

TFI Report 21-000569-05

Reaction to fire test

For the classification according to DIN EN 13501-1:2019

Customer

Novalis Global Flooring GmbH
Kurt Schumacher Str. 2
53113 Bonn
GERMANY

Product

resilient floor covering
LLT 5,0/0,7 mm

This report includes 3 pages and 3 annex(es).

Responsible at TFI

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Aachen, 18 May 2021



Dr. Andreas Zoëga
- head of testing laboratory -

The present document is provided with an advanced electronic signature.

This report only applies to the tested samples and has been established to the best of our knowledge. Only the entire report shall be reproduced. Under no circumstances, extracts shall be used. Furthermore, we apply the "General Terms and Conditions for the Execution of Contracts" of the TFI Aachen GmbH, also with regard to the order execution.

1 Transaction

| | |
|------------------------|---|
| Test order | Reaction to fire test for construction products according to EN ISO 11925-2:2020 and EN ISO 9239-1:2010 |
| Order date | 20 April 2021 |
| Your reference | Lars Grüter |
| Product designation | LLT 5,0/0,7 mm, batch no.210412C, article no. WD6906 |
| TFI sample number | 2100870 |
| Date of manufacture | 21 April 2021 |
| Date of sample receipt | 26 April 2021 |
| Sampling performed by | Customer |

2 Product Specification

| | |
|--|--------------------------------|
| Use surface | PVC |
| Construction | heterogeneous |
| Structure | flat |
| Pattern | multicoloured, patterned |
| Colour of the use surface | brown, light brown, dark brown |
| Type of delivery | modules |
| Total thickness [mm] | 4.98 |
| Thickness of the use surface [mm] | 0.7 |
| Total mass per unit area [g/m ²] | 8780 |
| | *customer information |

3 Results

Ignitability of products subjected to direct impingement of flame according to EN ISO 11925-2:2020

| | |
|------------------|--------------|
| Ignition | no |
| Flame tip | ≤ 150 mm |
| Burning droplets | not relevant |

Burning behaviour using a radiant heat source according to EN ISO 9239-1:2010

| | |
|---|--------|
| Average critical heat flux [kW/m ²] | > 11.0 |
| Integrated smoke density [% x min] | 401 |

| | |
|--------------------------------------|--------------------|
| Adhesion | none |
| Substrate according to EN 13238:2010 | fibre cement board |

This test report is the basis for a classification report according to DIN EN 13501-1:2019.

The measurement results are evaluated without consideration of the measurement uncertainty with reference to compliance with limit values, unless otherwise specified by the test standard.

The test results relate to the behaviour of the test specimens of a construction product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the construction product in use.

4 Annexes

| | |
|-------------------------------|-----------------|
| Photographs | F 21-000569-05 |
| Ignitability ^a | KB 21-000569-05 |
| Reaction to Fire ^a | RP 21-000569-05 |

The annexes marked ^a are based on tests accredited in accordance with EN ISO/IEC 17025.

