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

FIRE LABS
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

Reference: FLT 3778722 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)

Sponsor: ATP adhesive systems AG
Sihleggstraße 23
CH - 8832 Wollerau

Order: 2022-03-22 **Arrived:** 2022-03-25

Description of sample: Transparent, self-adhesive plastic film, to be used on metal surfaces, named "**GL-420**"/ APS: **FV8-85**
(for details see page 2)

Delivered: 2022-03-25

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

Assessment: The examined material meet the requirements of class B1 for "schwerentflammbare" (not easily flammable) building materials according to DIN 4102-1 on metal substrates and if the compound is used suspended freely or with distance if >40 mm to the same or other plain materials.
(For details see page 5.)

Validity of report: 2027-05-26

Sampling: The test material was provided by the sponsor itself

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 regarded as the sole proof if the tested building material is used as building product within 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.

TEST CERTIFICATE

PRÜFEN · ZERTIFIZIEREN · ÜBERWACHEN · FIRE LABS

This test report comprises 5 pages and 3 enclosures.

1 Test material

1.1 Description according to the sponsor

The delivered material is a self-adhesive plastic film consisting of a transparent soft-PVC film of a thickness of 170 µm with a one-sided polyacrylate adhesive with an application quantity of 30 g/m^2. The self-adhesive surface was covered with a one-sided siliconised protective paper. The self-adhesive film is intended to be used indoor, applied on metal surfaces and was named with the trade name "GL-420"/ APS: **FV8-85**

1.2 Description of the delivered material

For the tests, the laboratory received a sample roll of one-sided self-adhesive plastic film with a protective paper on the self-adhesive surface. The sample was marked with the trade name, sample size and batch G583319.

Colour: transparent embossed film, transparent adhesive layer, white protective paper.
Sample size: approx 10 m in length and 1.04 m in width.
Total thickness: ca. 0.26 mm.
Characteristic values: see table 1; photos: see enclosures.
Other specifications are not known to the laboratory, a sample is stored.

2 Preparation of samples

For the small burner test ("Brennkastenprüfung") samples for edge flame exposure (dimensions 190 mm x 90 mm) and samples for surface flame exposure (dimensions 230 mm x 90 mm) have been cut in longitudinal and transverse direction of the films and applied on one side onto uncoated aluminium sheets of a thickness of 1.0 mm.
For the fire shaft test ("Brandschacht") 2 specimen were prepared. The samples (dimensions 1000 mm x 190 mm) of test specimen A and C were cut in longitudinal, the samples for the test specimen B and D were cut in transverse orientation of the material and applied on aluminum sheet (thickness 1,0 mm).

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

3 Test procedure

The small burner tests have been performed acc. DIN 4102-1, chapter 6.2.5 (building materials class B2). The tests in the fire shaft have been performed acc. DIN 4102-1 and -16 (building materials class B1). There was no additional substrate arranged behind the material compound.

Test period: May 2022.

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 / Layer	Manufacturer's data		Measured values (m.v.)		
	Thickness [mm]	Mass per unit area [g/m^2]	Thickness [mm] (m.v.)	s	Mass per unit area [g/m^2]
GL-420 *)	0.20	./.	0,21	0,006	225
Paper liner	./.	63	0,05	< 0,01	60

m.v. mean value
s standard deviation
./. not received/not measured
*) with adhesive layer, without paper liner

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 did not show burning particles / droplets (Results: see enclosure 3).

