

Statement

Flame resistance of Ultrafuse[®] PPSU

Date / Revised: November 11, 2022

Version No.: 1.0

Dear Valued Customer,

This letter responds to your request to provide specific information regarding the flame resistance properties of our Ultrafuse[®] PPSU filament.

The Ultrafuse[®] PPSU filament is one of the few commercial filaments that **meets the EN 45545-2** standard. The EN 45545-2 is the sole standard for material fire behavior (toxicity, smoke density and oxygen-depletion), now adopted by EU nations.

This letter confirms that Ignition Resistance of Ultrafuse[®] PPSU was tested according to classification standard DIN EN 45545-2:2016-02 Railway applications – Fire protection of railway vehicles - Part 2: Requirements for fire behavior of materials and components. The Ultrafuse[®] PPSU filament is processed as end use application in an upright build orientation by utilizing Additive Manufacturing. The accreditations by DAkKS are presented as attachment to this letter.

Classification results:

Ultrafuse[®] PPSU meets the following requirements:

Classification:	HL1-3 R26, R24, R23, R7
UL94	V0
Oxygen Content	>32 %Oxygen
CIT (NFX)	1.3
CITg (50 kW/m ²)	0.14 / 0.17 (1.5mm / 3.0mm thickness)
Smoke VOF4 (50 kW/m ²)	32 / 32 (1.5mm / 3.0mm thickness)
Smoke DS(4) (25 kW/m ²)	2 / 2 (1.5mm / 3.0mm thickness)
Smoke DS(4) (50 kW/m ²)	88 / 104 (1.5mm / 3.0mm thickness)
Heat Release MARHE (50 kW/m ²)	73 kW/m ² / 57 kW/m ² (1.5mm / 3.0mm thickness)
Spread of Flame CFE	50.7 kW/m ² / 48.6 kW/m ² (1.5mm / 3.0mm thickness)

Further, complementing the [railway overview table](#) we have regrouped the following information to support our response, starting with the related items for the railway EN **45545-2** standard and a second section with continuative tests to delimit further demanding applications.

1. Regarding the railway EN 45545-2 standard:

- Test according to ISO 5660 Part I: 2015-09/Amd.1: 2019-08. Reaction-to-fire tests - Heat release, smoke production and mass loss rate Part 1: Heat release rate and smoke production rate. For a specimen with a thickness of **1.5mm the maximum rate of average heat emission (MAHRE) is 73kW/m²**, set of requirements **R7**, hazard level **HL2**. For a specimen with a thickness of **3mm the maximum rate of average heat emission (MAHRE) is 57kW/m²**, set of requirements **R7**, hazard level **HL3**. For further details please review Table 1Table 8Table 7 presented on page 4, Table 3 on page 8, and Table 4 on page 10.
- Test according to ISO 5658 Part2: 2006- {19/Amd.1: 2011-11. Reaction to fire tests - Spread of flame - Part 2: Lateral spread on building and transport products in vertical configuration. For a specimen with a thickness of 1.5 mm the **critical heat flux at extinguishment (CFE) is 50.7 kW/m²**, set of requirements **R7**, hazard level **HL3**. For a specimen with a thickness of 3mm the **critical heat flux at extinguishment (CFE) is 48.6 kW/m²**, set of requirements **R7**, hazard level **HL3**. For further details please review Table 1Table 8Table 7 presented on page 4, Table 5 on page Table 512, and Table 6 on page 14.
- CIT (NFX): **1.3** [dimensionless]. For further details please review Table 2Table 1Table 8Table 7 presented on page 6.
- CIT₆ (50 kW/m²): **0.14** [dimensionless]for a specimen with a thickness of 1.5mm and **0.17** [dimensionless] for a specimen with a thickness of 3mm. For further details please review Table 2Table 1Table 8Table 7 presented on page 6.
- Smoke VOF₄ (50 kW/m²): **32** [dimensionless] for a specimen with a thickness of 1.5mm and **32** [dimensionless]. For a specimen with a thickness of 3mm. For further details please review Table 2Table 1Table 8Table 7 presented on page 6.
- Smoke DS (4) (25 kW/m²): **2** [dimensionless] for a specimen with a thickness of 1.5mm and **2** [dimensionless] for a specimen with a thickness of 3mm. For further details please review Table 2Table 1Table 8Table 7 presented on page 6.
- Smoke DS (4) (50 kW/m): **88** [dimensionless] for a specimen with a thickness of 1.5mm and **104** [dimensionless] for a specimen with a thickness of 3mm. For further details please review Table 1Table 8Table 7 presented on page 4. **In reference to the UL94 Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing** our Ultrafuse® PPSU material is tested in 3D printed specimens complying and fulfilling the requirements in reference to **the UL94 V-0** standard with a wall thickness of 1.5- and 3-mm. Meaning, that it is classified as self-extinguishing. For further details please review Table 7 presented on page 16.

