DLAB
TEXTILE LABORATORY

Untersuchungsbericht
Investigation report

DELCOTEX
Delius Techtex GmbH & Co. KG
Vilsendorfer Str. 50
33739 Bielefeld
Germany

Internet - homepage: www.textillabor.eu

Kontakt- contact: Alicja Rösler
Abteilung - division: Laboratory Manager
Telefon - phone: +49 (0) 52 06 / 91 07 - 57
Fax - fax: +49 (0) 52 06 / 91 07 - 34

Datum - date : 01.08.2017

Investigation report No. 17-E-401.1

Order description:	Proof of flammability to classify building materials to class B1 „schwerentflammbar" according to DIN 4102, part 1
Test samples:	Artikel-Nr.: 4102 (-6, -8, -1002-xy); Creasefree Heavy Satin FR material: Satin 100% PES, flame retardant weight: 280 g/m²
Sampling:	by orderer
Orderer:	see address
Date of order:	30.06.2017
Receipt of order:	03.07.2017
Date of testing:	week 30 in 2017
Number of pages:	8

Remark:
The results are valid only for the tested object. Accredited test methods are underlined. The valuations and interpretations in the investigation report are not subject to accreditation. Tests conducted through co-operation partners are marked with *. The content of this investigation report will not be passed to third persons without written approval of the orderer. The partial publication of the test report, as well as the usage for commercial process, is only allowed with a permission of the DELCOTEX Delius Techtex GmbH & Co. KG. Remnants of test material will be destroyed after 3 months. Previously stated specifications / data sheets / certificates are only characters and no warranties. Also no warranty in case of durability will be overtaken. Finally our general delivery and payment conditions are valid (please see www.textillabor.eu).

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Test results

According to the test results of page 3-5, the material fulfils the requirements of building materials class B1 and B2 according to DIN 4102-1.

The present test samples (see page 2) can be classified according to the **DIN 4102 part1 (1998-05)** into the following class:

Baustoffklasse B1
(schwerentflammbare Baustoffe - hardly flammable)

Results: **The examined product in any colour meets the requirements of class B1 for „schwerentflammbare" (hardly flammable) building materials according to DIN 4102, part 1 (1998-05), suspended freely or with distance of >40 mm to same or other plain materials.**

Special remarks:

- This report in only valid for the material as described under paragraph 1 (see page 2). In combination with other materials or with additional coatings or grounds etc. the burning behaviour may differ.
- This test report is not valid for the exposure to outdoor climate conditions.
- This test report is not valid, as soon as the fabric is used as a building produkt in the sense of the "Landesbauordnungen" (state building requirements, MBO §17, par. 3).
- This test report is no substitute for a General Building Inspectorate Certificate.
- This test report is granted without prejudice to the rights of third parties, im particular private proprietary rights.
- For legal interests only the German original version is relevant.
- In General Building Inspectorates procedures this test report can be based for
  - regular building materials for the required proof of accordance
  - for not regular building materials for the required proof of applicability
- To noted is the notes in appendix D (DIN 4102-1)
- If the above-mntioned building materials is not used as product according to MBO § 2, Abs. 9, Ziffer 1,
- there is not need for a general building supervisory test report.
- This test report not replace an eventualyy necessary proof of applicability concerning building supervisory or building laws in the meaning of state building prescription. This has to be verified by:
  - "allgemeine bauaufsichtliche Zulassung" (general building inspectorate approval) or by
  - „allgemeine bauaufsichtliches Prüfzeugnis" (general building inspectorate certificate) or by
  - „Zustimmung im Einzelfall" (exceptional approval)
- This test report can underlie building supervisory procedures:
  - For regular building products for the pre scribed proofs of conformity
  - For non-regular building preoducts for the needed proofs of applicability

Validity:
This test report is valid until 30.06.2022, assuming that the test methods, the classification rules and the technology do not change during this period.
This test report is no substitute for a General Building Inspectorate Certificate.

i.A. Alicja Rösler
Labor/Laborleitung
DELCOTEX Delius Techtex GmbH & Co. KG
Als verbindlich gelten nur die Angaben im unterzeichneten Prüfbericht.

