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

FIRE LABS
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PÜZ-Stelle (LBO): BRA09

Reference	FLT 3651418 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)
Sponsor	ATP adhesive systems AG Sihleggstraße 23 CH - 8832 Wollerau
Order	2018-02-28 **Arrived** 2018-03-08
Description of samples	White self-adhesive plastic films to be used on metal surfaces, named "**GP- 410 P g**" and "**GP- 410 P g AE**". (for details see page 2)
Delivered	2018-03-08
Content of request	Proof of flammability to classify building materials to class B1 “schwerentflammbar” according to DIN 4102-1
Assessment	The examined materials meets the requirements of class B1 for ”schwerentflammbare" (not easily flammable) building materials according to DIN 4102-1 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 certificate	2023-03-31
Sampling	The sample material was sent to the laboratory by the sponsor

TEST CERTIFICATE

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.

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This test certificate comprises 5 pages and 3 enclosures.

Approved testing, inspection and certification body

1 Description of the test material

1.1 Description (according to the sponsor)

The materials delivered are self-adhesive plastic films consisting of a white soft-PVC film of a thickness of 80 µm with an polyacrylate adhesive with an application quantity of 20 g/m^2 on one side and a PE-overlaid paper covering the adhesive surface. The self-adhesive films are intended to be used indoor, applied on metal surfaces and were named "GP- 410 P g" and "GP- 410 P g AE".

1.2 Description of the delivered samples

For the tests the laboratory received 2 sample rolls of one-sided self-adhesive plastic films with a protective paper on the self-adhesive surface. The following variants have been delivered:

Trade name	Colour / Gloss	Adhesive colour	Batch	Sample size		Total thickness [mm]
				Length m]	Width [m]	
GP- 410 P g	white / glossy	light grey	429300-61	ca. 10	1.05	ca. 0.26
GP- 410 P g AE		grey	429364-69		1.05	ca. 0.30

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 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 tests in the fire shaft ("Brandschacht") 4 specimens were prepared. The samples (dimensions 1000 mm x 190 mm) of test specimens A and C were cut in longitudinal, the samples for the test specimens B and D in transverse orientation of the films and applied on one side onto uncoated aluminium sheets of a thickness of 1,0 mm (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 acc. DIN 4102-1 and -16 (building materials class B1). The small burner ("Brennkasten") tests have been performed acc. DIN 4102-1, chapter 6.2.5 (building materials class B2).
There was no additional substrate arranged behind the material compound.
Examination period: April 2018

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]	Weight per unit area [g/m^2]	Thickness [mm] (m.v.)	s	Weight per unit area [g/m^2]
GP- 410 P g *)	0.10	./.	0.11	0.002	139
Paper liner	./.	140	0.15	0.005	145
GP- 410 P g AE *)	0.10	./.	0.13	0.004	160
Paper liner	./.	140	0.18	0.002	147

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 does 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.		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	50	50	50	50	
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	3	3	3	3	
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	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	No 10	No 10	No 10	No 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				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	6.4	5.2	4.9	4.9	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.	./.	
30	Diagram fig. no.	1	3	5	7	
	Residual length					
31	Individual value ..... cm	50 51 51 53	53 53 50 51	52 48 47 49	49 49 49 49	> 0
32	Average value ..... cm	**51**	**51**	**49**	**49**	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	8	
	Flue gas temperature					
34	Maximum of average value ...°C	111	112	114	118	≤ 200
35	Time [1] ..... min:s	9:06	9:40	1:28	1:32	
36	Diagram fig. no.	1	3	5	7	
37	Remarks: line 32: Due to the residual length of the samples of ≥ 45 cm no additional tests were proceeded (DIN 4102-16: 2015-09, 5.2 b)). (diagrams and photos see appendices 1, 2)					

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

Specimen	Test-No.	Trade name	Orientation of self-adhesive film	Substrate
A	651418-001	GP- 410 P g	longitudinal	Aluminium sheet
B	651418-002		transversal	
C	651418-003	GP- 410 P g AE	longitudinal	
D	651418-004		transversal	

5 Assessment

Section 4.2 lists the test results of the composite which is 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 self-adhesive plastic film, fulfil the requirements of building materials class B1 according to DIN 4102-1, if used on one side onto metal surfaces:
- with a density ≥ 2025 kg/m^3, a melting point ≥ 500 °C and a thickness ≥ 0,8 mm
- with a density ≥ 5890 kg/m^3, a melting point ≥ 1000 °C and a 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. 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 2023-03-31, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 17th of April 2018

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

This translation was issued the 17th of April 2018, in a case of doubt the German version is valid solely.