Annex F - Photographs

1 Transaction

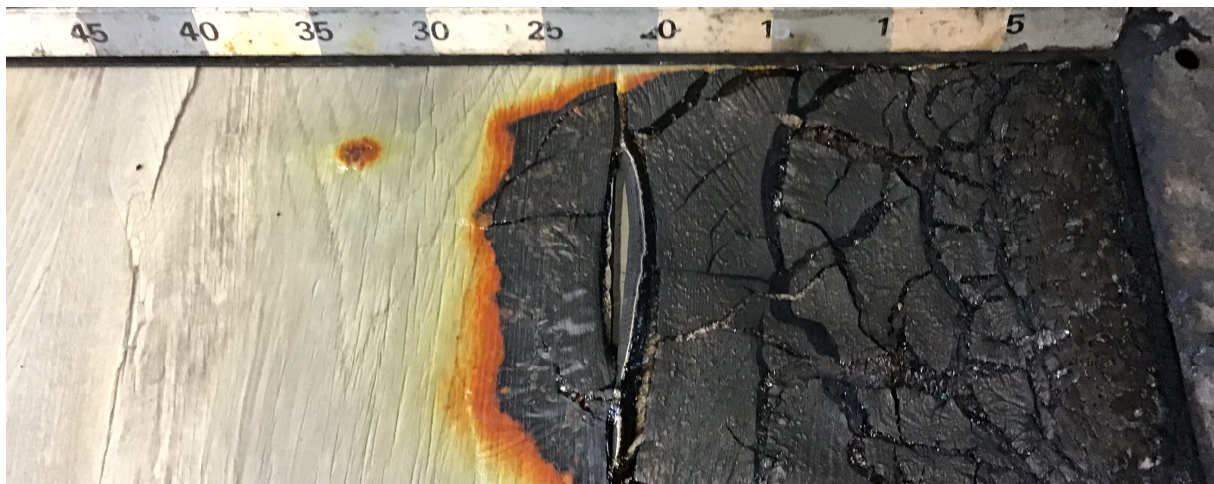
| | |
|---------------------|----------------|
| Product designation | LLT 5,0/0,7 mm |
| TFI sample number | 2100870 |
| Testing period | 11 May 2021 |

