

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

Reference FLT 3681919 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)

Sponsor

Order 2019-01-07 **Arrived** 2019-01-16

Description of samples Polyester knitted fabric, printed on one side and self-adhesive on the reverse side, named "DotCor".
(for details see page 2)

Delivered 2019-01-16

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

Assessment The examined material meets the requirements of class B1 for "schwerentflammbare" (not easily flammable) building materials in accordance with DIN 4102-1 when printed on one side in any colour and glued to solid mineral substrates or gypsum plasterboards.
(for details see page 5)

Validity of certificate 2024-02-29

Sampling The sample material was 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 proof of conformity
- non-regulated building products for the needed proof of applicability.

This test certificate comprises 5 pages and 4 enclosures.

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This test certificate must not be published and copied preceding agreement of the test laboratory and if agreed, only during validity and unchanged concerning appearance and contents.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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CERTIFICATE
TEST



1 Description of the test material

1.1 Description (according to the sponsor)

The materials provided are self-adhesive knitted fabrics, consisting of a knitted polyester fabric with a one-sided flame-retardant treated printable coating, one side printed with water-based inks in various colours and a polyacrylate adhesive applied to the reverse in dots. The self-adhesive surface was covered with a protective paper. The self-adhesive fabrics are intended to be used indoor, applied on mineral surfaces and were named "DotCor".

1.2 Description of the delivered samples

For the tests, 3 sample rolls of one-sided printed, self-adhesive knitted fabrics made of plastic fibres were sent to the testing laboratory. The self-adhesive surfaces of the knitted fabrics were covered with a white protective paper. The following variants were provided for the tests:

Trade name	Knitted fabric colour	Printing colour	Adhesive colour	Sample size		Total thickness [mm]
				Length m]	Width [m]	
DotCor	white	black	transparent	3.2	1.80	ca. 0.57
		red		3.1		
		grey		3.1		

In addition, a self-adhesive and a non-self-adhesive section of the unprinted knitted fabric of approx. 3 m² each was sent.

Characteristic values: table 1; photos: see enclosures

Other specifications are not known to the laboratory, retention samples are stored.

2 Preparation of samples

For the fire shaft ("Brandschacht") tests, from materials provided, 2 specimen each were prepared. 4 samples each with dimensions 1000 mm x 190 mm for the test specimen A, C and E were cut in longitudinal direction, the samples for the test specimen B, D and F were cut in transverse direction of the materials and bonded onto gypsum plaster boards (GKB, thickness 12.5 mm, class DIN 4102-A2). For the small burner ("Brennkasten") tests samples for edge flame exposure (dimensions 190 mm x 90 mm) and surface flame exposure (dimensions 230 mm x 90 mm) were cut in longitudinal and transversal direction and prepared using the same method (specimen assignment: see page 4).

Afterwards all samples kept in a climate chamber acc. DIN 50014-23/50-2 until they reached constant weight.

3 Test procedure

The tests in the fire shaft ("Brandschacht") have been performed according DIN 4102-1 and -16 (building materials class B1), the small burner ("Brennkasten") tests according DIN 4102-1, chapter 6.2.5 (building materials class B2). The tests were carried out in February 2019.

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

Tradename / printing colour Component	Herstellerangaben		Messwerte *)		
	Dicke [mm]	Flächengewicht [g/m ²]	Dicke (i.M.)	s	Flächengewicht [g/m ²]
			[mm]		
DotCor / black *)	./.	./.	0.49	0.003	234
DotCor / red *)			0.49	0.005	233
DotCor / grey *)			0.48	0.006	237
Paper liner	./.	./.	0.09	./.	91
Self-adhesive knitted fabric	0.42	210	0.48	0,004	231

m.v. mean value

s standard deviation

./. not received/not measured

*) with adhesive layer, without paper liner, printed on one side



4.2 Results of the fire behaviour

4.2.1 Test results class B2 (Brennkasten)

According DIN 4102-1 all building materials class B1 must also meet the requirements of materials class B2 (low flammable). The material, tested in "Brennkasten" acc. DIN 50 050 meets the requirements class B2; the material does not show burning particles / droplets. (Results: see enclosure 4)

