Comparison of print materials with Infomir 3D Printing: PA 12, PP and TPU

This document is intended for systematized analysis of the three main powder materials used for 3D printing with industrial capacity Infomir 3D Printing: polyamide PA 12, polypropene (PP), and polyurethane (TPU).

The tables below include three of the materials' main characteristics, mechanical properties, and their resilience when interacting with various liquids. This information is intended for engineers, developers, designers, and other 3D printing experts striving to optimize production processes and select the material most suitable for specific projects.

General properties

	PA 12	PP	TPU
Powder melting point (DSC)	187 °C	138 °C	192 °C
Size of particles	60 µm	62 µm	100 µm
Powder bulk density	1.01 g/cm^3	0.34 g/cm^3	1.16 g/cm^3

Mechanical characteristics

	PA 12	PP	TPU
Hardness	80 (Shore D)	68 (Shore D)	88 (Shore A)
Permittivity	3-4	2.2-2.4	3-7
Dielectric strength	20-30 kV/mm	30-45 kV/mm	15-30 kV/mm
Ultimate tensile strength, XY	65 MPa	29 MPa	10.5 MPa
Ultimate tensile strength, Z	70 MPa	29 MPa	6.5 MPa
Tensile elongation, XY	20%	20%	185%
Tensile elongation, Z	15%	14%	55%

Resistance to various environments and radiations

Type of environment or radiation	PA 12	PP	TPU
Alkaline environment	●●●	●●●	●●●
Gasoline	●●●	●●●	●●●
Acetone	●●●	●●●	●●●
Methyl spirit	●●●	●●●	●●●
Acetic acid	●●●	●●●	●●●
Carbon dioxide	●●●	●●●	●●●
Motor oil	●●●	●●●	●●●
UV radiation	●●●	●●●	●●●
IR radiation	●●●	●●●	●●●
Water	●●	●●●	●●
Bleach	●●	●●	●●
Sulfuric acid	●●	●●	●●
Hydrochloric acid, 20% solution	●●	●●	●●
Phosphoric acid, 10% solution	●●	●●	●●

●●● — high resistance ●● — medium resistance

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