4.2.2 Test results class B1 (Brandschacht)

Table 3

Test results "Brandschachtprüfung" (part 1)						
line no.	Measurement	Test results				require-ments
		A	B	C	D	
1	Number of specimen arrangement acc. DIN 4102 –15 Table 1	7	7	7	7	
2	Maximal flame height above bottom edge ..... cm	60	70	70	70	
3	Time [1] ..... min	1	1	1	1	*)
4	Burning / melting through Time [1] .....min	./.	./.	./.	./.	
5	Back side of the specimens: Flames / glowing Time [1] .....min	./.	./.	./.	./.	
6	Discolouring Time [1] .....min	2	2	2	2	
7	Falling of burning droplets Begin [1] .....min:s	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	
11	Extend: Sporadic falling of burning parts					
12	Continuous falling of burning parts					
13	Afterflame time at the bottom of thesieve (max.). .....min:s	./.	./.	./.	./.	
14	Impairment of the burner flames by dropping or falling Material Time [1] .....min:s	No	No	No	No	
15	Premature end of test Final occurrence of burning at the specimen [1] .....min	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.	Measurement	Test results				require-ments
		A	B	C	D	
	Afterflame after end of test	No	No	No	No	
17	Time .....min:s					
18	Number of specimen					
19	Front side of specimen					
20	Back side of specimen					
21	Flame length .....cm					
	Afterglow after end of test	No	No	No	No	
22	Time .....min:s					
23	Number of specimen					
	Place of appearance:					
24	Lower half of specimen					
25	Upper half of specimen					
26	Front side of specimen					
27	Back side of specimen					
	Smoke density					
28	≤ 400 % min	36,8	47,3	36,8	37,7	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.	./.	
30	Diagram fig. no.	1	3	5	7	
	Residual length					
31	Individual value .....cm	40 41 42 39	43 40 40 39	42 41 41 44	41 41 43 40	> 0
32	Average value .....cm	**40**	**40**	**42**	**41**	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	8	
	Flue gas temperature					
34	Maximum of average value...°C	123	121	120	121	≤ 200
35	Time [1] .....min:s	1:36	1:34	1:32	1:36	
36	Diagram fig. no.	1	3	5	7	
37	Remarks: - Diagrams and photos see enclosures 1, 2.					

1) indication of time: from the beginning of testing procedure
- not tested
. /. not occurred
*) no cause for complaint
VN test-number

Specimen	Test-No.	Type name	Orientation of samples	Substrate
A	778722-001	"GL-420" APS: **FV8-85**	longitudinal	Aluminium sheet
B	778722-002		transversal	
C	778722-003		longitudinal	
D	778722-004		transversal	

5 Assessment

In section 4.2, the test results of the material composite described in sections 1 and 4.1 were summarised and compared with the requirements of not easily flammable building materials acc. DIN 4102-1. According to the test results the self-adhesive plastic film, fulfil the requirements of building materials class B1 according to DIN 4102-1, if used on one side on metal surfaces with:

- a density ≥ 2025 kg/m^3, melting point ≥ 500 °C and thickness ≥ 0,8 mm
- a density ≥ 5890 kg/m^3, melting point ≥ 1000 °C and thickness ≥ 0,6 mm

and if the composite is mounted in a distance of > 40 mm to the same or other plain materials.

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 behaviour by outdoor weathering) has not been proved.

6 Special remarks

This certificate is only valid for the material as described under paragraph 1 and 4.1. In combination with other materials or additional coatings or surfaces etc. the burning behaviour may differ.
This test certificate is not regarded as the sole proof if the tested building material is used as building product within the meaning of state building prescriptions (MBO § 17).
This test certificate is no substitute for a General Building Inspectorate Certificate and is granted without prejudice to the rights of third parties, or particular private proprietary rights.

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.

The explanations given in DIN 4102-1 app. D, especially concerning an external production control have to be considered.
This test certificate is valid until 2027-05-26, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 27th May 2022

PRÜFEN · FIRE LABS · ÜBERWACHEN · ZERTIFIZIEREN

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

This translation was issued the 27 May 2022, in a case of doubt the German version is valid solely.