4.2.2 Test results class B1 (Brandschacht)

Table 3

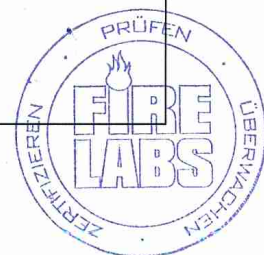
Test results "Brandschachtprüfung" (part 1)								
line no.		Test results of test specimen						requirements
		A	B	C	D	E	F	
1	<u>Number of specimen arrangement</u> acc. DIN 4102 –15 Table 1	7	7	7	7	7	7	
2	<u>Maximal flame height</u> above bottom edge cm	60	60	60	60	70	60	*)
3	Time ¹⁾ min	2	2	2	2	2	2	
4	<u>Burning / melting through</u> Time ¹⁾ min	./.	./.	./.	./.	./.	./.	
5	<u>Back side of the specimens:</u> <u>Flames / glowing</u> Time ¹⁾ min	./.	./.	./.	./.	./.	./.	
6	<u>Discolouring</u> Time ¹⁾ min	./.	./.	./.	./.	./.	./.	
7	<u>Falling of burning droplets</u> Begin ¹⁾ min	No	No	No	No	No	No	
8	Extend: Sporadic falling of burning droplets							
9	Continuous falling of burning droplets							
10	<u>Falling of burning parts</u> Begin ¹⁾ min	Yes 1	Yes 1	No	Yes 1	No	Yes 1	
11	Extend: Sporadic falling of burning parts	Yes	Yes		Yes		Yes	
12	Continuous falling of burning parts	No	No		No		No	
13	<u>Afterflame time at the bottom of the sieve (max.)</u> min:s	0:04	0:11	./.	0:14	./.	0:06	
14	<u>Impairment of the burner flames by dropping or falling</u> <u>Material</u> Time ¹⁾ min:s	No	No	No	No	No	No	
15	<u>Premature end of test</u> Final occurrence of burning at the specimen ¹⁾ min	10	10	10	10	10	10	
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



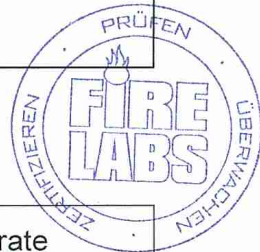
Test results "Brandschachtprüfung" (part 2)								
line no.		Test results of test specimen						requirements
		A	B	C	D	E	F	
17	<u>Afterflame after end of test</u>	No	No	No	No	No	No	
18	Time min:s							
19	Number of specimen							
20	Front side of specimen							
21	Back side of specimen							
21	Flame length cm							
22	<u>Afterglow after end of test</u>	No	No	No	No	No	No	
23	Time min:s							
23	Number of specimen							
24	<u>Place of appearance:</u>							
24	Lower half of specimen							
25	Upper half of specimen							
26	Front side of specimen							
27	Back side of specimen							
28	<u>Smoke density</u>							
28	≤ 400 % min	18,3	20,7	18,1	15,8	16,4	16,6	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.	./.	./.	./.	
30	Diagram fig. no.	1	3	5	7	9	11	
31	<u>Residual length</u>							
	Individual value cm	42 45 43 42	47 45 46 48	45 43 41 42	41 44 43 43	41 40 44 43	42 44 42 42	> 0
32	Average value cm	43	46	42	42	42	42	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	8	10	12	
34	<u>Flue gas temperature</u>							
35	Maximum of average value. °C	116	111	123	121	126	115	≤ 200
36	Time ¹⁾ min:s	1:44	1:30	2:04	2:02	2:06	1:46	
36	Diagram fig. no.	1	3	5	7	9	11	
37	<u>Remarks:</u> line 13: Afterflame time at the bottom of the sieve < 20 sec. is not rated as "falling of burning parts or droplets" (Graphs and photos: see enclosures 1-3)							

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

- not tested

./. not occurred

*) no cause for complaint



Specimen	Test-No.	Trade name / printing colour	Orientation of self-adhesive knitted fabric	Substrate
A	681919-001	DotCor / black	longitudinal	gypsum plasterboards
B	681919-002		transversal	
C	681919-003	DotCor / red	longitudinal	
D	681919-004		transversal	
E	681919-005	DotCor / grey	longitudinal	
F	681919-006		transversal	

5 Assessment

According to the test results in section 4.2 the material, described in section 1 and 4.1, fulfils the requirements of a building material class B1 according to DIN 4102-1, if the material is used on solid mineral substrates with a gross density $\geq 650 \text{ kg/m}^3$ and a thickness $\geq 11 \text{ mm}$ or gypsum plaster boards (non-perforated).

According to DIN 4102-16:2015-09, chapter 4.2, the results apply to the material described in section 4.1 and 4.2, printed in any colour using the printing process described.

