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

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PÜZ-Stelle (LBO): BRA09

Reference: FLT 3643117 (Translation of the German Prüfzeugnis - no guarantee for translation of technical terms)

Sponsor: RAUMAX GmbH
Eisenbahnstraße 6
D - 15517 Fürstenwalde

Order 2018-03-14 **Arrived** 2018-03-14

Description of samples: Uncoated wool felt made of new wool to be used as wall covering, named "**felty Wollfilz Tuch 1 mm**".
(for details see page 2)

Delivered: 2018-01-24, 2018-02-23

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

Assessment: The examined material, bonded to solid mineral substrates or to gypsum plaster boards, meets the requirements of class B1 for "schwerentflammbare" (not easily flammable) building materials according to DIN 4102-1.
(for details see page 5)

Validity: 2023-03-31

Sampling: The samples were 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 Prufzeugnis (general building inspectorate certificate) or by
- "Zustimmung im Einzelfall (exceptional approval).

This test certificate can underlie building supervisory procedures:

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

TEST CERTIFICATE

This test certificate includes 5 pages and 2 enclosures.

1 Description of test material

1.1 Description (according to the manufacturer) 0931233286

The delivered material is an uncoated, felted and dyed new wool with a nominal thickness of 1.2 mm. The material is intended to be used inside of buildings as wall covering, bonded onto solid mineral substrates or gypsum plaster boards using a dispersion adhesive. The material was named with the trade name “felty Wollfilz Tuch 1 mm“.

1.2 Description of the delivered samples

For the tests the laboratory received the following samples:

1. 3 sections of uncoated felt materials, each of dyed fibres
   Dimensions: each about 1.5 m x 0.9 m
   Colors: yellow, black and red
   Trade name: "felty Wollfilz Tuch 1 mm"
2. 1 container of dispersion adhesive
   Trade name: "felty Glue Classic"
   Content: about 1 kg
   Color: white

The materials were not marked. Characteristic values: see paragraph 4.1;
photos: see enclosures.
Other specifications are not known by the laboratory, a retain sample each is stored.

2 Preparation of samples

For the tests in the fire shaft (”Brandschacht”) 3 specimens were assembled. For this purpose, 4 samples of each felt material (dimensions 1000 mm x 190 mm) were cut and glued to 12.5 mm thick gypsum plasterboards (GKB, building material class DIN 4102-A2) by using the delivered dispersion adhesive of a wet application quantity of approx 95 g/m^2.

For the small burner (”Brennkasten”) tests samples of the felt materials for edge flame exposure (dimensions 190 mm x 90 mm) and samples for surface flame exposure (dimensions 230 mm x 90 mm) were cut and glued to gypsum plaster boards in the same process by using the same substrate boards.

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 (“Brennkastenprüfungen”) have been performed acc. DIN 4102-1, chapter 6.2.5 (building materials class B2).
Examination period: February-March 2018

4 Results

- section 4.1 Material characteristics
- section 4.2.1 Test results class B2
- section 4.3.3 Test results class B1

4.1 Material characteristics

Table 1

Trade name	Colour	Manufacturer`s data		Measured values		
		Weight per unit area [g/m^2]	Thickness [mm]	Thickness (m.v.)	Thickness (s) [mm]	Weight per unit area [g/m^2]
felty Wollfilz Tuch 1 mm	yellow	1.2	250	1.26	0.043	257
	black			1.53	0.051	250
	red			1.23	0.033	240

./. not received/not measured
m.v. mean value

4.2 Results of the fire behaviour

4.2.1 Test results class B2 (Brennkasten)

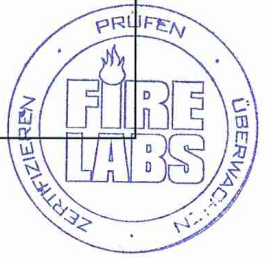
All building materials class B1 must also meet the requirements of materials class B2 (flammable). The material, tested in "Brennkasten" acc. DIN 50 050 meets the requirements of building materials class B2; the material did not show burning particles / droplets during these tests. (Results: see enclosure 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	7	7	7	-	
2	Maximal flame height above bottom edge ..... cm	60	60	60	-	
3	Time [1] ..... min	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	-	
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	-	
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		
15	Premature end of test Final occurrence of burning at the specimen [1] .....min	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 (part 2)						
line no.		Specimen				require-ments
		A	B	C	D	
	Afterflame after end of test	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	-	
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	1.22	0.25	0.69	-	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.		
30	Diagram fig. no.	1	3	5	-	
	Residual length					
31	Individual values ..... cm	43 46 40 45	46 49 45 48	45 46 43 41	- - - -	> 0
32	Average value ..... cm	**43**	**47**	**43**	-	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	-	
	Flue gas temperature					
34	Maximum of average value...°C	101	108	105	-	≤ 200
35	Time [1] ..... min:s	9:58	0:30	1:40	-	
36	Diagram fig. no.	1	3	5	-	
37	Remarks: - (Diagrams and photos see enclosures)					

Test specimen A (VN 643117-003): "felty Wollfilz Tuch 1 mm", colour: yellow
Test specimen B (VN 643117-004): "felty Wollfilz Tuch 1 mm", colour: black
Test specimen B (VN 643117-005): "felty Wollfilz Tuch 1 mm", colour: red

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 tested 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 bonded to solid mineral substrates or gypsum plaster boards (non-perforated) of a density of ≥ 650 kg/m^3 and a thickness of ≥ 11 mm by using the dispersion adhesive "felty Glue Classic" of a wet application quantity of approx. 95 g/m^2.

