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

FIRE LABS
Prüfstelle für das Brandverhalten von Baustoffen
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PÜZ-Stelle (LBO): BRA09

Reference:	FLT 3775722 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)
Client:	Com2C GmbH & Co. KG Industrieweg 1 D - 32457 Porta Westfalica
Order:	2022-03-08 **Arrived:** 2022-03-10
Description of samples:	On one side coated film made of rigid PVC, named "**PopUp 410 WB SM W FR**". (for details see page 2)
Delivered:	2022-03-10
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:	2027-03-31
Sampling:	The samples were sent to the laboratory by the client.

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

This test certificate comprises 5 pages and 3 appendices.

This test certificate must not be published and copied preceding agreement of the test laboratory and if agreed, only during validity and unchanged concerning appearance and contents.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

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1 Description of test material

1.1 Test material (according to the client)

The delivered material is a rigid PVC-film coated on one side with a one-sided, printable coating for water-based latex and UV-curable inks. The coated film is intended to be used indoor as printable advertising space or for decorative purposes and was named with the trade name "PopUp 410 WB SM W FR" by the client .

1.2 Description of the delivered samples

For the tests the laboratory received a sample roll of a plastic film with a coated surface on one side. The sample had a length of about 7 m and a width of 1.07 m. The sample was marked with the trade name and batch 221CV1904162.
Colour (film and coating): white.

Characteristic values: see passage 4.1; photos: see enclosures 1, 2
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") 4 specimens were assembled. The samples (dimensions 1000 mm x 190 mm) for test specimens A and C have been cut in longitudinal direction, the samples for test specimens B and D 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).

All tests were carried out in one layer, in a freely suspended arrangement, each from the front and the reverse side.

Period of testing: April 2022

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

Trade name	Manufacturer's data		Measured values		
	Mass per unit area [g/m²]	Thickness [mm]	Mass per unit area [g/m²]	Thickness (m.v.) [mm]	s
PopUp 410 WB SM W FR	./.	ca. 0.41	577	0.41	0.004

m.v. mean value (n=10)
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 3, table 2)

4.2.2 Test results class B1 ("Brandschacht")

Table 3

Test results "Brandschachtprüfung" (part 1)						
line no.		Specimen				require-ments
		A	B	C	D	
1	Number of specimen arrangement acc. DIN 4102 –15 Table 1	1	1	1	1	
2	Maximal flame height above bottom edge ..... cm	60	50	60	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:s	./.	./.	./.	./.	
6	Discolouring Time [1] ..... min:s	./.	./.	./.	./.	
7	Falling of burning droplets Begin [1] ..... min	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	Yes 1	Yes 1	Yes 1	Yes 1	
11	Extend: Sporadic falling of burning parts	Yes	Yes	Yes	Yes	
12	Continuous falling of burning parts	No	No	No	No	
13	Afterflame time at the bottom of thesieve (max.) ..... min:s	0:04	0:12	0:36	0:26	
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	3	3	3	2	
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

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Test results (part 2)						
line no.		Specimen				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	60.0	81.9	84.6	86.5	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.	./.	
30	Diagram fig. no.	1	3	5	7	
	Residual length					
31	Individual values ..... cm	62 67 46 60	51 52 39 65	46 45 58 48	52 52 47 49	> 0
32	Average value ..... cm	**58**	**51**	**49**	**50**	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	8	
	Flue gas temperature					
34	Maximum of average value...°C	116	113	116	115	≤ 200
35	Time [1] ..... min:s	9:42	9:54	9:46	9:58	
36	Diagram fig. no.	1	3	5	7	
37	Remarks: line 32: There were no additional tests proceeded based on the residual length of the samples of > 45 cm (DIN 4102-16, 5.2 b))					

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

Test specimen	Test-no.	Direction of samples	Tested surface
A	775722-001	longitudinal	coated
B	775722-002		uncoated
C	775722-003	transverse	coated
D	775722-004		uncoated

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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 also fulfilled.

