

for the proof of fire behaviour according to DIN 4102-1

Reference: FLT 3630117 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)

Sponsor: Big Image Systems Deutschland GmbH
Wetzlarer Str. 46
D - 14482 Potsdam

Order: 2017-07-16 **Arrived:** 2017-07-17

Description of samples: Uncoated fabric made of cotton, flame-retardant treated and printed on both sides in different colours, type name "Cloth 201 HzN".
(for details see page 2)

Delivered: 2017-07-17

Content of request: Proof of flammability to classify building materials to class B1 "schwerentflammbar" according to DIN 4102-1

Assessment: The examined product meets the requirements of class B1 for "schwerentflammbare" (not easily flammable) building materials according to DIN 4102-1. If used in one layer, suspended freely or with distance of >40 mm to the same or other plain materials.
(for details see page 5)

Validity: 2022-07-31

Sampling: The samples were sent to the laboratory by the sponsor

Remark: If the above-mentioned building material is not used as product according to MBO § 2, there is no need for a general building supervisory test certificate.
This test certificate is not valid if the examined building material is used as product in the meaning of state building prescriptions (MBO § 17).

This test certificate does not replace an eventually necessary proof of applicability concerning building supervisory or building laws in the meaning of state building prescriptions. This has to be verified by:

- "allgemeine bauaufsichtliche Zulassung" (general building inspectorate approval) or by
- "allgemeines bauaufsichtliches Prüfzeugnis" (general building inspectorate certificate) or by
- "Zustimmung im Einzelfall" (exceptional approval).

This test certificate can serve as a basis for building supervisory procedures for:

- regulated building products for the pre scribed proofs of conformity
- non-regulated building products for the needed proofs of applicability.

This test certificate comprises 5 pages and 5 appendices.

Approved testing, inspection and certification body

This test certificate must not be published and copied preceding agreement of the test laboratory and if agreed, only during validity and unchanged concerning appearance and contents. Agreement of the test laboratory has to be given in any case if norms in which the tests are based or other technical standards have changed.



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PÜZ-Stelle (LBO): BRA09

TEST CERTIFICATE



1 Description of test material

1.1 Test material (according to the sponsor)

The delivered materials are flame-retardant treated cotton fabrics, printed in black, red and yellow on both sides (INFINITUS inkjet printer using colours cyan, magenta, yellow, black). The printed fabrics are intended to be used inside of building as advertising space or for decorative purposes and have been designated with the trade name "Cloth 201 HzN" by the client.

1.2 Description of the delivered samples

For the tests, the laboratory received three sections of fabrics, printed in black, red and yellow on both sides and on its full surface, each with an approximate length of 1.4 m and a width of 3.3 m, as well as a plain section of the fabric. The delivered samples were not marked and were designated with the trade name "Cloth 201 HzN" by the client.

Colour: white fabric, printed in black, red or yellow on both sides;

Characteristic values: see passage 4.1; photos: see enclosures 1-4

Further details are not known to the laboratory; a retain sample has been deposited.

2 Preparation of samples

For the small burner ("Brennkasten") samples for edge flame exposure (dimensions 190 mm x 90 mm) and samples for surface flame exposure (dimensions 230 mm x 90 mm) were cut in warp and in weft orientation of the fabric.

For the fire shaft ("Brandschacht") tests 8 specimens were assembled. The samples (dimensions 1000 mm x 190 mm) for the test specimens A, C, E and G were cut in warp orientation; the samples for the test specimens B, D, F and H were cut in weft orientation of the fabric. Afterwards all samples were kept in a climate chamber acc. DIN 50014-23/50-2 until they reached constant weight.

3 Arrangement of samples

The tests in the fire shaft ("Brandschacht") have been performed acc. DIN 4102-1 and -16 (building materials class B1). The small burner tests ("Brennkastenprüfungen") have been performed acc. DIN 4102-1, chapter 6.2.5 (building materials class B2).