Test specimen A

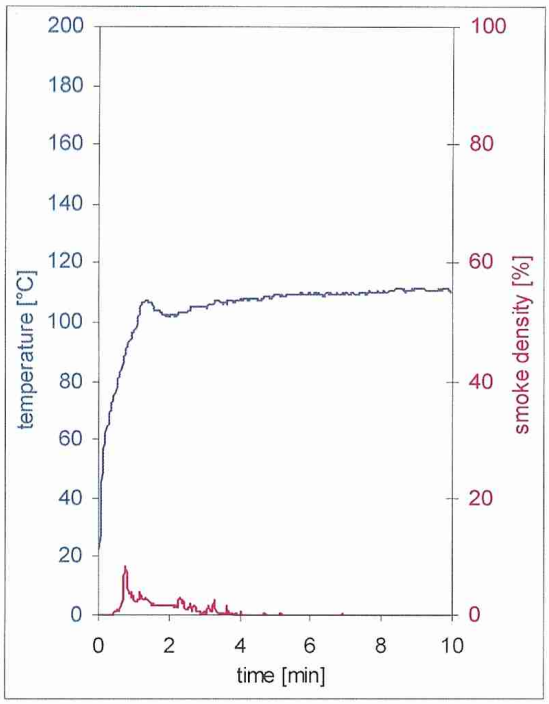

fig. 1
Graphs of the flue gas temperature and the smoke density

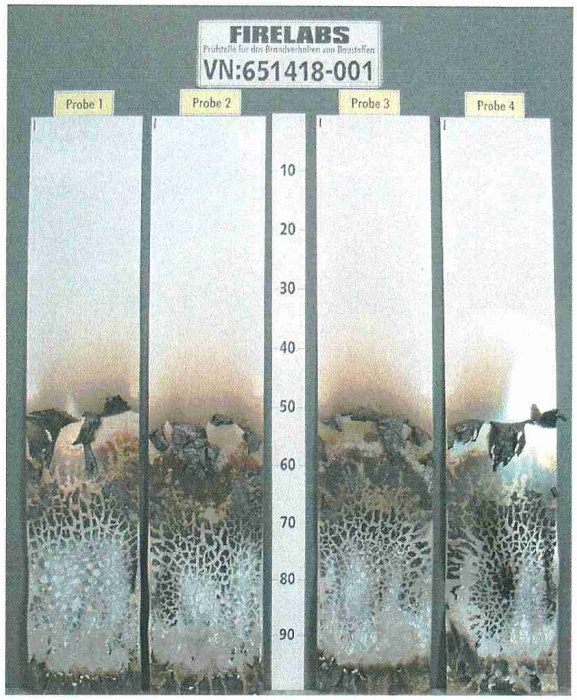

fig. 2
Photo of the test specimen after the test

Test specimen B

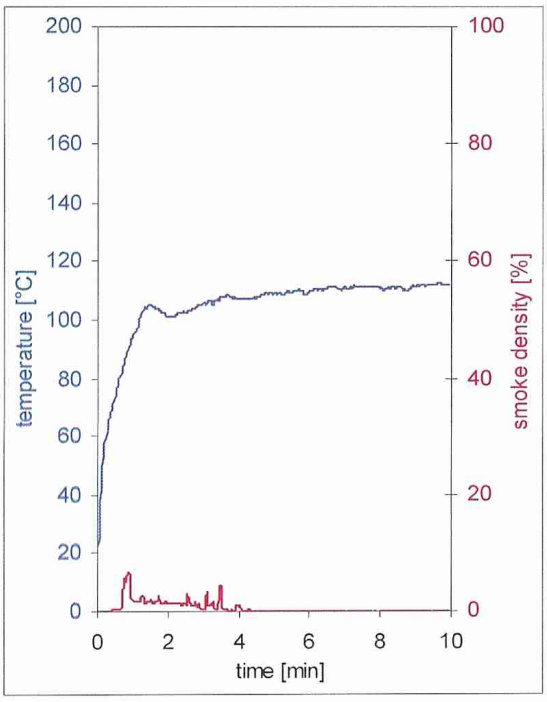

fig. 3
Graphs of the flue gas temperature and the smoke density

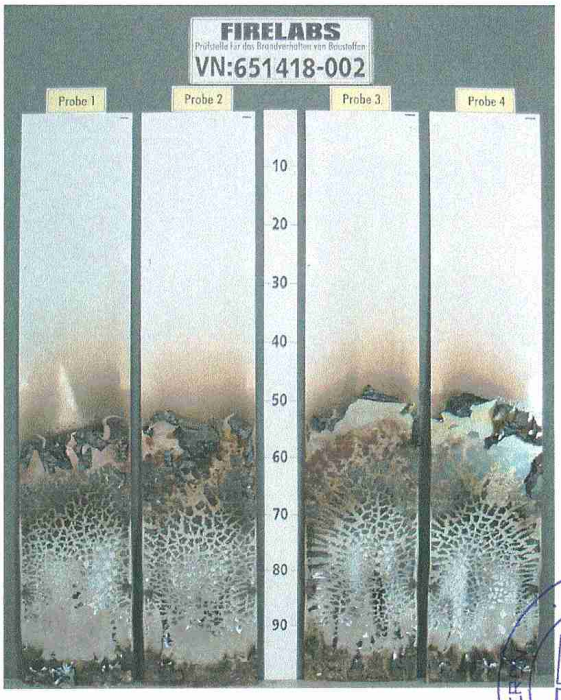

fig. 4
Photo of the test specimen after the test

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Test specimen C

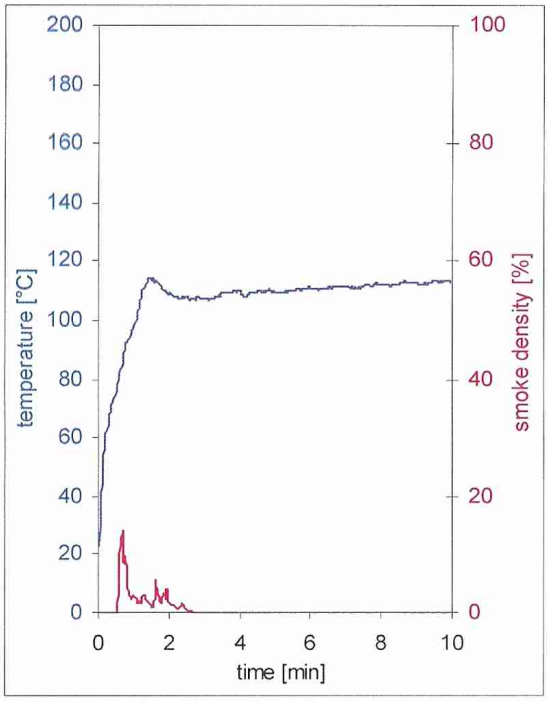

fig. 5
Graphs of the flue gas temperature and the smoke density

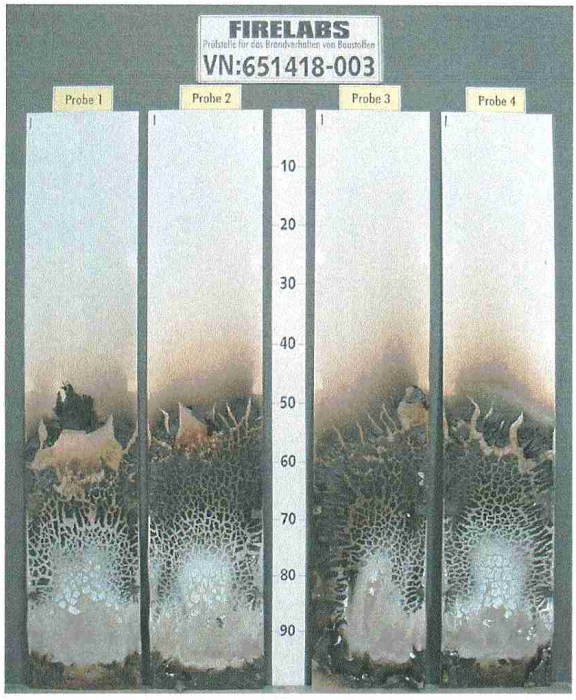

fig. 6
Photo of the test specimen after the test

Test specimen D

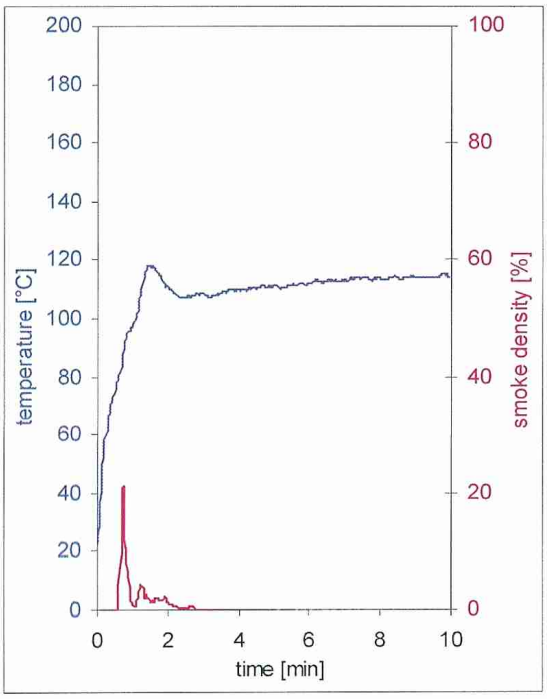

fig. 7
Graphs of the flue gas temperature and the smoke density