2. Ultrafuse® PPSU filament has been subjected to further flame retardancy testing, summarized below:

- **Glow wire on end product test (GWEPT)** is performed on 3D printed specimens per **IEC 60695-2-11**. The glow wire testing is an electrical safety test designed to evaluate the flame-resistant properties of plastic materials used in electrical devices. Based on the Glow Wire Test, the weakest “ZX / upright direction” 3D printed specimens from Ultrafuse® PPSU passed the GWEPT without dripping at **960 °C** when testing a specimen with a wall thickness of 1.5 mm and the **960 °C** with a wall thickness of 3 mm. For further details please review Table 8 Table 7 presented on page 17 and Table 9 presented on 18.
- Flammability F1 60 sec. vertical **PASSED**; Burn Length 203mm, Flame Time 1s, dripping flame time 3s. (Specimen thickness 1.6 and 6.35 mm) FAR 25.853 (a)
- Flammability F2 12 sec. vertical **PASSED**; Burn Length 203mm, Flame Time 1s, no dripping. (Specimen thickness 1.6 and 6.35 mm) FAR 25.853 (a)
- HR Total Heat Release (65) 44 / 3 [KW*min/m²] **PASSED** (Specimen thickness 1.0 and 4.0 mm) FAR 25.853 (d)
- HRRmax Maximum Heat Release Rate (65) 61 [KW/m²] **PASSED** (Specimen thickness 1.0 mm) FAR 25.853 (d)
- Optical Smoke Density DS (4) (200) **PASSED**; 3 / 2 (Specimen thickness 1.0 and 4.5 mm) FAR 25.853 (d)
- Smoke Toxicity **PASSED** (Specimen thickness 1.5 and 4.5 mm) AITM 3.0005
 - CO (ppm) (≤1000) 26 / 42
 - HCN (ppm) (≤150) 0 / 0
 - HF (ppm) (≤100) 0 / 0
 - HCl (ppm) (≤150) 1 / 1
 - SO₂ (ppm) (≤100) 0 / 0
 - NO_x (ppm) (≤100) 7 / 8

Further information can be accessed on our [ForwardAM](#) website. Specific technical information regarding the Ultrafuse® PPSU filament is available by clicking on the following link; [click here](#).

DISCLAIMER:

We give no warranties, expressed or implied, concerning the suitability of above-mentioned product for use in any device and applications.

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Table 1 Summary of results and classification according to DIN EN 45545-2:2016-02 Set of requirements: R7; Final classification HL2.

BASF – Fire Safety Technology

 **BASF**
We create chemistry

Classification report No.: 14672 / 54369

Date: 31.05.2022

BASF SE
Brandschutztechnik
E-CPB/EG - A521
D-67056 Ludwigshafen

Classification according to

DIN EN 45545 Part 2 : 2016-02

Railway applications - Fire protection of railway vehicles - Part 2: Requirements for fire behaviour of materials and components

Client:

BASF 3D Printing Solutions GmbH

Speyerer Straße 4

69115 Heidelberg

The results refer exclusively to the tested samples.

As an accredited Test Laboratory, the BASF SE Fire Safety Technology Test Centre is authorized to conduct fire tests in accordance with DIN EN ISO/IEC 17025 : 2018.
DAkkS-Register-No.: D-PL-14121-07-00



247_e.doc, Version 5: 5.9.2020, AE054369.doc
Report according to DIN EN ISO/IEC 17025 : 2018

Page 1 of 7

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BASF – Fire Safety Technology

Classification report according to DIN EN 45545 Part 2 : 2016-02
Railway applications - Fire protection of railway vehicles - Part 2: Requirements for fire behaviour of materials and components

Classification Report No.: 14672 / 54369

Receipt of order: 01.10.2021

1. Material: (information supplied by client)

Ultrafuse PPSU printing direction ZX
 Order number: ATLaS-2021-3387 + ATLaS-2021-3143 + ATLaS-2022-3626

