

Prüfinstitut Hoch, Lerchenweg 1, D-97650 Fladungen

Fladungen, March 14<sup>th</sup> 2014

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Our sign: K-Hoch-140110-3

**fire test according DIN EN 13823 (SBI) and DIN EN ISO 11925-2 (small burner) with the following materials:**

**PN 18553: PES-Lightbox with „INKTeX+® FL Ausrüstung“**

- white polyester fabric with flame-retardant finishes and PU-coating

the laboratory determined the following figures:

thickness: ≈ 0,28 mm

area weight: ≈ 191 g/m<sup>2</sup>

**PN 18554: PES-Blockout with „INKTeX+® FL Ausrüstung“**

- polyester fabric with flame-retardant finishes

side A: black

side B: white

the laboratory determined the following figures:

thickness: ≈ 0,28 mm

area weight: ≈ 268 g/m<sup>2</sup>

**Dear Mr. Vellmer,**

with the delivered materials we did SBI- and Single-flame source tests with the following results:

1. Both product pass the Single-flame source tests with a flame exposure period of 30 seconds.
2. The measured value of the SBI test:
  - a. **PES-Lightbox mit „INKTeX+® FL Ausrüstung“** are in the class **B-s1,d0**
  - b. **PES-Blockout mit „INKTeX+® FL Ausrüstung“** are in the class **B-s2,d0**.

The results are on the next pages. This short report consists of 12 pages.

**further procedure:**

For a classification according DIN EN 13501-1 of the products **PES-Lightbox with „INKTeX+® FL Ausrüstung“** and **PES-Blockout with „INKTeX+® FL Ausrüstung“** additional SBI tests according DIN EN 13823 and single-flame source tests according DIN EN ISO 11925-2 are necessary.

However, as discussed you by phone on 03.02.2014, no further test should be performed.

The remained sample material will be disposed in the week 7.

In case you do have questions, please do not hesitate to contact us.

Yours sincerely

Tina Zitzmann

### 1. results of the single-flame source tests according DIN EN ISO 11925-2:

From the delivered material samples were cut for the edge and surface test with the dimensions length of the sample 250 mm x width 90 mm.

The samples were conditioned according DIN EN 13238:2010 and reached constant weight.

PN 18553 PES-Lightbox with „INKTeX+® FL Ausrüstung“	edge exposure					surface exposure					dimension	
flame exposure period	<b>30 seconds</b>											
substrate material	<b>none / tested freely suspended</b>											
sample No.	1	2	3	4	5	1	2	3	4	5	--	
side and direction	AK	BK	AS	BS	--	AK	BK	AS	BS	BK	--	
ignition <sup>1)</sup>	Yes	Yes	Yes	Yes	--	Yes	Yes	Yes	Yes	Yes	--	
start of flame formation <sup>1)</sup>	1	1	1	1	--	3	3	3	3	3	s	
top flames at the limit <sup>1)2)</sup>	-/-	-/-	-/-	-/-	--	-/-	-/-	-/-	-/-	-/-	s	
<b>max. flame height</b>	<b>5</b>	<b>9</b>	<b>7</b>	<b>7</b>	--	<b>7</b>	<b>12</b>	<b>10</b>	<b>6</b>	<b>11</b>	<b>cm</b>	
time <sup>1)2)</sup>	5	4	3	4	--	5	10	8	5	8	s	
self-extinguishing of the flames <sup>1)</sup>	6	5	4	5	--	9	12	14	9	12	s	
the flames was extinguished after <sup>1)</sup>	-/-	-/-	-/-	-/-	--	-/-	-/-	-/-	-/-	-/-	s	
smoke development (visually)	high					high					--	
<b>ignition of the filter paper<sup>1)2)</sup></b>	-/-	-/-	-/-	-/-	--	-/-	-/-	-/-	-/-	-/-	s	
<i>The material was cone-shaped or drop-shaped burned / discolored with a max. width of 2,7 cm x height 12,0 cm.</i>												

<sup>1)</sup> time from the beginning  
-/- no occurrence  
K = warp direction  
A = side A

<sup>2)</sup> within 60 Seconds  
-- no data  
S = weft direction  
B = side B

#### notes:

The material **pass** the freely suspended single-flame source tests, with a flame exposure period of 30 seconds and an observation period of 60 seconds.

The measure mark of 15 cm was not exceeded.

For a classification according DIN EN 13501-1 additional single-flame source tests according DIN EN ISO 11925-2 are necessary.