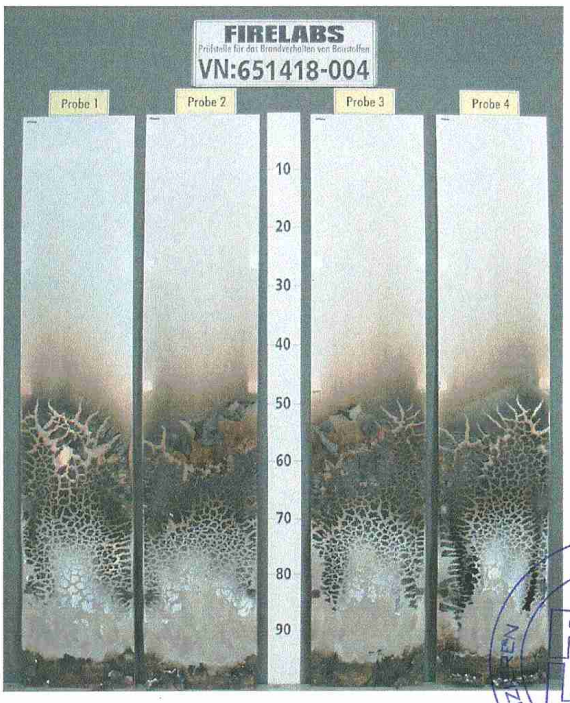

fig. 8
Photo of the test specimen after the test

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Test results class B2 (Brennkasten)

Table 2.1: "GP- 410 P g" (complete set of samples)

	longitudinal						transversal						dim.	require-ments
Sample-No.	1	2	3	4	5	6	1	2	3	4	5	6	-	-
Ignition of the sample	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	-
Maximum flame height	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	cm	-
Time of the maximum	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	-	-
Flame tip has reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Flame has extinguished	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	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 discoloured to brown approx 1 cm in height and 0,5 cm in width. None of the samples showed ignition.														

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

Table 2.2 : "GP- 410 P g AE"

	longitudinal						transversal						dim.	require-ments
Sample-No.	1	2	3	-	-	-	1	2	3	-	-	-	-	-
Ignition of the sample	./.	./.	./.	-	-	-	./.	./.	./.	-	-	-	s	-
Maximum flame height	./.	./.	./.	-	-	-	./.	./.	./.	-	-	-	cm	-
Time of the maximum	./.	./.	./.	-	-	-	./.	./.	./.	-	-	-	-	-
Flame tip has reached the 150 mm mark	./.	./.	./.	-	-	-	./.	./.	./.	-	-	-	s	≥ 20
Flame has extinguished	./.	./.	./.	-	-	-	./.	./.	./.	-	-	-	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 discoloured to brown approx 1 cm in height and 0,5 cm in width. None of the samples showed ignition.														

Samples 1, 2: edge flame exposure
Samples 3: 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