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Test results

1. Method: "Brandschacht" test accordance to DIN 4102 (1998-05)

"Brandschacht" tests (Part 1)

Arrangement of samples: freely suspended

Sample A	flaming side A in lenght direction	colour: blue	4 samples lenght side A
Sample B	flaming side A in cross direction	colour: blue	4 samples cross side A
Sample C	flaming side B in lenght direction	colour: blue	4 samples lenght side B
Sample D	flaming side B in cross direction	colour: black	4 samples cross side B
Sample E	flaming side A in lenght direction	colour: white	4 samples lenght side A

			Result with the tested specimen				
		Dim.	A	B	C	D	E
1	**Number of specimen arrangement acc. to. DIN 4102/T15 (1990-05), schedule 1**		1	1	1	1	1
2	**Maximum flame height above bottom edge of the specimen**	cm	30	30	30	30	30
3	Time [1]	min:s	0:13	0:15	0:13	0:15	0:12
4	**Burn through / melting** Time [1]	min:s	0:04	0:06	0:05	0:05	0:07
5	**Observations on the back side of the specimen** Flames/Glowing		-	-	-	-	-
	Time [1]	min:s					
6	Change of color		-	-	-	-	-
	Time [1]	min:s					
7	**Falling of burning droplets** Start [1]	min:s	-	-	-	-	-
	Extent						
8	Sporatic falling of burning droplets [2]		-	-	-	-	-
9	Continuous falling of burning droplets [2]		-			-	
	Falling of burning parts						
10	Start [1]		-	-	-	-	-
11	Sporatic falling of burning parts [2]		-	-	-	-	-
12	Continuous falling of burning parts [2]		-	-	-	-	-
13	Afterflame time at the bottom of the sieve (max.)	min:s	-	-	-	-	-
	Impairment of the burner by dropping or falling material:		-	-	-	-	-
14	Time [1]	min:s	-	-	-	-	-
15	**Premature end of test:** Final occurance of burnig at the specimen [1]	min:s	1:45	1:50	1:45	1:45	1:45
16	Time of eventually end of test [1]	min:s	-	-	-	-	-

[1] indication of times: from the begin of testing procedure
[2] checked off if applicable
[3] indication of carrier/foam layer seperated in case of fire-proofing agents
[4] very strong development of smoke

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Test results

Description of test material in condition as delivered

Name of the material	Description of samples	Colour	thickness [mm]	weight [g/m²]
article 4102-310-1002-280 Creasefree Heavy Satin FR	Satin-fabric 100% Polyester, flame retardant side A: shiny side side B: mat side	1002-280/blue	≈ 0,46	≈ 257,58
article 4102-310-0008 Creasefree Heavy Satin FR	Satin-fabric 100% Polyester, flame retardant side A: shiny side side B: mat side	0008/black	≈ 0,47	≈ 246,24
article 4102-310-0006 Creasefree Heavy Satin FR	Satin-fabric 100% Polyester, flame retardant side A: shiny side side B: mat side	0006/white	≈ 0,44	≈ 255,04

The testing laboratory is not provided with further details concerning composition of the tested building materials.

Preparation of samples:
Out of the material there have been cut samples with the dimensions of 1000mm x 190mm to flame impingement for the ignitability apparatus.
The samples were kept in climate chamber 20 +/- 2 °C and 65 +/- 4 humidity until they reached constant weight.

Special remarks: none

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"Brandschacht" tests (Part 2)

			Result with the tested specimen				
		Dim.	A	B	C	D	E
	Afterflame after end of test		no	no	no	no	no
17	Time	min:s	-	-	-	-	-
18	Number of specimen		-	-	-	-	-
19	Front side of specimen [2]		-	-	-	-	-
20	Back side of specimen [2]		-	-	-	-	-
21	Flame length	cm	-	-	-	-	-
	Afterglow after end of test		no	no	no	no	no
22	Time	min:s	-	-	-	-	-
23	Number of specimen		-	-	-	-	-
	Place of appearence		-	-	-	-	-
24	Lower half of the specimen [2]		-	-	-	-	-
25	Upper half of the specimen [2]		-	-	-	-	-
26	Front side of specimen [2]		-	-	-	-	-
27	Back side of specimen [2]		-	-	-	-	-
	Density of smoke						
28	≤ 400% * min		78,05	58,84	51,95	107,02	122,0
29	> 400% *min[4]		-	-	-	-	-
30	Diagram: encl. No.		1	2	3	4	5
	Residual lengths:						
31	Individual value [3]	cm	60 56 67 69	57 68 50 71	60 66 50 66	54 61 57 69	61 59 53 72
32	Average value, individual test [3]	cm	63	62	61	60	61
33	Photo of specimen in enclosure no.		1	2	3	4	5
34	**Flue gas temperature**						
35	Maximum of average value	°C	120,5	124,0	125,2	125,9	125,1
	Time [1]	min:s	9:58	9:59	9:59	9:59	9:59
36	Diagram: encl. No.		1	2	3	4	5
37	**Remarks: -none-**						

[1] indication of times: from the begin of testing procedure
[2] checked of if applicable
[3] indication of carrier/foam layer seperated in case of fire-proofing agents
[4] very strong development of smoke

Special remarks: There were no additional tests proceeded, because of the residual length of more then 45 cm.