PN 18554 <b>PES-Blockout with „INKTeX+® FL Ausrüstung“</b>	edge exposure					surface exposure					dimension
<b>flame exposure period</b>	<b>30 seconds</b>										
substrate material	<b>none / tested freely suspended</b>										
sample No.	1	2	3	4	5	1	2	3	4	5	--
side and direction	AK	BK	AS	BS	--	AK	BK	AS	BS	--	--
ignition <sup>1)</sup>	Yes	Yes	Yes	Yes	--	Yes	Yes	Yes	Yes	--	--
start of flame formation <sup>1)</sup>	1	1	1	1	--	3	4	4	3	--	s
top flames at the limit <sup>1)2)</sup>	-/-	-/-	-/-	-/-	--	-/-	-/-	-/-	-/-	--	s
<b>max. flame height</b>	<b>10</b>	<b>4</b>	<b>12</b>	<b>11</b>	--	<b>10</b>	<b>9</b>	<b>12</b>	<b>10</b>	--	<b>cm</b>
time <sup>1)2)</sup>	6	3	7	6	--	7	8	11	11	--	s
self-extinguishing of the flames <sup>1)</sup>	7	4	13	8	--	9	15	15	14	--	s
the flames was extinguished after <sup>1)</sup>	-/-	-/-	-/-	-/-	--	-/-	-/-	-/-	-/-	--	s
smoke development (visually)	high					high					--
<b>ignition of the filter paper<sup>1)2)</sup></b>	-/-	-/-	-/-	-/-	--	-/-	-/-	-/-	-/-	--	s
<i>The material was cone-shaped or drop-shaped burned / discolored with a max. width of 2,6 cm x height 10,0 cm.</i>											

<sup>1)</sup> time from the beginning  
-/- no occurrence  
K = warp direction  
A = side A

<sup>2)</sup> within 60 Seconds  
-- no data  
S = weft direction  
B = side B

**notes:**

The material **pass** the freely suspended single-flame source tests, with a flame exposure period of 30 seconds and an observation period of 60 seconds.

The measure mark of 15 cm was not exceeded.

For a classification according DIN EN 13501-1 additional single-flame source tests according DIN EN ISO 11925-2 are necessary.

## **2. Results of the SBI-test according DIN EN 13823:2010:**

### preparation and conditioning of the samples

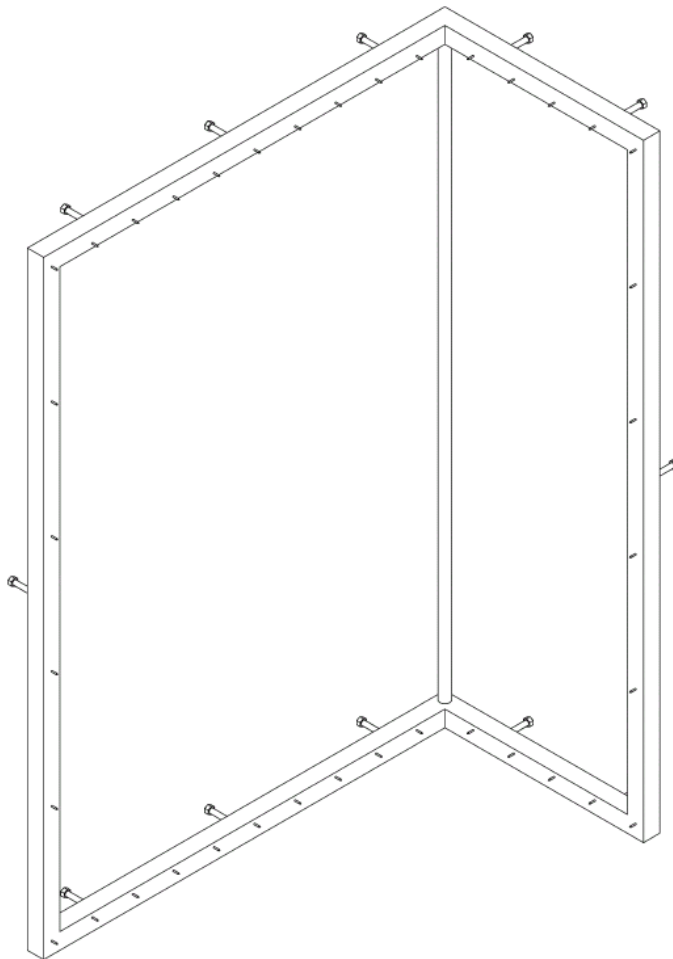
The samples were conditioned according DIN EN 13238:2010 and reached constant weight. The samples were weighed again after 24 h and showed a mass loss of less than 0,1 g.

### arrangement of the samples by the SBI-tests:

- The samples were fixed on the specimen holder according to EN 14716: 2004 (D): “Stretched ceilings – Requirements and test methods”; see also sketch in appendix 1.
- Mounting of the backing board according DIN EN 13823, topic 4.4.10.
- The distance of the backing board (calcium silicate board:  $11 \pm 2$  mm,  $870 \pm 50$  kg/m<sup>3</sup> according to 13238:2010) was 80 mm.
- The lateral closing plate from the SBI trolley were removed according to DIN EN 13823 / 5.2.2 a and article 4.4.11.