End use application: interior covering train

2. Summary of results and classification:

Standard: DIN EN 45545-2:2016-02		Set of requirements: R7			
14672 / 54263 Thickness 1,5 mm	ISO 5660-1 50 kW/m ²	MARHE	73	[kW/m ²]	HL2
14672 / 54264 Thickness 3 mm	ISO 5660-1 50 kW/m ²	MARHE	57	[kW/m ²]	HL3
14672 / 53879 Thickness 1,5 mm	EN ISO 5659-2 50 kW/m ²	Ds (max)	88		HL3
14672 / 53879 Thickness 1,5 mm	EN ISO 5659-2 50 kW/m ²	CIT (G)	0,14		HL3
14672 / 53880 Thickness 3 mm	EN ISO 5659-2 50 kW/m ²	Ds (max)	104		HL3
14672 / 53880 Thickness 3 mm	EN ISO 5659-2 50 kW/m ²	CIT (G)	0,17		HL3
14672 / 54281 Thickness 1,5 mm	ISO 5658-2	CFE	50,7	[kW/m ²]	HL3
14672 / 54282 Thickness 3 mm	ISO 5658-2	CFE	48,6	[kW/m ²]	HL3
Final classification:		HL2			

Remarks:

Valid for thickness range from 1,5 mm to 3 mm

Any conclusions we draw about the fire safety of the materials we test are based exclusively on the results of the test under the conditions described. The extent to which such conclusions can be applied to non-tested material under non-standard conditions is the sole responsibility of the customer and is done so at his own risk. - Decision rule acc. to DIN EN ISO/IEC 17025: Wherever statements of conformity are made, no measurement uncertainty is taken into account.

BASF-Fire Safety Technology

Ludwigshafen, 31.05.2022

Table 2 Summary of results and classification according to DIN EN 45545-2: 2016-02 Set of requirements: R23 and R24; Final classification HL3.

BASF – Fire Safety Technology

 **BASF**
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Classification report No.: 14672 / 53882 Rev. 1

Date: 20.05.2022

BASF SE
Brandschutztechnik
E-CPB/EG - A521
D-67056 Ludwigshafen

Classification according to
DIN EN 45545 Part 2 : 2016-02

Railway applications - Fire protection of railway vehicles - Part 2: Requirements for fire behaviour of materials and components

Client:
BASF 3D Printing Solutions GmbH
Speyerer Straße 4
69115 Heidelberg

The results refer exclusively to the tested samples.

As an accredited Test Laboratory, the BASF SE Fire Safety Technology Test Centre is authorized to conduct fire tests in accordance with DIN EN ISO/IEC 17025 : 2018.
DAkkS-Register-No.: D-PL-14121-07-00

247_e.dot, Version 5: 5.9.2020; AEO03882.doc
Report according to DIN EN ISO/IEC 17025 : 2018



Page 1 of 7

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BASF – Fire Safety Technology

**Classification report according to DIN EN 45545 Part 2 : 2016-02
 Railway applications - Fire protection of railway vehicles - Part 2: Requirements for fire behaviour of
 materials and components**

Classification Report No.: 14672 / 53882 Rev. 1

Receipt of order: 01.10.2021

1. Material: (information supplied by client)

Ultrafuse PPSU
 printing direction ZX
 Order number: ATLaS-2021-3387 + ATLaS-2021-3143 + ATLaS-2022-3566 + ATLaS-2021-3089
 Colour:
 End use application: interior covering train

2. Summary of results and classification:

Standard: DIN EN 45545-2:2016-02 Set of requirements:					R23	R24
14672 / 53878	EN ISO 4589-2	LOI	≥ 32,0	[% O2]	HL3	HL3
14672 / 54283 Thickness 1,5 mm	EN ISO 5659-2 25 kW/m ² (pilot flame)	Ds (max)	2		HL3	
14672 / 54284 Thickness 3 mm	EN ISO 5659-2 25 kW/m ² (pilot flame)	Ds (max)	2		HL3	
14672 / 53881	NF X 70-100-1/-2 (600°C)	CIT (NLP)	1,30		HL3	
Final classification R23:					HL3*	
Final classification R24:					HL3	

Remarks:

* Valid for thickness range from 1,5 mm to 3 mm
 Revised version of the test report from March 28th, 2022 (Sets of requirements have been changed).