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2. Methode: **Fire behaviour of building materials and building components accordace DIN 4102-1 B2 (1998-05) - Test for normal flammability**

3. Description of test material in condition as delivered: look at page 2

4. Preperation of samples:
Out of the material there have been cut samples for the ignitability appartus. The samples were kept 14 days in climate chamber 20 +/- 2 °C and 65 +/- 4 humidity.

5. Arrangement of samples: freely suspended, flaming in lenght and cross direction / flaming side A and side B

6. Date of Test: week 29 and 30 in 2017

Test results of normal flammability

4102-310-1002-280/blue lenght direction	Dim.	edge-test						surface-test					
samples no.		1	2	3	4	5	6	1	2	3	4	5	6
flaming direction	A/B	A	A	A	B	B		A	B				
ignition[1)]	s	1	1	/	/	1		1	/				
reaching the mark of measurement[1)2)]	s	/	/	/	/	/		/	/				
max. flame height	cm	4	3	/	/	4		5	/				
time	s	4	4	/	/	5		5	/				
self cessation of the flames end of afterflame[1)]	s	6	5	/	/	5		7	/				
end of glowing[1)]	s	/	/	/	/	/		/	/				
flames were extinguished after[1)]	s	/	/	/	/	/		/	/				
smoke development (visual)		low						low					
dropping of burning material during 20s[1)]	s	/	/	/	/	/		/	/				
Appearence after test: burned out till max. height 6,0 cm width 1,0 cm													

4102-310-1002-280/blue cross direction	Dim.	edge-test						surface-test					
samples no.		1	2	3	4	5	6	1	2	3	4	5	6
flaming direction	A/B	A	A	A	B	B		A	B				
ignition[1)]	s	/	1	1	1	/		/	1				
reaching the mark of measurement[1)2)]	s	/	/	/	/	/		/	/				
max. flame height	cm	/	5	5	6	/		/	4				
time	s	/	6	6	5	/		/	5				
self cessation of the flames end of afterflame[1)]	s	/	8	7	7	/		/	7				
end of glowing[1)]	s	/	/	/	/	/		/	/				
flames were extinguished after[1)]	s	/	/	/	/	/		/	/				
smoke development (visual)		low						low					
dropping of burning material during 20s[1)]	s	/	/	/	/	/		/	/				
Appearence after test: burned out till max. height 7,5 cm width 1,5 cm													

1) time mentioned from the beginning of the test 2) during 20 Sec -/- no appearence - no information

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Test results of normal flammability

4102-310-0008/black lenght direction	Dim.	edge-test						surface-test					
samples no.		1	2	3	4	5	6	1	2	3	4	5	6
flaming direction	A/B	A	A	A	B	B		A	B				
ignition[1)]	s	1	1	1	1	1		1	1				
reaching the mark of measurement[1)2)]	s	/	/	/	/	/		/	/				
max. flame height	cm	8	9	5	8	7		4	8				
time	s	7	8	7	6	6		5	7				
self cessation of the flames end of afterflame[1)]	s	9	9	8	8	8		7	8				
end of glowing[1)]	s	/	/	/	/	/		/	/				
flames were extinguished after[1)]	s	/	/	/	/	/		/	/				
smoke development (visual)		moderate						moderate					
dropping of burning material during 20s[1)]	s	/	/	/	/	/		/	/				
Appearence after test: burned out till max. height 10,5 cm width 1,0 cm													