Arrangement of the samples: single layer, freely suspended

Period of testing: August 2017

4 Results

- section 4.1 Material characteristics
- section 4.2.1 Test results class B2 (small burner test)
- section 4.2.2 Test results class B1 (fire shaft)

4.1 Material characteristics

Table 1

Trade name	Printing ink	Specifications by manufacturer		Measured values		
		Mass/unit [g/m ²]	thickness [mm]	Mass/unit [g/m ²]	thickness (m.v.) [mm] s	
Cloth 201 HzN	without	0.80-0.85	270 - 300	0.84	0.009	338
	black	./.	./.	0.91	0.006	342
	red			0.91	0.007	350
	yellow			0.90	0.007	340

m.v. mean value

s standard deviation

./. not received/not measured



4.2 Results of the fire behaviour

4.2.1 Test results class B2 (Brennkasten)

All building materials class B1 must also meet the requirements of materials of class B2 (flammable). The material, tested in "Brennkasten" acc. DIN 50 050 meets the requirements building materials class B2; the material did not show burning particles/droplets during these tests. Exposing the flame to the front or reverse side did not influence the fire behaviour. (Results: see enclosures 5)

4.2.2 Test results class B1 (Brandschacht)

Table 3

Test results "Brandschachtprüfung" (part 1)										
line no..		Test results								requirements
		A	B	C	D	E	F	G	H	
1	Number of specimen arrangement acc. DIN 4102 –15 Table 1	1	1	1	1	1	1	1	1	
2	Maximal flame height above bottom edge cm	60	50	60	60	50	60	70	60	*)
3	Time ¹⁾ min	1	1	1	1	1	1	1	1	
4	Burning / melting through Time ¹⁾ min	1	1	1	1	1	1	1	1	
5	Back side of the specimens: Flames / glowing Time ¹⁾ min:s	./.	./.	./.	./.	./.	./.	./.	./.	
6	Discolouring Time ¹⁾ min:s	./.	./.	./.	./.	./.	./.	./.	./.	
7	Falling of burning droplets Begin ¹⁾ min	No	No	No	No	No	No	No	No	
8	Extend: Sporadic falling of burning droplets									
9	Continuous falling of burning droplets									
10	Falling of burning parts Begin ¹⁾ min:s	No	No	No	No	No	No	No	No	
11	Extend: Sporadic falling of burning parts									
12	Continuous falling of burning parts									
13	Afterflame time at the bottom of the sieve (max.) min:s	./.	./.	./.	./.	./.	./.	./.	./.	
14	Impairment of the burner flames by dropping or falling Material Time ¹⁾ min:s	./.	./.	./.	./.	./.	./.	./.	./.	
15	Premature end of test Final occurrence of burning at the specimen ¹⁾ min	No	No	No	No	No	No	No	No	
16	Time of eventually end of test ¹⁾ min:s	./.	./.	./.	./.	./.	./.	./.	./.	

¹⁾ Indication of time: from the beginning of testing procedure

- Not tested

./. Not occurred

*) No cause for complaint



Test results "Brandschachtprüfung" (part 2)										
line no.		Test results								requirements
		A	B	C	D	E	F	G	H	
17	<u>Afterflame after end of test</u>	No	No	No	No	No	No	No	No	
18	Time min:s									
19	Number of specimen									
20	Front side of specimen									
21	Back side of specimen									
21	Flame lengthcm									
22	<u>Afterglow after end of test</u>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
23	Time min:s	1:34	1:12	1:35	2:10	1:17	1:04	2:17	2:12	
23	Number of specimen	4	4	4	4	4	4	4	4	
24	<u>Place of appearance:</u>									
24	Lower half of specimen	./.	./.	./.	./.	./.	./.	./.	./.	
25	Upper half of specimen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
26	Front side of specimen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
27	Back side of specimen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
28	<u>Smoke density</u>									
28	≤ 400 % min	12.1	11.2	22.6	18.3	15.3	13.9	10.1	12.2	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.	./.	./.	./.	./.	./.	
30	Diagram fig. no.	1	3	5	7	9	11	13	15	
31	<u>Residual length</u>									
31	Individual value cm	29	21	28	22	26	27	26	25	> 0
		28	18	27	28	30	29	29	29	
		35	24	29	29	19	31	34	25	
32	Average value cm	30	21	27	26	24	27	28	25	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	8	10	12	14	16	
34	<u>Flue gas temperature</u>									
34	Maximum of average value. °C	110	120	115	117	117	116	116	117	≤ 200
35	Time ¹⁾ min:s	9:3	4:12	8:30	9:48	3:38	9:12	9:54	9:48	
36	Diagram fig. no.	1	3	5	7	9	11	13	15	
37	<u>Remarks:</u> - Graphs and photos: see enclosures 1-4.									