### Mounting and fixing

EN 14716: 2004 (D): “Stretched ceilings – Requirements and test methods”



**results of the indicative SBI-tests:**

test-no.:	SBI_3987	SBI_3986	limit values according DIN EN 13501-1
name:	<b>PES-Lightbox with „INKTeX+® FL Ausrüstung“</b>	<b>PES-Blockout with „INKTeX+® FL Ausrüstung“</b>	--
date of test:	20.01.2014	20.01.2014	--
sample-no.:	PN 18553	PN 18554	--
flame impingement:	side A / warp direction		--
maximum heat release:	1,6 kW (average value)	1,6 kW (average value)	--
FIGRA_02 MJ	<b>0,00 W/s</b>	<b>0,00 W/s</b>	≤ 120 W/s for class A2 ≤ 120 W/s for class B
FIGRA_04 MJ	0,00 W/s	0,00 W/s	≤ 250 W/s for class C ≤ 750 W/s for class D
THR <sub>600s</sub>	0,28 MJ	0,28 MJ	≤ 7,5 MJ for class A2 ≤ 7,5 MJ for class B ≤ 15 MJ for class C
SMOGRA	0,00 m <sup>2</sup> /s <sup>2</sup>	6,54 m <sup>2</sup> /s <sup>2</sup>	≤ 30 m <sup>2</sup> /s <sup>2</sup> for s1 ≤ 180 m <sup>2</sup> /s <sup>2</sup> for s2
TSP <sub>600s</sub>	<b>23,07 m<sup>2</sup></b>	<b>52,03 m<sup>2</sup></b>	≤ 50 m <sup>2</sup> for s1 ≤ 200 m <sup>2</sup> for s2
LFS	< edge of specimen	< edge of specimen	lateral flame spread no longer then the outside edge of the specimen (big specimen wing) for class A2 up to C
FDP	0 s	0 s	FDP < 10 second (d1) FDP > 10 second (d2)
d0 / d1 / d2	d0	d0	d0 = no flaming droplets within 600sec d1 = no flaming droplets longer than 10 sec within 600 sec d2 = neither do nor d1
photos and graphs on page:	7 up to 9	10 up to 12	--
possible classification:	<b>B-s1,d0</b>	<b>B-s2,d0</b>	--

notes to the tables:

Figra<sub>0,2MJ</sub>: Fire Growth Rate in consideration of the total heat release threshold of 0,2 MJ [W/s]  
 Figra<sub>0,4MJ</sub>: Fire Growth Rate in consideration of the total heat release threshold of 0,4 MJ [W/s]  
 THR<sub>600s</sub>: Total heat released over the first 10 minutes [MJ]  
 SMOGRA: Smoke Growth Rate [m<sup>2</sup>/s<sup>2</sup>]  
 TSP<sub>600s</sub>: Total smoke production over the first 10 minutes [m<sup>2</sup>]  
 LSF: lateral flame spread  
 FDP: flaming droplets / particles [s]

### **commentary the results:**

#### **SBI\_3987: PES-Lightbox with „INKTeX+® FL Ausrüstung“**

##### heat release:

For this test, the measured data of heat release (FIGRA-result and THR-result) reach the class B.

##### smoke production:

Concerning the smoke development, the SMOGRA-result and TPS-result reach the smoke class s1.

##### droplets / particles:

The product does not showed flaming droplets and would be thus classified in d0.

#### **SBI\_3986: PES-Blockout with „INKTeX+® FL Ausrüstung“**

##### heat release:

For this test, the measured data of heat release (FIGRA-result and THR-result) reach the class B.

##### smoke production:

Concerning the smoke development, the SMOGRA-result reach the smoke class s1.

But the total smoke production ( $TSP_{600s}$ ) of the product is above the limit of  $50m^2$  for the smoke class s1, thus the product can only be classified in the smoke class s2.

notes: The smoke class s1 can be achieved with the adoption of the alternative smoke calculation method according EN 13823:2010 topic A.6.1.2.

It must be performed on the same day then the sample material is tested, an additional test with calcium silicate board. Thereby it comes to a lager scope of tests and additional costs. Furthermore it is listed in the classification report that the smoke class dis obtained with the alternative method.

##### droplets / particles:

The material ignited once again after 673 seconds flame impingement. Some parts of the material fall down outside the burner area and burned longer than 10 seconds.

However the product must be classified in this test as non- burning droplet, because it was outside the observation period of 600 seconds. The product would be classified in this test in d0.