The material showed falling of burning parts/droplets during the 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 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. This test certificate 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 2027-03-31, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 13th of April 2022

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

This translation was issued 13th of April 2022. In a case of doubt the German version is valid solely.

Test specimen A

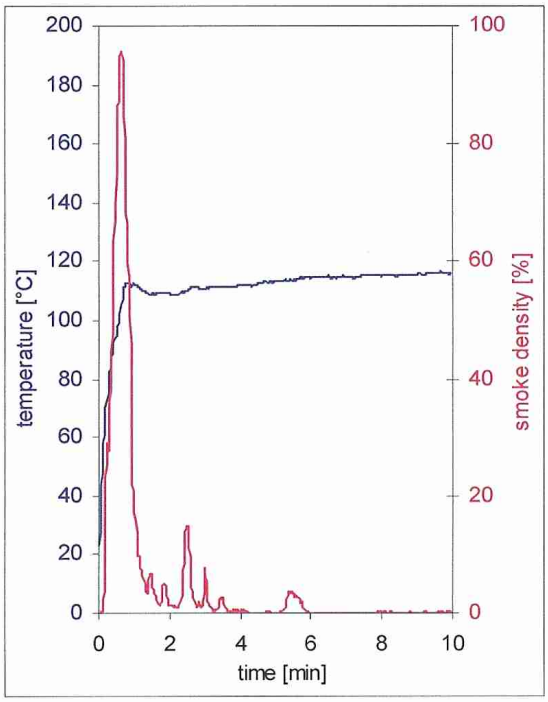

fig. 1
Graphs of the flue gas temperature and the smoke density

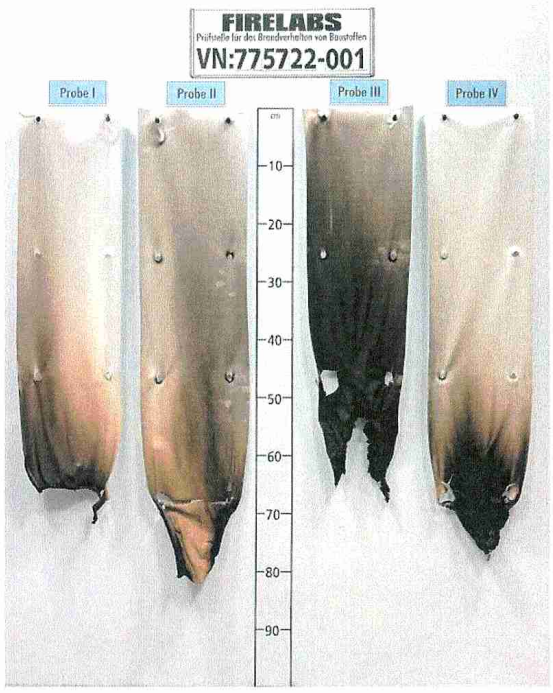

fig. 2
View of test specimen after the test

Test specimen B

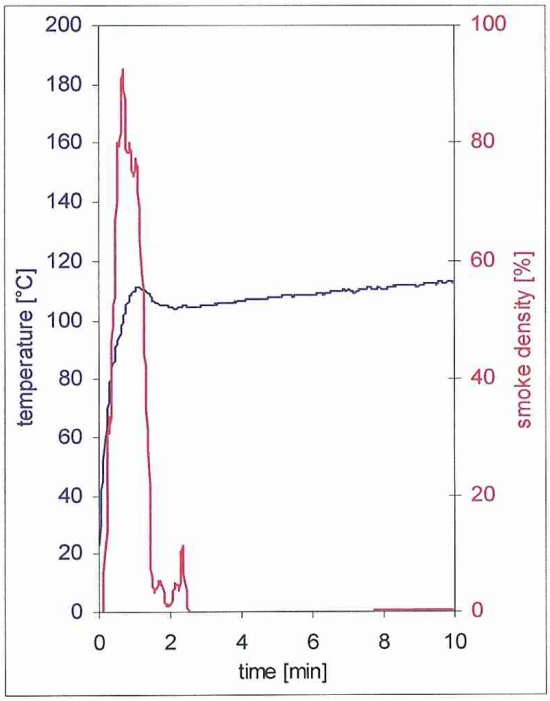

fig. 3
