

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

**Reference:** FLT 3604916 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)

**Sponsor:** Convertec GmbH  
Heideweg 2-4  
D – 77880 Sasbach

**Order:** 2016-11-30 **Arrived:** 2016-12-02

**Description of samples:** On one side coated films made of rigid PVC, named "Hart-PVC 430 W FR" and "Hart-PVC 430 S FR".  
(for details see page 2)

**Delivered:** 2016-12-02

**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 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:** 2022-02-28

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This test certificate must not be published and copied preceding agreement of the test laboratory and if agreed, only during validity and unchanged concerning appearance and contents.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



Prüfstelle für das  
Brandverhalten  
von Baustoffen  
Dipl.-Ing. Uwe Kühnast

Steinstrasse 18  
D - 14822 Borkheide  
Fon: +49 33845 90901  
Fax: +49 33845 90909  
Mail: info@firelabs.de

PÜZ-Stelle (LBO): BRA09

TEST CERTIFICATE



## 1 Description of test material

### 1.1 Test material (according to the sponsor)

The delivered materials are rigid PVC-films coated on one side with a printable surface for water- or solvent based printing media with a nominal thickness of 0.43 mm each. The coated films are intended to be used indoor as advertising space or for decorative purposes and were named with the trade names "Hart-PVC 430 W FR" and "Hart-PVC 430 S FR" by the sponsor.

### 1.2 Description of the delivered samples

For the tests the laboratory received 2 sample rolls of plastic films with a coated surface on one side. The samples were marked with the material name, dimensions and batch and were delivered as follows:

Name	Colour of film and coating	Batch	Sample size	
			Length [m]	Width [m]
Hart-PVC 430 W	white	151125.2	20	1,067
Hart-PVC 430 S		161126.2		

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

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

## 2 Preparation of samples

For the small burner tests ("Brennkastenprüfungen") 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 longitudinal and transverse direction of the films.

For the tests in the fire shaft ("Brandschacht") 8 specimens were assembled. The samples (dimensions 1000 mm x 190 mm) for test specimens A, C, E and G were cut in longitudinal direction, the samples for test specimens B, D, F and H were cut in transverse direction of the films.

All samples were kept in a climate chamber acc. DIN 50014-23/50-2 until they reached constant weight before testing.

## 3 Arrangement of samples

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

Arrangement of the samples: single layer, freely suspended

Period of testing: February - March 2017

## 4 Results

- section 4.1 Material characteristics
- section 4.2.1 Test results class B2
- section 4.2.2 Test results class B1

### 4.1 Material characteristics

Table 1

Trade name	Manufacturer's data		Measured values		
	Thickness [mm]	Weight per unit area [g/m <sup>2</sup> ]	Weight per unit area [g/m <sup>2</sup> ]	Thickness (m.v.)	
Hart-PVC 430 W FR	0,43 ± 0,03	620 ± 30	587	0,42	0,006
Hart-PVC 430 S FR		630 ± 30	609	0,42	0,006

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 class B2 (flammable). The material, tested in "Brennkasten" acc. DIN 50 050 meets the requirements class B2; the material did not show burning particles/droplets during these tests. (Results: see enclosure 5)

### 4.2.2 Test results class B1 ("Brandschacht")

Table 3

Test results "Brandschachtprüfung" (part 1)										
line no..		Test results								
		A	B	C	D	E	F	G	H	requirements
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	60	50	50	40	40	50	50	*)
3	Time <sup>1)</sup> ..... min	1	1	1	1	1	1	1	1	
4	Burning / melting through Time <sup>1)</sup> ..... min	./.	./.	./.	./.	./.	./.	./.	./.	
5	Back side of the specimens: Flames / glowing Time <sup>1)</sup> ..... min:s	./.	./.	./.	./.	./.	./.	./.	./.	
6	Discolouring Time <sup>1)</sup> ..... min:s	./.	./.	./.	./.	./.	./.	./.	./.	
7	Falling of burning droplets Begin <sup>1)</sup> ..... 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 <sup>1)</sup> ..... min:s	Yes	Yes	Yes	Yes	No	Yes	No	No	
11	Extend: Sporadic falling of burning parts	1	1	1	1		3			
12	Continuous falling of burning parts									
13	Afterflame time at the bottom of the sieve (max.) ..... min:s	0:18	0:15	0:12	0:08	./.	0:05	./.	./.	
14	Impairment of the burner flames by dropping or falling Material Time <sup>1)</sup> ..... min:s	./.	./.	./.	./.	./.	./.	./.	./.	
15	Premature end of test Final occurrence of burning at the specimen <sup>1)</sup> ..... min	3	4	3	4	5	8	2	8	
16	Time of eventually end of test <sup>1)</sup> ..... min:s	./.	./.	./.	./.	./.	./.	./.	./.	