**SBI 3987**

**PES-Lightbox with „INKTeX+® FL Ausrüstung“**  
flame impingement: side A / warp direction

photo before the test

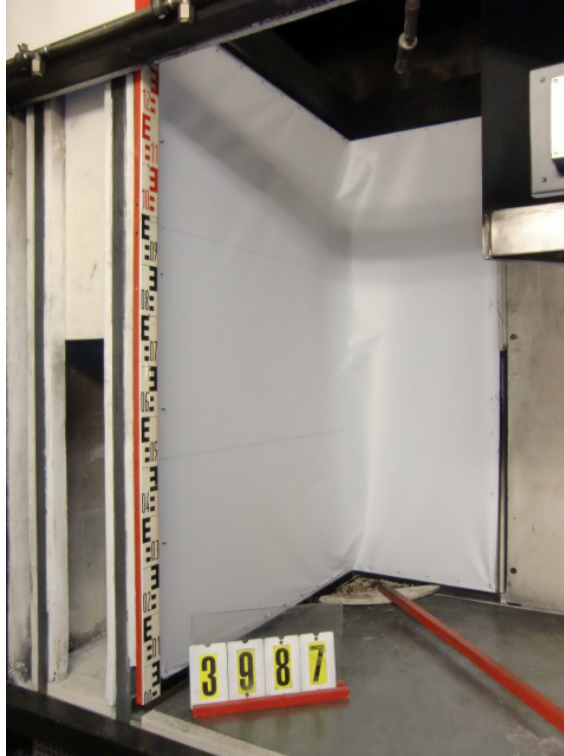
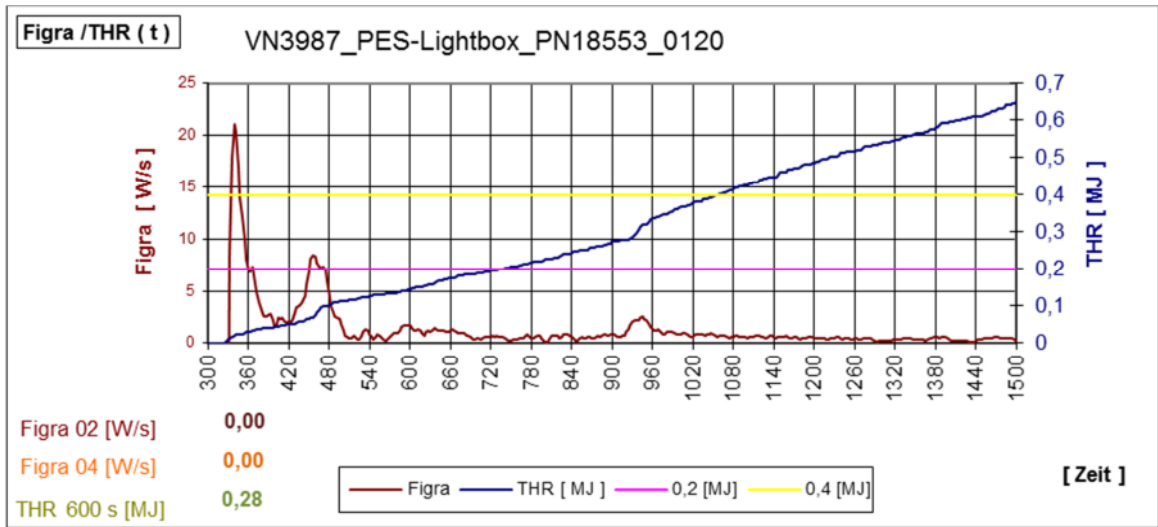
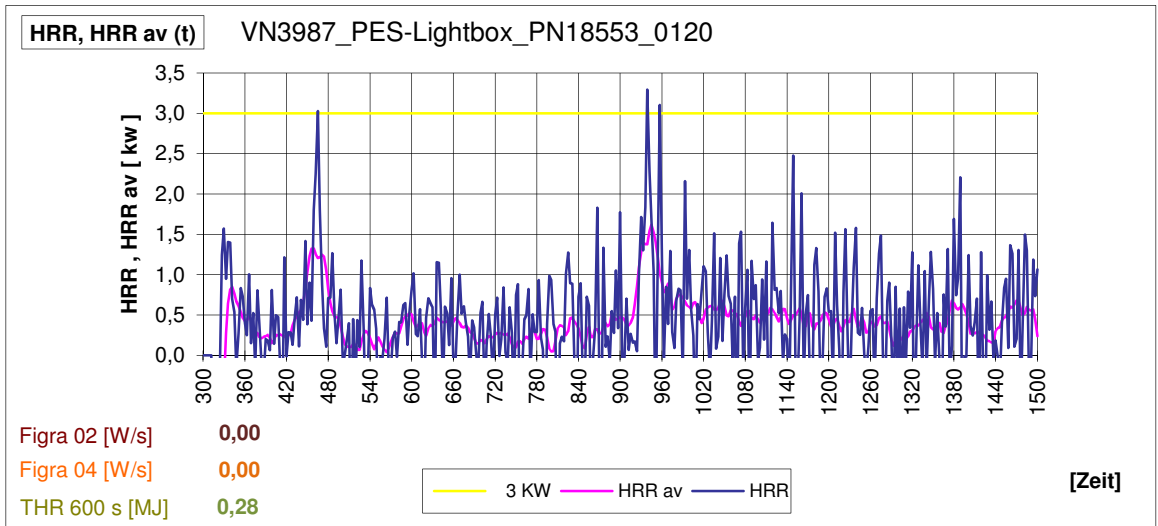
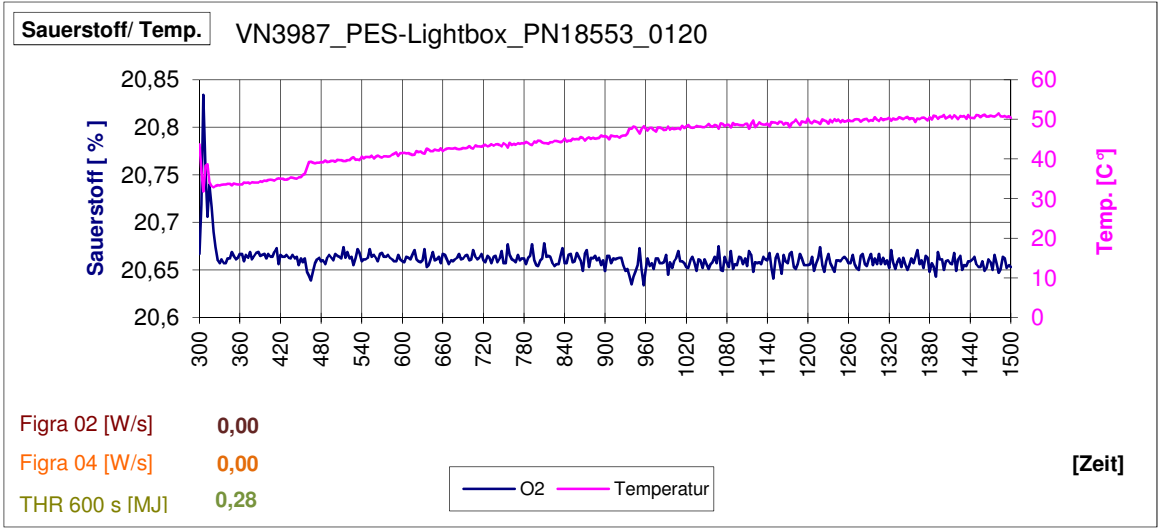