Any conclusions we draw about the fire safety of the materials we test are based exclusively on the results of the test under the conditions described. The extent to which such conclusions can be applied to non-tested material under non-standard conditions is the sole responsibility of the customer and is done so at his own risk. - Decision rule acc. to DIN EN ISO/IEC 17025: Wherever statements of conformity are made, no measurement uncertainty is taken into account.

BASF-Fire Safety Technology

Ludwigshafen, 20.05.2022

Table 3 Summary of results and classification according to DIN EN 45545-2: 2016-02 Set of requirements: R7;
Final classification HL3.

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Test Report No.: 14672 / 54264

Date: 04.03.2022

BASF SE
Brandschutztechnik
E-CPB/EG - A521
D-67056 Ludwigshafen

Test according to

ISO 5660 Part 1 : 2015-09/Amd.1 : 2019-08

Reaction-to-fire tests - Heat release, smoke production and mass loss rate Part 1: Heat release rate and smoke production rate

Client:

BASF 3D Printing Solutions GmbH
Speyerer Straße 4
69115 Heidelberg

The results refer exclusively to the tested samples.

As an accredited Test Laboratory, the BASF SE Fire Safety Technology Test Centre is authorized to conduct fire tests in accordance with DIN EN ISO/IEC 17025 : 2018.
DAkkS-Register-No.: D-PL-14121-07-00



104_e.dot, Version 18: 10.09.2020; AE064264.doc
Test report according to DIN EN ISO/IEC 17025 : 2018

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BASF – Fire Safety Technology

Test according to ISO 5660 Part 1 : 2015-09/Amd.1 : 2019-08
Reaction-to-fire tests - Heat release, smoke production and mass loss rate
Part 1: Heat release rate and smoke production rate

Test Report No.: 14672 / 54264

Receipt of order: 01.10.2021

Receipt of samples: 03.02.2022

Date of test: 02.03.2022

1. **Material:** (information supplied by client)

Ultrafuse PPSU
3mm thick, printing direction ZX
Order number: ATLaS-2021-3387 + ATLaS-2021-3143
Colour:
End use application: interior covering train

2. **Summary of results and classification:**

Maximum Rate of Average Heat Emission	(MARHE)	57 kW/m ²
Classification according to DIN EN 45545-2:2016-02, set of requirements R7, with respect to test method ISO 5660-1, at 50 kW/m ²		HL3

Remarks: For a final classification, additional tests are required.

Any conclusions we draw about the fire safety of the materials we test are based exclusively on the results of the test under the conditions described. The extent to which such conclusions can be applied to non-tested material under non-standard conditions is the sole responsibility of the customer and is done so at his own risk. - Decision rule acc. to DIN EN ISO/IEC 17025: Wherever statements of conformity are made, no measurement uncertainty is taken into account.

BASF Fire Safety Technology

Ludwigshafen, 04.03.2022

Table 4 Summary of results and classification according to DIN EN 45545-2: 2016-02 Set of requirements: R7;
Final classification HL2.

BASF – Fire Safety Technology

 **BASF**
We create chemistry

Test Report No.: 14672 / 54263

Date: 04.03.2022

BASF SE
Brandschutztechnik
E-CPB/EG - A521
D-67056 Ludwigshafen

Test according to

ISO 5660 Part 1 : 2015-09/Amd.1 : 2019-08

Reaction-to-fire tests - Heat release, smoke production and mass loss rate Part 1: Heat release rate and
smoke production rate

Client:

BASF 3D Printing Solutions GmbH

Speyerer Straße 4

69115 Heidelberg

The results refer exclusively to the tested samples.

As an accredited Test Laboratory, the BASF SE Fire Safety Technology Test Centre is authorized to conduct
fire tests in accordance with DIN EN ISO/IEC 17025 : 2018.
DAkkS-Register-No.: D-PL-14121-07-00



104_e.dot, Version 18: 10.09.2020: AE/054263.doc
Test report according to DIN EN ISO/IEC 17025 : 2018

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BASF – Fire Safety Technology

Test according to ISO 5660 Part 1 : 2015-09/Amd.1 : 2019-08
Reaction-to-fire tests - Heat release, smoke production and mass loss rate
Part 1: Heat release rate and smoke production rate

Test Report No.: 14672 / 54263

Receipt of order: 01.10.2021

Receipt of samples: 03.02.2022

Date of test: 02.03.2022

1. **Material:** (information supplied by client)

Ultrafuse PPSU
1,5mm thick, printing direction ZX
Order number: ATLaS-2021-3387 + ATLaS-2021-3143
Colour:
End use application: interior covering train

2. **Summary of results and classification:**

Maximum Rate of Average Heat Emission	(MARHE)	73 kW/m ²
Classification according to DIN EN 45545-2:2016-02, set of requirements R7, with respect to test method ISO 5660-1, at 50 kW/m ²		HL2

Remarks: For a final classification, additional tests are required.