<sup>1)</sup> Indication of time: from the beginning of testing procedure

- Not tested

./.. Not occurred

\*) No cause for complaint



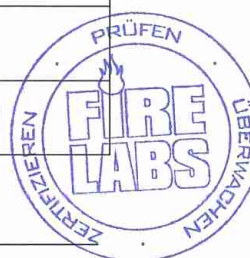
Test results "Brandschachtprüfung" (part 2)										
line no.		Test results								
		A	B	C	D	E	F	G	H	requirements
17	<u>Afterflame after end of test</u> Time ..... min:s	No	No	No	No	No	No	No	No	
18	Number of specimen									
19	Front side of specimen									
20	Back side of specimen									
21	Flame length .....cm									
22	<u>Afterglow after end of test</u> Time ..... min:s	No	No	No	No	No	No	No	No	
23	Number of specimen									
24	<u>Place of appearance:</u> Lower half of specimen									
25	Upper half of specimen									
26	Front side of specimen									
27	Back side of specimen									
28	<u>Smoke density</u> ≤ 400 % min	67,5	58,9	57,3	49,7	32,9	64,8	58,0	64,7	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.	./.	./.	./.	./.	./.	
30	Diagram fig. no.	1	3	5	7	9	11	13	15	
31	<u>Residual length</u> Individual value ..... cm	61 65 57 55	58 54 56 57	57 55 57 57	58 55 63 58	64 58 67 66	64 67 68 65	57 58 65 43	55 57 62 59	> 0
32	Average value ..... cm	<b>59</b>	<b>56</b>	<b>56</b>	<b>58</b>	<b>63</b>	<b>66</b>	<b>55</b>	<b>58</b>	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	8	10	12	14	16	
34	<u>Flue gas temperature</u> Maximum of average value.°C	124	117	101	103	110	112	115	114	≤ 200
35	Time <sup>1)</sup> ..... min:s	1:02	9:50	9:52	9:50	9:58	9:58	0:58	9:50	
36	Diagram fig. no.	1	3	5	7	9	11	13	15	
37	<u>Remarks:</u> line 13: Afterflame time on the bottom of the sieve of < 20 sec. is not rated as "falling of burning parts or droplets" line 32: There were no additional tests proceeded because of the residual length of > 45 cm (DIN 4102-16, 5.2 b)).									

<sup>1)</sup> indication of time: from the beginning of testing procedure

./. not occurred

\*) no cause for complaint

Test specimen	Test-no.	Trade name	Direction of samples	Tested surface
A	604916-001	Hart-PVC 430 W FR	longitudinal	coated
B	604916-002		transversely	
C	604916-003		longitudinal	uncoated
D	604916-004		transversely	
E	604916-010	Hart-PVC 430 S FR	longitudinal	coated
F	604916-011		transversely	
G	604916-012		longitudinal	uncoated
H	604916-013		transversely	



## 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 suspended freely or with a distance of > 40 mm to the same or other plain materials.

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 2022-02-28, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 20<sup>th</sup> of March 2017



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

*This translation was issued 20<sup>th</sup> of March 2017, in a case of doubt the German version is valid solely.*

