

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



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Brandverhalten
von Baustoffen
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PÜZ-Stelle (LBO): BRA09

Reference: FLT 3596716 (Translation of the German test report - no guarantee for translation of technical terms)

Sponsor: YSHIELD GmbH & Co. KG
Am Schulplatz 2
D - 94099 Ruhstorf

Order: 2016-09-08 **Arrived:** 2016-09-17

Description of samples: Dispersion coating to be used as primer, named "HSF54".
(for details see page 2)

Delivered: 2016-09-17

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 on solid mineral surfaces or gypsum plasterboards and with a standard dispersion paint.
(for details see page 5)

Validity of report: 2021-09-30

Sampling: The material was delivered to the laboratory by the sponsor.

Remark: If the above-mentioned building material is not used as product according to MBO § 2, Abs. 9, Ziffer 1, there is no need for a general building supervisory test report. This test report is not valid if the examined building material is used as product in the meaning of state building prescriptions (MBO § 17, Abs. 3).

This test report 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).

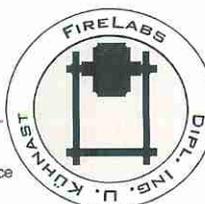
This test report can serve as a basis for building supervisory procedures for:

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

This test report comprises 5 pages and 1 enclosure.

Approved testing, inspection and certification body

This test report must not be published and copied preceding agreement of the test laboratory and if agreed, only during validity and unchanged concerning appearance and contents.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



TEST REPORT

1 Description of test material

1.1 Test material (according to the sponsor)

The delivered material is a acrylic dispersion essentially consisting of graphite and carbon black. The dispersion paint is intended to be used as electrically conductive primer and has been designated with the trade name "HSF54".

1.2 Description of the delivered samples

A container of a dispersion paint was sent to the laboratory for the tests. The container was labeled "YSHIELD EMR-PROTECTION" and the trade name "HSF54".

Color: black.

Containment: 1 litre.

Batch number: 540908 160005.

Other specifications are not known to the laboratory, a sample is stored.

Characteristic values: see table 1; photo: see enclosure.

2 Preparation of samples

1. For the test in the fire shaft ("Brandschacht") 1 specimen was prepared. For this purpose, 4 samples of gypsum plasterboards (GKB, class DIN 4102-A2) with dimensions 1000 mm x 190 mm x 12.5 mm (L x W x H) were coated on one side in a single working step using with a paint roller. After drying the primed surfaces of the samples were coated with white dispersion paint acc. to DIN EN 13300 with a quantity of organic constituents of approx. 50%.

2. For the test in the small burning cabinet ("Brennkasten"), tests samples for edge exposure with dimensions of 190 mm x 90 mm x 12.5 mm (LxWxH) and samples for surface exposure with dimensions of 230 mm x 90 mm x 12.5 mm (LxWxH) were prepared using the same materials and quantities in the same procedure.

Application quantities: see table 1.

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

Arrangement of all samples: single layered, freely suspended.

Examination period: October 2016.

4 Results

- Section 4.1 Material characteristics
- Section 4.2.1 Test results class B2 ("Brennkasten"), see enclosure
- Section 4.2.2 Test results class B1 ("Brandschacht")



4.1 Material characteristics

Table 1

Characteristics:		Manufacturer's data	Measured values
Thickness of substrate (GKB)	[mm]	12,5	12,5
Primer "HSF54"	- Wet application quantity	[g/m ²]	ca. 160
	- Involatile material constituent	[%]	56 %
Dispersion paint, white (finish coating)			
- Wet application quantity	[g/m ²]	195	197

./ not received / not measured

m.v. mean value

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 of class B2; the material did not show burning particles/droplets during these tests. (Results see enclosure)

4.2.2 Test results class B1 (Brandschacht)

Table 3

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

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

- No data / Not tested

./. Not occurred

*) No cause for complaint



Test results "Brandschachtprüfung" (part 2)						
line no.		measured values specimen				requirements
		A	B	C	D	
17	<u>Afterflame after end of test</u> Time min:s	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	-	-	-	
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	0,9	-	-	-	
29	≥ 400 % min (very strong smoke density)	./.				
30	Diagram fig. no.	1	-	-	-	
31	<u>Residual length</u> Individual value cm	57 58 56 58	- - - -	- - - -	- - - -	> 0
32	Average value cm	57	-	-	-	≥ 15
33	Photo of test specimen fig. no.	2	-	-	-	
34	<u>Flue gas temperature</u> Maximum of average value...°C	105	-	-	-	≤ 200
35	Time ¹⁾ min:s	9:38	-	-	-	
36	Diagram fig. no.	1	-	-	-	
37	<u>Remarks:</u> line 32: Due to the residual length of ≥ 45 cm no additional tests were carried out. (DIN 4102-16:2015-09, 5.2 b))					

Test specimen A (VN 596716-001): Gypsum plasterboards with primer "HSF54" and final coating

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

- Not tested

./. Not occurred

*) No cause for complaint

VN test-number



5 Assessment

Section 4.2 lists the test results of the material tested described in section 1 and compares the results with the requirements for not easily flammable building materials acc. DIN 4102-1.