4102-310-0008/black cross direction	Dim.	edge-test						surface-test					
samples no.		1	2	3	4	5	6	1	2	3	4	5	6
flaming direction	A/B	A	A	A	B	B		A	B				
ignition[1)]	s	1	1	1	1	1		1	1				
reaching the mark of measurement[1)2)]	s	/	/	/	/	/		/	/				
max. flame height	cm	4	4	7	9	8		5	/				
time	s	3	4	6	7	6		4	/				
self cessation of the flames end of afterflame[1)]	s	5	5	8	8	7		6	/				
end of glowing[1)]	s	/	/	/	/	/		/	/				
flames were extinguished after[1)]	s	/	/	/	/	/		/	/				
smoke development (visual)		moderate						moderate					
dropping of burning material during 20s[1)]	s	/	/	/	/	/		/	/				
Appearence after test: burned out till max. height 7,0 cm width 2,5 cm													

1) time mentioned from the beginning of the test 2) during 20 Sec -/- no appearence - no information

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Test results of normal flammability

4102-310-0006/white lenght direction	Dim.	edge-test						surface-test					
samples no.		1	2	3	4	5	6	1	2	3	4	5	6
flaming direction	A/B	A	A	A	B	B		A	B				
ignition[1)]	s	1	1	1	/	1		/	1				
reaching the mark of measurement[1)2)]	s	/	/	/	/	/		/	/				
max. flame height	cm	2	3	3	/	3		/	2				
time	s	2	2	3	/	3		/	3				
self cessation of the flames end of afterflame[1)]	s	3	2	4	/	4		/	3				
end of glowing[1)]	s	/	/	/	/	/		/	/				
flames were extinguished after[1)]	s	/	/	/	/	/		/	/				
smoke development (visual)		low						low					
dropping of burning material during 20s[1)]	s	/	/	/	/	/		/	/				
Appearence after test: burned out till max. height 5,0 cm width 1,0 cm													

4102-310-0006/white cross direction	Dim.	edge-test						surface-test					
samples no.		1	2	3	4	5	6	1	2	3	4	5	6
flaming direction	A/B	A	A	A	B	B		A	B				
ignition[1)]	s	1	1	1	/	1		1	/				
reaching the mark of measurement[1)2)]	s	/	/	/	/	/		/	/				
max. flame height	cm	4	5	4	/	3		3	/				
time	s	4	5	5	/	3		2	/				
self cessation of the flames end of afterflame[1)]	s	5	6	6	/	4		3	/				
end of glowing[1)]	s	/	/	/	/	/		/	/				
flames were extinguished after[1)]	s	/	/	/	/	/		/	/				
smoke development (visual)		low						low					
dropping of burning material during 20s[1)]	s	/	/	/	/	/		/	/				
Appearence after test: burned out till max. height 7,0 m width 1,0 cm													

1) time mentioned from the beginning of the ~~ig~~t 2) during 20 Sec -/- no appearence - no information

7. Remarks and explanations to the testing procedure: -none-

8. Opinion concerning the dropping of burning material:

The material shows no dripping burning material.

