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

TEST CERTIFICATE

Reference	FLT 3615217 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)
Sponsor	REGULUS GMBH Paul-Gossen-Str. 114 D – 91011 Erlangen
Order	2017-01-31 **Arrived** 2017-02-07
Description of samples	Self-adhesive, colour-coated plastic film to be used on metallic substrates, named "**SIVC**". (for details see page 2)
Delivered	2017-02-07
Content of request	Proof of flammability to classify building materials to class B1 “schwerentflammbar” according to DIN 4102-1
Assessment	The examined material compound meets the requirements of class B1 for ”schwerentflammbare" (not easily flammable) building materials according to DIN 4102-1 if suspended freely or with distance if >40 mm to the same or other plain materials. (for details see page 5)
Validity	2022-02-28
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 2 enclosures.

Approved testing, inspection and certification body

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1 Description of the test material

1.1 Description (according to the sponsor)
The material provided is a film made of PVC with a one-sided colour coating and an adhesive application on the rear side. The adhesive was covered for protection with a siliconized paper. The self-adhesive film is intended to be used indoor, applied on metallic surfaces and was named "SIVC".

1.2 Description of the delivered samples
For the tests the laboratory received a sample roll of a white plastic film with white coating and self-adhesive backing as well as a siliconized protective paper applied on the rear side. The sample roll had a length of about 20 m and a width of 1.07 m.
Colour: white film, white coating, beige paper liner
Marking: SIVC 1067/20, 22VC0.100.30500, CH129917602/M16
Characteristic values: table 1; photos: see enclosures.
Other specifications are not known by the laboratory, a sample is stored for documentation.

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 and applied on uncoated aluminium sheets (thickness 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 were cut in longitudinal, the samples for the test specimen B in transverse orientation of the material and applied on uncoated aluminium sheets (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 tests in the fire shaft ("Brandschacht") have been performed acc. DIN 4102-1 and -16 (building materials class B1). The small burner tests ("Brennkastenprüfungen") have been performed acc. DIN 4102-1, chapter 6.2.5 (building materials class B2). No additional substrate was arranged behind the material compound.
Examination period: March 2017

4 Results

- section 4.1 Material characteristics
- section 4.2.1 Test results class B2 (Brennkasten)
- section 4.2.2 Test results class B1 (Brandschacht)

4.1 Material characteristics

Table 1

Characteristics			Manufacturer`s data	Measured values (m.v.)
Film with coating and adhesive layer	Thickness	[mm]	0,13	0,15 (s=0,002)
	Weight per area unit	[g/m²]	./.	170
Protective paper	Thickness	[mm]	./.	0,14
	Weight per area unit	[g/m²]	./.	137
Coated, self-adhesive film with protective paper	Thickness	[mm]	0,3	0,29
	Weight per area unit	[g/m²]	280	307

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)

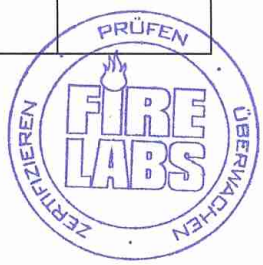
According DIN 4102-1 all building materials class B1 must also meet the requirements of materials class B2 (low flammable). The material, tested in "Brennkasten" acc. DIN 50 050 meets the requirements class B2; the material does not show burning particles / droplets. (Results: see enclosure 2)