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

The verification for

- outdoor usage (ageing by outdoor weathering)

is not proved with this test certificate.

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 not 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 2024-02-29, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 21st of March 2019



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

This translation was issued the 21st of March 2019, in a case of doubt the German version is valid solely.

Test specimen A

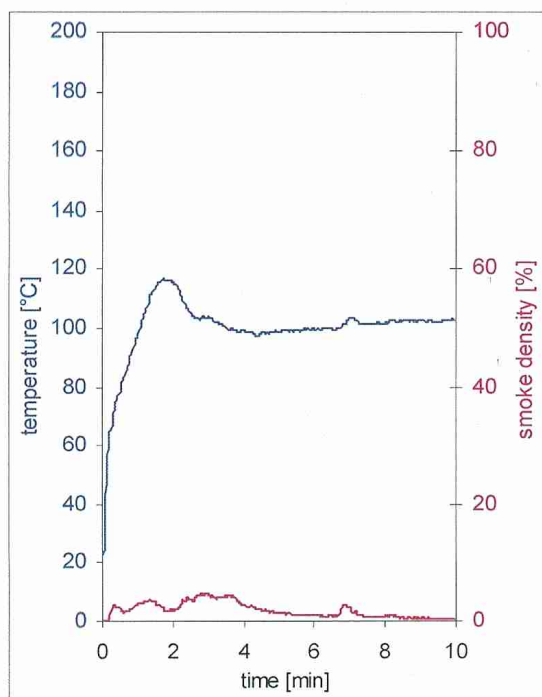


fig. 1
Graphs of the flue gas temperature and the smoke density

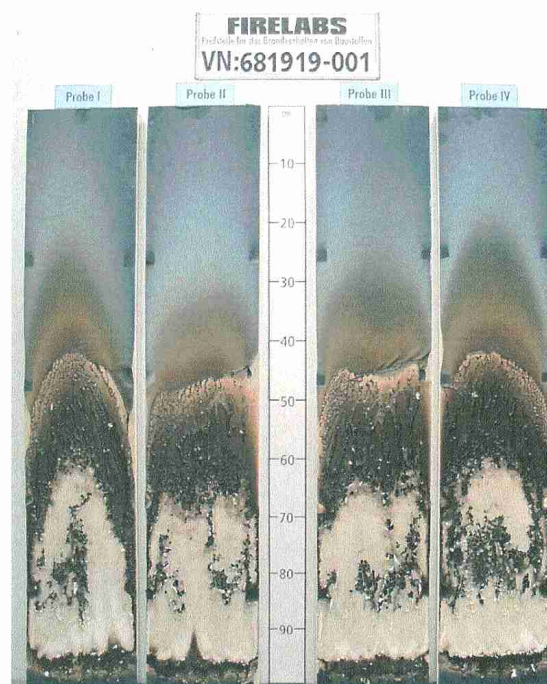


fig. 2
Photo of the test specimen after the test

Test specimen B

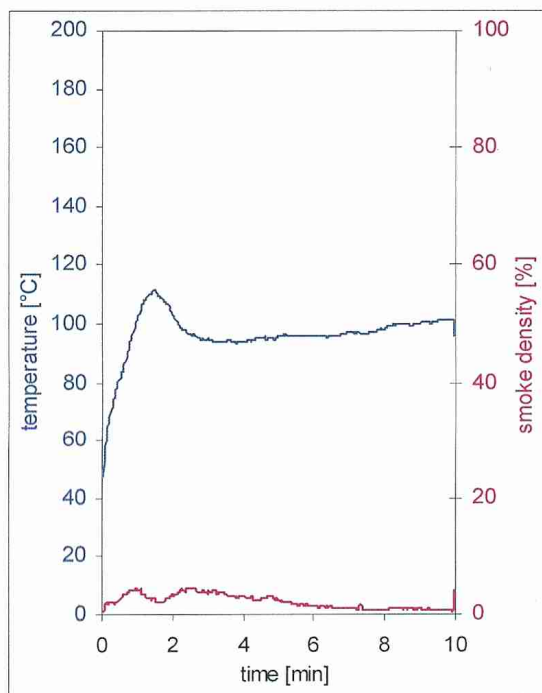


fig. 3
Graphs of the flue gas temperature and the smoke density