photo after the test

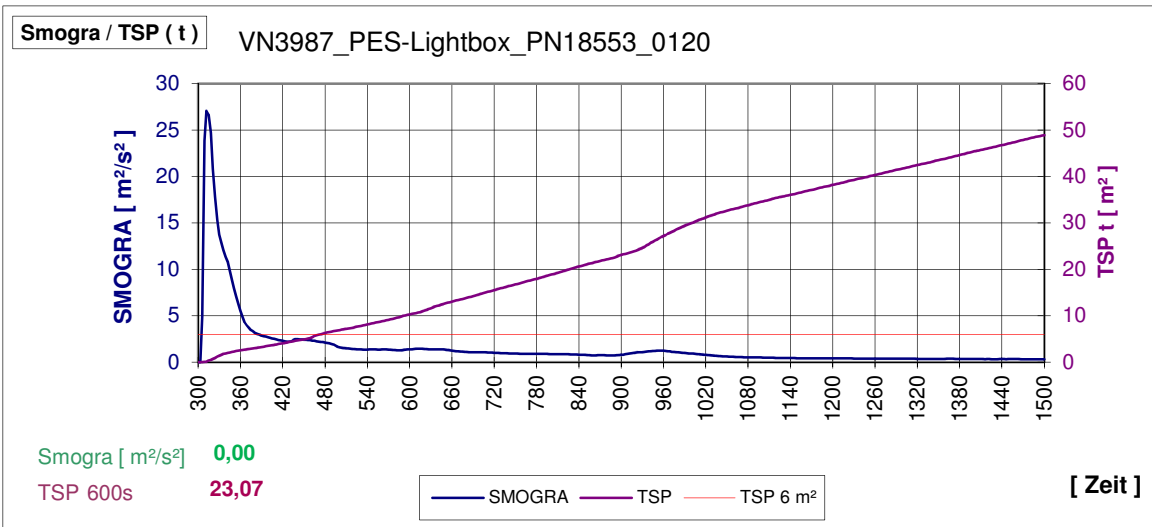
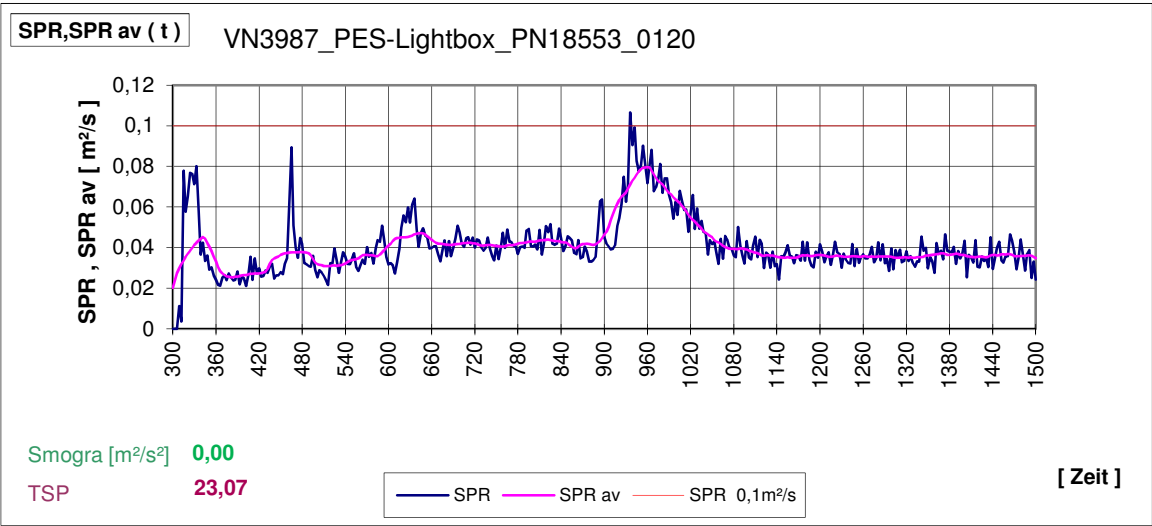
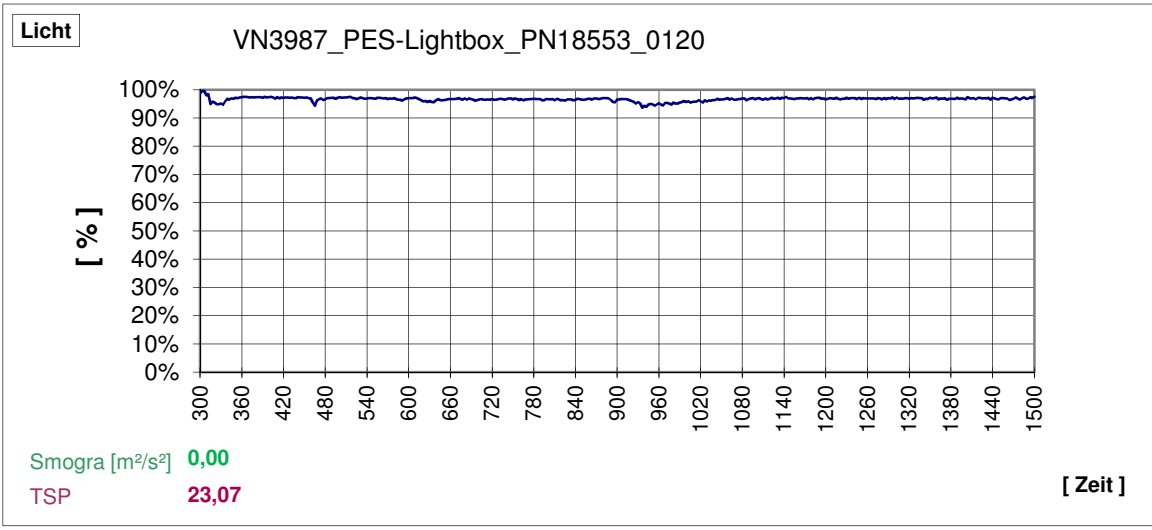