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	-	-	
2	Maximal flame height above bottom edge ..... cm	50	60	-	-	
3	Time [1] ..... min	1	1	-	-	*)
4	Burning / melting through Time [1] ..... min	./.	./.	-	-	
5	Back of the specimens: Flames / glowing Time [1] ..... min:s	./.	./.	-	-	
6	Discolouring Time [1] ..... min	4	4	-	-	
7	Falling of burning droplets Begin [1] ..... min:s	No	No	-	-	
8	Extend: Sporadic falling of burning droplets					
9	Continuous falling of burning droplets					
10	Falling of burning parts Begin [1] ..... min	Yes 2	Yes 2	- -	- -	
11	Extend: Sporadic falling of burning parts	Yes	Yes	-	-	
12	Continuous falling of burning parts	No	No	-	-	
13	Afterflame time at the bottom of thesieve (max.) ..... min:s	0:04	0:03	-	-	
14	Impairment of the burner flames by dropping or falling Material Time [1] ..... min:s	No	No	-	-	
15	Premature end of test Final occurrence of burning at the specimen [1] ..... min	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	-	-	
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	-	-	
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	23,1	25,6	-	-	
29	≥ 400 % min (very strong smoke density)	./.	./.	-	-	
30	Diagram fig. no.	1	3	-	-	
	Residual length					
31	Individual value ..... cm	46	47	-	-	
		45	44	-	-	> 0
		47	48	-	-	
		49	46	-	-	
32	Average value ..... cm	**46**	**46**	-	-	≥ 15
33	Photo of the test specimen fig. no.	2	4	-	-	
	Flue gas temperature					
34	Maximum of average value ...°C	115	110	-	-	≤ 200
35	Time [1] ..... min:s	9:58	10:00	-	-	
36	Diagram fig. no.	1	3	-	-	
37	Remarks: line 13: Afterflame time at the bottom of the sieve < 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: 2015-09, 5.2 b))					

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

Specimen	Test-No.	Type name	Orientation of samples	Substrate
A	615217-001	"SIVC"	longitudinal	aluminium sheet
B	615217-002		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 coated self-adhesive plastic foil, fulfils 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 2022-02-28, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 22nd of March 2017

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

This translation was issued the 22nd of March 2017, in a case of doubt the German version is valid solely.