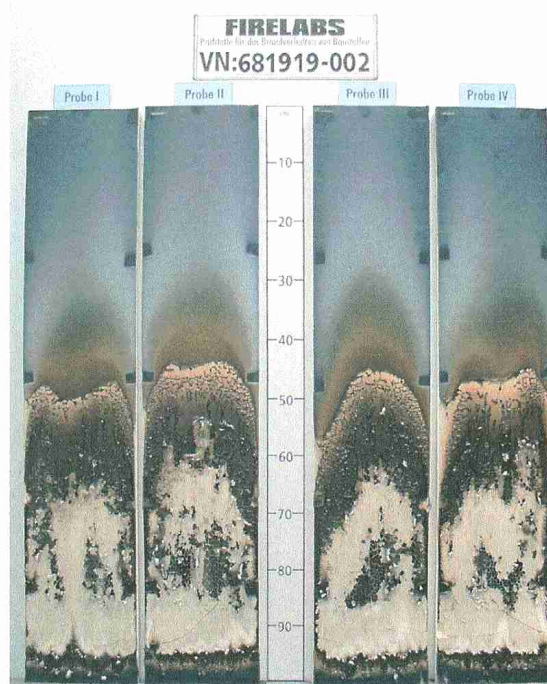


fig. 4
Photo of the test specimen after the test

Test specimen C

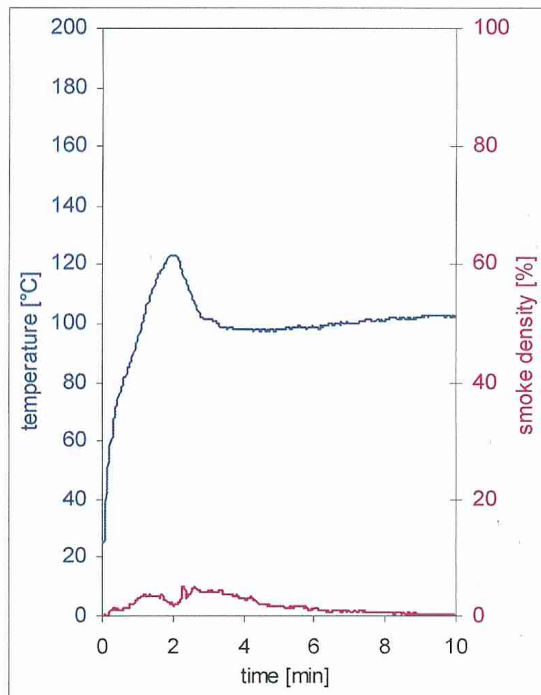


fig. 5
Graphs of the flue gas temperature and the smoke density

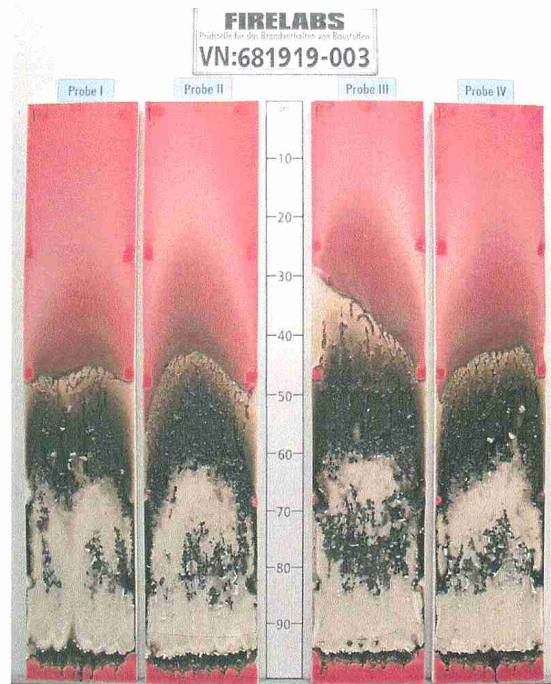


fig. 6
Photo of the test specimen after the test

Test specimen D

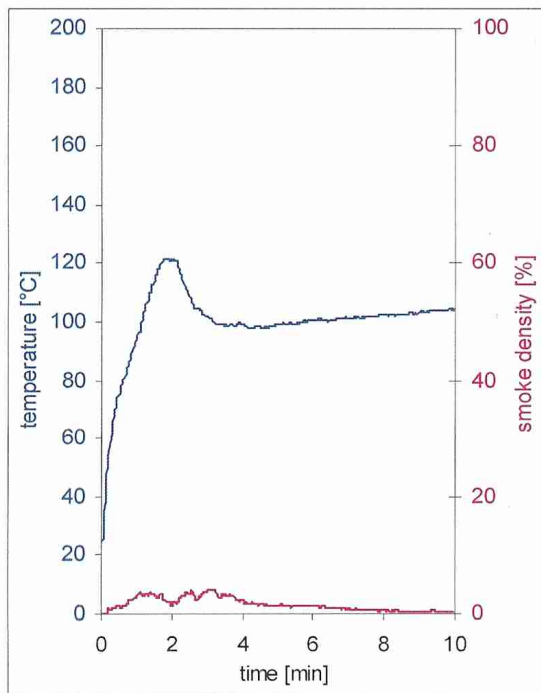


fig. 7
Graphs of the flue gas temperature and the smoke density

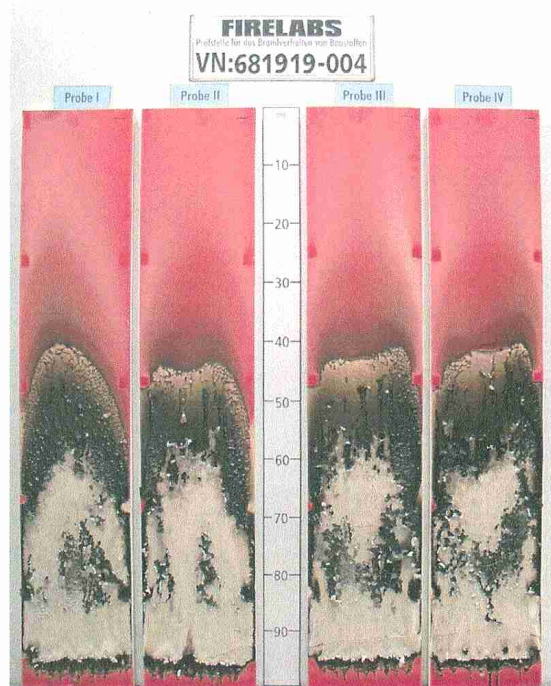


fig. 8
Photo of the test specimen after the test

Test specimen E

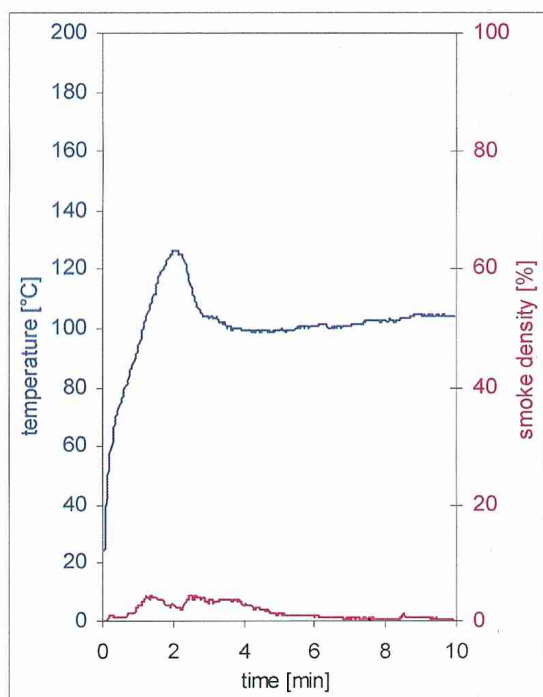


fig. 9
Graphs of the flue gas temperature and the smoke density

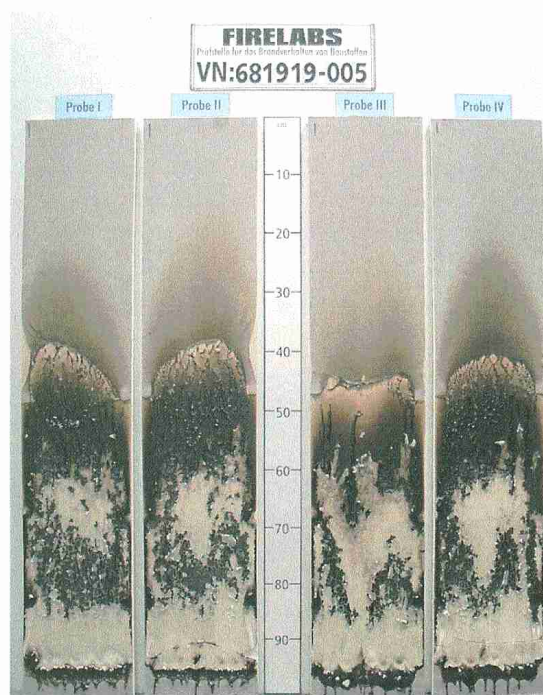


fig. 10
Photo of test specimen after the test

Test specimen F

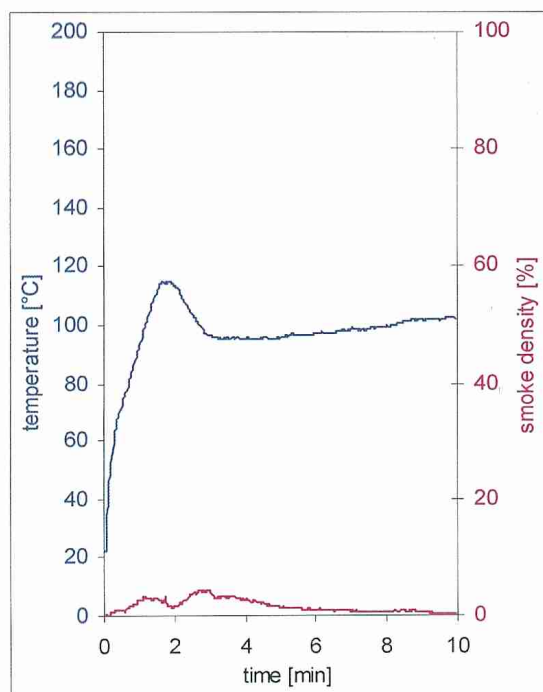


fig. 11
Graphs of the flue gas temperature and the smoke density

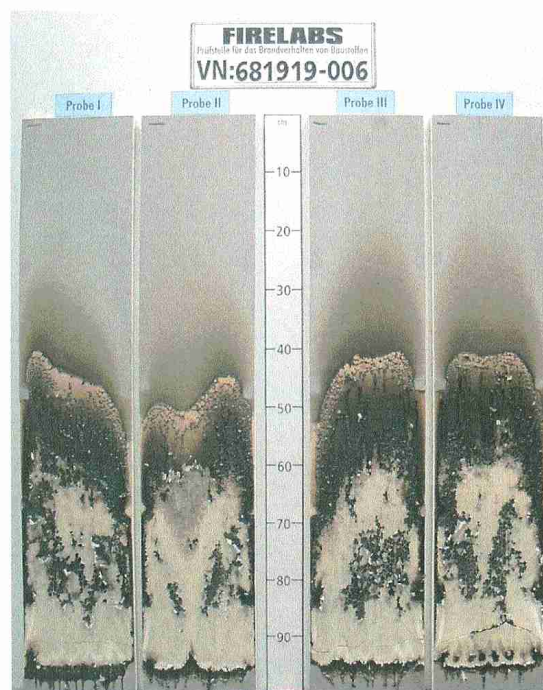


