

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 3630517 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)

Sponsor: 

Order: 2017-07-24 **Arrived:** 2017-07-24

Description of samples: On both sides with plasticised PVC coated fabric made of polyester, named "Frontlit TG-510FR".
(for details see page 2)

Delivered: 2017-07-31

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

Assessment: The examined product 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 2022-07-31

Sampling: The sample was sent to the laboratory by the manufacturer.

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

This test certificate comprises 5 pages and 2 appendices.

Approved testing, inspection and certification body

This test certificate must not be published and copied preceding agreement of the test laboratory and if agreed, only during validity and unchanged concerning appearance and contents.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

TEST CERTIFICATE



1 Description of test material

1.1 Test material (according to the sponsor)

The provided material is a fabric made of polyester coated on both sides with plasticized PVC containing flame retardant treatments.

The material is intended to be used for textile architecture or for decorative purposes and was named with the trade name "Frontlit TG-510FR" by the sponsor.

1.2 Description of the delivered samples

For the tests the laboratory received a fabric made of plastic fibres coated on both sides, heaving a length of approx. 12 m and a width of 1.01 m. The coated fabric was not labelled and was named with the trade name "Frontlit TG-510FR".

Colour: white

Characteristic values: see paragraph 4.1; Photos: see enclosure 1

Details to the manufacturer and a retain sample have been deposited at the laboratory.

2 Preparation of samples

For the small burner (Brennkasten) tests 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 warp and in weft orientation of the support fabric.

For the fire shaft (Brandschacht) tests 2 specimens were assembled. The samples (dimensions 1000 mm x 190 mm) for the test specimen A have been cut in warp orientation, the samples for the test specimen B have been cut in weft orientation of the support fabric.

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 tests in the fire shaft ("Brandschacht") have been performed acc. DIN 4102-1 and -16 (building materials class B1). The small burner tests ("Brennkasten") have been performed acc. DIN 4102-1, chapter 6.2.5 (building materials class B2) without edge protection.

Arrangement of all samples: single layer, freely suspended

Examination period: August 2017

4 Results

- section 4.1 Material characteristics
- section 4.2.1 Test results class B2
- section 4.2.2 Test results class B1

4.1 Material characteristics

Table 1

| Specific values | | Specifications by manufacturer | Measured values | |
|--------------------|---------------------|--------------------------------|-----------------|-------|
| | | | m.v. | s |
| Thickness | [mm] | ./. | 0.43 | 0.011 |
| Mass per unit area | [g/m ²] | 510 | 531 | |

./. not received/not measured

m.v. mean value

s standard deviation

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.

Exposing the flame to the front or reverse side did not influence the fire behaviour.

(Results: see enclosure 2)



