

Technical Data Sheet

Ultrasint® PA6 FR black

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Version No.: 2.4, revised 01/2021

General information

Components

Polyamide 6-based powder for Laser Sintering with flame retardant

Product Description

All Ultrasint® PA6 grades have in common that they show high modulus, high strength and excellent thermal distortion stability. These properties ensure precise feature control, very good mechanical properties and simple surface reprocessing of 3D printed parts.

Parts made of Ultrasint® PA6 FR black reach a V2 rating (UL 94V) and boast of high modulus, high strength and excellent thermal distortion stability, making the material suitable for prototyping and small series production in automotive, transportation, E&E and aerospace applications. Ultrasint® PA6 FR Black can fulfil the requirements of functional applications regarding high accuracy and mechanical strength as well as high heat distortion temperature – properties, where existing 3D printing materials often show limitations.

Typical applications are:

- Switchboard parts and other electronic components
- Media flow & storage parts (i.e. air ducts for buses/aerospace)
- Jigs & Fixtures for cables and pipes

Delivery form & warehousing

Ultrasint® PA6 FR black powder should be stored at 15 – 25°C in its originally sealed package in a clean and dry environment.

Product safety

Mandatory and recommended industrial hygiene procedures and the relevant industrial safety precautions must be followed whenever this product is being handled and processed. Product is sensitive to humid environment conditions. For additional information please consult the corresponding material safety data sheets.

For your information

Ultrasint® PA6 FR black comes in solid black color. Electrical properties (e.g. volume resistivity, surface resistivity), chemical properties (e.g. resistance against particular substances) and tolerance for solvents are available upon request. Generally, these properties correspond to publicly available data on polyamides.

Notice

The data contained in this publication are based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, these data do not relieve processors from carrying out their own investigations and tests; neither do these data imply any guarantee of certain properties, nor the suitability of the product for a specific purpose. Any descriptions, drawings, photographs, data, proportions, weights etc. given herein may change without prior information and do not constitute the agreed contractual quality of the product. It is the responsibility of the recipient of our products to ensure that any proprietary rights and existing laws and legislation are observed.

The safety data given in this publication is for information purposes only and does not constitute a legally binding Material Safety Data Sheet (MSDS). The relevant MSDS can be obtained upon request from your supplier or you may contact Forward AM directly at sales@basf-3dps.com.

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General Properties	Test Method	Typical Values
Bulk Density / kg/m ³	DIN EN ISO 60	550
Printed Part Density / kg/m ³	DIN EN ISO 1183-1	1300
Mean particle size d50 / μm	Laser Diffraction	65-75
Melting Temperature / °C	ISO 11357 (20 K/min)	218
Crystallization Temperature / °C	ISO 11357 (20 K/min)	169
Melt Volume Flow Rate / cm ³ /10min	ISO 1133 (240 °C, 2.16kg)	10

Thermal Properties	Test Method	Typical Values ¹
HDT/A (1.8 MPa) / °C	ISO 75-2	113
HDT/B (0.45 MPa) / °C	ISO 75-2	207
Vicat/A (10 N) / °C	ISO 306	214
Vicat/B (50 N) / °C	ISO 306	197

Mechanical Properties	Test Method	Typical Values X-direction		Typical Values Z-direction	
		Dry ¹	Cond. ²	Dry ¹	Cond. ²
Tensile Strength / MPa	ISO 527-2	56	41	33	27
Tensile Modulus / MPa	ISO 527-2	4750	2450	4500	2450
Tensile Elongation at break / %	ISO 527-2	1.4	2.6	0.8	1.2
Flexural Modulus / MPa	DIN EN ISO 178	4400	2000	3850	2050
Charpy Impact Strength (notched) / kJ/m ²	ISO 179-1	1.3	1.6	1.0	1.1
Charpy Impact Strength (unnotched) / kJ/m ²	ISO 179-1	4.8	7.4	2.5	3.6
Izod Impact Strength (notched) / kJ/m ²	ISO 180	1.8	2.1	1.5	1.5
Izod Impact Strength (unnotched) / kJ/m ²	ISO 180	5.0	7.0	3.4	3.8

1) Measured after drying 14 days at 80°C / vacuum. Water content is about 0.09% acc. to DIN EN ISO 15512

2) Measured after conditioning 14 days at 70°C / 62% r.h. Water content is about 2.1% acc. to DIN EN ISO 15512

All values measured with virgin material.

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UL & Electrical Properties	Test Method	Typical Values
UL Flammability	UL 94V	V-2 (0.8-3 mm)
Hot-Wire Ignition (HWI)	UL 746A	PLC-4 (1 mm), PLC-3 (2-3 mm)
Glow Wire Flammability Index (GWFI) / °C	DIN EN 60695-2-12	750 (1 mm), 970 (1.6 mm)
Glow Wire Ignition Temperature (GWIT) / °C	DIN EN 60695-2-13	775 (1-1.8 mm)
Dielectric Strength (1 mm) kV/mm	IEC 60243-1	15 (X-direction), 7 (Z-direction)

Aerospace FR Properties	Test Method	Typical Values
Flammability 12 s vertical	FAR 25.853 (a)	Pass
Flammability 60 s vertical	FAR 25.853 (a)	Pass
Gas Toxicity	BSS 7239 Rev A	Pass
Smoke Density (Flaming mode)	BSS 7238 Rev C	Pass
Smoke Density (Non-flaming mode)	BSS 7238 Rev C	Pass

Public Transportation FR Properties	Test Method	Typical Values
Melting Behavior	ECE-R 118 App. 7	Pass