¹⁾ indication of time: from the beginning of the test procedure

- not tested

./. not occurred

*) no cause for complaint

Test specimen	Test-no.	Printing ink	Direction of samples
A	630117-001	black	warp
B	630117-002		weft
C	630117-003	yellow	warp
D	630117-004		weft
E	630117-005	red	warp
F	630117-006		weft
G	630117-007	black	warp
H	630117-008		weft



5 Assessment

According to the test results in section 4.2 the material, described in section 1 and 4.1, the tested material fulfils the requirements of a building material class B1 according to DIN 4102-1, if the material is used suspended freely or with a distance of > 40 mm to the same or other plain materials. According DIN 4102-16:2015-09 section 4.2 this assessment is valid for the described fabric and printing process, double-sided printed in any colours.

The requirements of building materials class B2 are fulfilled also, no falling of burning parts or droplets occurred during these tests.

The verification for

- outdoor usage (ageing behavior by outdoor weathering)
has not been proved.

6 Special remarks

This certificate is only valid for the material as described under paragraph 1. In combination with other materials or with additional coatings or surfaces etc. the burning behaviour may differ.

This test certificate is not valid, as soon as the product is used as a building product in the sense of the "Landesbauordnungen" (state building requirements, MBO § 17).

This test certificate is no substitute for a General Building Inspectorate Certificate. This test certificate is granted without prejudice to the rights of third parties, or particular private proprietary rights.

In General Building Inspectorates procedures this test certificate can be based for

- regulated building materials for the required proof of accordance
- for non-regulated building materials for the required proof of applicability

The explanations given in DIN 4102-1 app. D, especially concerning an external production control has to be considered.

This test certificate is valid until 2022-07-31, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 21st of August 2017



Head of the test laboratory
(Dipl.-Ing. Uwe Kühnast)

This translation was issued the 14th of October 2017, in a case of doubt the German version is valid solely.