According to the test results the tested primer "HSF54" fulfils the requirements of building materials class B1 according to DIN 4102-1 if applied to solid mineral substrates or non-perforated gypsum plasterboards with a maximum application rate of approx. 160 g/m² and final coated with a standard white dispersion coating according to DIN EN 13300 with a quantity of organic constituents of not more than 50% and a wet application quantity of about 190 g/m².

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

The proof of the use after

- exposure to outdoor climate conditions

was not subjects of the tests.

6 Special remarks

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

This test report is not valid, as soon as the product is used as a building product in the sense of the "Landesbauordnungen" (Model Building Code, MBO § 17, Abs. 3).

This test report is no substitute for a General Building Inspectorate Certificate.

This test report is granted without prejudice to the rights of third parties, or particular private proprietary rights.

This test report 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 report is valid until 2021-09-30, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 16th of October 2016

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



In charge for testing
Dipl.-Ing. (FH) Manfred Sailer

This translation was issued on 16th of October 2016, in a case of doubt the German version is valid solely.

Test specimen A

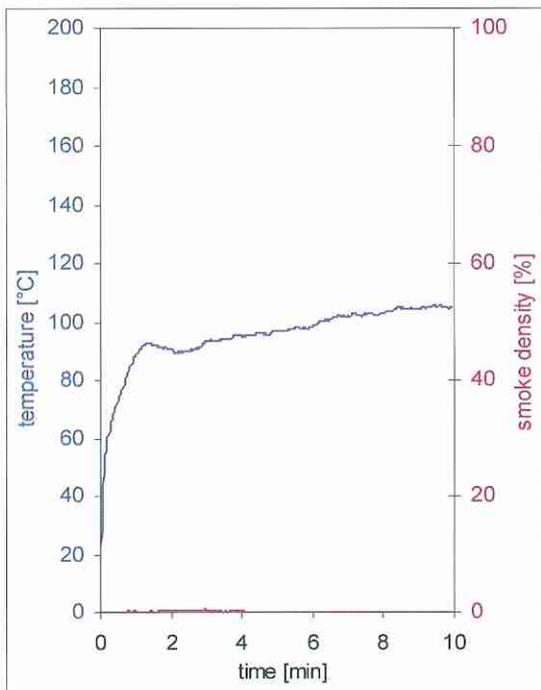


fig. 1
Graphs of the flue gas temperature and the smoke density

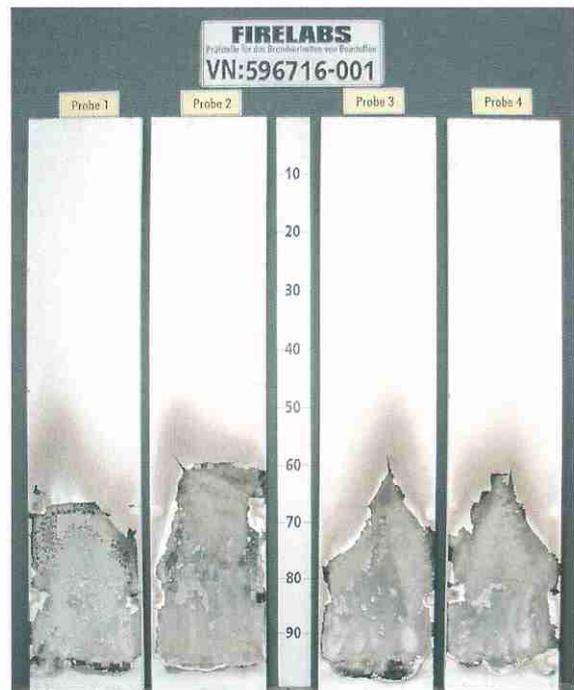


fig. 2
Photo of test specimen after the test

Test results class B2 ("Brennkasten")

Table 2

	edge flame impingement						surface flame impingement						dim.	requirements
	1	2	3	4	5	-	1	-	-	-	-	-		
Sample-No.	1	2	3	4	5	-	1	-	-	-	-	-	-	-
Ignition of the sample	2	3	2	3	3	-	./.	-	-	-	-	-	s	-
Maximum flame height	1	1	1	1	1	-	2	-	-	-	-	-	cm	-
Time of the maximum	15	15	15	15	15	-	./.	-	-	-	-	-	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	-	./.	-	-	-	-	-	s	≥ 20
Flame has extinguished before reaching the test mark	16	16	16	16	16	-	./.	-	-	-	-	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	-	./.	-	-	-	-	-	s	1)
Smoke density	very low						very low						-	-
Afterburning after end of test	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	-

View of the samples after the test (20 seconds after exposure the flame):
 - damaged and discoloured area at the point of flame impingement: approx. 2 cm height and 1 cm width.

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