According DIN 4102-16:2015-09 section 4.2, this assessment is valid for the felt material described in section 4.2 in any colours.

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 by outdoor weathering)
- after washing or cleaning with chemicals

is not been proved with this test certificate.

This test certificate is not valid for the material described in section 1 in a freely suspended application.

6 Special remarks

This test 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 the test methods, classification rules and technology do not change during this period.

Borkheide, 4th of April 2018

PRÜFEN ZERTIFIZIEREN FIRE LABS ÜBERWACHEN

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

This translation was issued on 4th of April 2018, in a case of doubt the German version is valid solely.

Test specimen A

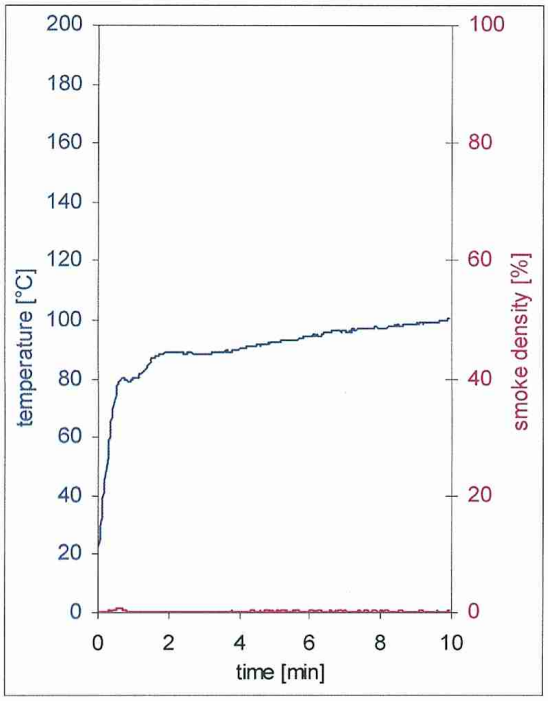


fig. 1
Graphs of the flue gas temperature and the smoke density

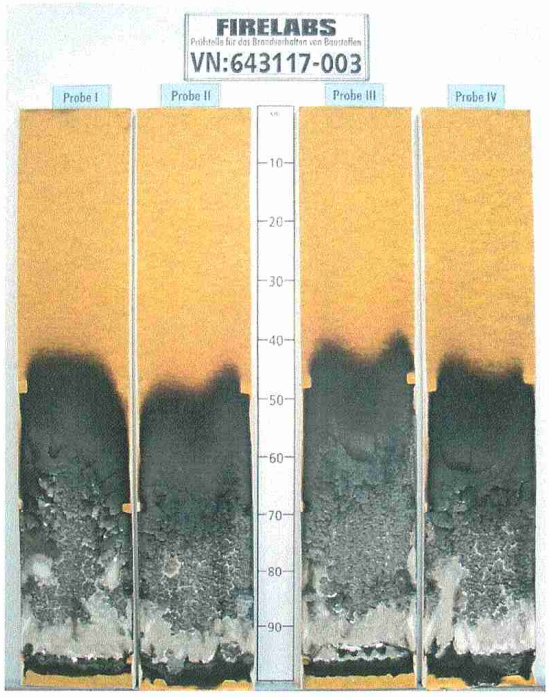


fig. 2
Photo of the test specimen after the test

Test specimen B

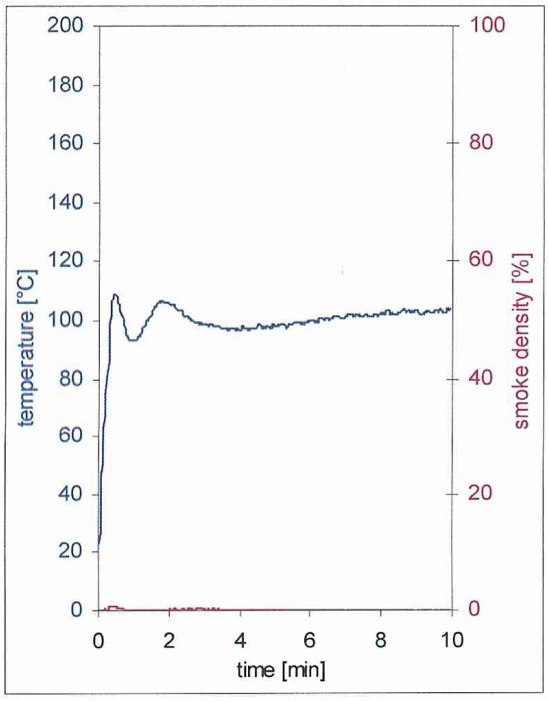