Graphs of the flue gas temperature and the smoke density

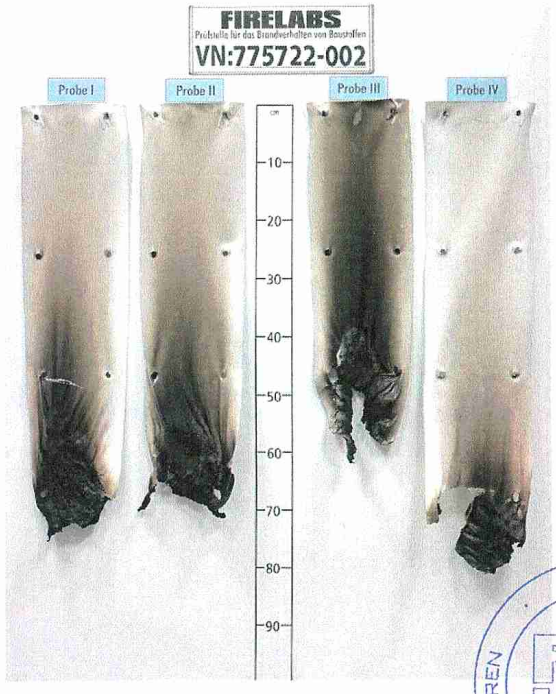

fig. 4
View of test specimen after the test

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Test specimen C

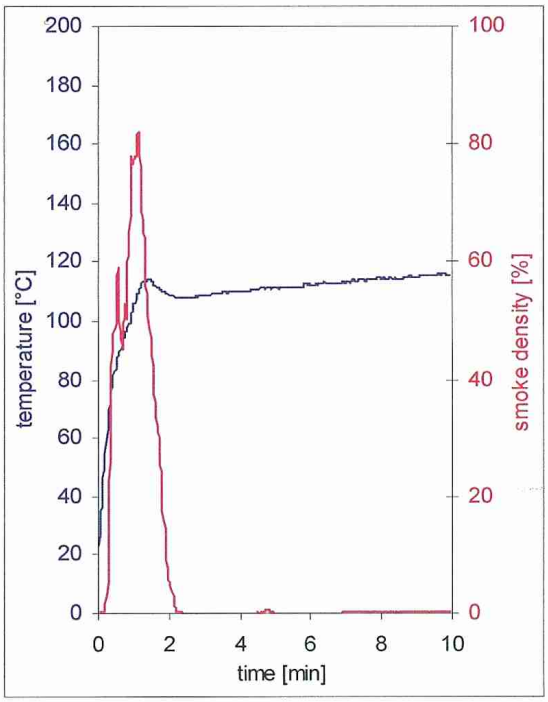

fig. 5
Graphs of the flue gas temperature and the smoke density

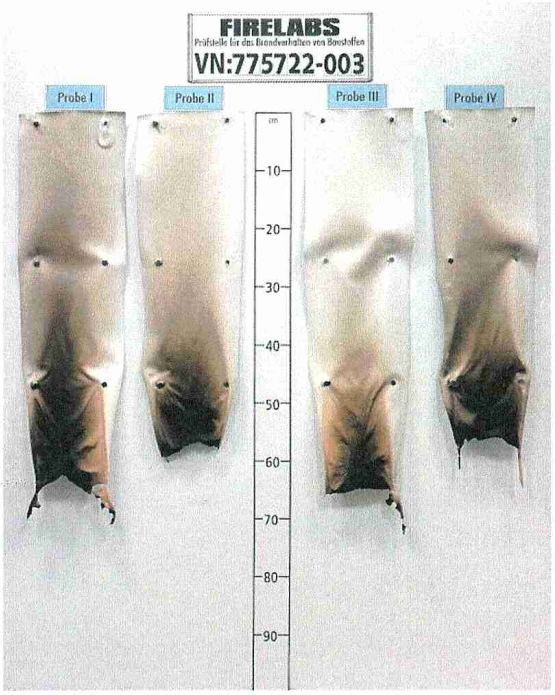

fig. 6
View of test specimen after the test

Test specimen D

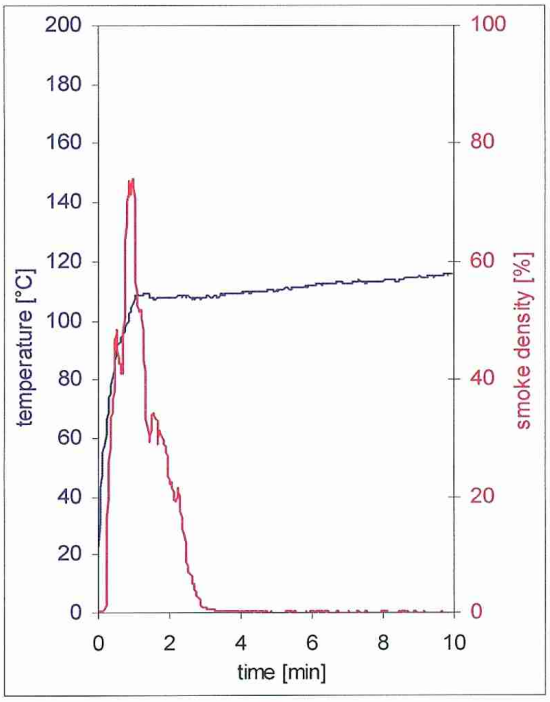

fig. 7
Graphs of the flue gas temperature and the smoke density

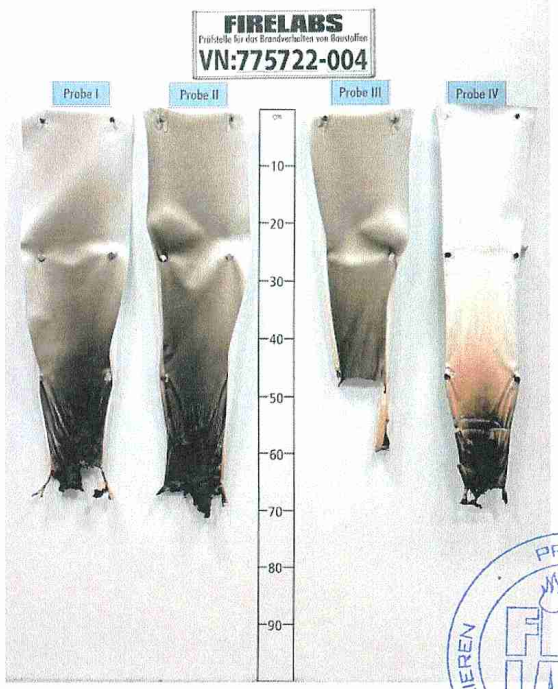

fig. 8
View of test specimen after the test (Sample 4: reverse side)

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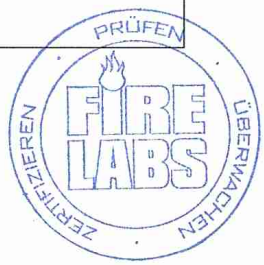
Test results small burner ("Brennkasten") tests

Table 2

PopUp 410 WB SM W FR	Longitudinal direction							Transverse direction							dim.	require-ments
Sample-No.	1	2	3	4	5	6	7	1	2	3	4	5	6	7	n	-
Ignition of the sample	1	4	4	4	5	4	4	1	5	4	5	5	5	4	s	-
Maximum flame height	4	6	6	5	6	6	5	5	6	6	7	6	7	5	cm	-
Time of the maximum	15	11	10	11	10	13	12	8	13	9	8	10	10	8	s	-
Flame tip reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Self-extinguishing of flames	18	16	16	16	16	16	16	16	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 about 7 cm and about 1.5 cm in width, soot above until top edge of the samples.																

Samples 1: edge flame exposure
Samples 2-6: surface flame exposure coated surface
Samples 7: surface flame exposure 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