Test specimen A

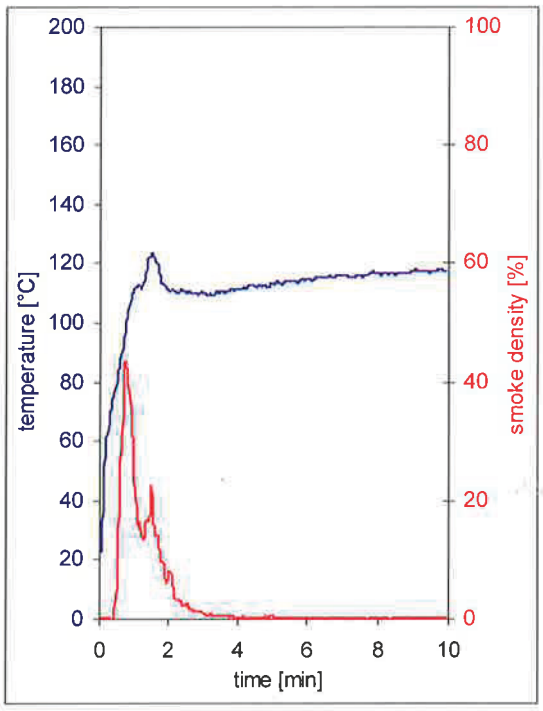

fig. 1
Graphs of the flue gas temperature and the smoke density

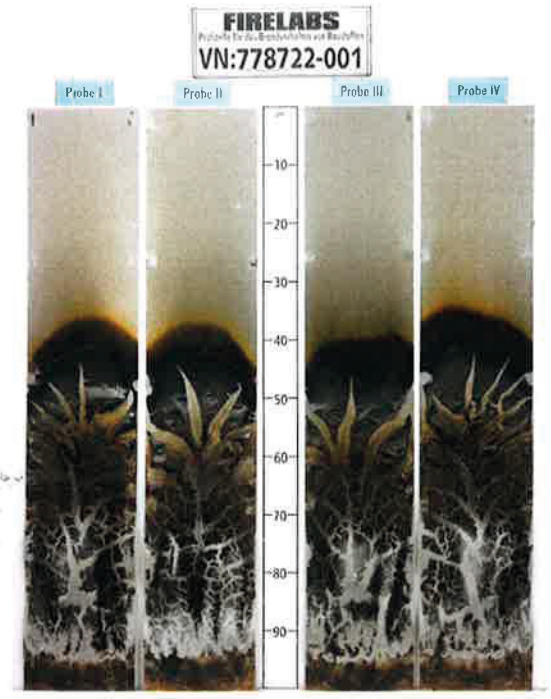

fig. 2
Photo of the test specimen after the test

Test specimen B

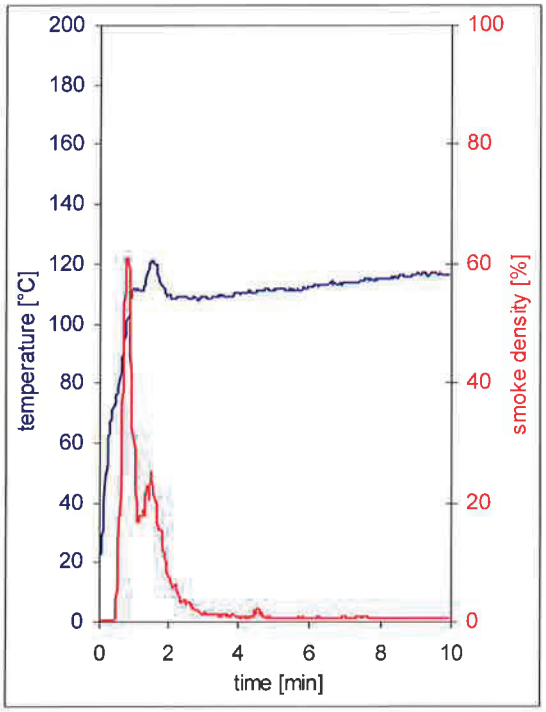

fig. 3
Graphs of the flue gas temperature and the smoke density

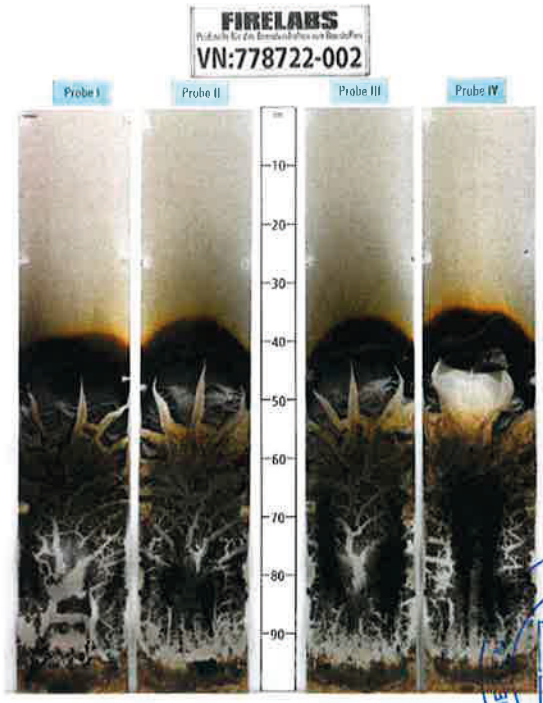

fig. 4
Photo of the test specimen after the test

PRÜFEN · ÜBERWACHEN · ZERTIFIZIEREN
FIRE LABS

Test specimen C

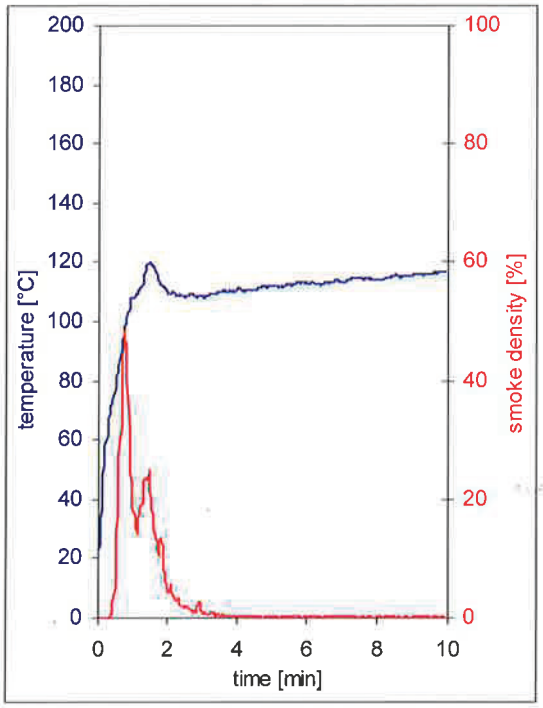

fig. 5
Graphs of the flue gas temperature and the smoke density

