Xometry

Datasheet

PA12-SLS

Description

SLS Nylon 12 achieves a balance between strength and detail, making it a powerful material for functional prototyping and end-use production of complex components and durable parts with high environmental stability.

Features

[Print size]: 680x380x580 mm

[Features]: Heat-resistant, excellent toughness, and high strength, suitable for functional parts. No support is required during printing, making it suitable for prototyping products with extremely complex structures. The surface of nylon material is not as smooth as SLA resin and has a slightly granular texture.

Colors: White/Black

Advantages: Heat-resistant, excellent toughness, and high strength, suitable for functional parts. No support is required during printing, making it suitable for prototyping products with extremely complex structures

Disadvantages: Uncoated prints absorb moisture and dust from the air, causing color changes and degradation over time. Certain changes of material properties may result in disproportionate shrinkage during printing or cooling.

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Recommended applications: Functional prototypes, small-batch rapid manufacturing, motorsports and aerospace, sports products, enclosures, connectors and mechanical components, medical and biocompatible applications.

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Parameters

Measurement	HP 3D HR PA12[18]	HP 3D HR PA12 GB[19]	HP 3D HR PA11[20]	VESTOSINT © 3D Z2773 PA 12
Tensile Strength, Max Load[17], XY	48 MPa/6960 psi	30 MPa/4350 psi	50 MPa/7250 psi	48 MPa/6960 psi
Tensile Modulus[17], XY	1700MPa/247 ksi	2800 MPa/406 ksi	1800 MPa/261 ksi	1700 MPa/247 ksi
Elongation at Break[17], XY	20%	6.5%	50%	20%
Izod Impact Strength - Notched (3.2 mm, 23°C), XYZ	3.5 kJ/m2	2.7 kJ/m2	6 kJ/m2	-
Heat Deflection Temperature (@0.45 MPa, 66 psi)-Z	175 °C/347 °F	173 °C/344 °F	183 °C/361 °F	-
Heat Deflection Temperature (@1.82 MPa, 264 psi)-Z	106 °C/223 °F	121 °C/250 °F	50 °C/122 °F	-
Refresh ratio for stable performance	20%	30%	30%	50%
Application Example				

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Base Data		PA 12 White	PA 12 Black	PA 11 White	PA 11 Black
Powder Density		0.49 g/cm³	g/cm³	0.50 g/cm³	0.50 g/cm³
Part Density		0.98 g/cm³	0.99 g/cm³	1.01 g/cm³	1.01 g/cm³
Color		White	Black	White	Black
Heat Data					
FUP (10°C /min) GB/T 19466.1-2004		185°C	184.5°C	201°C	202°C
HDT GB/T 1634.2-2004	1.82 MPa	84.5°C	73.1°C	51°C	47°C
	0.46 Mpa	148.2°C	146.1°C	151.1°C	185°C
Mechanical Data					
Tensile Modulus GB/T 1040.2-2006		45 MPa	47 MPa	48 MPa	76 MPa
Tensile Strength at Yield GB/T 1040.2-2006		1600 MPa	1951 MPa	1483 MPa	1830 MPa
Elongation at Break GB/T 1040.2-2006		38%	19%	56%	30%
Flexural Strength GB/T 9341-2008		46.1 MPa	40.1 MPa	59 MPa	57 MPa
Flexural Modulus GB/T 9341-2008		1297 MPa	1053.7 MPa	1470 MPa	1480 MPa
Notched Impact Strength GB/T 1843-2008		4.8 KJ/m²	8.6 KJ/m²	26 KJ/m²	23 KJ/m²
Unnotched impact strength GB/T 1843-2008		13.3 KJ/m²	23.1 KJ/m²	Pending KJ/m²	Pending KJ/m²

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Base Data		Glass Filled Nylon Gray	Glass Filled Nylon Black
Powder Density		0.68 g/cm³	0.69 g/cm³
Part Density		1.31 g/cm³	1.35 g/cm³
Color		Light Gray	Black
Heat Data			
FUP (10°C /min) GB/T 19466.1-2004		184.5°C	183.5°C
HDT GB/T 1634.2-2004	1.82 MPa	69°C	69.5°C
	0.46 Mpa	153.1°C	155.1°C
Mechanical Data			
Tensile Modulus GB/T 1040.2-2006		45 MPa	43 MPa
Tensile Strength at Yield GB/T 1040.2-2006		2600 MPa	2700 MPa
Elongation at Break GB/T 1040.2-2006		6.7%	5.4%
Flexural Strength GB/T 9341-2008		60 MPa	62 MPa
Flexural Modulus GB/T 9341-2008		2100 MPa	2200 MPa
Notched Impact Strength GB/T 1843-2008		6.1 KJ/m²	6.6 KJ/m²
Unnotched impact strength GB/T 1843-2008		31.2 KJ/m²	31.8 KJ/m²

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Liquid performance index	
Inspection item	Numerical value
Appearance	Milky white viscous liquid
Viscosity (30ÿ)	320cps
Density (25ÿ)	1.14g/cm^3
Penetration depth (Dp)	0.12mm
Critical Exposure Energy (Ec)	10.30mJ/cm^2

Parts performance index			
Test items	Detection method	UTR8360X	ABS
Tensile strength (MPa)	ASTM D638M	53.7	45.7
Tensile modulus (MPa)	ASTM D638M	3160	-
Elongation at break	ASTM D638	5.1%	42
Bending strength (MPa)	ASTM D790	78.6	73.5
Flexural modulus (MPa)	ASTM D790	2450	2300
Impact strength (J/m)	ASTM D256	31	160
Water absorption (%)	ASTM D570	0.49	0.20-0.45
Shore hardness (D)	ASTM D2241	84	81
Heat distortion temperature (ÿ)	ASTM D648 0.45MPa 59.1		84
Heat distortion temperature (ÿ)	ASTM D648 1.82MPa 52		80