2 Test Method / Requirements

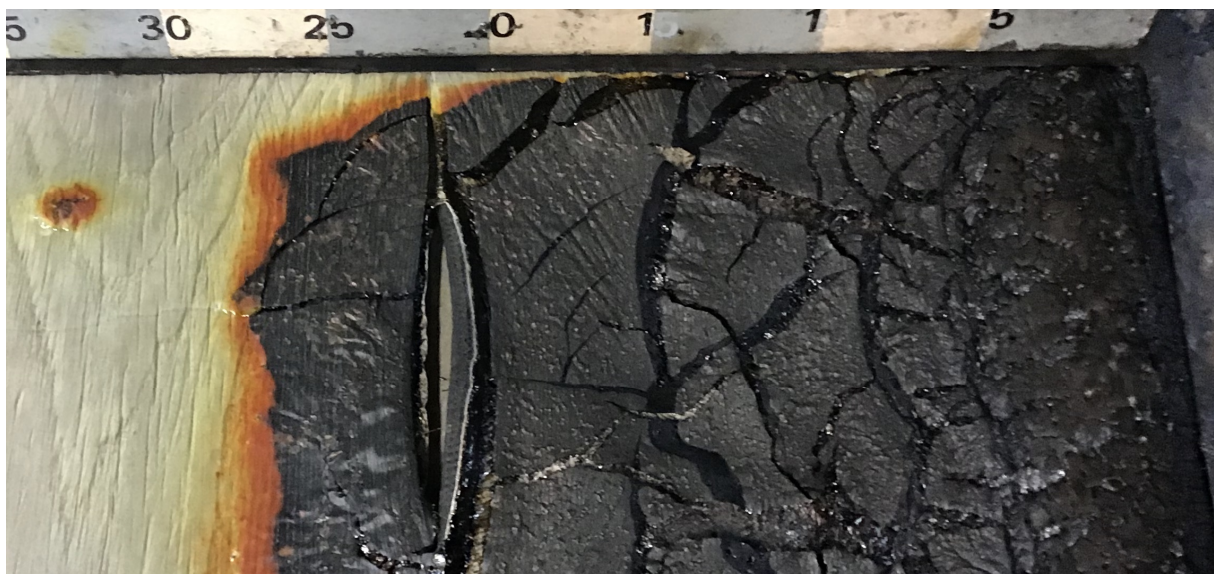
-not specified-

3 Results

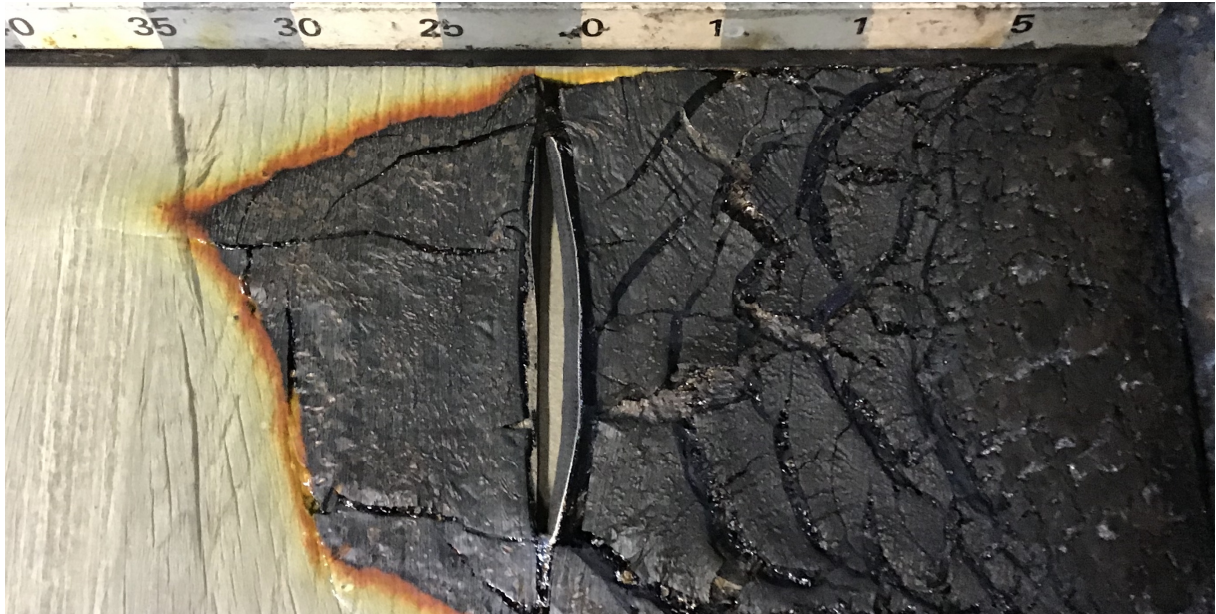
3.1 Sample 1 cross production direction



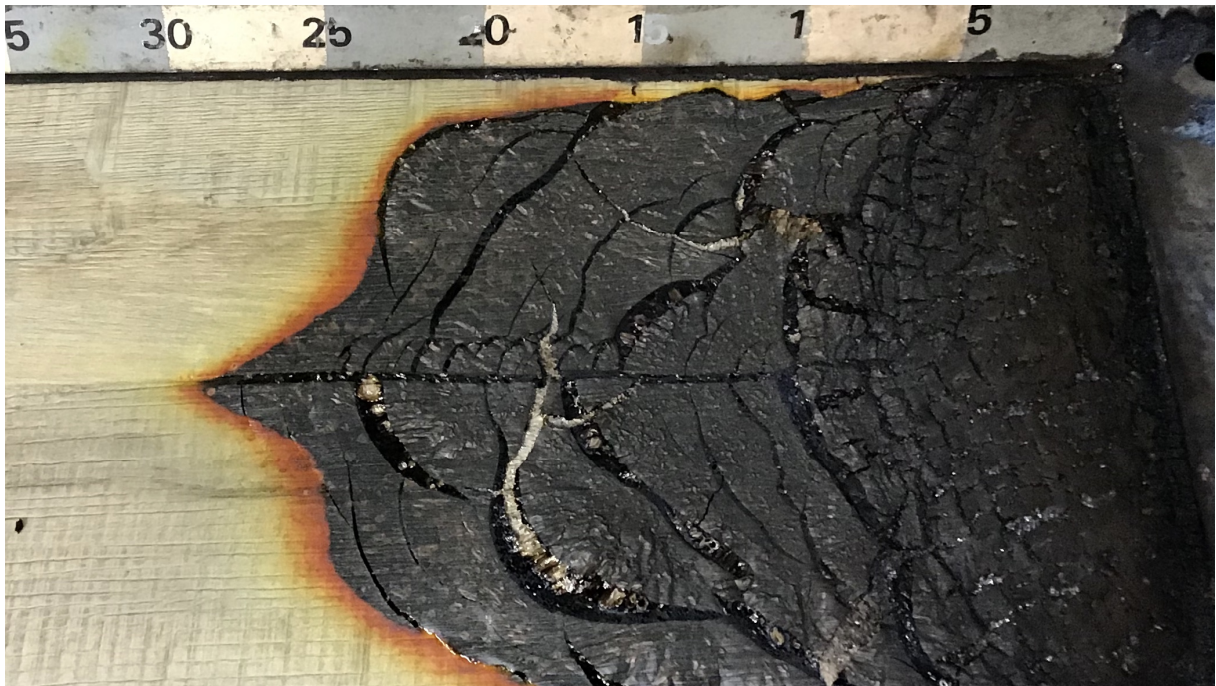
3.2 Sample 2 cross production direction



3.3 Sample 3 cross production direction



3.4 Sample 1 in production direction



Annex KB - Ignitability

1 Transaction

| | |
|---------------------|----------------|
| Product designation | LLT 5,0/0,7 mm |
| TFI sample number | 2100870 |
| Testing period | 11 May 2021 |

2 Test Method / Requirements

| | |
|--------------------------------------|---|
| EN ISO 11925-2:2020 Part 2 | Ignitability of products subjected to direct impingement of flame |
| Substrate according to EN 13238:2010 | Fibre cement board |
| Type of fixation | Loosely laid |
| Conditioning | Conditioning according to EN 13238:2010 |
| Type of ignition | Surface ignition |
| Ignition time [s] | 15 |
| Deviation from the standard | -none- |

3 Results

| Parameter | Specimen no. | | | | | |
|--|-------------------------|-------------------------|-------------------------|----------------------------|----------------------------|----------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Orientation to the direction of production | in production direction | in production direction | in production direction | cross production direction | cross production direction | cross production direction |