Test specimen A

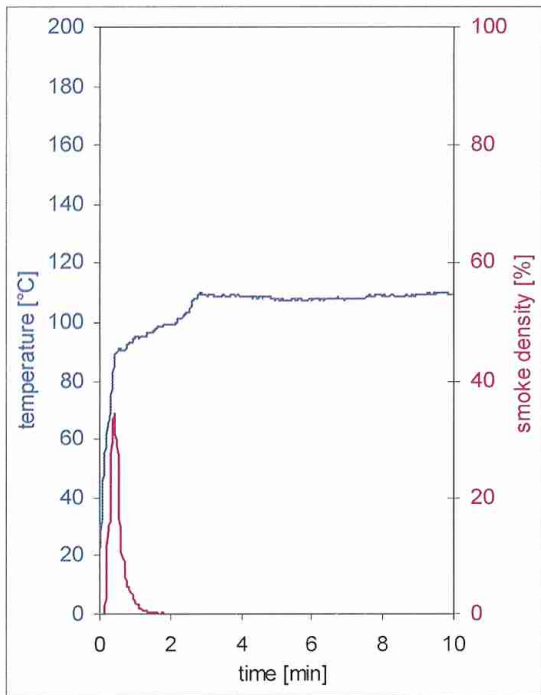


fig. 1
Graphs of the flue gas temperature and the smoke density

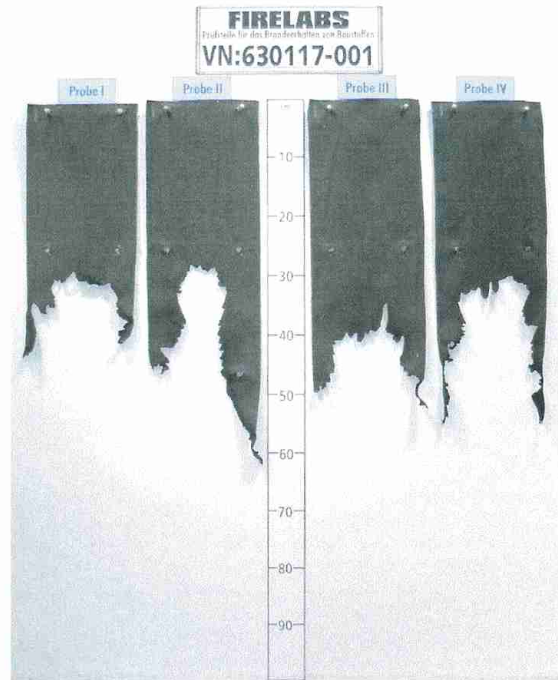


fig. 2
View of test specimen after the test

Test specimen B

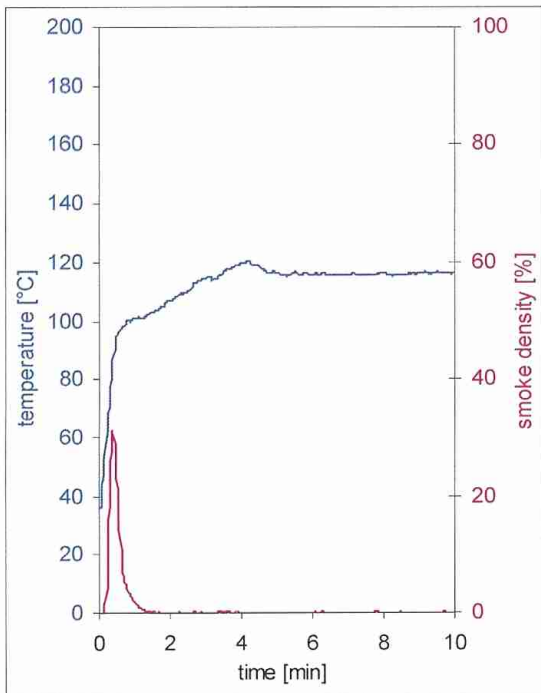


fig. 3
Graphs of the flue gas temperature and the smoke density

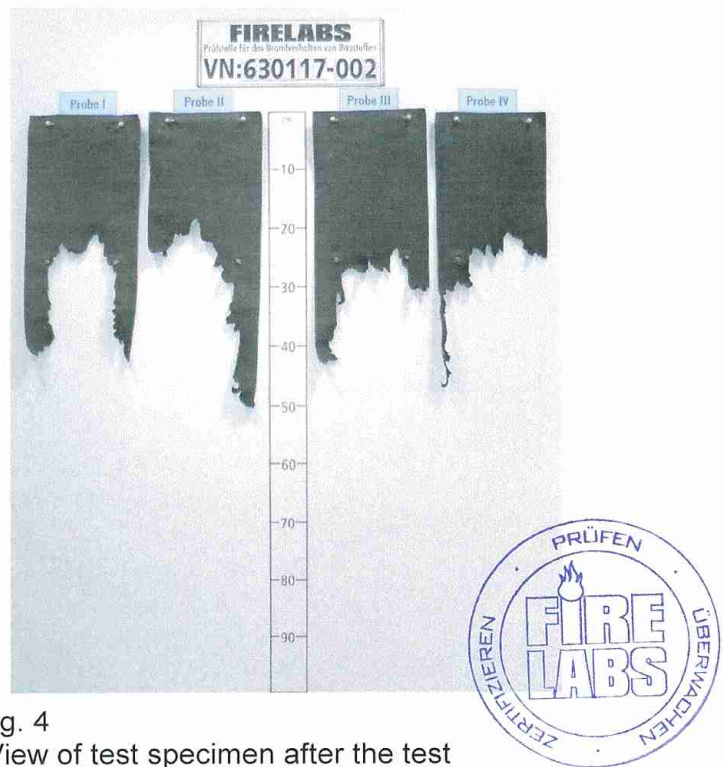


fig. 4
View of test specimen after the test

Test specimen C

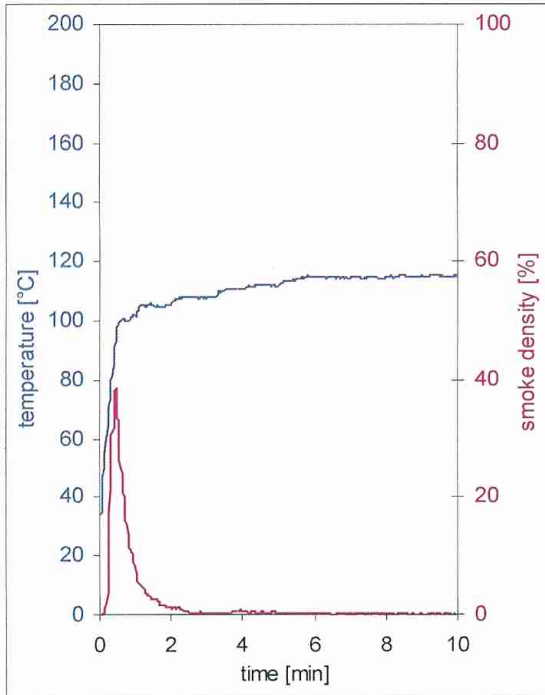


fig. 5
Graphs of the flue gas temperature and the smoke density

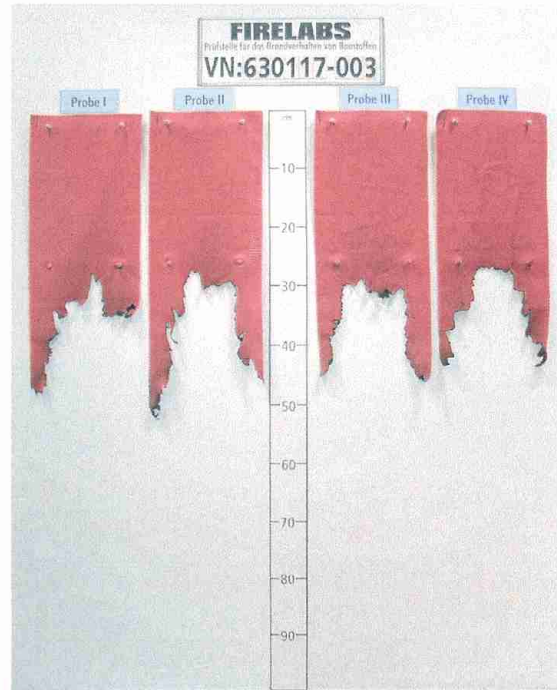


fig. 6
View of test specimen after the test

Test specimen D

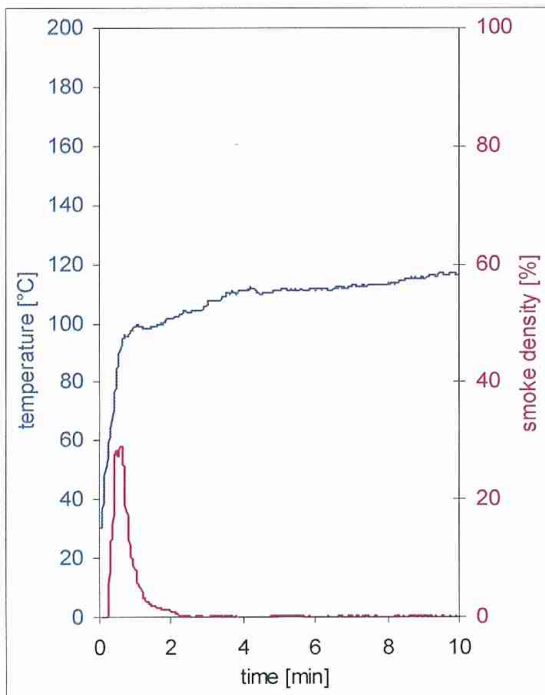


fig. 7
Graphs of the flue gas temperature and the smoke density

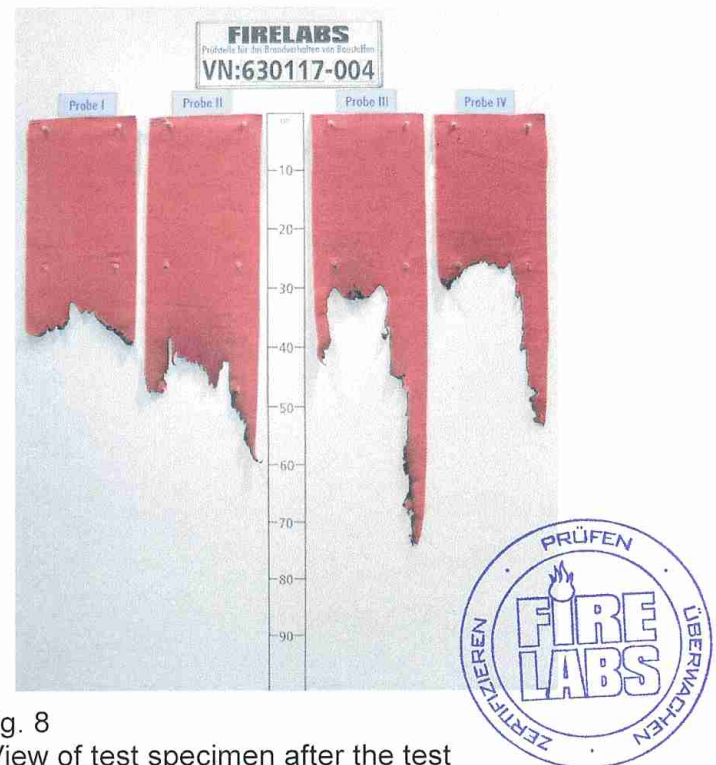


fig. 8