4.2.2 Test results class B1 (Brandschacht)

Table 3

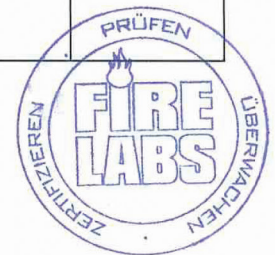
| Test results (part 1) | | | | | | |
|-----------------------|--|----------|-----|---|---|--------------|
| line no. | | Specimen | | | | requirements |
| | | A | B | C | D | |
| 1 | <u>Number of specimen arrangement</u> acc. DIN 4102 –15 Table 1 | 1 | 1 | - | - | |
| 2 | <u>Maximal flame height</u> above bottom edge cm | 40 | 40 | - | - | *) |
| 3 | Time ¹⁾ min | 1 | 1 | - | - | |
| 4 | <u>Burning / melting through</u> Time ¹⁾min | 1 | 1 | - | - | |
| 5 | <u>Back side of the specimens:</u> <u>Flames / glowing</u> Time ¹⁾ min:s | ./. | ./. | - | - | |
| 6 | <u>Discolouring</u> Time ¹⁾ min | ./. | ./. | | | |
| 7 | <u>Falling of burning droplets</u> Begin ¹⁾ min | No | No | - | - | |
| 8 | Extend: Sporadic falling of burning droplets | | | | | |
| 9 | Continuous falling of burning droplets | | | | | |
| 10 | <u>Falling of burning parts</u> Begin ¹⁾ min | No | 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 Material</u> Time ¹⁾ min:s | No | No | - | - | |
| 15 | <u>Premature end of test</u> Final occurrence of burning at the specimen ¹⁾min | 3 | 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 (part 2) | | | | | | |
|-----------------------|---|----------------------|----------------------|------------------|------------------|--------------|
| line no. | | Specimen | | | | requirements |
| | | A | B | C | D | |
| 17 | <u>Afterflame after end of test</u> Timemin:s | No | No | - | - | |
| 18 | Number of specimen | | | | | |
| 19 | Front side of specimen | | | | | |
| 20 | Back side of specimen | | | | | |
| 21 | Flame lengthcm | | | | | |
| 22 | <u>Afterglow after end of test</u> Timemin:s | No | 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 | 25.1 | 44.2 | - | - | |
| 29 | ≥ 400 % min (very strong smoke density) | ./. | ./. | - | - | |
| 30 | Diagram fig. no. | 1 | 3 | - | - | |
| 31 | <u>Residual length</u> Individual valuecm | 65 69 67 67 | 67 63 68 67 | - - - - | - - - - | > 0 |
| 32 | Average valuecm | 67 | 66 | - | - | ≥ 15 |
| 33 | Photo of test specimen fig. no. | 2 | 4 | - | - | |
| 34 | <u>Flue gas temperature</u> Maximum of average value...°C | 110 | 114 | - | - | ≤ 200 |
| 35 | Time ¹⁾min:s | 9:36 | 9:54 | - | - | |
| 36 | Diagram fig. no. | 1 | 3 | - | - | |
| 37 | <u>Remarks:</u> line 32: There were no additional tests proceeded because of the residual length of > 45 cm (DIN 4102-16: 2015-09, 5.2 b)). | | | | | |

Test specimen A (VN 630517-001): samples in warp orientation
 Test specimen B (VN 630517-002): samples in weft orientation

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



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. No falling of burning parts or droplets occurred during these tests.

The verification

- for outdoor usage (ageing behavior by outdoor weathering)
- after washing or cleaning with chemicals.

was not subject of the tests.

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, par. 3).

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

- regular building materials for the required proof of accordance
- for not regular 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 2022-07-31, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 25th of August 2017



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



This translation was issued on 25th of August 2017, in a case of doubt the German version is valid solely.