Any conclusions we draw about the fire safety of the materials we test are based exclusively on the results of the test under the conditions described. The extent to which such conclusions can be applied to non-tested material under non-standard conditions is the sole responsibility of the customer and is done so at his own risk. - Decision rule acc. to DIN EN ISO/IEC 17025: Wherever statements of conformity are made, no measurement uncertainty is taken into account.

BASF Fire Safety Technology

Ludwigshafen, 04.03.2022

Table 5 Summary of results and classification according to DIN EN 45545-2: 2016-02 Set of requirements: R7; Final classification HL3.

BASF – Fire Safety Technology

 **BASF**
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Test Report No.: 14672 / 54281

Date: 28.04.2022

BASF SE
Brandschutztechnik
E-CPB/EG - A521
D-67056 Ludwigshafen

Test according to

ISO 5658 Part 2 : 2006-09/Amd. 1 : 2011-11

Reaction to fire tests - Spread of flame - Part 2: Lateral spread on building and transport products in vertical configuration

Client:

BASF 3D Printing Solutions GmbH
Speyerer Straße 4
69115 Heidelberg

The results refer exclusively to the tested samples.

As an accredited Test Laboratory, the BASF SE Fire Safety Technology Test Centre is authorized to conduct fire tests in accordance with DIN EN ISO/IEC 17025 : 2018.
DAkKS-Register-No.: D-PL-14121-07-00



161_e.dot, Version 12: 11.09.2020: AE054281.doc
Test report according to DIN EN ISO/IEC 17025 : 2018

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BASF – Fire Safety Technology

Test according to ISO 5658 Part 2 : 2006-09/Amd. 1 : 2011-11
Reaction to fire tests - Spread of flame - Part 2: Lateral spread on building and transport products in vertical configuration

Test Report No.: 14672 / 54281

Receipt of order: 01.10.2021

Receipt of samples: 26.04.2022

Date of test: 28.04.2022

1. **Material:** (information supplied by client)

Ultrafuse PPSU, thickness: 1,5 mm, printing direction ZX
Order number: ATLaS-2022-3626

Colour:

End use application: interior covering train

2. **Summary of results and classification:**

Critical Heat Flux at Extinguishment	(CFE)	[kW/m ²]	50,7
Classification according to DIN EN 45545-2:2016-02, requirement table R7, with respect to test according to ISO 5658-2			HL 3

Remarks:

For a final classification, additional tests are required.

Any conclusions we draw about the fire safety of the materials we test are based exclusively on the results of the test under the conditions described. The extent to which such conclusions can be applied to non-tested material under non-standard conditions is the sole responsibility of the customer and is done so at his own risk. - Decision rule acc. to DIN EN ISO/IEC 17025: Wherever statements of conformity are made, no measurement uncertainty is taken into account.

BASF Fire Safety Technology

Ludwigshafen, 28.04.2022

Table 6 Summary of results and classification according to DIN EN 45545-2: 2016-02 Set of requirements: R7; Final classification HL3.

BASF – Fire Safety Technology

 **BASF**
We create chemistry

Test Report No.: 14672 / 54282

Date: 31.05.2022

BASF SE
Brandschutztechnik
E-CPB/EG - A521
D-67056 Ludwigshafen

Test according to

ISO 5658 Part 2 : 2006-09/Amd. 1 : 2011-11

Reaction to fire tests - Spread of flame - Part 2: Lateral spread on building and transport products in vertical configuration

Client:

BASF 3D Printing Solutions GmbH
Speyerer Straße 4
69115 Heidelberg

The results refer exclusively to the tested samples.