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Attachment 3

Sample: C

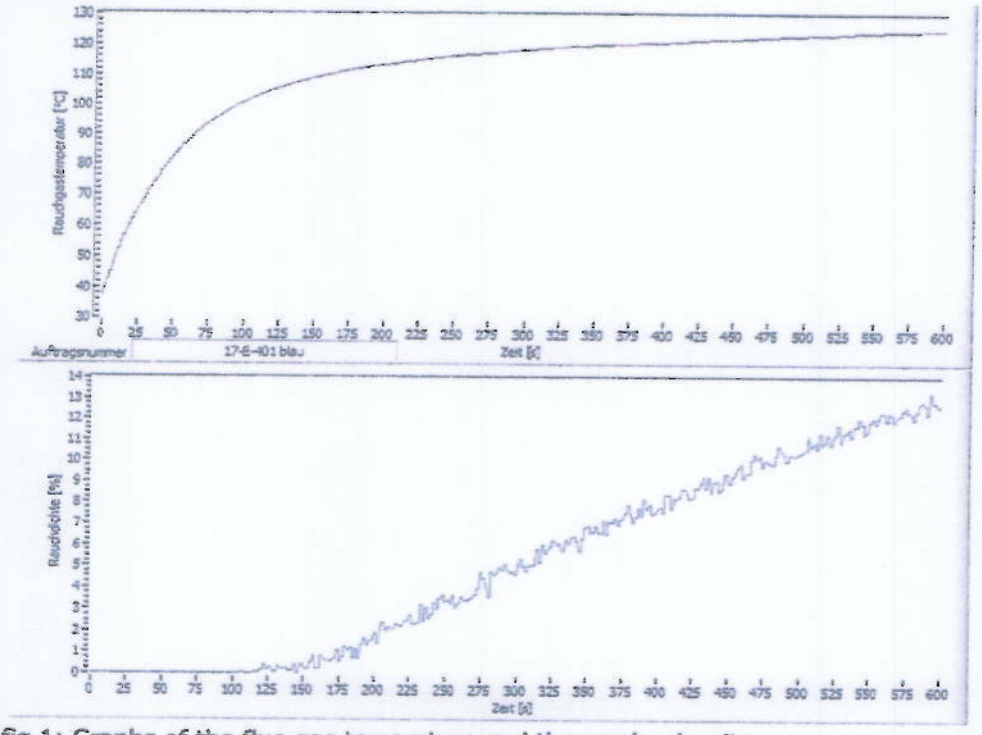

fig 1: Graphs of the flue gas temerature and the smoke density

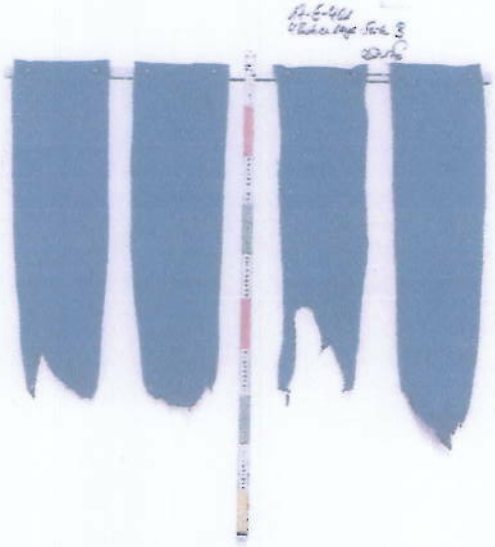

fig 2: Photo of test specimen after the test

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Attachment 4