View of test specimen after the test

Test specimen E

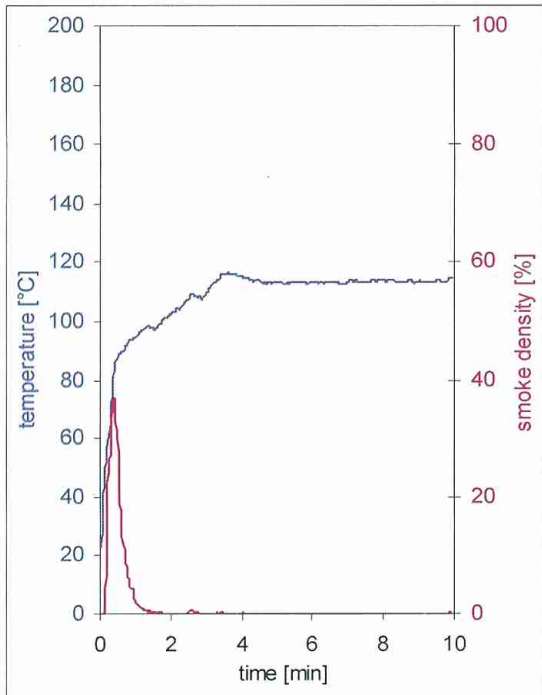


fig. 9
Graphs of the flue gas temperature and the smoke density

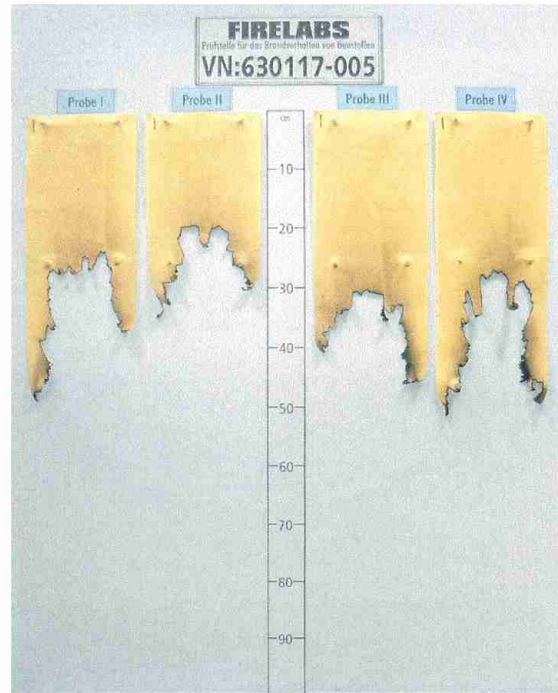


fig. 10
View of test specimen after the test

Test specimen F

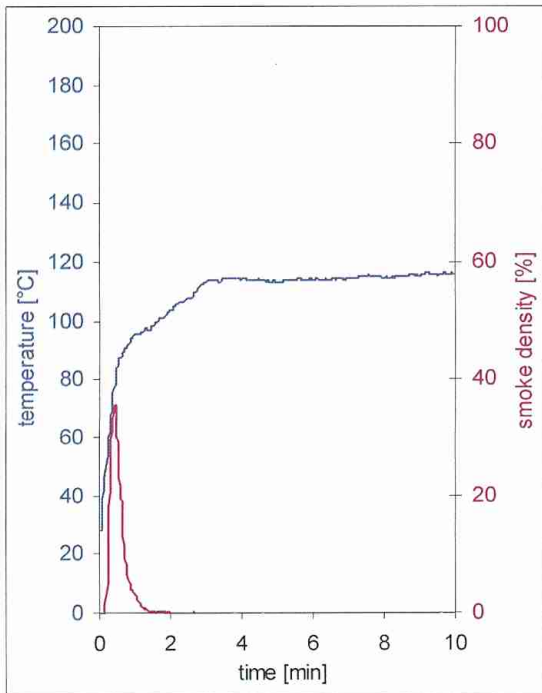


fig. 11
Graphs of the flue gas temperature and the smoke density

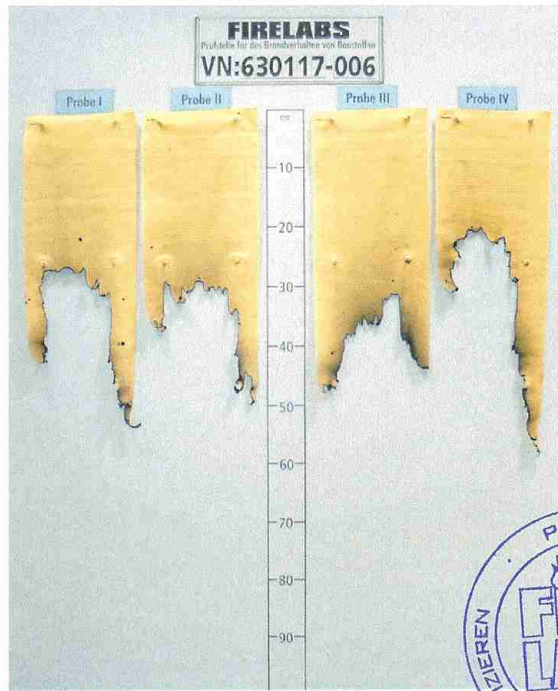


fig. 12
View of test specimen after the test

Test specimen G

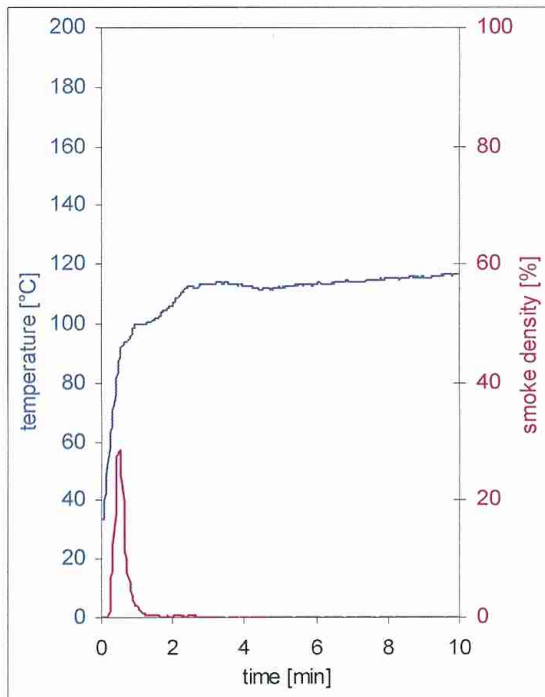


fig. 13
Graphs of the flue gas temperature and the smoke density

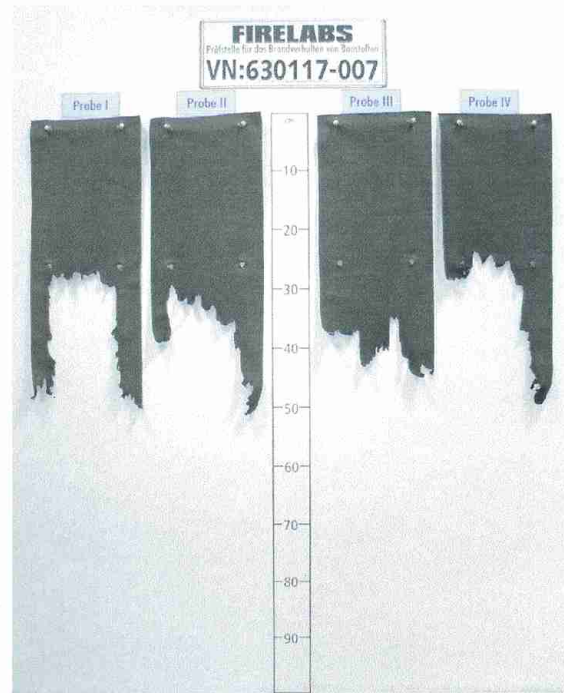


fig. 14
View of test specimen after the test

Test specimen H

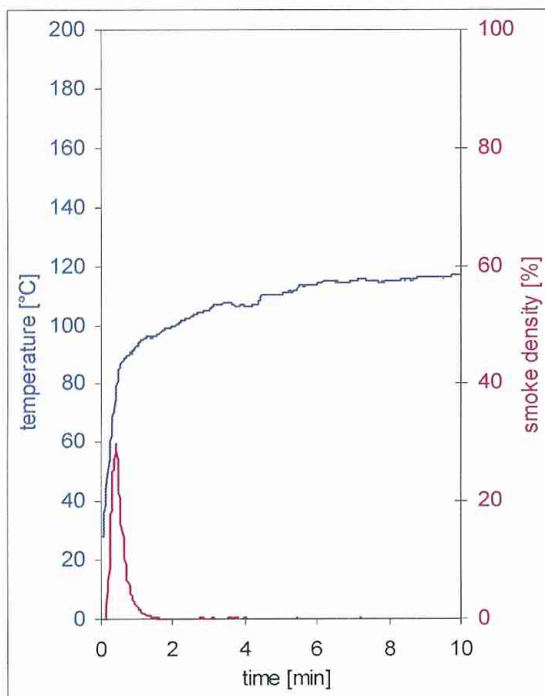


fig. 15
Graphs of the flue gas temperature and the smoke density

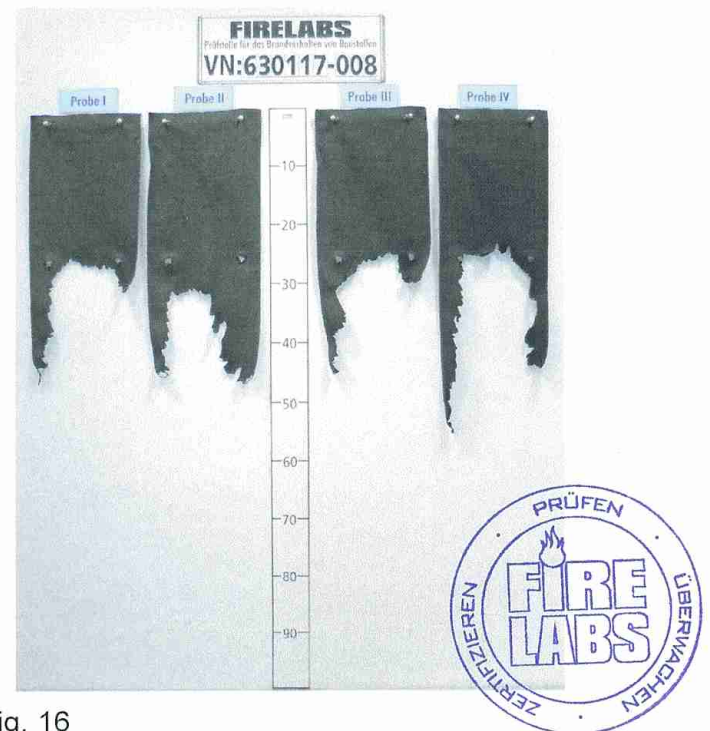


