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Empa
Materials Science and Technology

rohi Stoffe GmbH
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Report no 5214028382-E

Test order	**Determination of the fire code rating (BKZ) according to the directive for fire police prescriptions, building materials and components, part B** **Test specifications 1988 edition (with supplements).**
Customer	rohi Stoffe GmbH, DE – 82538 Geretsried
Sampling	by customer
Test object	**CLEO**
Contact person	Nikolina Pavleska
Your order from	10 November 2021
Receipt of the test object	11 November 2021
Execution of the test	17 November 2021 till 26 November 2021
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/s	The remaining test object/s will be archived for 1 year.

This test report has a validity period of five years 29 November 2026.

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

Technical specialist

Digital unterschrieben von Pierrine Zeller
Datum: 2021.11.29 11:08:36 +01'00'

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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

	Declared according to order form	Additional information
Test object	CLEO	/
Intended use	not declared	/
Material composition (%)	95% WV / 5% PA	/
Coating	-	
Thickness (mm)	-	
Mass per unit area (g/m^2)[1]	690	Informative measurement: 688
Color	02054.00 / VA: 846809	Black/grey/beige/light blue
Sample size received	(300 x 141) cm	
Test condition	as delivered, without pretreatment	
Subcontractors	non-existent	

2. Image/s

CLEO	
Aussenseite	Innenseite
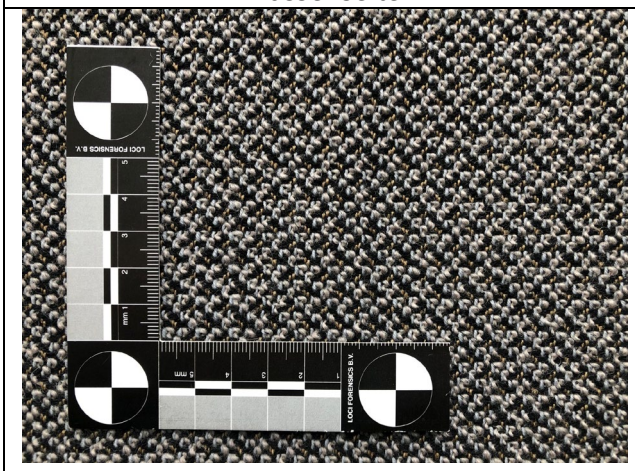	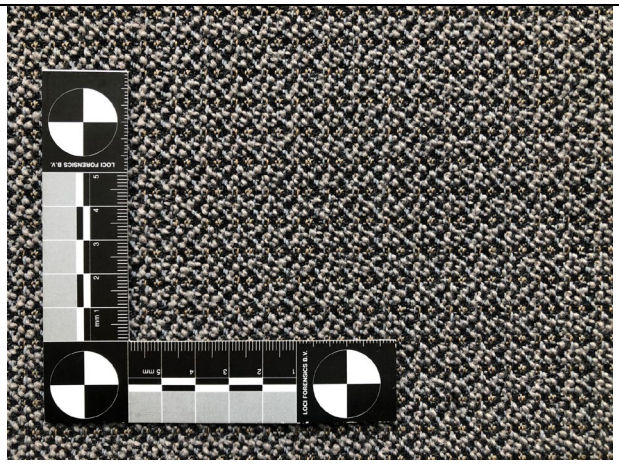
Image in millimeters	

3. Performed tests

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(Withdrawn 1999-07-01)

4.2 Determination of the smoke density test according to VKF

[1] mass equals balance reading (without buoyancy correction)

4. Test methods

4.1 Flammability of textiles according 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 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,
Air flow	(0.1 to 0.2) m/s
Test climate	19.3°C / 30.0% 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	350g

4.1.2 Deviation/s from the standard

1. The test object was not pretreated before the test.

4.2 Determination of the smoke density test 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. Should the results not agree, up to six tests will be conducted and the maximum and minimum values 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	(30 x 30) mm at 2g
Sample holder	grating

4.2.2 Deviation/s from the standard

1. 2g, instead of the thickness of 4mm ±10 % tolerance.
2. without pretreatment, cleaning treatment not tested

5. Requirements according VKF

5.1 Flammability of textiles according 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 VKF for achieving the flammability grade 5

5.2 Determination of the smoke density test 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 VKF for classification of the smoke density test

6. Result/s

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

Empa No.	Afterflame time [s]	Afterglow time [s]	Damaged length [mm]	Peak of flame [>400mm]	Melt and / or drop off	Burning droplets	Ignition blotting paper
Longitudinal: Ignition time 3 s							
1	**1**	**-**	**2**	**No**	-	-	-
2	**2**	**-**	**2**	**No**	-	-	-
3	**1**	**-**	**3**	**No**	-	-	-
4	**1**	**-**	**2**	**No**	-	-	-
5	**1**	**-**	**1**	**No**	-	-	-
Longitudinal: Ignition time 15 s							
1	**5**	**-**	**40**	**No**	-	-	-
2	**1**	**-**	**35**	**No**	-	-	-
3	**2**	**-**	**26**	**No**	-	-	-
4	**1**	**-**	**29**	**No**	-	-	-
5	**1**	**-**	**36**	**No**	-	-	-
Transverse: Ignition time 3 s							
1	**1**	**-**	**1**	**No**	-	-	-
2	**1**	**-**	**1**	**No**	-	-	-
3	**1**	**-**	**2**	**No**	-	-	-
4	**1**	**-**	**4**	**No**	-	-	-
5	**0**	**-**	**4**	**No**	-	-	-

Transverse: Ignition time 15 s							
1	**3**	**-**	**27**	**No**	-	-	-
2	**2**	**-**	**27**	**No**	-	-	-
3	**3**	**-**	**36**	**No**	-	-	-
4	**3**	**-**	**27**	**No**	-	-	-
5	**1**	**-**	**17**	**No**	-	-	-

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

The test object >>CLEO<< fulfils the requirements for flammability grade 5 according to VKF.

6.2 Smoke density test according to VKF

	Sample 1	Sample 2	Sample 3	Sample 4	**Average**
Maximum Light absorption (%)	11	13	1	-	**8**

Table 4: Results of the smoke density test

Maximum light Absorption **8 %** ≙ Smoke density level 3 (light smoke density)

7. Fire protection classification according to the directive for fire police prescriptions, building materials and building elements, part B (test conditions), edition 1988[2]

Fire protection classification : 5.3

(Class 5.3 stands for "low combustible / slight smoke density ")

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