fig. 12
Photo of test specimen after the test

Test results class B2 (Brennkasten)

Table 2.1: "DotCor", printing colour: red (complete set of samples)

	longitudinal						transversal						dim.	requirements
Sample-No.	1	2	3	4	5	6	1	2	3	4	5	6	-	-
Ignition of the sample	1	1	1	1	1	5	1	1	1	1	1	6	s	-
Maximum flame height	4	4	4	4	4	3	3	4	4	3	4	2	cm	-
Time of the maximum	9	10	11	13	12	11	13	11	11	15	13	10	-	-
Flame tip has reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Flame has 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	-

View of the samples after the test (20 seconds after exposure the flame):

At the point of flame impingement the samples were destroyed up to a height of approx. 4 cm and a width of approx. 2 cm, slightly sooty above about 10 cm.

Table 2.2

Tradename / printing colour	DotCor / black						DotCor / grey						dim.	requirements
Sample-No.	1	2	3	4	5	6	1	2	3	4	5	6	-	-
Ignition of the sample	1	1	5	1	1	6	1	1	6	1	1	11	s	-
Maximum flame height	4	4	3	3	3	2	3	3	3	3	3	2	cm	-
Time of the maximum	13	14	8	10	8	8	13	15	7	15	15	15	-	-
Flame tip has reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Flame has 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	-

View of the samples after the test (20 seconds after exposure the flame):

At the point of flame impingement the samples were destroyed up to a height of approx. 4 cm and a width of approx. 2 cm, slightly sooty above about 12 cm.

Samples 1, 2: edge flame exposure longitudinal direction

Samples 3: surface flame exposure longitudinal direction

Samples 4, 5: edge flame exposure transversal direction

Samples 6: surface flame exposure transversal direction

¹⁾ No ignition within 20 seconds

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