| Ignition of the specimen | no | no | no | no | no | no |
| Flame tip (moment [s]) | < 150 mm (n.r.) | < 150 mm (n.r.) | < 150 mm (n.r.) | < 150 mm (n.r.) | < 150 mm (n.r.) | < 150 mm (n.r.) |
| Maximum flame height [mm] (moment [s]) | n.r. | n.r. | n.r. | n.r. | n.r. | n.r. |
| Burning droplets | no | no | no | no | no | no |
| Ignition of the filter paper | no | no | no | no | no | no |

Observations: -none-

Annex RP – Reaction to Fire

1 Transaction

| | |
|---------------------|----------------|
| Product designation | LLT 5,0/0,7 mm |
| TFI sample number | 2100870 |
| Testing period | 11 May 2021 |

2 Test Method / Requirements

| | |
|---------------------------------------|--|
| EN ISO 9239-1:2010 Part 1 | Determination of the burning behaviour using a radiant heat source |
| Substrate according to EN 13238:2010 | Fibre cement board |
| Adhesion | -none - |
| Joint according to EN ISO 9239-1:2010 | No |
| Conditioning | Conditioning according to EN 13238:2010 |
| Deviation | -none- |

3 Results

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Annex RP - Burning behaviour

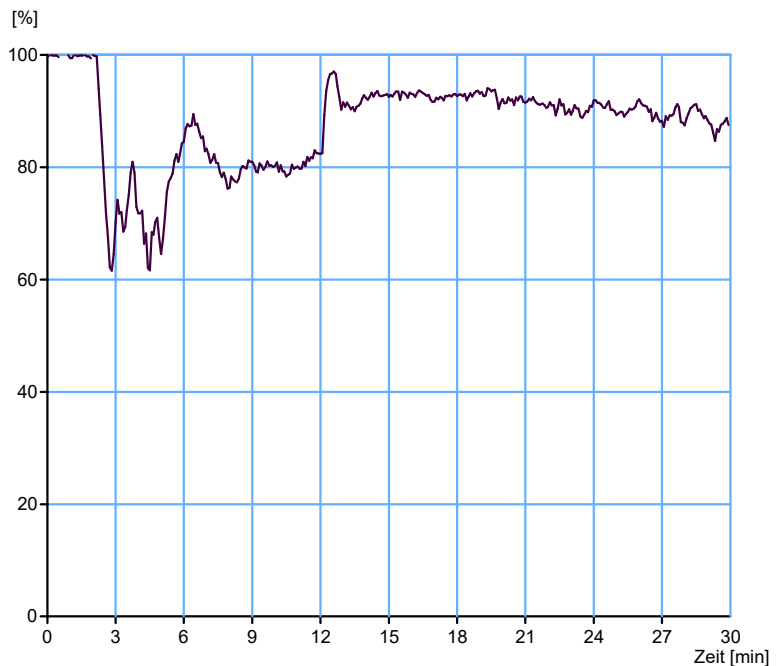
Sample designation 2100870
Sample
 Sample No.: 1
 Direction: cross production direction