---



## Test specimen A

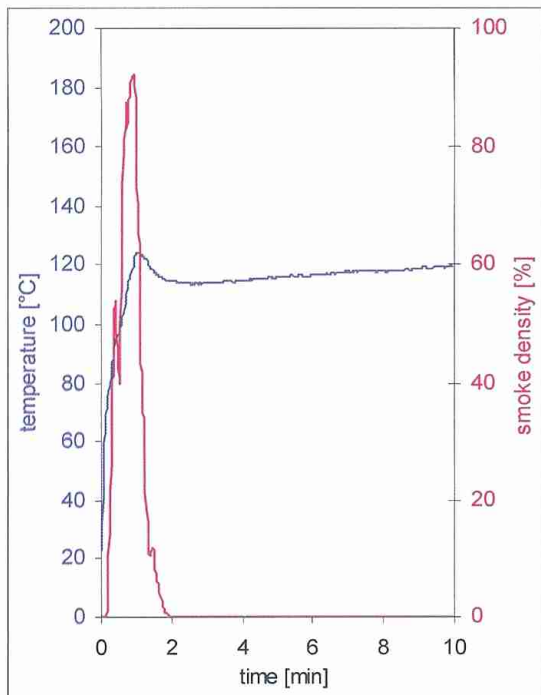


fig. 1  
Graphs of the flue gas temperature and the smoke density

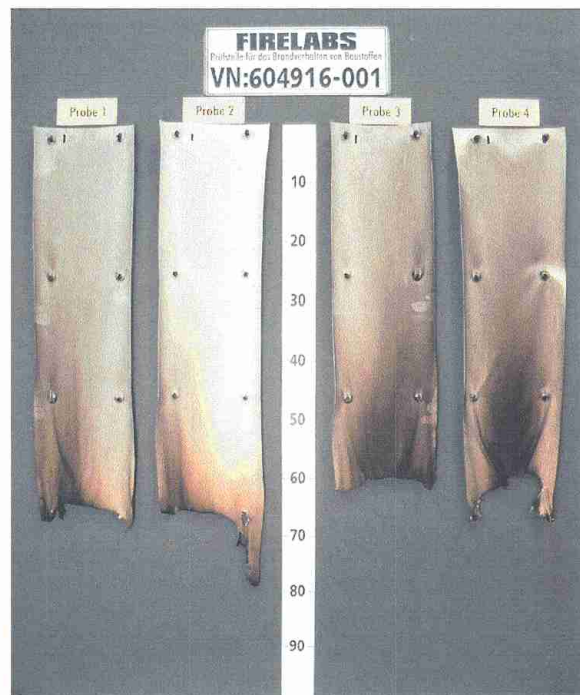


fig. 2  
View of test specimen after the test

## Test specimen B

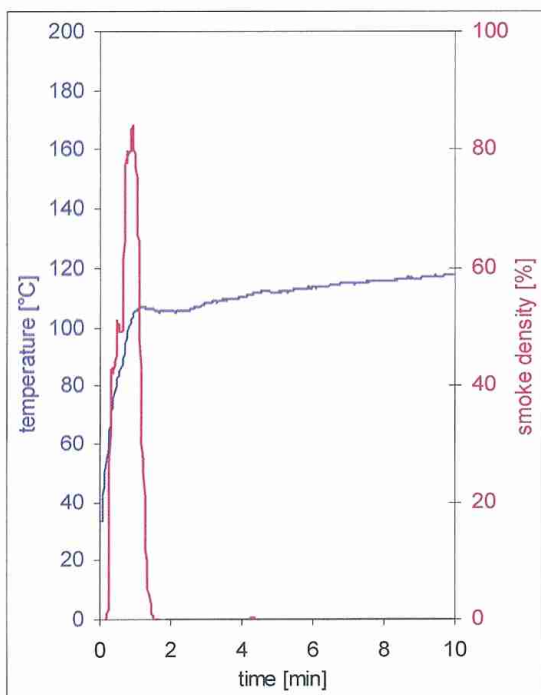


fig. 3  
Graphs of the flue gas temperature and the smoke density

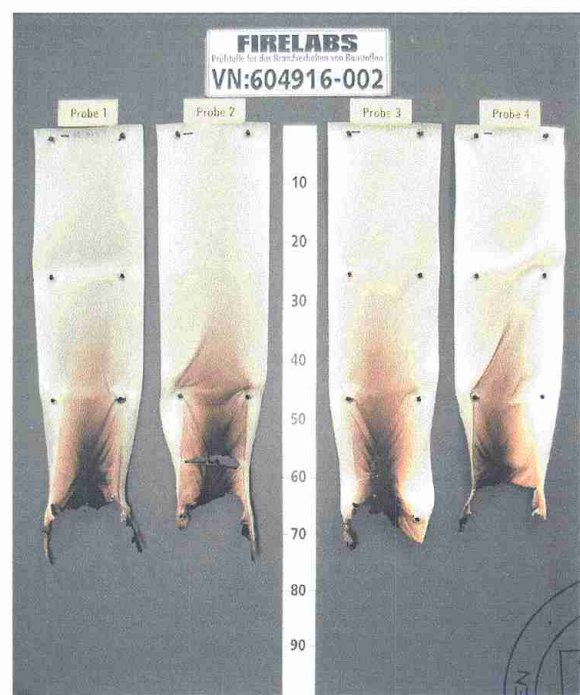


fig. 4  
View of test specimen after the test



