

Empa  
Lerchenfeldstrasse 5  
CH-9014 St. Gallen  
T +41 58 765 74 74  
F +41 58 765 74 99  
www.empa.ch

Swiss Shield AG  
Bergstrasse 25  
8890 Flums

## Report no 5214033147-E

<b>Test order</b>	<b>Determination of the fire code rating (BKZ) according to the directive for fire police regulations, building materials and components, part B: Test specifications. Edition 1988 (with supplements)</b>
Customer	Swiss Shield AG
Sampling	by customer
<b>Test object</b>	<b>Swiss Shield® NATURELL_ARBOR FR</b>
Contact person	Carlo Raas
Your order from	23 November 2023
Receipt of the test object	28 November 2023
Execution of the test	30 November 2023 till 8 December 2023
Number of pages	6
Attachments	1) General Terms and Conditions for Empa Services 2) Regulation of advertising with Empa test reports
Archiving of the test object	The remaining test object will be archived for 1 year.

This report has a validity period of five years 11 December 2028.

Abt. 401 – zep/ell/mase/buno - controlled by:

---

Empa, Swiss Federal Laboratories for Materials Science and Technology,  
Laboratory for Biomimetic Membranes and Textiles

Technical specialist



---

Clues The examination results are only valid for the inspected object. Information on the measurement uncertainty can be requested from the laboratory. The report and documents are kept for ten (10) years. If the Customer does not wish to take back the test objects, Empa shall be entitled to freely dispose of or destroy the test objects one (1) year after completion of its activities. The use of the report for advertising purposes is subject to authorisation (so-called advertising authorisation in accordance with the Advertising with Empa test reports regulation).

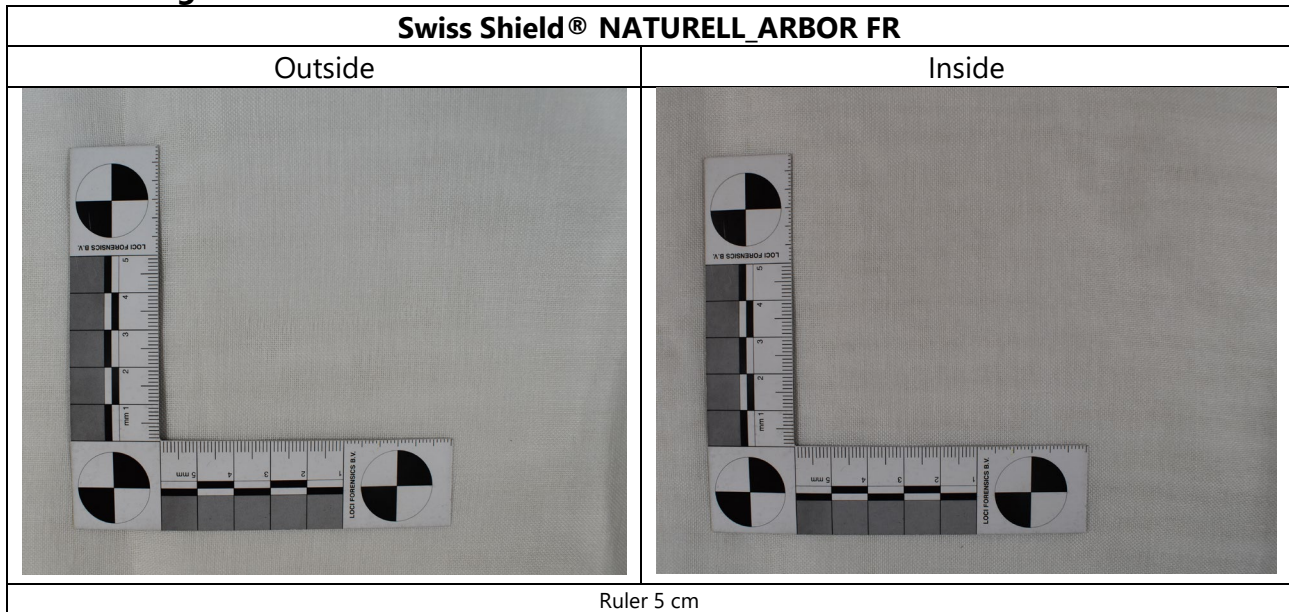
## Contents

1.	Test object.....	3
2.	Images.....	3
3.	Performed tests.....	3
4.	Test methods.....	4
4.1	Flammability of textiles according to SN 198898:1987 [de].....	4
4.1.1	Test conditions.....	4
4.1.2	Deviation from the standard.....	4
4.2	Determination of the smoke density according to VKF.....	4
4.2.1	Test conditions.....	4
4.2.2	Deviations from the standard.....	4
5.	Requirements according to VKF.....	5
5.1	Flammability of textiles according to SN 198898:1987 [de].....	5
5.2	Determination of the smoke density according to VKF.....	5
6.	Results.....	5
6.1	Flammability of textiles according to SN 198898:1987 [de].....	5
6.2	Smoke density according to VKF.....	6
7.	Fire protection classification according to the directive for fire police regulations, building materials and components, part B: Test conditions. Edition 1988.....	6

## 1. Test object

Declared according to order form	
Test object	<b>Swiss Shield® NATURELL_ARBOR FR</b>
Material composition	82% Viskose FR/ 18% Copper Silver
Coating	no
Thickness	-
Weight value per unit area	69 g/m <sup>2</sup> // Informative measurement: 67 g/m <sup>2</sup>
Color	Ecru
Sample size received	1.50 m x 2.50 m
Test condition	as delivered, without pretreatment

## 2. Images



## 3. Performed tests

- 4.1 Determination of the burning and smouldering behaviour of textiles; vertical edge ignition  
 Guideline VKF: Flammability of textiles according to SN 198898:1987 [de]  
 (Withdrawn 1999-07-01)
- 4.2 Determination of the smoke density according to VKF

## 4. Test methods

### 4.1 Flammability of textiles according to SN 198898:1987 [de]

The acclimatized samples are suspended vertically in a combustion box and brought into contact with a propane gas flame from a burner positioned at 30° to the vertical for 3s and 15s at the lower edge.