**SBI 3987**  
**PES-Lightbox with „INKTeX+® FL Ausrüstung“**  
 flame impingement: side A / warp direction





**SBI 3987**  
**PES-Lightbox with „INKTeX+® FL Ausrüstung“**  
 flame impingement: side A / warp direction



**SBI 3986**

**PES-Blockout with „INKTeX+® FL Ausrüstung“**

flame impingement: side A / warp direction

photo before the test



photo after the test

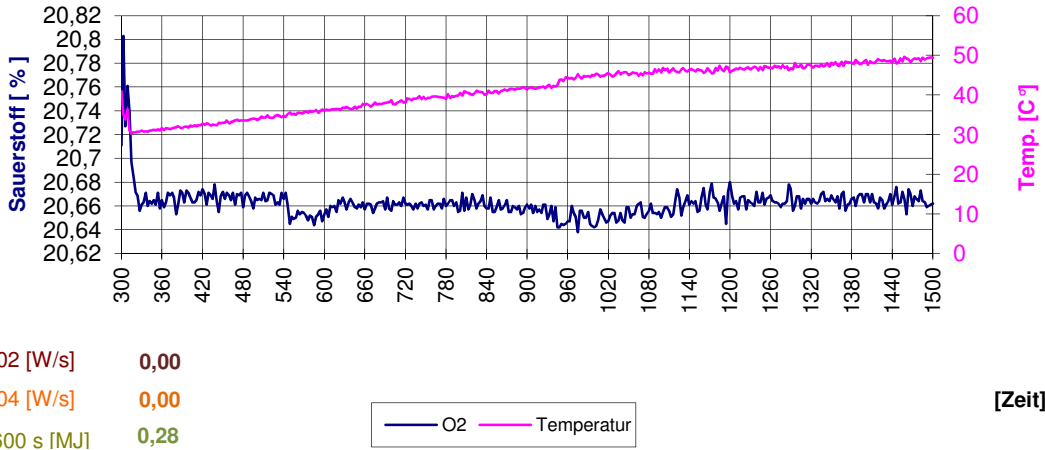


**SBI 3986**

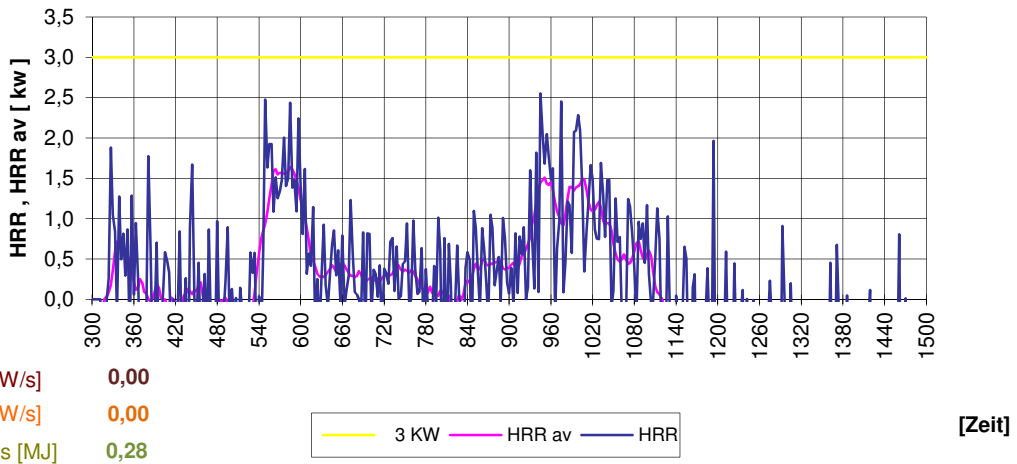
**PES-Blockout with „INKTeX+® FL Ausrüstung“**

flame impingement: side A / warp direction

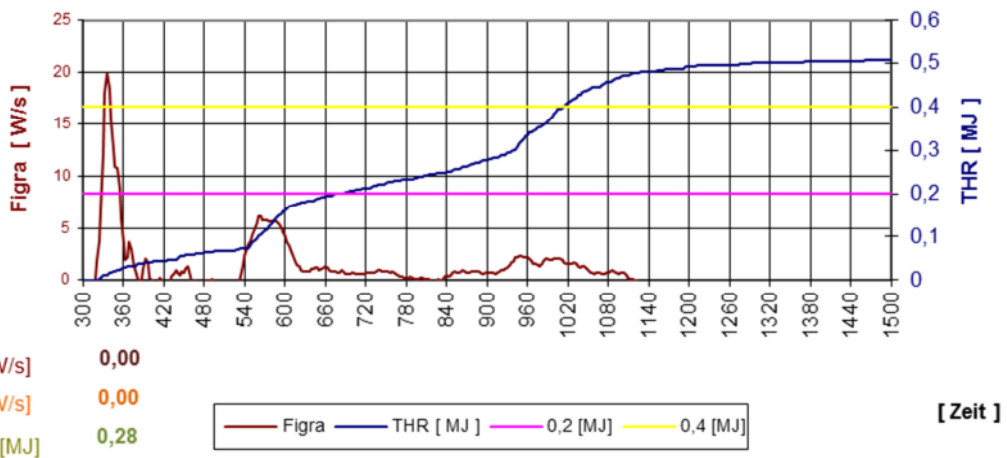
**Sauerstoff/ Temp.** VN3986\_PES-Blockout\_PN18554\_0120