As an accredited Test Laboratory, the BASF SE Fire Safety Technology Test Centre is authorized to conduct fire tests in accordance with DIN EN ISO/IEC 17025 : 2018.
DAkKS-Register-No.: D-PL-14121-07-00



161_e.dpl_Version 12: 11.09.2020; AE054282.doc
Test report according to DIN EN ISO/IEC 17025 : 2018

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BASF – Fire Safety Technology

Test according to ISO 5658 Part 2 : 2006-09/Amd. 1 : 2011-11
Reaction to fire tests - Spread of flame - Part 2: Lateral spread on building and transport products in vertical configuration

Test Report No.: 14672 / 54282

Receipt of order.: 01.10.2021
Receipt of samples: 25.05.2022
Date of test: 31.05.2022

1. Material: (information supplied by client)

Ultrafuse PPSU, thickness: 3 mm, printing direction ZX
Order number: ATLaS-2022-3626
Colour:
End use application:

2. Summary of results and classification:

Critical Heat Flux at Extinguishment	(CFE)	[kW/m²]	48,6
Classification according to DIN EN 45545-2:2016-02, requirement table R7, with respect to test according to ISO 5658-2			HL 3

Remarks:

For a final classification, additional tests are required.


Any conclusions we draw about the fire safety of the materials we test are based exclusively on the results of the test under the conditions described. The extent to which such conclusions can be applied to non-tested material under non-standard conditions is the sole responsibility of the customer and is done so at his own risk. - Decision rule acc. to DIN EN ISO/IEC 17025: Wherever statements of conformity are made, no measurement uncertainty is taken into account.

BASF Fire Safety Technology

Ludwigshafen, 31.05.2022

Table 7 Summary of results and classification according to IEC 60695-11-10:2014 vertical (equivalent to UL94:2020). Set of requirements: R26 (EL10); Final classification HL1-3 (V0).

We create chemistry

TEST REPORT according to ISO/IEC 17025 No. AVS: 2006115 Date: 2022-04-14 File: 2006115B_V_EN.DOCX	 Deutsche Akkreditierungsstelle D-PL-14121-04-00
Testing laboratory BASF SE RBU Performance Materials Europe Materials and Parts Testing PMD/EX-H201 67056 Ludwigshafen Deutschland	Contact at laboratory
Client Company: BASF 3D Printing Solutions GmbH Speyerer Strasse 4 69115 Heidelberg Germany	Contact at client
Test specimen / Material A2020-2247 PPSU uncolored	Test methods (Standard and publication date) - IEC 60695-11-10:2014 vertical (equivalent to UL94:2020)
Order received on: 2020-12-08 Specimen received on: 2020-12-08 Tests conducted on: 2020-12-16	This report contains: Pages: 3 Diagrams: 0 Tables: 2 Photos: 0 Attachments: 2

Decision rule

EN45545-2:2016, R26 (EL 10): HL1-3 (V0)

Result

Test specimen of nominal thickness 1.5 and 3 mm were subjected to vertical flammability testing according to DIN EN 60695-11-10:2014 (equivalent to UL94:2018). The test result is V-0. This result provides evidence for conformity with EN45545-2:2016, R26 for HL1, HL2 and HL3.

The test results of this report are only valid for the specimens tested and only describe the results achieved by the application of the particular tests methods to these specimens. They do not imply any guarantee nor any agreement on a contractual quality or a suitability of the product for a specific purpose. In view of the many factors that may affect processing and application of the product, the test results do not relieve processor from carrying out own investigations and tests. The report does not imply any recommendation for a product. The report shall only be reproduced and passed on in full.
 The testing laboratory is accredited by DAkkS Deutsche Akkreditierungsstelle GmbH (German Accreditation Body) according to ISO 17025 for mechanical, thermal, physical-chemical and flammability tests. The accreditation is valid only for the scope of accreditation listed in the Annex to the accreditation certificate (Registration No. D-PL-14121-04-00).

Table 8 Summary of results and classification according to DIN IEC 60695-2. Result: the GWEPT without dripping at 960 °C when testing a specimen with a wall thickness of 1.5 mm

BASF SE, PMD/EX - H202, D-67056 Ludwigshafen
 Prüfer:

Seite 1 von 1

Auftrag:
 Auftraggeber:

Eingang : 09.02.2021
 Auftrags-Nr.: 2100902
 PDF-Nr.: 1486

Produkt: 1 A2021-2393_ZX U_FUSE_PPSU UNGEFÄRBT
 40004342_AES

Herstellung: 3D-Druck 1,5mm

Vorbehandlung:

Bemerkung: orientierend Prüfen wie AVS 2100645

***** Brandschutzprüfung *****
Glühdrahtprüfung gemäß DIN EN 60695-2-11:2015

Angaben zu Prüfgegenstand und Prüfung

M 0 0328			Meßgrößen/Beobachtungen							
Probekörpermaße 80 * 80 * d mm³			letzter Glühdrahtwechsel:							
Abkürzungen Brennverhalten			# = keine Entzündung nach 30 s Applikationszeit				4 = Glühdraht durchdringt Probe			
			1 = kein Tropfen				5 = blauer Kranz			
			2 = Tropfen ohne Zündung des Seidenpapiers				6 = Sonstiges			
			3 = Brennendes Abtropfen, Entzündung des Seidenpapiers							
Glühdraht-temperatur [°C]	Probe Nr.	Dicke [mm]	t _i [s]	t _e [s]	t _f [s]	t _A [s]	t _R [s]	Flammenhöhe [mm]	Entzündung der Unterlage? (ja/nein)	Brennverhalten
960	1	1.57	0.5	33.5	33.0	29.5	3.5	20	Nein	(1),(4)
960	2	1.58	0.5	35.5	35.0	29.5	5.5	20	Nein	(1),(4)
960	3	1.58	0.5	36.5	36.0	29.5	6.5	10	Nein	(1), (4)
	4									
	5									
	6									
	7									
	8									
	9									
	10									
			Prüfzeitraum: 16.02.2021 13:14 - 16.02.2021 13:21							
Erläuterungen:			t _f = Gesamtbrenndauer							
t _i = Zeit der Entzündung ab Versuchsbeginn			t _A = Brenndauer bis zum Entfernen des Glühdrahtes							
t _e = Zeit des Verlöschens ab Versuchsbeginn			t _R = Brenndauer nach Entfernen des Glühdrahtes							

Kriterien:

GWEPT: 960 /Prüfling

Keine Flammenbildung > 30 s
 innerhalb der Beobachtungszeit

Table 9 Summary of results and classification according to DIN IEC 60695-2. Result: the GWEPT without dripping at 960 °C when testing a specimen with a wall thickness of 3 mm

BASF SE, PMD/EX - H202, D-67056 Ludwigshafen
 Prüfer:

Seite 1 von 1

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Produkt: 1 A2021-2393_ZX U_FUSE_PPSU UNGEFÄRBT
 40004342_AES

Herstellung: 3D-Druck 3,0mm

Vorbehandlung:

Bemerkung: orientierend Prüfen wie AVS 2100645

***** Brandschutzprüfung *****
Glühdrahtprüfung gemäß DIN EN 60695-2-11:2015

Angaben zu Prüfgegenstand und Prüfung

M 0 0328			Meßgrößen/Beobachtungen								
Probekörpermaße 60 * 60 * d mm³			letzter Glühdrahtwechsel:								
Abkürzungen Brennverhalten			# = keine Entzündung nach 30 s Applikationszeit						4 = Glühdraht durchdringt Probe		
			1 = kein Tropfen						5 = blauer Kranz		
			2 = Tropfen ohne Zündung des Seidenpapiers						6 = Sonstiges		
			3 = Brennendes Abtropfen, Entzündung des Seidenpapiers								
Glühdraht-temperatur [°C]	Probe Nr.	Dicke [mm]	t _i [s]	t _e [s]	t _f [s]	t _A [s]	t _{ik} [s]	Flammenhöhe [mm]	Entzündung der Unterlage? (ja/nein)	Brennverhalten	
960	1	3.24	1.0	36.0	35.0	29.0	6.0	20	Nein	(1)	
960	2	3.04	1.0	37.0	36.0	29.0	7.0	20	Nein	(1)	
960	3	3.06	1.0	38.5	37.5	29.0	8.5	20	Nein	(1)	
	4										
	5										
	6										
	7										
	8										
	9										
	10										
			Prüfzeitraum: 16.02.2021 11:06 - 16.02.2021 11:13								
Erläuterungen:			t _f = Gesamtbrenndauer								
t _i = Zeit der Entzündung ab Versuchsbeginn			t _A = Brenndauer bis zum Entfernen des Glühdrahtes								
t _e = Zeit des Verlöschens ab Versuchsbeginn			t _{ik} = Brenndauer nach Entfernen des Glühdrahtes								

Kriterien:

GWEPT: 960 /Prüfling

Keine Flammenbildung > 30 s
 innerhalb der Beobachtungszeit