fig. 3
Graphs of the flue gas temperature and the smoke density

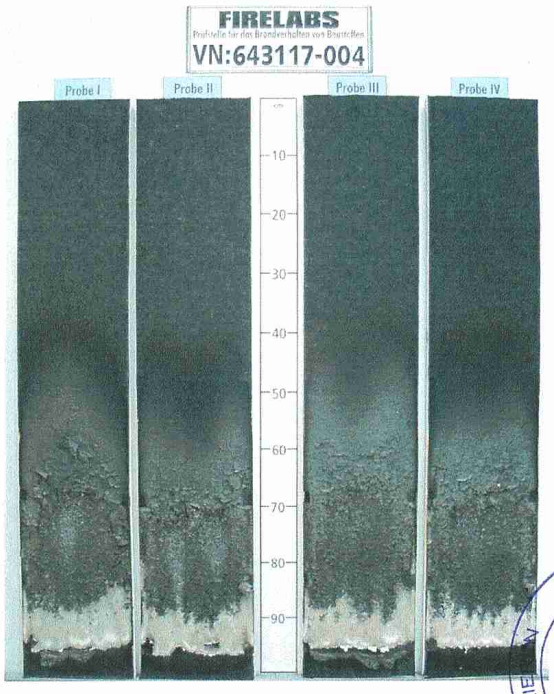


fig. 4
Photo of the test specimen after the test

Test specimen C

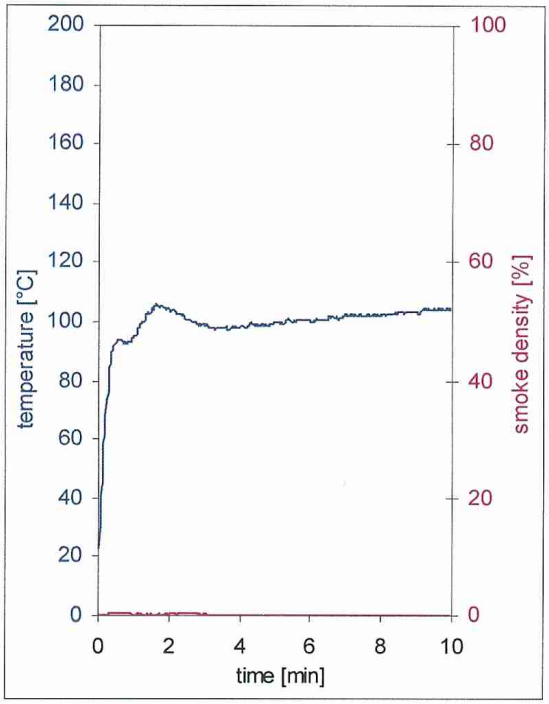


fig. 5
Graphs of the flue gas temperature and the smoke density

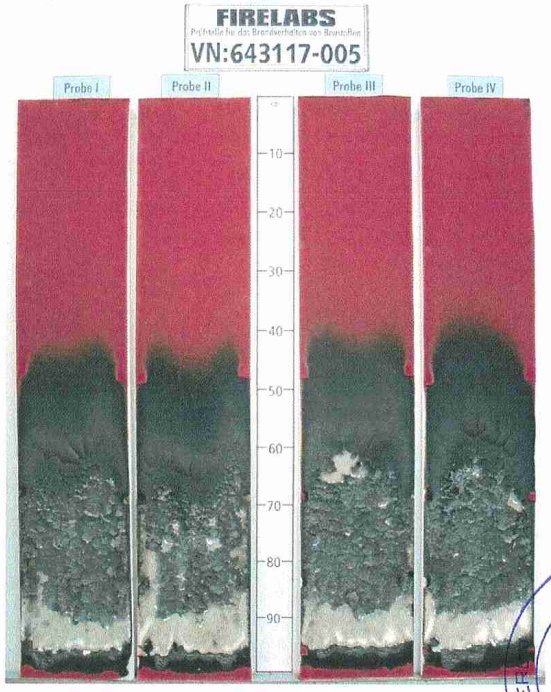


fig. 6
Photo of the test specimen after the test

Test results small burner test

Table 2

"felty Wollfilz Tuch 1 mm"	red						yellow			black			dim.	require-ments
Sample-No.	1	2	3	4	5	6	1	2	6	1	2	6	-	-
Ignition of the sample	1	1	1	1	1	6	1	1	5	1	1	6	s	-
Maximum flame height	4	5	5	4	5	4	5	4	4	4	5	4	cm	-
Time of the maximum	13	15	15	14	15	15	15	13	15	15	15	15	s	-
Flame tip reached the 150 mm mark	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	./.	s	≥ 20
Flame has extinguished	16	16	16	16	16	16	16	16	16	16	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): Damaged area at the point of flame impingement approx 6 cm in height and 2 cm in width and discoloured above approx 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