TECHNICAL DATA SHEET



PA12

Smart Print PA12 is a premium Nylon 12 filament developed for users who require consistent performance, dimensional precision, and long-term reliability in functional 3D printed parts. Based on Polyamide 12, the material combines low moisture sensitivity with excellent toughness and stable thermal behavior.
Designed for demanding applications, Smart Print PA12 delivers predictable printing results, strong layer bonding, and controlled deformation. It is well suited for advanced functional components and precision parts where stability over time and environmental resistance are essential.

Product features

High Dimensional Stability

Thanks to its naturally low water absorption, Smart Print PA12 maintains accurate dimensions even in environments with fluctuating humidity and temperature. This makes it suitable for precision parts and assemblies with tight tolerances.

Outstanding Toughness and Fatigue Resistance

PA12 exhibits excellent elongation at break and impact resistance, reducing the risk of cracking or brittle failure. Printed parts remain durable and reliable under repeated mechanical stress.

Wear Resistance and Smooth Motion

The material's self-lubricating characteristics and low surface friction support smooth operation in moving components. Smart Print PA12 performs well in gears, bearings, bushings, and mechanical interfaces requiring long service life.

Stable Printing Performance

Low shrinkage and controlled thermal behavior minimize warping and internal stress. The filament is optimized for consistent extrusion and repeatable results in professional printing environments.

Printing guidelines

Based on a 0.4 mm nozzle. Printing conditions may vary with different nozzle diameters.

Nozzle temperature **260–290°C**	Build surface material **PA/Nylon surface, garolite, PEI**	Build surface treatment **glue, PA adhesive**
Build plate **70–90°C**	Cooling fan **0% / off**	Printing speed: **40–100 mm/s**
Raft separation distance **0.2 mm**	Retraction distance **5–7 mm**	Retraction speed **20–35 mm/s**

Drying guidelines

As a nylon-based material, Smart Print PA12 is hygroscopic and must be dried before printing. Dry the filament at 70–90°C for 4–6 hours to ensure stable extrusion, smooth surfaces, and strong interlayer adhesion. Store the filament in a sealed container with desiccant to prevent moisture absorption and maintain consistent performance over time.

Available colors



Precautions

Printer Compatibility

Smart Print PA12 requires an all-metal hotend capable of maintaining temperatures up to 290°C. Ensure that your printer's extruder, heat break, and feeder are suitable for nylon-based materials.

Shrinkage & Warping Control

PA12 offers lower shrinkage than other nylons, but printing inside an enclosure is recommended for larger or more complex parts. Avoid drafts or temperature swings to keep dimensions accurate.

Cooling Settings

Print with cooling fan off (0%). Cooling can weaken interlayer adhesion and may cause cracking in nylon prints.

Filament Storage

Store Smart Print PA12 in a sealed container with desiccant. Nylon absorbs moisture rapidly; dry again if extrusion quality degrades.

Printing & Handling Guidelines

Smart Print PA12 is intended for printers equipped with an all-metal hotend capable of maintaining high extrusion temperatures. A heated build plate is recommended to ensure optimal adhesion and dimensional accuracy.

For larger or more complex parts, printing in an enclosed chamber helps maintain stable thermal conditions and improves overall print consistency.

Important Notes

- Premium nylon filament optimized for precision and long-term stability
- Drying required before printing for best results
- Enclosure recommended for complex or high-accuracy parts
- Print parameters may vary depending on printer configuration and environment

Property	Test Standard	Unit	Typical Value
Density	GB/T 1033	g/cm³	1.012
Tensile Strength	GB/T 1040	MPa	55.64
Elongation at Break	GB/T 1040	%	165.41
Flexural Strength	GB/T 9341	MPa	50.81
Flexura Modulus	GB/T 9341	MPa	659.49
Izod Impact Strength	GB/T 1843	kJ/m²	10.14
Heat Deflection Temperature (0.45 MPa)	GB/T 1634	°C	100
Melt Flow Index	GB/T 3682	g/10 min	–
Recommended Extrusion Temperature	–	°C	260–290
Build Plate Temperature	–	°C	70–90

Disclaimer

The information in this document is based on internal testing and provided for general reference only. Actual performance may vary depending on printer configuration, environmental conditions, and part geometry. As nylon materials are sensitive to moisture, proper storage and drying are required to ensure consistent results. Smart Print is not liable for equipment damage, improper handling, or print failures resulting from operation outside recommended guidelines. Always store and dispose of materials responsibly and in accordance with local regulations.