

# Technical Data Sheet

# Ultrafuse PA

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Version No.: 2.2

## General information

### Components

BASF Polyamide (PA) based filament for Fused Filament Fabrication.

### Product Description

The key features of Ultrafuse PA are the high strength and high modulus. Furthermore, Ultrafuse PA shows a good thermal distortion stability.

### Delivery form and warehousing

Ultrafuse PA filament should be stored at 15 - 25°C in its originally sealed package in a clean and dry environment. If the recommended storage conditions are observed the products will have a minimum shelf life of 12 months.

### Product safety

Recommended: Process materials in a well ventilated room, or use professional extraction systems. For further and more detailed information please consult the corresponding material safety data sheets.

### 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.

**Recommended 3D-Print processing parameters**

Nozzle Temperature	220 – 250 °C / 428 – 482 °F
Build Chamber Temperature	-
Bed Temperature	90 – 120 °C / 194 – 248 °F
Bed Material	Glass + PVA / Kapton tape / PA adhesive
Nozzle Diameter	≥ 0.4 mm
Print Speed	30 – 60 mm/s

**Drying Recommendations**

Drying recommendations to ensure printability	70 °C in a hot air dryer for 4 to 16 hours
Optimum drying recommendations for best mechanical part properties	80 °C in a vacuum oven for at least 40 hours
Please note: To ensure constant material properties the material should always be kept dry.	

**General Properties**

## Standard

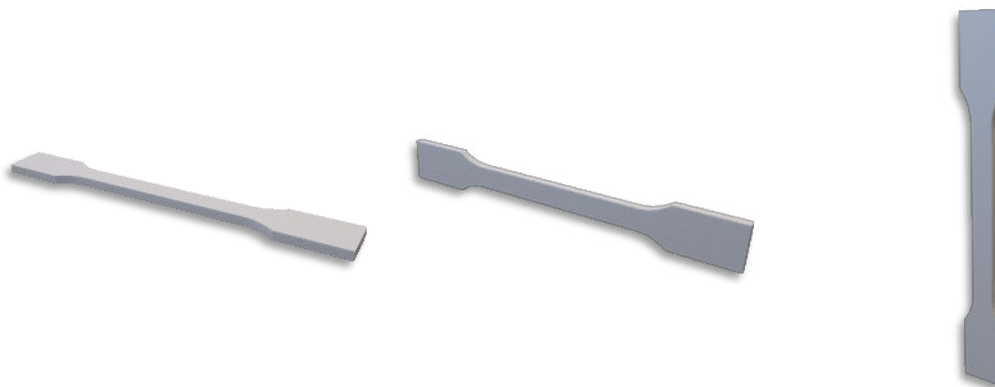
Printed Part Density (dry)	1115 kg/m <sup>3</sup> / 69.6 lb/ft <sup>3</sup>	ISO 1183-1
Printed Part Density (conditioned)	1050 kg/m <sup>3</sup> / 65.5 lb/ft <sup>3</sup>	ISO 1183-1

**Thermal Properties**

## Standard

HDT at 1.8 MPa (dry)	65 °C / 149 °F	ISO 75-2
HDT at 0.45 MPa (dry)	135 °C / 275 °F	ISO 75-2
Vicat softening point at 50 N	172 °C / 342 °F	ISO 306
Glass Transition Temperature	49 °C / 120 °F	ISO 11357-2
Crystallization Temperature	147 °C / 297 °F	ISO 11357-3
Melting Temperature	195 – 197 °C / 383 – 386 °F	ISO 11357-3
Melt Volume Rate	49.5 cm <sup>3</sup> /10 min / 3.02 in <sup>3</sup> /10 min (275 °C, 5 kg)	ISO 1133

