000TM DIFFERENTIAL PREASSURE AIR PERMEABILITY TESTER,
- FAP-1034-LP
- Number of specimens tested: 10
- Surface of the sample: 20 cm<sup>2</sup>
- Gradient pressure: 100 Pa

Results: Permeability of fabric to air expressed as mm.s<sup>-1</sup>

***Abrasion resistance of fabrics by the Martindale method –***

***Part 2: Determination of specimen breakdown***

was determined according to ČSN EN ISO 12947-2:2017

- Abrasion tester: MARTINDALE SDL, Type M 235
- Conditioning a testing atmosphere: relative humidity (65±4) %, temperature (20±2) °C
- Load: 9 kPa (595±7) g
- Backing foam used: yes
- Specimen type/end-point assessment: woven fabric / two threads completely broken

Result: The lowest individual result of all test specimens expressed by the number of rubs, prior to the end-point being reached.

*In case the test was stopped before reaching its end-point, result is expressed as „≥“, indicating the reached number of rubs*

***Elasticity of fabrics (Strip tests)***

was determined according to ČSN EN ISO 20932-1:2020 Method A

- Conditioning according: relative humidity (65±4) %, temperature (20±2) °C
- Standard atmosphere for testing: relative humidity 67%, temperature 21°C
- Tensile strength tester: INSTRON 1122 CRE
- Rate of travel of clamping jaw: 500 mm.min.<sup>-1</sup>
- Nominal gauge length: 100 mm
- Number of specimens tested: 5 longitudinal, 5 transverse

Results: maximum extension S, recovered elongation D as %

***Number of stitches per unit length \****

was determined according to LST EN 14971:2006 Method A

- Conditioning: relative humidity (65±4) %, temperature (20±2) °C
- Standard atmosphere for testing: relative humidity 66 %, temperature 20 °C
- Measured length: 1 cm
- The number of tests: 5x columns, 5x rows

Results: Number of stitches per unit length.

\*unaccredited method

***Weave***

was determined according to ČSN 80 0020:1965 Weaves and weaves technique. Terminology.

Results: verbal description of weave





***Textiles – Bursting properties of fabrics – Part 1: Hydraulic method for determination of bursting strength and bursting distension\****

was determined according to LST EN ISO 13938-1:2020

- Conditioning: relative humidity (65±4)%, temperature (20±2)°C
- Standard atmosphere for testing : relative humidity 66%, temperature 21°C
- Tensile strength tester : T – 50
- Test area : 7,3 cm<sup>2</sup>, Number of specimens tested : 5
- Time to burst : (20 ± 5)s

Results: bursting strength expressed as kPa  
\* unaccredited method

***Thermal resistance***

was determined according to LST EN ISO 11092:2015

- Conditioning: relative humidity (65±4) %; temperature (20±2)°C
- Standard atmosphere for testing: air temperature (20±0,1)°C, relative humidity (65±3,0) %
- Temperature of hotplate (35±0,1)°C, temperature of measuring unit (35±0,1)°C
- M259B Sweating Guarded Hot Plate" device for measuring thermal and
- water vapor resistance of textile materials
- Number of samples: 3

Results: thermal resistance  $R_{ct}$  expressed as m<sup>2</sup>.K.W<sup>-1</sup>

***Colour fastness to rubbing***

was determined according to LST EN ISO 105-X12:2016

- Rubbing conditions: dry
- Rubbing conditions: wet (wetting of rubbing cloth: 100%)
- Rubbing finger: for textiles [diameter (16±0,1) mm; downward force (9±0,2) N], ISO105-F09:2009
- Climatic conditions during testing: temperature (20±2) °C, relative humidity (65±2) %
- LST EN ISO 139:2006
- Time of air-conditioning of samples: 4 hours

Result: Numerical rating for the staining of tested specimen for warp / weft directions to the cotton rubbing cloth, assessed according to the LST EN ISO 105-A03:2020

***Colour fastness to washing***

was determined according to LST EN ISO 105-C06:2010

- Test conditions: test A1S (t=40°C)
- Number of steel balls: 10
- Detergent: ECE
- Additional souring: not used
- Adjacent fabrics used: multifibre DW (Acetate/Cotton/Polyamide/Polyester/Acryl/Wool)

Results: Numerical rating of the tested specimen colour change, assessed according to LST EN 20105-A02:1997. Staining of the tested specimen to the individual adjacent fabrics, assessed according to LST EN ISO 105-A03:2020





Textilní zkušební ústav, s.p.

