

Technical Data Sheet

Ultrasint® PA11 ESD

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Version No.: 1.1, revised 10/2022

General information

Components

Polyamide 11 ESD powder for Laser Sintering

Product Description

Ultrasint PA11® ESD, a bio-based material (castor oil), is a special material for applications requiring electrostatic discharge behavior of the printed part. Parts produced with this material show a reduced surface and volume resistivity compared to non-functionalized PA11. Typical applications are where electrostatic discharge matters, i.e. in the electronics industry. The material is suitable for production of functional parts and i.e. manufacturing tools and fixtures. Ultrasint® PA11 ESD is processable on most common LS printers. Parameters for printing will be provided.

Typical applications are:

- Durable jigs, fixtures and tools for electronics industry
- Electronic housings
- Chemical system components
- ESD safe prototypes and end-use part

Delivery form & warehousing

Ultrasint® PA11 ESD 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® PA11 ESD comes in natural grey color. Further 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 | 460 |
| Printed Part Density / kg/m ³ | DIN EN ISO 1183-1 | 1070 |
| Mean particle size d50 / μm | Laser Diffraction | 40-50 |
| Melting Temperature / °C | ISO 11357 (10 K/min) | 204 |
| Crystallization Temperature / °C | ISO 11357 (10 K/min) | 162 |
| Melt Volume Flow Rate / cm ³ /10min | ISO 1133 (220 °C, 2.16 kg) | 20 |

| Thermal Properties | Test Method | Typical Values ¹ |
|-----------------------|-------------|-----------------------------|
| HDT/A (1.8 MPa) / °C | ISO 75-2 | 111 |
| HDT/B (0.45 MPa) / °C | ISO 75-2 | 186 |
| Vicat/A (10 N) / °C | ISO 306 | 192 |
| Vicat/B (50 N) / °C | ISO 306 | 183 |
| UL Flammability | UL 94 | HB (0.7-3.0mm) |

| Electrical Properties | Test Method | Typical Values (X-direction) | Typical Values (Z-direction) |
|-----------------------------------|---------------|---------------------------------|---------------------------------|
| Specific volume resistivity / Ωcm | IEC 62631-3-1 | 2.3•10 ⁶ | 2.1•10 ⁵ |
| Specific surface resistivity / Ω | IEC 62631-3-2 | 1.3•10 ⁴ | 3.4•10 ⁴ |
| Dielectric Strength (1mm) / kV/mm | IEC 60243-1 | 0 | 0 |

| 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 (23° C) | 65 | 55 | 55 | 47 |
| Tensile Modulus / MPa | ISO 527-2 (23° C) | 3150 | 2300 | 2150 | 1550 |
| Tensile Elongation at break / % | ISO 527-2 (23° C) | 20 | 22 | 23 | 31 |
| Tensile Strength / MPa | ISO 527-2 (80° C) | 38 | 34 | 30 | 27 |
| Tensile Modulus / MPa | ISO 527-2 (80° C) | 900 | 800 | 550 | 500 |
| Tensile Elongation at break / % | ISO 527-2 (80° C) | 37 | 35 | 49 | 46 |
| Flexural Modulus / MPa | DIN EN ISO 178 | 3050 | 2550 | 2100 | 1650 |
| Charpy Impact Strength (notched) / kJ/m ² | ISO 179-1 | 6.6 | 7.3 | 4.7 | 5.3 |

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| Mechanical Properties | Test Method | Typical Values X-direction | | Typical Values Z-direction | |
|--|-------------|-------------------------------|--------------------|-------------------------------|--------------------|
| | | Dry ¹ | Cond. ² | Dry ¹ | Cond. ² |
| Charpy Impact Strength (unnotched) / kJ/m ² | ISO 179-1 | 80 | 101 | 90 | 107 |
| Izod Impact Strength (notched) / kJ/m ² | ISO 180 | 7.0 | 7.9 | 5.0 | 5.5 |
| Izod Impact Strength (unnotched) / kJ/m ² | ISO 180 | 67 | 81 | 58 | 83 |

1) Measured after drying 14 days at 80°C / vacuum. Water content is about 0.08% acc. to DIN EN ISO 15512

2) Measured after conditioning 14 days at 70°C / 62% r.h. Water content is about 0.8% acc. to DIN EN ISO 15512

All values measured with virgin material.