In the case of samples that do not ignite by the flame, the destroyed distance and the glow time are determined, and in the case of samples that extinguish after flame exposure within the measuring distance, the destroyed distance, the burning time and the glow time are determined. In addition, it is also determined whether the height of the flame peak is reached. It is recorded whether the samples melt or there is dripping debris. In the case of dripping, it is also assessed whether the dripping is burning and the blotting paper is ignited.

#### 4.1.1 Test conditions

Apparatus	Ahiba Type FTG 70/A1 - Fab 72188
Marking thread	Cotton, raw 50/3 dtex
Gas	Propane, calorific value approx. 46 MJ/kg; (40 ± 2) mm flame length
Airflow	(0.1 to 0.2) m/s
Test climate	18.2 °C / 28.7 % RH
Sample acclimatization	≥ 24 h at (20 ± 2) °C / (65 ± 4) % RH
Number of samples	20 (10 in longitudinal, and 10 in transverse direction)
Size of the samples	(105 x 450)mm
Attachment weight	100g

#### 4.1.2 Deviation from the standard

The test object was not pretreated prior to the test.

### 4.2 Determination of the smoke density according to VKF

A defined test specimen is exposed in a standardized test apparatus with a defined air flow rate and a defined flame exposure until it burns off. The maximum of the obscuration (light absorption) produced by the smoke is measured by photometry.

The smoke density is determined with three tests. If they do not result in a matching classification, the number of attempts is extended to six and the maximum and minimum value excluded. The average of the four remaining results is decisive for the classification.

#### 4.2.1 Test conditions

Apparatus	Smoke intensity tester (Qualmintensitäts-Tester) QIT No. 26
Gas	Propane, pressure approx. 0.5 bar
Flame height	150 mm
Air influx	(6.0 bis 6.5) l/s
Sample acclimatization	≥ 24 h at (20 ± 2) °C / (65 ± 4) % RH
Number of samples	3 (up to 6)
Size of the samples	Compact materials: (30 x 30) mm, thickness 4 mm ± 10%
Sample holder	Bowl

#### 4.2.2 Deviations from the standard

The test object was not pretreated prior to the test.

## 5. Requirements according to VKF

### 5.1 Flammability of textiles according to SN 198898:1987 [de]

Flammability grade 5 is achieved when 18 of the 20 Samples meet all requirements.

Classification	Requirements	
Flammability grade 5	Peak of flame	≤ 400 mm
	Afterflame time	< 5 s
	Afterglow time	≤ 5 min
	Damaged length	≤ 150 mm

Table 1: Requirements according to VKF for achieving the flammability grade 5.

### 5.2 Determination of the smoke density according to VKF

The decisive criterion for classification is light absorption

Classification	Requirements	
Smoke density level 1	Maximum light absorption	> 90%
Smoke density level 2	Maximum light absorption	> 50 - 90%
Smoke density level 3	Maximum light absorption	0 - 50%

Table 2: Requirements according to VKF for classification of the smoke density test.

## 6. Results

### 6.1 Flammability of textiles according to SN 198898:1987 [de]

Sample no.	After flame time [s]	Afterglow time [s]	Damaged length [mm]	Peak of flame reached [>400mm]	Melt and/or drop off	Burning droplets	Ignition blotting paper
Longitudinal: Ignition time 3 s							
1	1	-	75	no	-	-	-
2	1	-	72	no	-	-	-
3	1	-	90	no	-	-	-
4	1	-	98	no	-	-	-
5	13	-	437	yes	-	-	-
Longitudinal: Ignition time 15 s							
1	0	-	61	no	-	-	-
2	0	-	80	no	-	-	-
3	0	-	80	no	-	-	-
4	0	-	109	no	-	-	-
5	0	-	108	no	-	-	-

Transverse: Ignition time 3 s							
1	0	-	79	no	-	-	-
2	0	-	69	no	-	-	-
3	1	-	77	no	-	-	-
4	1	-	72	no	-	-	-
5	0	-	49	no	-	-	-
Transverse: Ignition time 15 s							
1	0	-	65	no	-	-	-
2	0	-	76	no	-	-	-
3	0	-	74	no	-	-	-
4	0	-	71	no	-	-	-
5	0	-	70	no	-	-	-

Table 3: Single results of the flammability of textiles according to SN 198898:1987 [de]. Measurement results that do not meet the requirements are marked yellow.

The test object >> Swiss Shield® NATURELL\_ARBOR FR << fulfils the requirements for flammability grade 5 according to VKF.

## 6.2 Smoke density according to VKF

	Sample 1	Sample 2	Sample 3	Sample 4	Average
<b>Maximum light absorption (%)</b>	12	15	14	-	<b>14</b>

Table 4: Results of the smoke density test.

Maximum light absorption 14 % corresponds to smoke density level 3, light smoke density.

## 7. Fire protection classification<sup>1</sup> according to the directive for fire police regulations, building materials and components, part B: Test conditions. Edition 1988<sup>2</sup>

**Fire protection classification: 5.3**

\* \* \* \* \*

<sup>1</sup> Measurement uncertainty is not considered for the conformity assessment.

<sup>2</sup> Association of Swiss Canton Fire Insurance Companies (VKF), Bundesgasse 20, CH-3001 Bern, Phone: +41 (0)31 320 22 22, www.vkf.ch