**Colour fastness to perspiration**

was determined according to LST EN ISO 105-E04:2013

- Alkaline solution of model perspiration
- Acid solution of model perspiration
- Adjacent fabric: multifibre DW (Acetate/Cotton/Polyamide/Polyester/Acryl/Wool)

**Results:** Numerical rating of the tested specimen colour change, assessed according to LST EN 20105-A02:1997 Staining of the tested specimen to the individual adjacent fabrics, assessed according to LST EN ISO 105-A03:2020

**Colour fastness to light**

was determined according to LST EN ISO 105-B02:2015

- Instrument: MEGASOL V2.01
- Filter System: LST EN ISO 105-B02:2015
- Lighting procedure: method 1
- Exposure conditions: normal

**Results:** Change of colour shade after exposition of the specimen to artificial light, expressed as numerical value according to the blue scale (LST EN ISO 105-B02:2015)

**TEST RESULTS:**

<b>Material: Single Fleece Quality</b> Colour: black			
Characteristics	Test method	Measuring unit	Values found
<b>Fibre composition+</b>	LST EN ISO 1833-2:2020	%	Polyester Polyamide Elastan
<b>Mass per unit area+</b> average value	LST EN 12127:1999	g.m <sup>-2</sup>	
<b>Propensity to surface pilling or fuzzing</b> - standard wool fabric . 125 . 500 . 1000 . 2000 . 5000 . 7000	ČSN EN ISO 12945-2:2021	degree	inc
<b>Surface change +</b> . pilling, fuzzing or matting number of cycles: 3 600 cycles (60 min)	LST EN ISO 12945-1:2021*	grade	

\* unaccredited method

+ Results tested by WMTI Fiznių ir technologijos mokslų centro, issued est report  
est report was delivered by the customer, results were implemented into this report on his request.





Textilní zkušební ústav, s.p.

Material: Single Fleece Quality Colour: black			
Characteristics	Test method	Measuring unit	Values found
<b>Dimensional change after washing and drying+</b> number of washing: 1x temperature: 40 °C	LST EN ISO 5077:2008 LST EN ISO 6330:2012	%	
<b>Permeability+</b>	LST EN ISO 9237:1996	mm.s <sup>-1</sup>	
<b>Abrasion resistance +</b> sample no. 1 sample no. 2 sample no. 3	ČSN EN ISO 12947- 2:2017	number of cycles	
<b>Elasticity</b> . elongation S . residual elongation C after 30 min . recovered elongation D after 30 min	ČSN EN ISO 20932-1: 2020 Method A	%	longitudinal / transverse
<b>Knitting density+</b>	LST EN 14971:2006* Method A	number of stitches per 1 cm	columns // rows
<b>Thermal resistance R<sub>ct</sub>+</b> . average value	LST EN ISO 11092:2015	m <sup>2</sup> .K.W <sup>-1</sup>	
<b>Determination of bursting strength+</b> - measured value in bursting pressure	LST EN ISO 13938-1:2020 *	kPa	
<b>Weave</b>	ČSN 80 0020: 1965	-	
<b>Colour fastness to rubbing +</b> . dry . wet	ČSN EN ISO 105-X12:2016	grade grey scale	staining of the adjacent fabric - warp / weft
<b>Colour fastness to washing +</b> . test A1S	ČSN EN ISO 105-C06:2010	grade grey scale	change in colour// staining of the adjacent fabric
<b>Colour fastness to perspiration +</b> . alkaline solution . acid solution	ČSN EN ISO 105-E04:2013	grade grey scale	change in colour// staining of the adjacent fabric
<b>Colour fastness to light +</b>	ČSN EN ISO 105-B02:2015	grade blue scale	change in colour

\* unaccredited method

+ Results tested by WMTI Fyzniú ir technologijos mokslu centro,  
issued

Test 1

Test report was delivered by the customer, results were implemented into this report on his request.