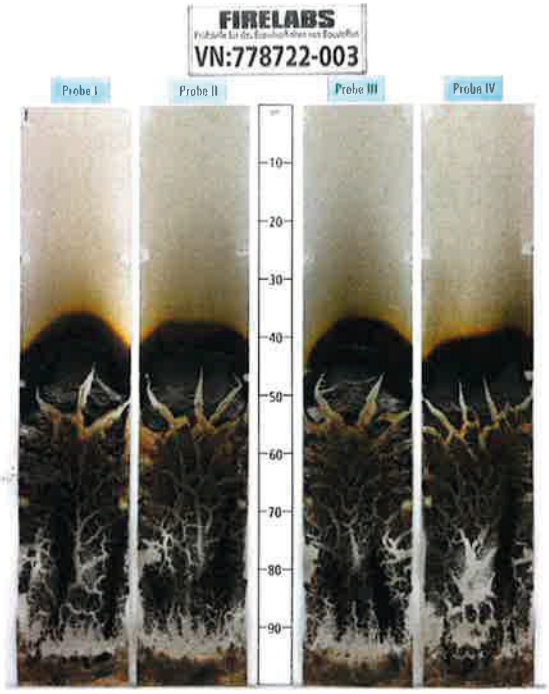

fig. 6
Photo of the test specimen after the test

Test specimen D

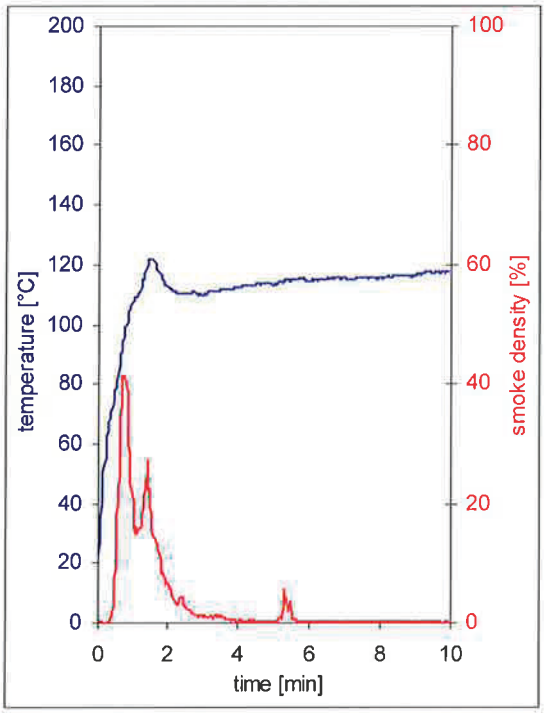

fig. 7
Graphs of the flue gas temperature and the smoke density

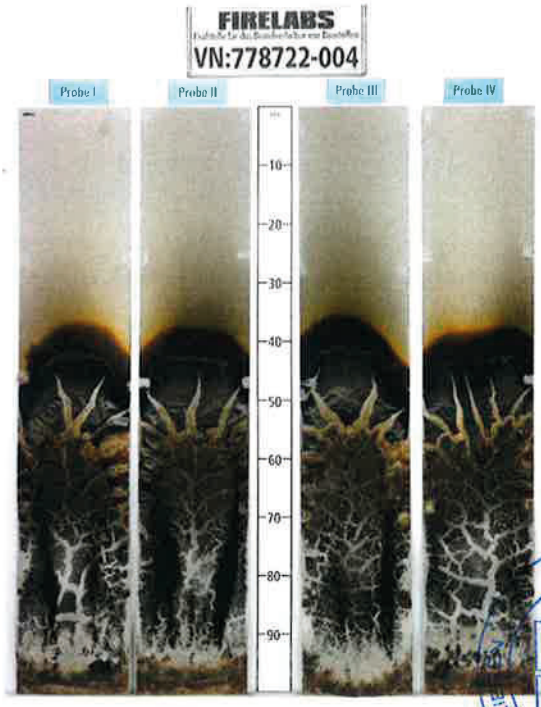

fig. 8
Photo of the test specimen after the test

Test results small burner test
Table 2

	longitudinal						transversal						dim.	require-ments
Sample-No.	1	2	3	4	5	6	1	2	3	4	5	6	-	-
Ignition of the sample	1	1	3	./.	4	./.	1	./.	./.	1	3	./.	s	-
Maximum flame height	< 1	< 1	< 1	./.	< 1	./.	< 1	./.	./.	< 1	< 1	./.	cm	-
Time of the maximum	1	1	3	./.	4	./.	1	./.	./.	1	3	./.	-	-
Flame tip has reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Flames extinguished	16	16	16	./.	16	./.	1	./.	./.	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): The specimens were superficially destroyed in the area of the flame impingement point up to a height of about 0.2 cm and a width of about 1 cm, brown discoloured above about 1 cm														

Samples 1-5: edge flame exposure
Samples 6: surface flame exposure

[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