Observation
 molten/singed during pre-radiation up to 0 mm
 buckled/contracted from pilot flame area up to 0 mm
 penetration of flame through substrate -
 transitory flaming -
 blistering -
 glowing, after flame has extinguished -

Results

Smoke density

| Position [mm] | Time [min:s] | Heat Flow [kW/m ²] |
|---------------|--------------|--------------------------------|
| 50 | 03:58 | 11.82 |
| 100 | - | - |
| 150 | - | - |
| 200 | - | - |
| 250 | - | - |
| 300 | - | - |
| 350 | - | - |
| 400 | - | - |
| 450 | - | - |
| 500 | - | - |
| 550 | - | - |
| 600 | - | - |
| 650 | - | - |
| 700 | - | - |
| 750 | - | - |
| 800 | - | - |
| 850 | - | - |
| 900 | - | - |
| 950 | - | - |
| 1000 | - | - |



| Time [min:s] | Position [mm] | Heat Flow [kW/m ²] |
|--------------|---------------|--------------------------------|
| 10:00 | 67 | 11.54 |
| 20:00 | 67 | 11.54 |
| 30:00 | 67 | 11.54 |

CHF [kW/m²] >= 11
 HF_30 [kW/m²] 11.54
 Smoke density integral [%*min] 373.6
 Flame extinguished after [min:s] 12:00
 max. burnt distance [mm] 67
 max. light attenuation [%] 38.4



Annex RP - Burning behaviour

Sample designation 2100870
Sample
 Sample No.: 2
 Direction: cross production direction

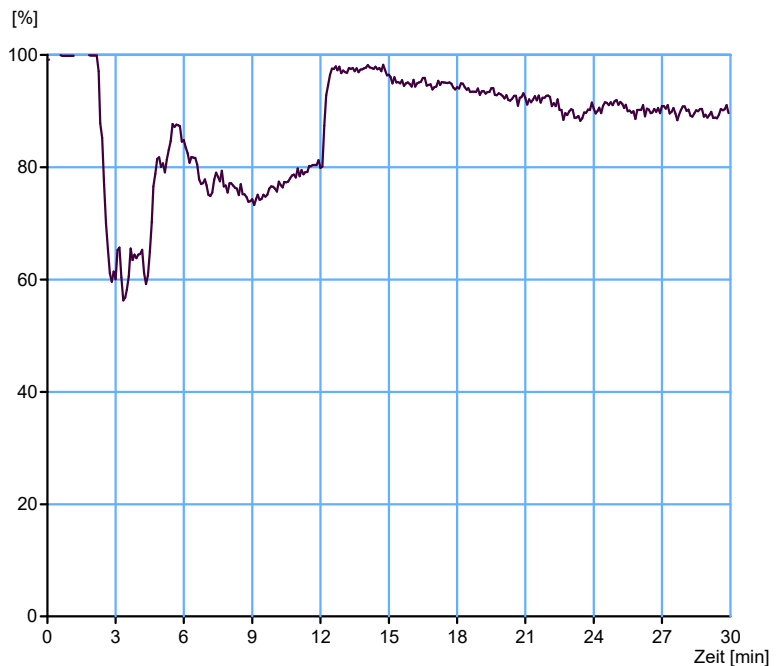
Observation

molten/singed during pre-radiation up to 0 mm
 buckled/contracted from pilot flame area up to 0 mm
 penetration of flame through substrate -
 transitory flaming -
 blistering -
 glowing, after flame has extinguished -