Test specimen A

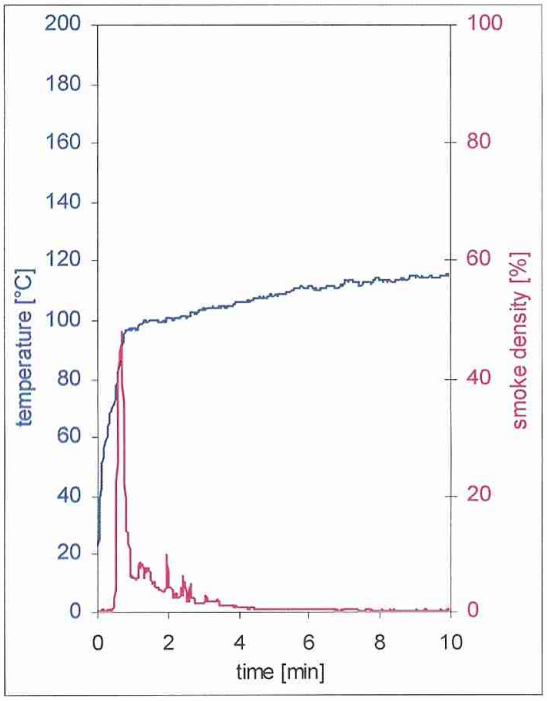

fig. 1
Graphs of the flue gas temperature and the smoke density

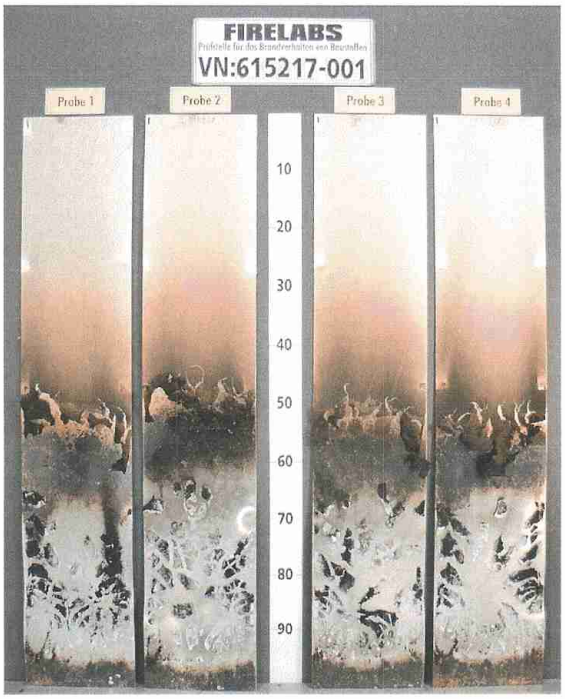

fig. 2
Photo of the test specimen after the test

Test specimen B

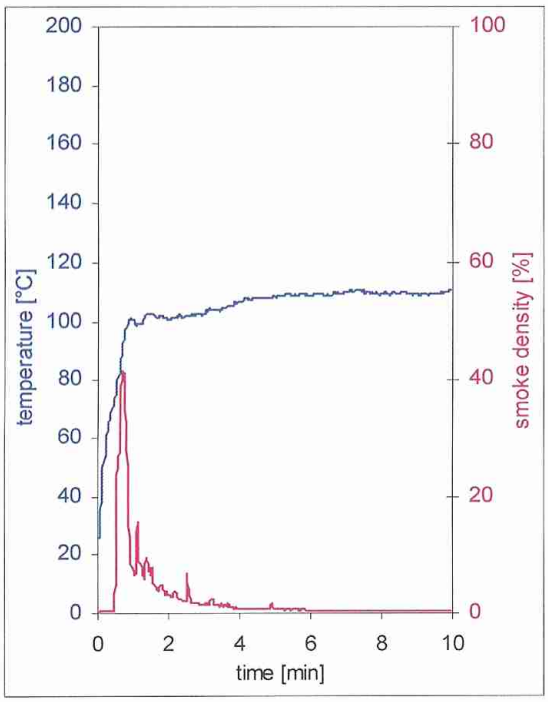

fig. 3
Graphs of the flue gas temperature and the smoke density

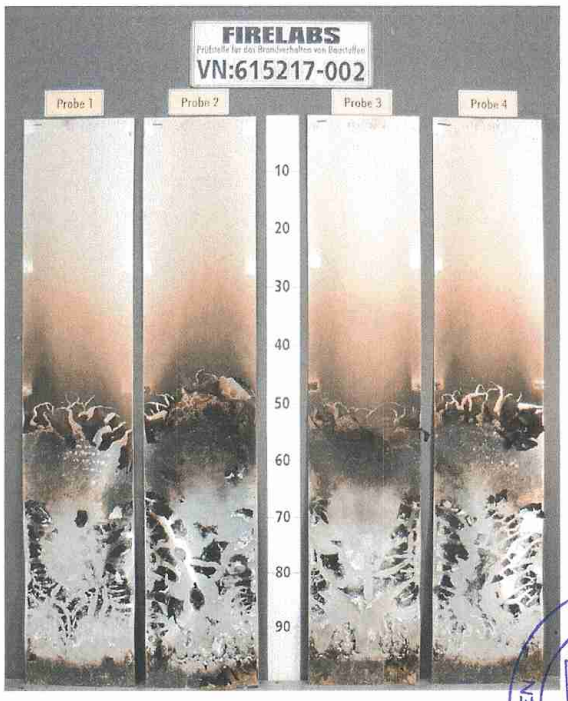

fig. 4
Photo of the test specimen after the test

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Test results small burner test (Brennkasten)
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	7	5	4	6	3	./.	5	8	5	4	4	./.	s	-
Maximum flame height	1	1	1	1	1	1	1	1	1	1	1	1	cm	-
Time of the maximum	15	15	15	15	15	15	15	15	15	15	15	15	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Self-extinguishing of flames	16	16	16	16	16	16	16	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 area at the point of flame impingement: approx. 10 mm height x 10 mm width														

Samples 1-5: edge exposure
Samples 6: surface 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

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