Sample: D

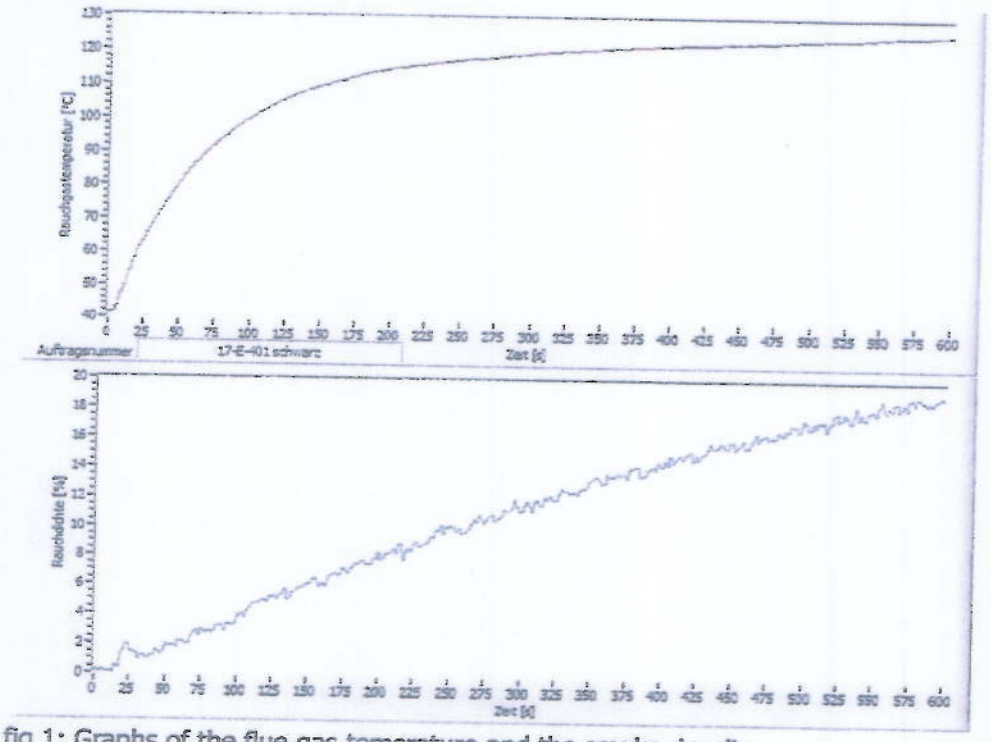

fig 1: Graphs of the flue gas temerature and the smoke density

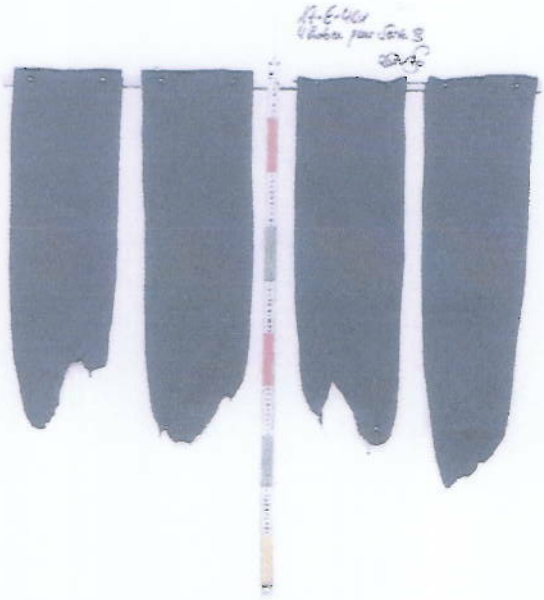

fig 2: Photo of test specimen after the test

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Attachment 5

Sample: E

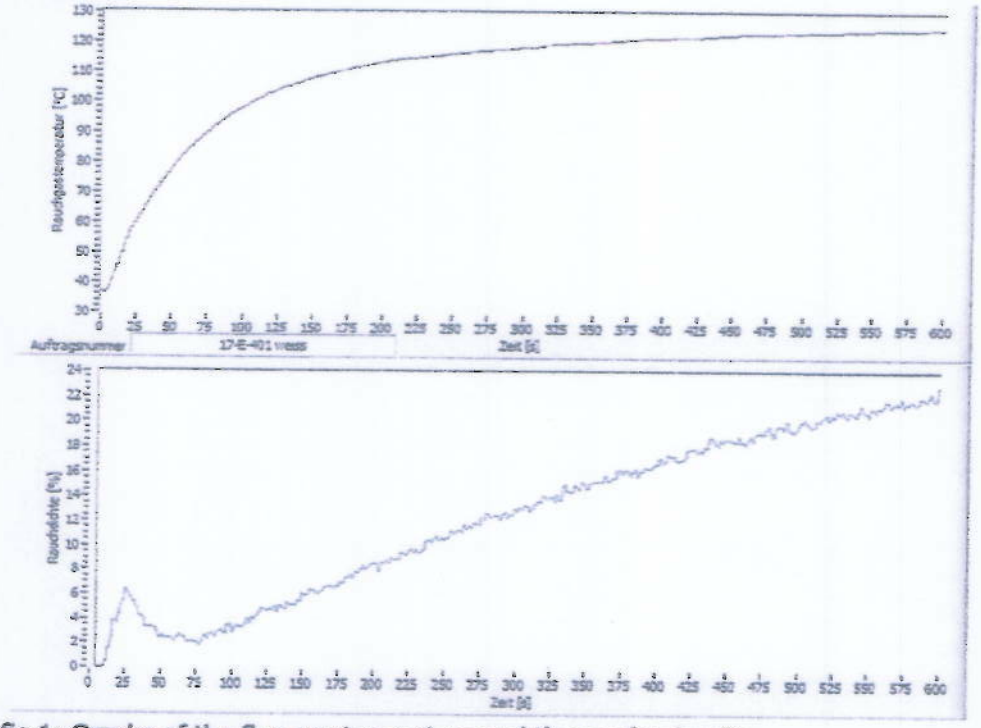