## Test specimen C

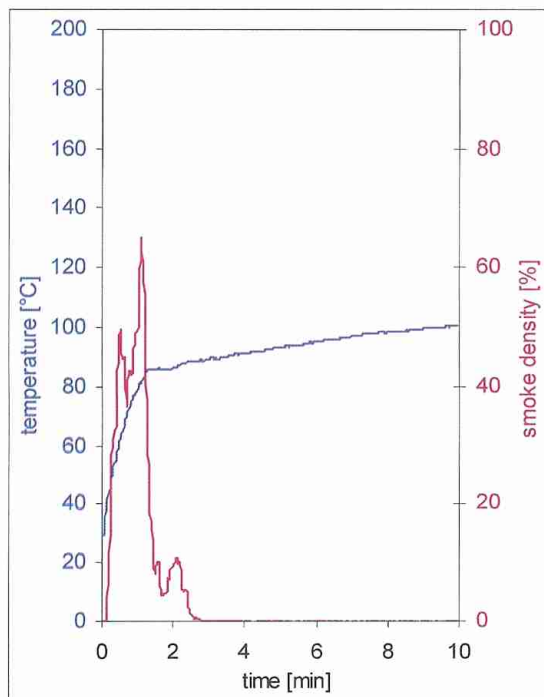


fig. 5  
Graphs of the flue gas temperature and the smoke density

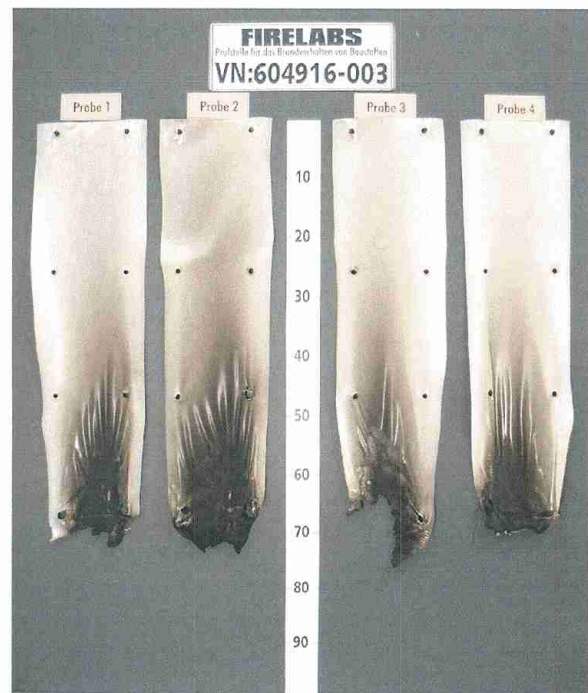


fig. 6  
View of test specimen after the test

## Test specimen D

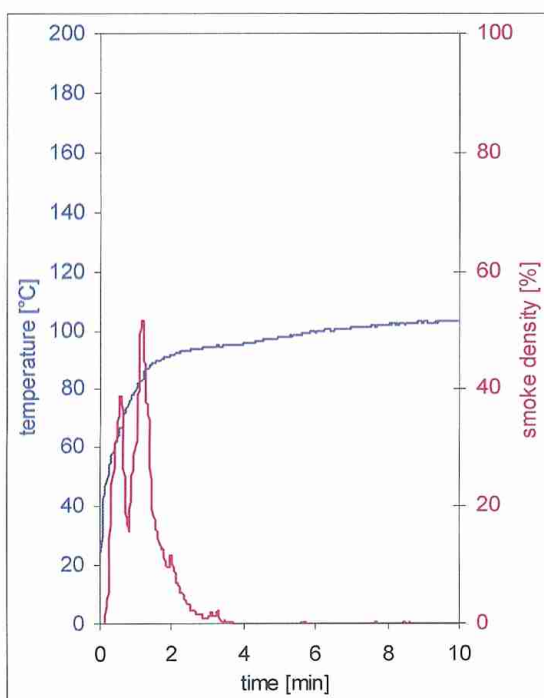


fig. 7  
Graphs of the flue gas temperature and the smoke density



fig. 8  
View of test specimen after the test (sample 4: reverse side)