**HRR, HRR av (t)** VN3986\_PES-Blockout\_PN18554\_0120



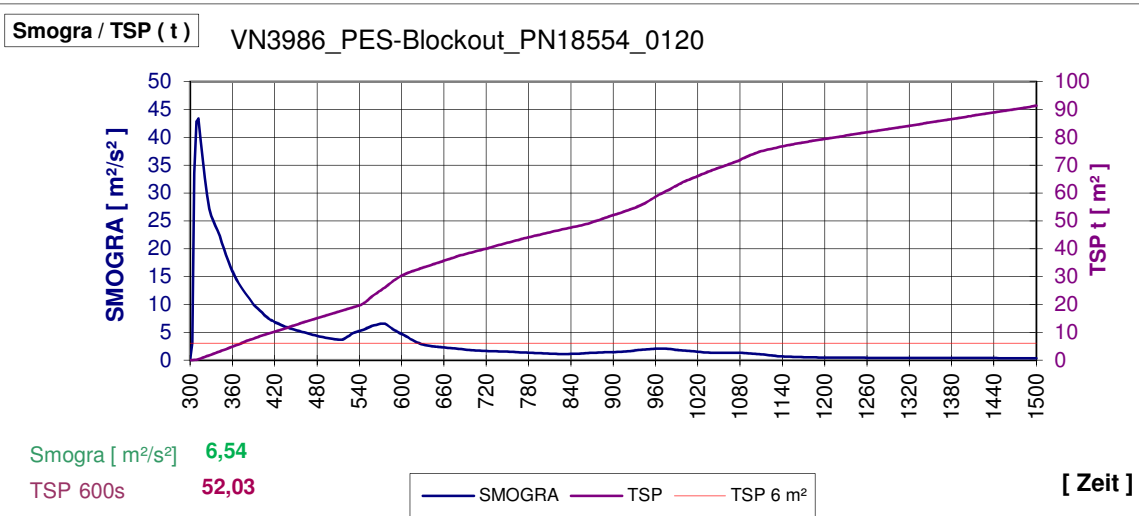
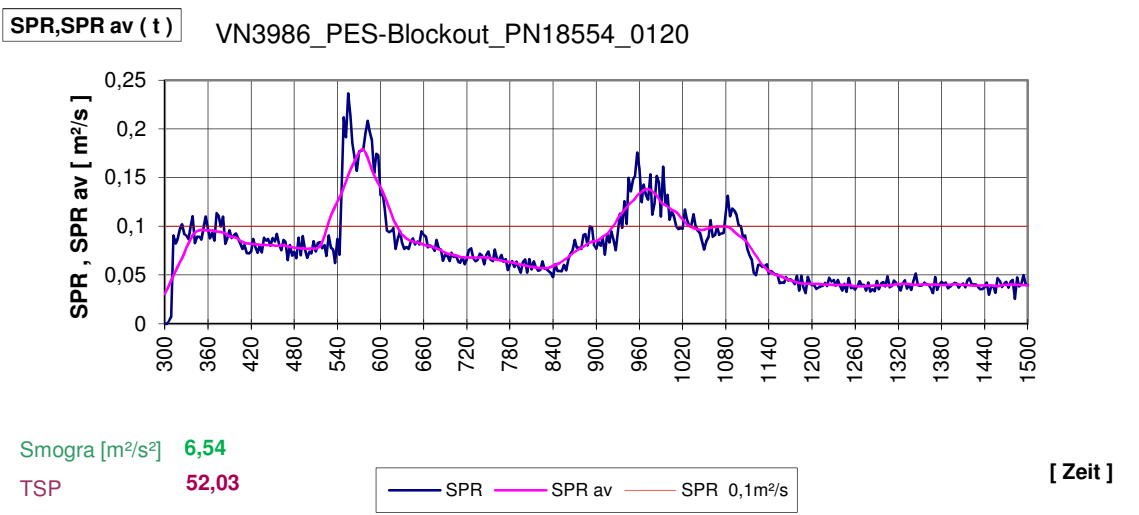
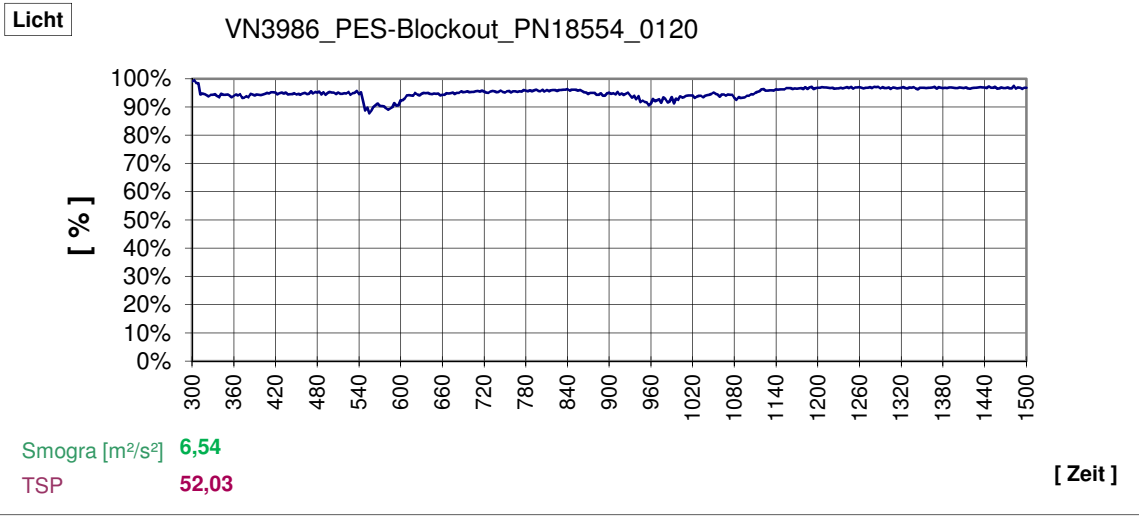
**Figra / THR (t)** VN3986\_PES-Blockout\_PN18554\_0120



**SBI 3986**

**PES-Blockout with „INKTeX+® FL Ausrüstung“**

flame impingement: side A / warp direction





**Prüfinstitut Hoch**

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Anlage 1 zum Kurzbericht  
K-Hoch-140110-3

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