fig 1: Graphs of the flue gas temerature and the smoke density

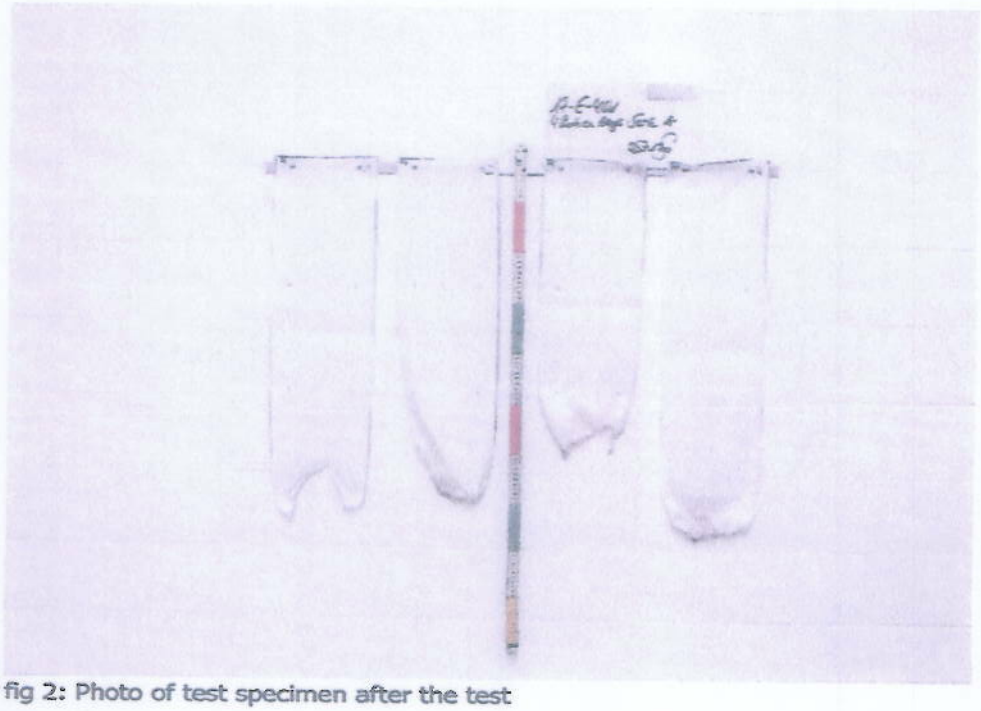

fig 2: Photo of test specimen after the test

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Attachment 1

Sample: A

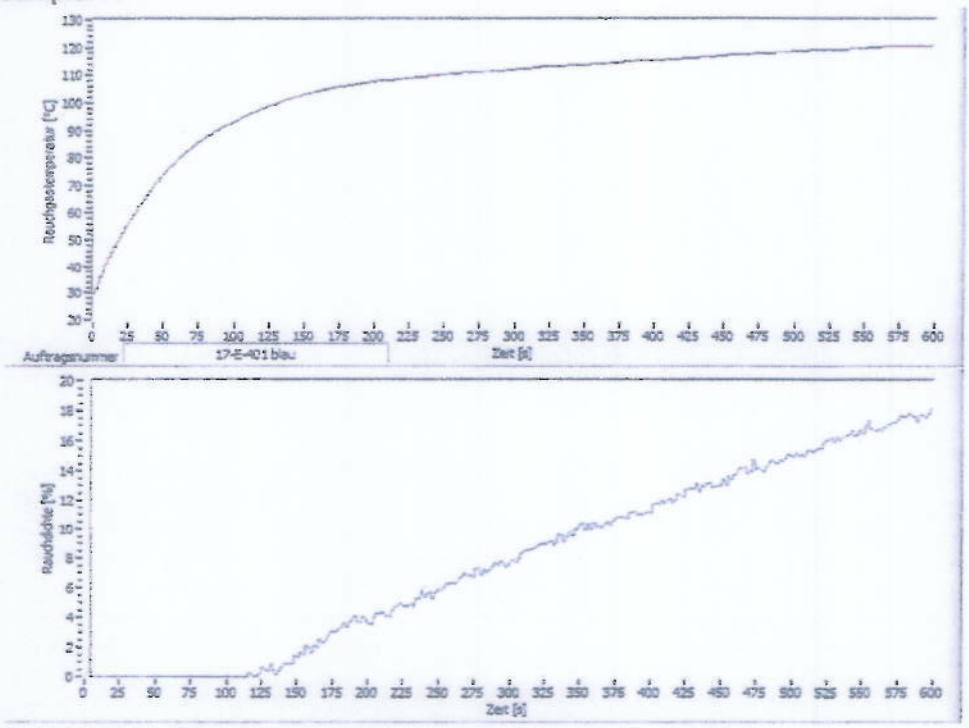

fig 1: Graphs of the flue gas temerature and the smoke density