Approved:

Petr Nasadil  
Head of Testing Laboratories





KONFIDENCIALU

KOPIJA TKRA  
*J. Hrubá*

# TEST REPORT

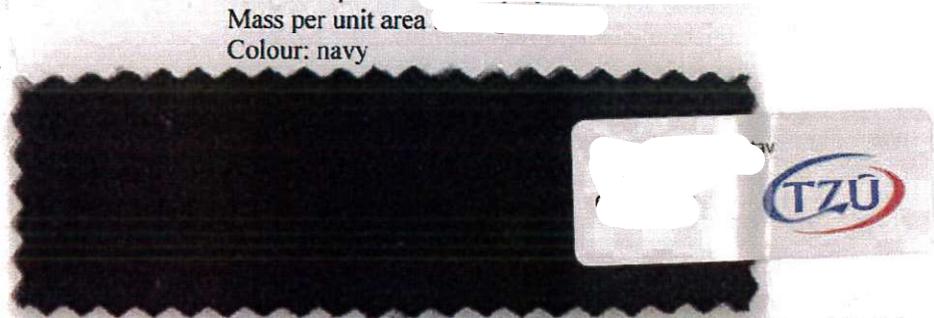
AZL 24/0784-01

CUSTOMER

L.

**SAMPLE:**  
(according to the customer order)

**Single Fleece fabric, art.**  
Fibre composition  
Mass per unit area  
Colour: navy



The laboratory is not responsible for information supplied by the customer that may affect the validity of test results.

**CONDITIONS OF APPLICATION OF THE TEST REPORT:**

Test Report contains results of the tests related to the submitted sample only. Sampling has been done by the customer. The Report may not be reproduced in any way other than as a complete set. Reproduction of certain parts of the Report is subject to approval of the test laboratory, which has issued it. All information about subcontracted tests results or unaccredited test methods is presented in text part of the test report. Unless otherwise stated, all tests were performed at the address, listed in the header.

**PREPARED BY:**  
**CHECKED BY:**  
**NUMBER OF PAGES:**

M. Hrubanová *Hrubanová*  
I. Tichá *Tichá*  
3

**DATE OF ACCEPTANCE:**  
02.07.2024

**DATE OF EXAMINATION:**  
02.07.-11.07.2024

**DATE OF ISSUE:**  
16.07.2024



+420 543 426 730  
www.tzu.cz  
azl@tzu.cz



Textilní zkušební ústav, s.p.

**Determination of colour fastness to rubbing**

was tested according to ČSN EN ISO 105-X12:2016

- rubbing conditions: dry / wet (wetting of rubbing cloth: 100 %)
- rubbing finger: for textiles [diameter (16±0,1) mm; downward force (9±0,2) N]
- climatic conditions during testing: temperature (20±2) °C, RH (65±2) %
- time of air-conditioning of samples: 4 hours

Result: grade of grey scale (staining to cotton rubbing cloth according to ČSN EN ISO 105-A03:2020)

Results	
staining in warp / weft direction	
dry conditions	
wet conditions	

**Determination of colour fastness to artificial light: Xenon arc fading lamp test**

was tested according to ČSN EN ISO 105-B02:2015

- instrument: QSUN-Xe2, model B02, air cooled Xe lamp
- lighting procedure: method 2
- sample's rotation: not used
- exposure conditions: A1 - normal, adequate to mild zone (RH 40 %, BST (45±3) °C)
- approximate radiation energy: (300-400 nm): 20,1 MJ/m<sup>2</sup>

Result: grade of blue scale

Results
colour change

**Determination of colour fastness to washing**

was tested according to ČSN EN ISO 105-C06:2010

- pre-treatment: 5 washing cycles according to ČSN EN ISO 6330:2022
- test conditions: AIS, 40 °C
- steel balls number: 10
- washing detergent: ECE
- souring treatment: not used
- adjacent fabrics: polyester /polyamide
- Result: Numerical rating of the tested specimen colour change (ČSN EN 20105-A02:1995).  
Staining of the tested specimen to the individual adjacent fabrics (ČSN EN ISO 105-A03:2020)

Results
colour change / staining





Textilní zkušební ústav, s.p.

***Determination of colour fastness to perspiration***

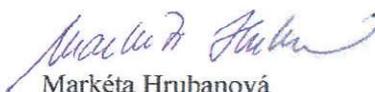
was tested according to ČSN EN ISO 105-E04:2013

- adjacent fabrics: polyester / polyamide
- the option used: samples tested horizontally

**Result:** Numerical rating of the tested specimen colour change (ČSN EN 20105-A02:1995). Staining of the tested specimen to the individual adjacent fabrics (ČSN EN ISO 105-A03:2020)

Results	
colour change / staining	
alkaline solution	
acid solution	

Approved by:

  
Markéta Hrušanová  
Head of Testing Laboratories

End of report