fig. 16
View of test specimen after the test

Test results small burner ("Brennkasten") tests

Table 2.1: complete set of samples

Cloth 201 HzN, red	warp direction							weft direction							dim.	requirements
	1	2	3	4	5	6	-	1	2	3	4	5	6	-		
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	1	1	1	6	-	1	1	1	1	1	8	-	s	-
Maximum flame height	3	4	4	2	3	4	-	4	3	4	4	3	4	-	cm	-
Time of the maximum	10	11	10	11	11	15	-	10	10	10	11	11	15	-	s	-
Flame tip reached the 150 mm mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flames extinguished	16	16	16	16	16	16	-	16	16	16	16	16	17	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	1)
Smoke density (visual)	very low							very low							-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	-
Flames were extinguished after	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	-
View of the samples after the test (20 seconds after exposure the flame):																
- destroyed or burned length at flame impingement area of max. 3 cm, discoloured above about 3 – 3.5 cm.																

Samples 1-5: Edge flame exposure
 Samples 6: Surface flame exposure

Table 2.2

Cloth 201 HzN	printed black							printed yellow							dim.	requirements
	1	2	3	4	5	6	-	1	2	3	4	5	6	-		
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	6	1	1	8	-	1	1	8	1	1	7	-	s	-
Maximum flame height	2	1	1	1	2	2	-	2	3	3	3	3	3	-	cm	-
Time of the maximum	5	5	10	6	6	10	-	12	11	12	10	11	12	-	s	-
Flame tip reached the 150 mm mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flames extinguished	16	16	16	16	16	16	-	16	16	16	16	16	16	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	1)
Smoke density (visual)	very low							very low							-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	-
Flames were extinguished after	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	-
View of the samples after the test (20 seconds after exposure the flame):																
- destroyed or burned length at flame impingement area of max. 3 cm, discoloured above about 3 – 3.5 cm.																

Samples 1, 2: Edge flame exposure, samples in warp direction
 Samples 3: Surface flame exposure, samples in warp direction
 Samples 4, 5: Edge flame exposure, samples in weft direction
 Samples 6: Surface flame exposure, samples in weft direction

1) No ignition within 20 seconds

./. Not occurred

dim. Dimension

Indication of time: from the beginning of testing procedure

Indication of measurements: from reference line of the flame