Test specimen A

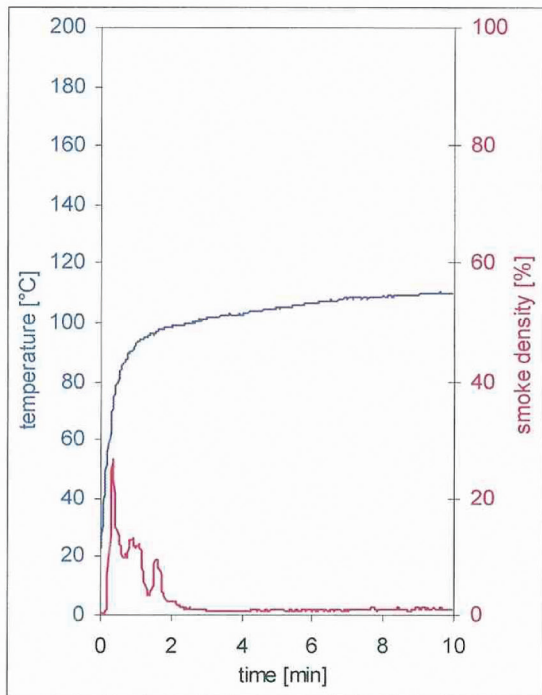


fig. 1
Graphs of the flue gas temperature and the smoke density

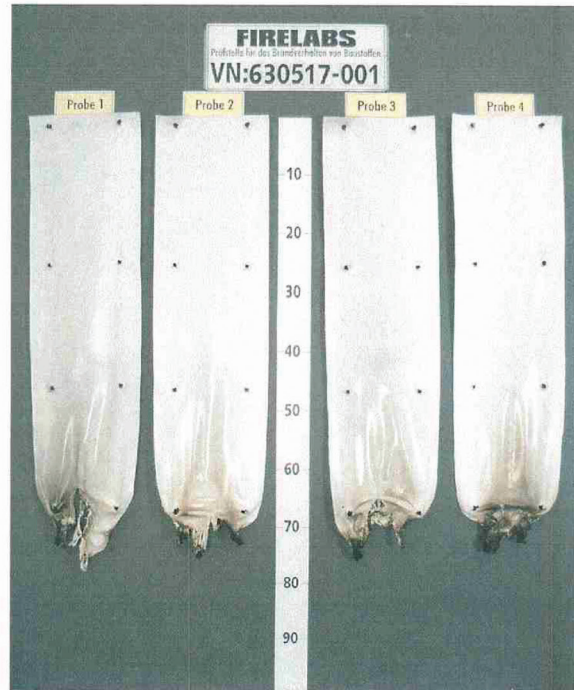


fig. 2
View of test specimen after the test

Test specimen B

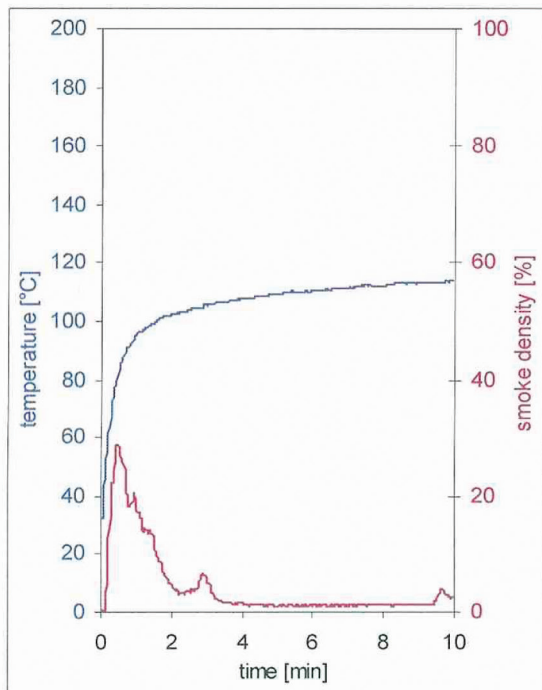


fig. 3
Graphs of the flue gas temperature and the smoke density



fig. 4
View of test specimen after the test (sample no. 4: rear side)



Test results small burner test

Table 2

| Sample-No. | warp direction | | | | | | | weft direction | | | | | | | dim. | requirements |
|-----------------------------------|----------------|-----|-----|-----|-----|-----|-----|----------------|-----|-----|-----|-----|-----|-----|------|--------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | |
| Ignition of the sample | 1 | 1 | 1 | 1 | 1 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | 4 | 4 | s | - |
| Maximum flame height | 11 | 10 | 10 | 9 | 10 | 9 | 8 | 10 | 9 | 7 | 10 | 9 | 8 | 8 | cm | - |
| Time of the maximum | 13 | 15 | 12 | 13 | 15 | 15 | 15 | 15 | 15 | 13 | 15 | 15 | 15 | 15 | s | - |
| Flame tip reached the 150 mm mark | ./. | ./. | ./. | ./. | ./. | ./. | ./. | ./. | ./. | ./. | ./. | ./. | ./. | ./. | s | ≥ 20 |
| Self-extinguishing of flames | 13 | 16 | 13 | 13 | 15 | 16 | 16 | 16 | 15 | 14 | 15 | 15 | 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):

- warp and weft direction, destroyed or burned length max. 8 cm, destroyed width approx. 1.5 cm, soot above until top edge of samples.

Samples 1-5: Edge flame exposure

Samples 6: Surface flame impingement front side

Samples 7: Surface flame impingement rear side

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

