formlabs

TPU 90A Powder

A Tough SLS Elastomer for Resilient, Skin-Safe Products

Create flexible TPU parts with unmatched design freedom and ease. Balancing high elongation at break and superior tear strength, TPU 90A Powder enables you to produce flexible, skin-safe prototypes and end-use parts that withstand the demands of everyday use – all at a low cost per part thanks to a 20% refresh rate.

TPU 90A Powder is specifically developed for use on Fuse Series printers.

Wearables and soft-touch elements

Gaskets, seals, masks, belts, plugs, and tubes

Padding, dampers, cushions, and grippers

Soles, splints, orthotics, and prosthetics

Protective sports equipment

V1 **FLTP9G01** * **May not be available in all regions**

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MATERIAL PROPERTIES DATA

TPU 90A Powder

	METRIC [1,2]	IMPERIAL [1,2]	METHOD
Mechanical Properties			
Ultimate Tensile Strength (X/Y)	8.7 MPa	1260 PSI	ASTM D412-16, Method A
Ultimate Tensile Strength (Z)	7.2MPa	1050 PSI	ASTM D412-16, Method A
Elongation at Break (X/Y)	310%		ASTM D412-16, Method A
Elongation at Break (Z)	110%		ASTM D412-16, Method A
Stress @ 50% Elongation (X/Y)	6.1 MPa	889 PSI	ASTM D412-16, Method A
Stress @ 50% Elongation (Z)	5.9 MPa	860 PSI	ASTM D412-16, Method A
Stress @ 100% Elongation (X/Y)	7.2 MPa	1050 PSI	ASTM D412-16, Method A
Stress @ 100% Elongation (Z)	7.0 MPa	1020 PSI	ASTM D412-16, Method A
Tear Resistance (X/Y)	66 kN/m	378 lbf/in	ASTM D624-00 (2020)
Tear Resisitance (Z)	39 kN/m	247 lbf/in	ASTM D624-00 (2020)
Compression Set (23°C)	20.5%		ASTM D395-18, Method B
Compression Set (70°C)	59.9%		ASTM D395-18, Method B
Shore Hardness	90A		ASTM D2240-15 (2021)
Tabor Abrasion	122mm^3	7 x 10^{-3} in^3	ISO 4649 (40rpm, 10N load)
Thermal Properties			
Vicat Softening Temperature	94.3 °C	201.7 °F	ASTM D 1525
Other Properties			
Moisture Content (powder)	0.19%		ISO 15512 Method D
Water Absorption (Printed Part)	0.89%		ASTM D570
Bulk Density (Sintered)	1.14 g/cm^3	71.2 lb/fi^3	In-house method

Samples printed with TPU 90A powder have been evaluated in accordance with ISO 10993-1:2018, and has passed the requirements for the following biocompatibility risks:

ISO Standard	Result [3,4]
ISO 10993-5: 2009	Non-cytotoxic
ISO 10993-23:2021	Non-irritant
ISO 10993-10:2021	Non-sensitizer

SOLVENT COMPATIBILITY

Percent weight gain over 24 hours for a printed 1 x 1 x 1 cm cube immersed in respective solvent:

Solvent	24 hr weight gain, %	Solvent	24 hr weight gain, %
Acetic Acid 5%	1.3	Isooctane (aka gasoline)	0.7
Acetone	28.6	Mineral oil (light)	2.3
Isopropyl Alcohol	4.8	Mineral oil (Heavy)	2.1
Bleach ~5% NaOCl	0.8	Salt Water (3.5% NaCl)	0.9
Butyl Acetate	16.5	Sodium Hydroxide solution (0.025% PH 10)	0.9
Diesel Fuel	2.0	Water	0.9
Diethyl glycol Monomethyl Ether	14.4	Xylene	20.8
Hydraulic Oil	2.8	Strong Acid (HCl conc)	- 5.2
Skydrol 5	6.5	TPM	9.9
Hydrogen peroxide (3%)	1.0		

[1] Material properties may vary with part geometry, print orientation and temperature.

[2] Results on Fuse 1 and Fuse 1+ 30W are equivalent within the bounds of experimental uncertainty

[3] Material properties may vary based on part design and manufacturing practices. It is the manufacturer's responsibility to validate the suitability of the printed parts for the intended use.

[4] TPU 90A was tested at NAMSA World Headquarters, OH, USA.