## Test specimen E

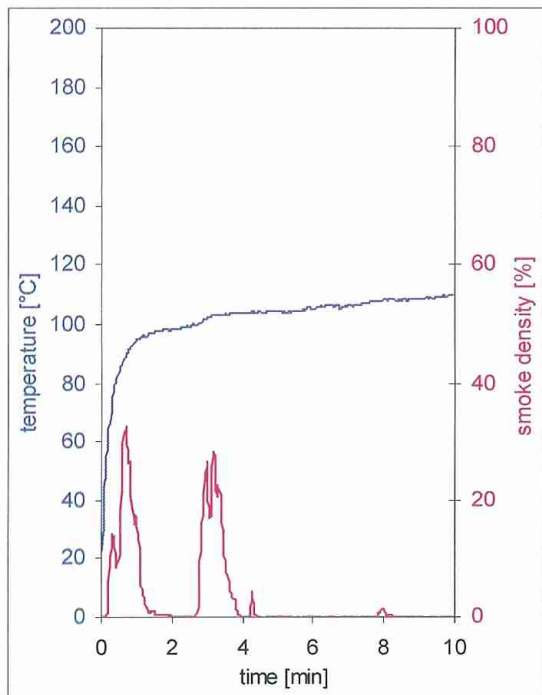


fig. 9  
Graphs of the flue gas temperature and the smoke density

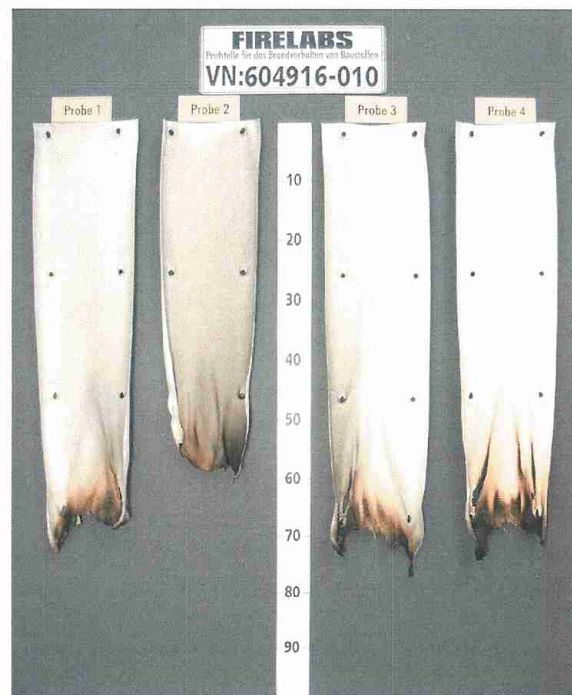


fig. 10  
View of test specimen after the test

## Test specimen F

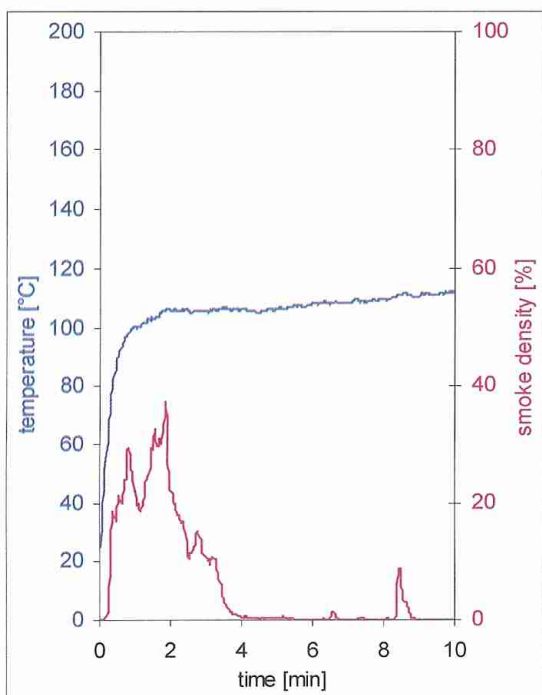


fig. 11  
Graphs of the flue gas temperature and the smoke density

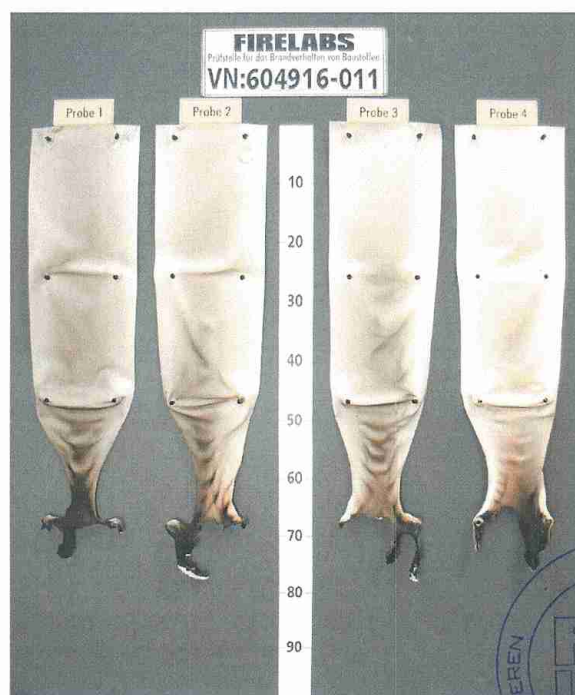


fig. 12  
View of test specimen after the test





## Test specimen G

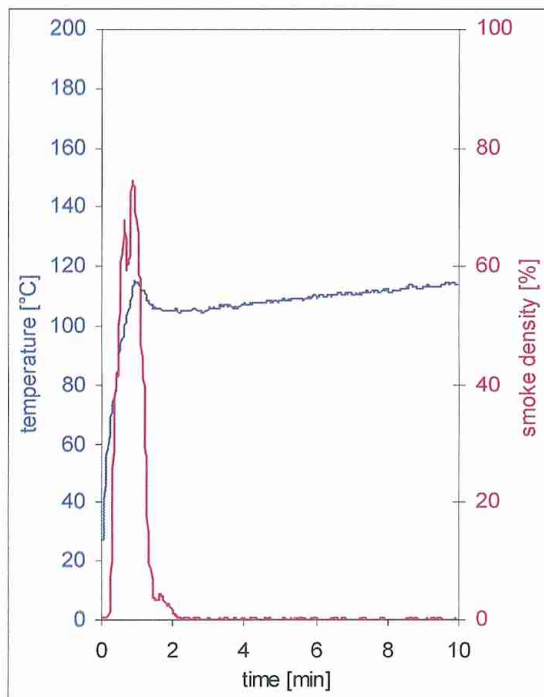


fig. 13  
Graphs of the flue gas temperature and  
the smoke density

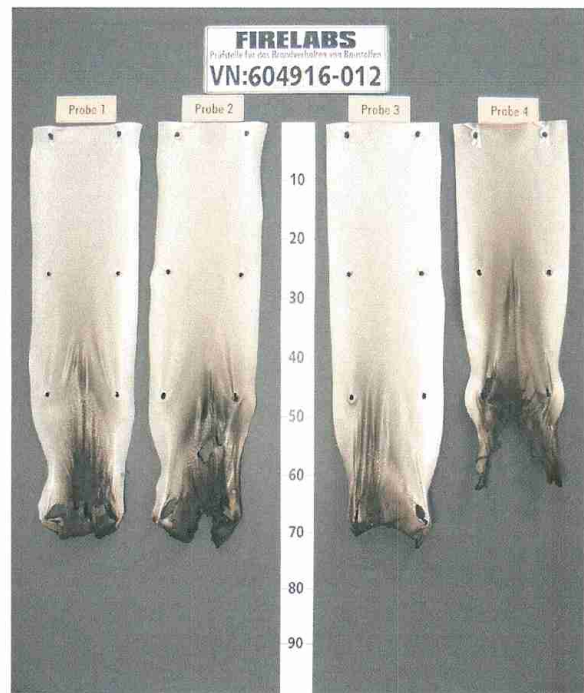


fig. 14  
View of test specimen after the test

## Test specimen H

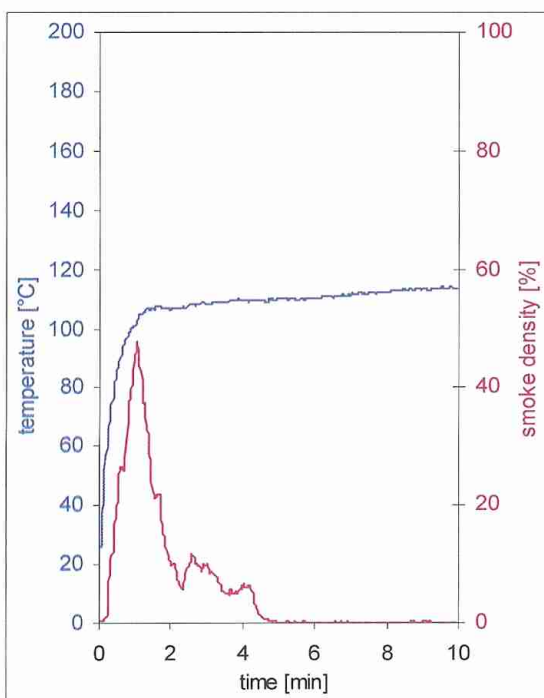


fig. 15  
Graphs of the flue gas temperature and  
the smoke density



fig. 16  
View of test specimen after the test  
(sample 4: reverse side)

## Test results small burner ("Brennkasten") tests

Table 2.1

Hart-PVC 430 W FR	Longitudinal direction							Transverse direction							dim.	requirements
Sample-No.	1	2	3	4	5	6	7	1	2	3	4	5	6	7	n	-
