PRODWAYS
PREMIUM MATERIALS

TPU-70A THERMOPLASTIC URETHANE POWDER

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Prodways TPU-70A is a fine powder based on Thermoplastic Urethane, specifically formulated to function on laser sintering- or radiation-based additive manufacturing systems. It enables the manufacturing of prototypes, presentation models and functional parts in elastomeric plastic with:

- **Elastic elongation up to 350%**
- **High detail resolution**
- **Long life cycle without infiltration**
- **Flexible and smooth**
- **Very low refresh rates**
- **Good chemical resistance**
- **Easy to color**

PHYSICAL PROPERTIES

Chemical nature of the preparation	POLURETHANE blend : Polyurethane, Presence of additives and stabilizers	
Grades (*)	Natural: 70A	
Physical State (20°C) and Color	Solid (powder) Natural grade : White to slightly yellowish	
Odor	Transparent, hardly noticeable	
pH	not applicable (aqueous suspension)	
Average particle size	Diffraction laser	45 < __ < 90 µm
	Grain size D10	48 µm
	Grain size D50	60 µm
	Grain size D90	88 µm
Powder packed Density 23°C	1.20	+/- 0.05 g/cm³
Bulk Density	Natural (20°C) : 1110 - 1200 kg/m³	
Part Density	1.12	+/- 0.05 g/cm³
Density	Natural (20°C) : 1020 - 1150 kg/m³	
23°C Moisture absorption 24 hrs.	ASTM D570	* +/- 0.05 %

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THERMAL PROPERTIES

T°f Melting point >95 °C (KOFLER) / softening range: >80 °C (KOFLER)	DSC	105 < __ < 122 °C
T°g Glazing point	DSC	+/- °C
Heat Deflection Temperature at 1.82 Mpa	ASTM D648	* +/- * °C
T° Process (according to machine reading)	Glazing method	-11 +/-2°C (ex : 103 °C +/-2)
Flashpoint	>220°C	
Decomposition Temperature	Polyurethane: > 225 ° C	
Development of flammable gases / vapors. Dangerous decomposition products	Toxic gases & vapors such as: CO (carbon monoxide), CO^2 (carbon dioxide), NO (nitrogen oxide)	
Autoignition Temperature	>390°C	
Explosive Properties (*)	Dust may form explosive mixture in air (30 - 60 g/m^3) Test of dust behavior in explosions : (*) Kst = 200 - 250 m.bar/s (1550) / 301 m.bar/s (*) Explosibility class : St2(1550) / St3(2000)	
Explosive Limits (*)	Lower : (in air 30 - 60 g/m^3) (*) Higher (*) : In air(*)Approximately 200 g/m^3 (estimated) (*)	
Flammability – Fire Classification UL-94 following ASTM D618(ISO 921) with a barrel 125 mm x 13 mm, e=13 mm	UL94 vertical&Horizontal test	Natural grade: HC Out Classification

MECHANICAL PROPERTIES

Tensile strength XY (average XY)	ISO 527	7 +/- 1 MPa*
Tensile strength Z (average Z)	ISO 527	5.5 +/- 1 MPa*
Young modulus	ISO 527	65 +/- 25 MPa*
Elongation at break XY (average XY)	ISO 527	350 +/- 25 %*
Elongation at break Z (average Z)	ISO 527	200 +/- 15 %*
Flexural modulus	ISO 178	* +/- 25 MPa*
Charpy – Impact strength	ISO 179	* No break, dry/cond. 24 hrs. KJm^2
Charpy – Notched impact strength	ISO 179	* +/- * KJm^2
Shore Test (Shore A)	ISO 868A	70 +/- 5 Shore A

*statistics after several cycles >10 refresh

CHEMICAL PROPERTIES

Matrix in TPU with a good chemical resistance to alkaline, hydrocarbons, oils, gasolines, gas oil and solvents. Attack by the acids.

Solubility:

Water (*)	Insoluble in Water (20 °C) < 1 mg/m3 (estimated) (*)
Solvents	Under investigation

ELECTRICAL PROPERTIES

Volume resistivity	CEI 93	* Ohms/m
Horizontal surface Voluminal resistivity, Vertical surface Voluminal resistivity	CEI 93	* Ohms

Insulator — Static Dissipative — Conductor

$1E^{+15}$ $1E^{+14}$ $1E^{+13}$ $1E^{+12}$ $1E^{+11}$ $1E^{+10}$ $1E^{+9}$ $1E^{+8}$ $1E^{+7}$ $1E^{+6}$ $1E^{+5}$ $1E^{+4}$ $1E^{+3}$ $1E^{+2}$ $1E^{+1}$ Ohms/m

SURFACE FINISH

Natural coloration	Visual	Cream white, slightly yellow
Surface Ra/ Upper Facing processed & blasting, Surface Ra	ISO 4287	12-14 +/- 2 µm
Surface Ra/ Upper Facing after Finishing, Surface Ra	ISO 4287	6 +/- 1 µm

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The mechanical properties can vary according to the positioning of the tensile bars, operating conditions and exposure parameters of the systems used. These data rest on the current state of our knowledge. They do not give the exact characteristics of material and does not represent a guarantee.
Some data contained in this document are under investigation - this is a preliminary data sheet.