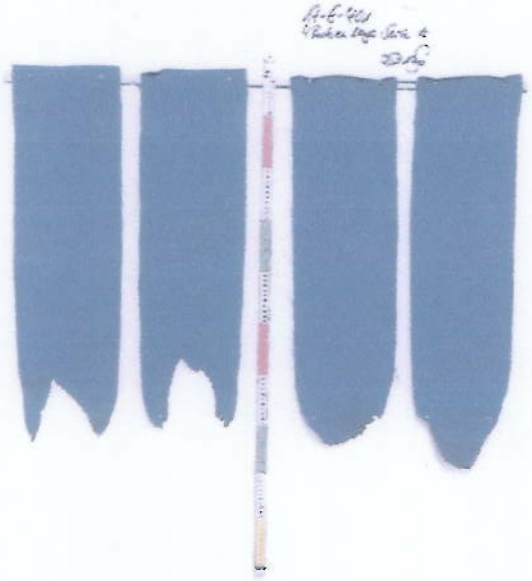

fig 2: Photo of test specimen after the test

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Attachment 2

Sample: B

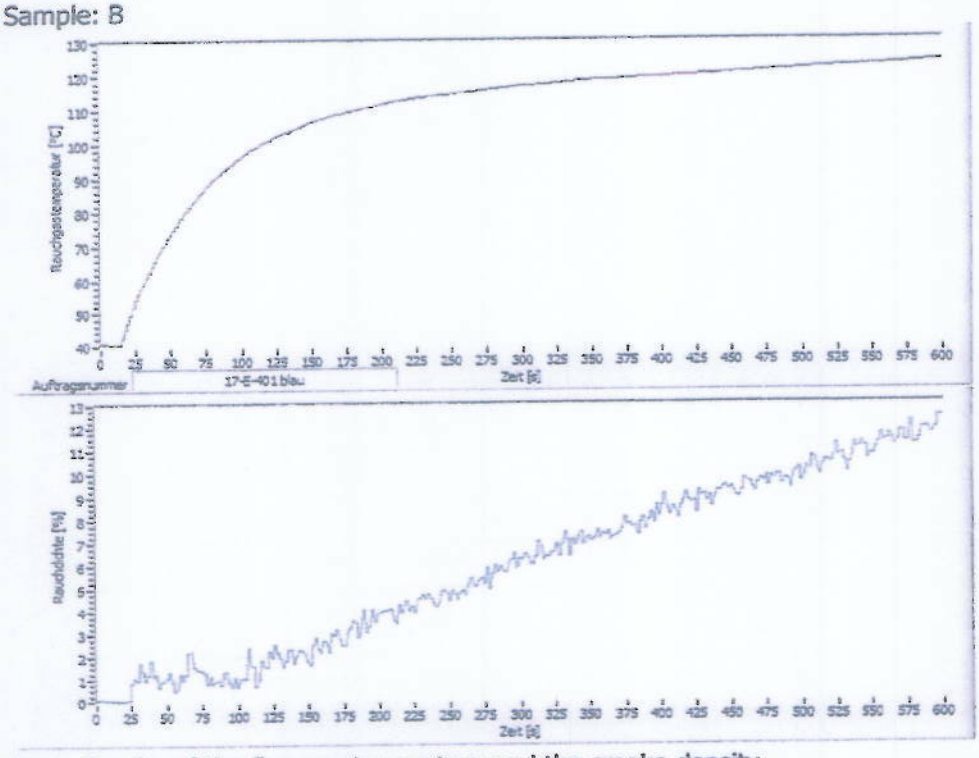

fig 1: Graphs of the flue gas temerature and the smoke density

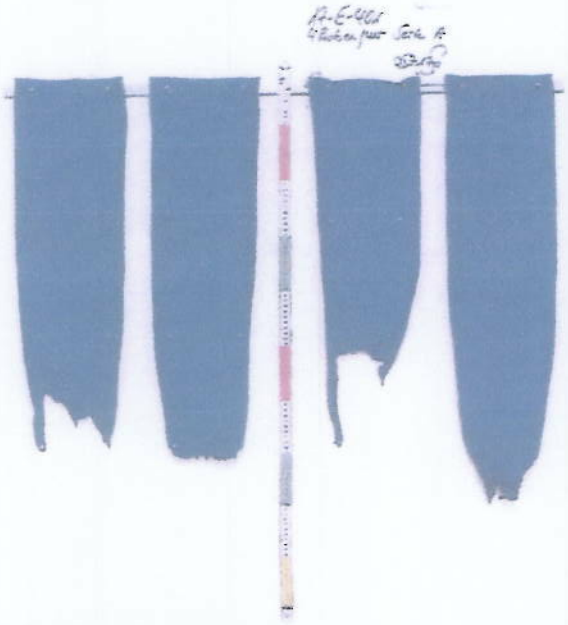

fig 2: Photo of test specimen after the test