Ignition of the sample	1	1	1	1	1	8	6	4	4	4	4	4	1	7	s	-
Maximum flame height	6	6	5	6	6	6	5	6	6	5	6	6	3	5	cm	-
Time of the maximum	13	12	12	15	13	13	15	13	12	15	13	15	15	15	s	-
Flame tip reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Self-extinguishing of flames	14	15	14	16	15	16	16	18	16	16	16	16	16	16	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	1)
Smoke density (visual)	moderate							moderate							-	-
Afterburning time	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	-
Flames were extinguished after	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed in the area of the flame exposure up to a max. height of approx. 7 cm and approx. 1.5 cm in width, above soot until top edge of the samples.																

Longitudinal direction Samples 1-5: edge flame exposure  
 Samples 6: surface flame exposure of uncoated surface  
 Samples 7: surface flame exposure of coated surface  
 Transverse direction Samples 1-5: surface flame exposure of uncoated surface  
 Samples 6: edge flame exposure  
 Samples 7: surface flame exposure of coated surface

Table 2.2

Hart-PVC 430 S FR	Longitudinal direction							Transverse direction							dim.	requirements
Sample-No.	1	2	3	4	5	6	7	1	2	3	4	5	6	7	n	-
Ignition of the sample	1	1	1	1	1	6	6	1	1	1	1	1	7	7	s	-
Maximum flame height	6	6	5	6	6	5	5	7	6	7	6	6	6	5	cm	-
Time of the maximum	15	15	13	15	15	15	12	11	12	13	13	12	13	12	s	-
Flame tip reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Self-extinguishing of flames	16	16	16	16	16	16	16	14	14	16	16	14	16	16	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	1)
Smoke density (visual)	moderate							moderate							-	-
Afterburning time	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	-
Flames were extinguished after	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed in the area of the flame exposure up to a max. height of approx. 7 cm and approx. 2 cm in width, above soot until top edge of the samples.																

Samples 1-5: edge flame exposure  
 Samples 6: surface flame exposure of coated surface  
 Samples 7: surface flame exposure of uncoated surface

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

