



Technical Data Sheet

PA12

Available colors



Product overview

Professional Lab PA12 is a versatile nylon filament designed for reliable functional 3D printing and everyday engineering applications. Based on Polyamide 12, the material offers low moisture absorption, good toughness, and stable dimensional behavior, making it well suited for parts that must retain their shape and performance over time.

PA12 provides a practical balance between durability, flexibility, and ease of processing. Its consistent extrusion and low warping characteristics support smooth printing on standard FDM/FFF printers equipped for nylon materials.

Product features

Low Moisture Absorption

Compared to other nylon materials, PA12 absorbs significantly less moisture. This helps printed parts maintain stable dimensions and mechanical properties, even in environments with changing humidity.

Good Toughness and Fatigue Resistance

Professional Lab PA12 offers high toughness and impact resistance, with excellent elongation at break. Printed components are resistant to cracking and brittle failure during long-term use.

Wear Resistance and Self-Lubricating Behavior

The naturally low friction coefficient makes PA12 suitable for parts exposed to repeated movement. It performs well in gears, bushings, connectors, and mechanical interfaces.

Stable Printing and Low Warping

Low shrinkage during cooling reduces the risk of warping. This allows users to produce accurate parts with reliable geometry using standard nylon-compatible printing setups.

Printing Recommendations

- Nozzle temperature: 260–290°C
- Build surface material: PA/Nylon-compatible surface, garolite, PEI
- Build surface treatment: glue, PA adhesive
- Build plate temperature: 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

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

Drying recommendations

PA12 is hygroscopic and should be dried before printing. Dry the filament at 70–90°C for 4–6 hours to prevent surface defects, bubbling, and inconsistent extrusion. Store the filament in a sealed container with desiccant to maintain stable print quality.

Precautions

Printer Compatibility: An all-metal hotend capable of sustaining temperatures up to 290°C is required. Ensure the extruder, heat break, and feeder are suitable for nylon-based filaments.

Shrinkage & Warping Control: PA12 exhibits lower shrinkage than other nylons, but printing inside an enclosure is recommended for larger or more complex parts. Avoid drafts or sudden cooling to maintain consistent dimensions.

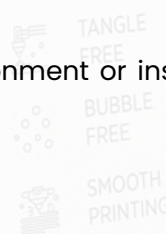
Cooling Settings: Print with cooling fan off (0%). Cooling can weaken interlayer adhesion and may cause cracking in nylon prints.

Filament Storage: Store Professional Lab PA12 in a dry, sealed container with desiccant. Nylon absorbs moisture rapidly, which can degrade extrusion quality. Dry again if the filament becomes inconsistent.

Printing & Handling Guidelines

Professional Lab PA12 prints reliably on FDM/FFF printers equipped with an all-metal hotend capable of high temperatures. A heated build plate is recommended to ensure proper first-layer adhesion and dimensional stability.

For larger or more complex parts, printing in a draft-free environment or inside an enclosure helps reduce thermal stress and improves consistency.



Important Notes

- Nylon material sensitive to moisture – drying recommended
- Enclosure improves results on larger prints
- Cooling fan should remain off for best layer adhesion
- Print parameters may vary depending on printer and setup

Property	Test Standard	Unit	Typical Value
Density	GB/T 1033	g/cm ³	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/m ²	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 of Liability

The information provided in this datasheet is intended for reference and comparison only. Actual results may vary depending on printer configuration, environmental factors, part geometry, and material handling. Nylon materials are sensitive to moisture; proper drying and storage are required to ensure consistent performance. Professional Lab assumes no responsibility for equipment damage, print failures, or performance issues resulting from improper use or operation outside recommended guidelines. Always store, handle, and dispose of materials responsibly and in accordance with local regulations.

