

Ultrasint® PA11 ESD
Supertough | Bio-Based |
Electrostatic Dissipative

Extended TDS

**Complete Technical Documentation
and Testing Summary**

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Are you looking for an updated TDS version? [Check out the latest online version here.](#)

Technical Data Sheet

Carbon fiber-reinforced, bio-based nylon powder designed for electrostatic discharge (ESD) sensitive environments. Offering high strength, stiffness and durability, it ensures reliable performance and protection against static buildup in demanding environments.

The data contained in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application of our product, this data does not relieve processors from carrying out their own investigations and tests; neither does this 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.

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General Properties	Method	Typical Values
Appearance	-	Natural grey powder
Density (printed part)	DIN EN ISO 1183-1	1.07 g/cm ³
Density (Bulk Density)	DIN EN ISO 60	0.46 g/cm ³
Mean Particle Size d50	ISO 13320	40-50 µm
Melting Temperature (10 K/min)	ISO 11357	204°C
Crystallization Temperature (10 K/min)	ISO 11357	162°C
Melting Volume Flow Rate (220°C, 2.16 kg)	ISO 1133	20 cm ³ /10min

Tensile Properties	Method	Typical Values X-Direction		Typical Values Z-Direction	
		Dry ¹⁾	Cond ²⁾	Dry ¹⁾	Cond ²⁾
		E Modulus	ISO 527-2, 23°C	3150 MPa	2300 MPa
Ultimate Tensile Strength	ISO 527-2, 23°C	65 MPa	55 MPa	55 MPa	47 MPa
Elongation at Break	ISO 527-2, 23°C	20%	22%	23%	31%
E Modulus	ISO 527-2, 80°C	900 MPa	800 MPa	550 MPa	500 MPa
Ultimate Tensile Strength	ISO 527-2, 80°C	38 MPa	34 MPa	30 MPa	27 MPa
Elongation at Break	ISO 527-2, 80°C	37%	35%	49%	46%

Flexural Properties	Method	Typical Values X-Direction		Typical Values Z-Direction	
		Dry ¹⁾	Cond ²⁾	Dry ¹⁾	Cond ²⁾

Flexural Modulus	DIN EN ISO 178	3050 MPa	2550 MPa	2100 MPa	1650 MPa
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Impact Properties	Method	Typical Values X-Direction		Typical Values Z-Direction	
		Dry ¹⁾	Cond ²⁾	Dry ¹⁾	Cond ²⁾

Charpy Notched, 23°C	DIN EN ISO 179-1	6.6 kJ/m ²	7.3 kJ/m ²	4.7 kJ/m ²	5.3 kJ/m ²
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Charpy Unnotched, 23°C	DIN EN ISO 179-1	80 kJ/m ²	101 kJ/m ²	90 kJ/m ²	107 kJ/m ²
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Izod Notched, 23°C	ISO 180	7 kJ/m ²	7.9 kJ/m ²	5 kJ/m ²	5.5 kJ/m ²
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Izod Unnotched, 23°C	ISO 180	67 kJ/m ²	81 kJ/m ²	58 kJ/m ²	83 kJ/m ²
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Thermal Properties	Method	Typical Values
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HDT/A (1.8 MPa)	ISO 75-2	111°C
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HDT/B (0.45 MPa)	ISO 75-2	186°C
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Vicat/A (10 N)	DIN EN ISO 306	192°C
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Vicat/A (10 N)	DIN EN ISO 306	183°C
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Fire, Smoke, Toxicity (FST) properties	Method	Typical Values
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Flammability	UL 94	HB (0.7 -3.0mm)
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Electrical Properties	Method	Typical Values	
		X-Direction	Z-Direction
Dielectric Strength	IEC 60243-1	0 kV/mm (1 mm)	0 kV/mm (1 mm)
Volume Resistivity	IEC 62631-3-1	2.3•10 ⁶ Ωcm	2.1•10 ⁵ Ωcm
Specific Surface resistivity	IEC 62631-3-2	1.3•10 ⁴ Ω	3.4•10 ⁴ Ω

Mechanical properties overview

- 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
- 3) If not noted otherwise, all specimens are 3D printed. Samples were tested at room temperature, 23°C. All values measured with virgin material.

Printing Performance

The combination of 3D printer and material has a huge impact on the quality of the parts produced.

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Flammability

Ultrasint® PA11 ESD does not contain any flame retardants and passes UL94 “HB” rating down to a wall thickness of 0.7 mm.

***** Flame testing *****
Flammability HB acc. to UL 94 : 2021

Information about test procedure and test specimens

M 0 0321			Measurements & observations after application of flame (30 s)					Flame class
Dimensions of test specimens 127 * 12,7 * d mm ^ø			Flame front ceases before 25mm mark	Flame front ceases before 100mm mark	Damaged length beyond 25mm mark [mm]	Burning time beyond 25mm mark [s]	Burning rate [mm/min]	
Requirements			for d < 3 mm ---	---	---	>= 60	<= 75	= HB
			for d >= 3 mm ---	---	---	>= 112,5	<= 40	= HB
Pre-conditioning	Spec. no.	Thickn. [mm]						HB HB -
Conditioning	1	0.72	No	Yes	30	50	36	
(2d / 23°C / 50%)	2	0.71	No	Yes	5	28	11	
	3	0.69	No	No	75	57	78	
Comments			First test 2022-02-14 7:11 - 2022-02-14 7:17					
Conditioning	1	0.73	Yes	Yes	0	0	0	HB
(2d / 23°C / 50%)	2	0.71	No	Yes	3	14	13	HB
	3	0.71	No	Yes	15	49	18	HB
Comments			Repeated test 2022-02-14 7:18 - 2022-02-14 7:21					HB @0.7mm