Results

Smoke density

| Position [mm] | Time [min:s] | Heat Flow [kW/m ²] |
|---------------|--------------|--------------------------------|
| 50 | 03:49 | 11.82 |
| 100 | - | - |
| 150 | - | - |
| 200 | - | - |
| 250 | - | - |
| 300 | - | - |
| 350 | - | - |
| 400 | - | - |
| 450 | - | - |
| 500 | - | - |
| 550 | - | - |
| 600 | - | - |
| 650 | - | - |
| 700 | - | - |
| 750 | - | - |
| 800 | - | - |
| 850 | - | - |
| 900 | - | - |
| 950 | - | - |
| 1000 | - | - |



| Time [min:s] | Position [mm] | Heat Flow [kW/m ²] |
|--------------|---------------|--------------------------------|
| 10:00 | 72 | 11.45 |
| 20:00 | 72 | 11.45 |
| 30:00 | 72 | 11.45 |

CHF [kW/m²] >= 11
 HF_30 [kW/m²] 11.45
 Smoke density integral [%*min] 373.9
 Flame extinguished after [min:s] 12:00
 max. burnt distance [mm] 72
 max. light attenuation [%] 43.7



Annex RP - Burning behaviour

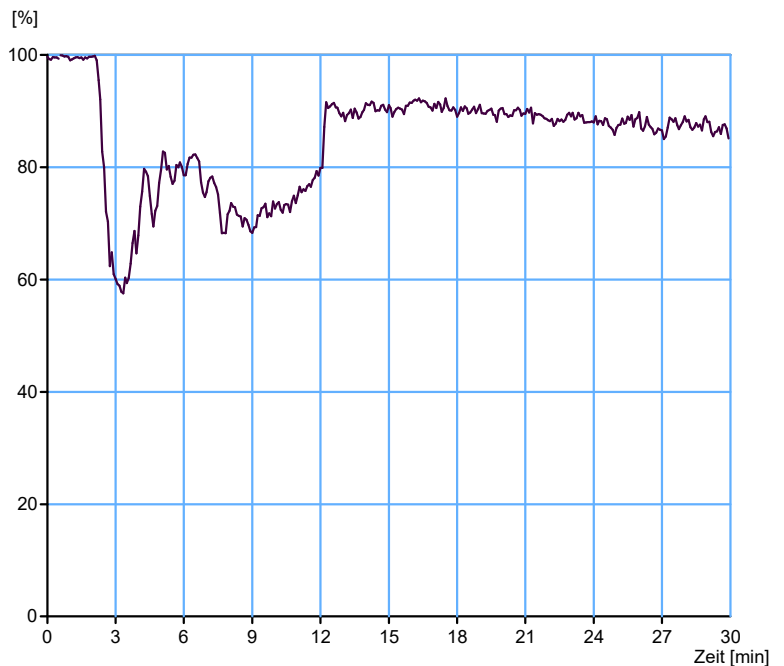
Sample designation 2100870
Sample
 Sample No.: 3
 Direction: cross production direction

Observation
 molten/singed during pre-radiation up to 0 mm
 buckled/contracted from pilot flame area up to 0 mm
 penetration of flame through substrate -
 transitory flaming -
 blistering -
 glowing, after flame has extinguished -

Results

Smoke density

| Position [mm] | Time [min:s] | Heat Flow [kW/m ²] |
|---------------|--------------|--------------------------------|
| 50 | 03:59 | 11.82 |
| 100 | - | - |
| 150 | - | - |
| 200 | - | - |
| 250 | - | - |
| 300 | - | - |
| 350 | - | - |
| 400 | - | - |
| 450 | - | - |
| 500 | - | - |
| 550 | - | - |
| 600 | - | - |
| 650 | - | - |
| 700 | - | - |
| 750 | - | - |
| 800 | - | - |
| 850 | - | - |
| 900 | - | - |
| 950 | - | - |
| 1000 | - | - |



| Time [min:s] | Position [mm] | Heat Flow [kW/m ²] |
|--------------|---------------|--------------------------------|
| 10:00 | 85 | 11.24 |
| 20:00 | 85 | 11.24 |
| 30:00 | 85 | 11.24 |