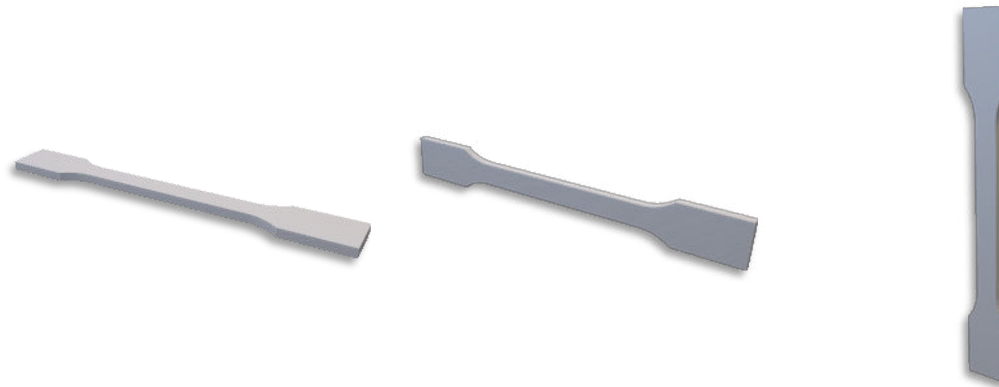
## Mechanical Properties | Dried specimens



Print direction	Standard	XY	XZ	ZX
		Flat	On its edge	Upright
Tensile strength	ISO 527	61.4 MPa / 8.9 ksi	-	16.4 MPa / 2.4 ksi
Elongation at Break	ISO 527	9.6 %	-	0.8 %
Young's Modulus	ISO 527	2419 MPa / 351 ksi	-	2122 MPa / 308 ksi
Flexural Strength	ISO 178	77.0 MPa / 11.2 ksi #	95.5 MPa / 13.9 ksi #	40.2 MPa / 5.8 ksi
Flexural Modulus	ISO 178	2051 MPa / 297 ksi	2246 MPa / 326 ksi	2149 MPa / 312 ksi
Flexural Strain at Break	ISO 178	No break	No break	1.8 %
Impact Strength Charpy (notched)	ISO 179-2	5.6 kJ/m2	3.3 kJ/m2	1.2 kJ/m2
Impact Strength Charpy (unnotched)	ISO 179-2	23.0 kJ/m2	29.7 kJ/m2	3.5 kJ/m2
Impact Strength Izod (notched)	ISO 180	5.8 kJ/m2	3.9 kJ/m2	1.7 kJ/m2
Impact Strength Izod (unnotched)	ISO 180	28.0 kJ/m2	45.6 kJ/m2	3.2 kJ/m2

# No break, strength at 5% bending strain

## Mechanical Properties | Conditioned specimens



Print direction	Standard	XY	XZ	ZX
		Flat	On its edge	Upright
Tensile strength	ISO 527	33.2 MPa / 4.8 ksi	-	17.6 MPa / 2.6 ksi
Elongation at Break	ISO 527	143.3%	-	12.8%
Young's Modulus	ISO 527	395 MPa / 57 ksi	-	334 MPa / 48 ksi
Flexural Strength	ISO 178	17.7 MPa / 2.6 ksi #	18.1 MPa / 2.6 ksi #	17.3 MPa / 2.5 ksi #
Flexural Modulus	ISO 178	445 MPa / 64.5 ksi	468 MPa / 67.9 ksi	428 MPa / 62.1 ksi
Flexural Strain at Break	ISO 178	No break	No break	No break
Impact Strength Charpy (notched)	ISO 179-2	-	136 kJ/m <sup>2</sup> ##	9.4 kJ/m <sup>2</sup>
Impact Strength Charpy (unnotched)	ISO 179-2	No break	No break	13.4 kJ/m <sup>2</sup>
Impact Strength Izod (notched)	ISO 180	85.4 kJ/m <sup>2</sup>	106.0 kJ/m <sup>2</sup>	10.1 kJ/m <sup>2</sup>
Impact Strength Izod (unnotched)	ISO 180	No break	No break	17.4 kJ/m <sup>2</sup>

# No break, strength at 5% bending strain

## Partial rupture