CHF [kW/m²] >= 11
 HF_30 [kW/m²] 11.24
 Smoke density integral [%*min] 455.5
 Flame extinguished after [min:s] 12:00
 max. burnt distance [mm] 85
 max. light attenuation [%] 42.5



Annex RP - Burning behaviour

Sample designation 2100870
Sample
 Sample No.: 1
 Direction: in production direction

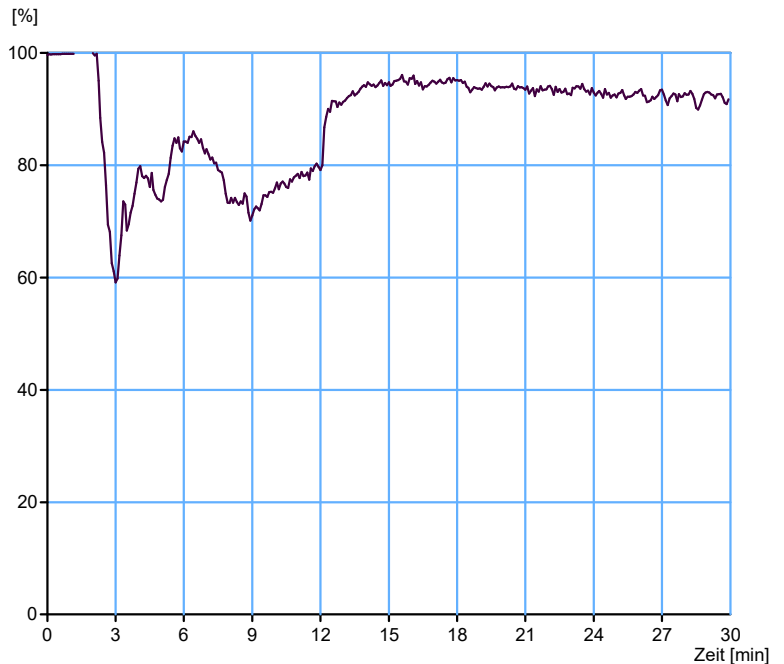
Observation

| | |
|--|------|
| molten/singed during pre-radiation up to | 0 mm |
| buckled/contracted from pilot flame area up to | 0 mm |
| penetration of flame through substrate | - |
| transitory flaming | - |
| blistering | - |
| glowing, after flame has extinguished | - |

Results

Smoke density

| Position [mm] | Time [min:s] | Heat Flow [kW/m ²] |
|---------------|--------------|--------------------------------|
| 50 | 03:05 | 11.82 |
| 100 | - | - |
| 150 | - | - |
| 200 | - | - |
| 250 | - | - |
| 300 | - | - |
| 350 | - | - |
| 400 | - | - |
| 450 | - | - |
| 500 | - | - |
| 550 | - | - |
| 600 | - | - |
| 650 | - | - |
| 700 | - | - |
| 750 | - | - |
| 800 | - | - |
| 850 | - | - |
| 900 | - | - |
| 950 | - | - |
| 1000 | - | - |



| Time [min:s] | Position [mm] | Heat Flow [kW/m ²] |
|--------------|---------------|--------------------------------|
| 10:00 | 87 | 11.20 |
| 20:00 | 87 | 11.20 |
| 30:00 | 87 | 11.20 |

| | |
|----------------------------------|-------|
| CHF [kW/m ²] | >= 11 |
| HF_30 [kW/m ²] | 11.20 |
| Smoke density integral [%*min] | 349.4 |
| Flame extinguished after [min:s] | 12:00 |
| max. burnt distance [mm] | 87 |
| max. light attenuation [%] | 40.9 |