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PLA SILK+

A high-gloss, almost metallic sheen straight off the printer — the reformulated silk with markedly better layer strength than the original, and still a material to display rather than to stress.

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A high-gloss, almost metallic sheen straight off the printer — the reformulated silk with markedly better layer strength than the original, and still a material to display rather than to stress.

1 · In plain words

2 · Living with it

3 · How it is printed

4 · The numbers

5 · Compared with other brands

Silk PLA gets its lustre from a polymer additive that makes the surface of each extruded line smooth and reflective, so light bounces off a print the way it does off satin or polished metal. It is the material behind the gold trophies, chrome-look vases and pearlescent figures that fill 3D-printing showcases. The original silk had a well-earned reputation for splitting along its layers; Silk+ is the manufacturer's reworked version, with roughly 85 % better impact strength across the layers and a higher softening point. It remains a decorative grade — weaker between layers than PLA Basic and notably brittle in thin sections — and it rewards patience: the slower and hotter you print it, the shinier it gets.

FEELS LIKE

Glassy, slippery, cool

The smoothest surface in the range; fingerprints show

THE EFFECT

Deep gloss, metallic look

Best on curved surfaces and outer walls; flat tops are less shiny

STRENGTH

Decorative grade

Layer toughness about 60 % of PLA Basic; snaps rather than bends

IMPROVEMENT OVER SILK

Much better layers

Z impact 8.5 vs 4.6 kJ/m²; Z tensile 25 vs 18 MPa

COLOUR RANGE

13 colours

Gold, Silver, Rose Gold, Champagne, Titan Gray, Candy Red and more

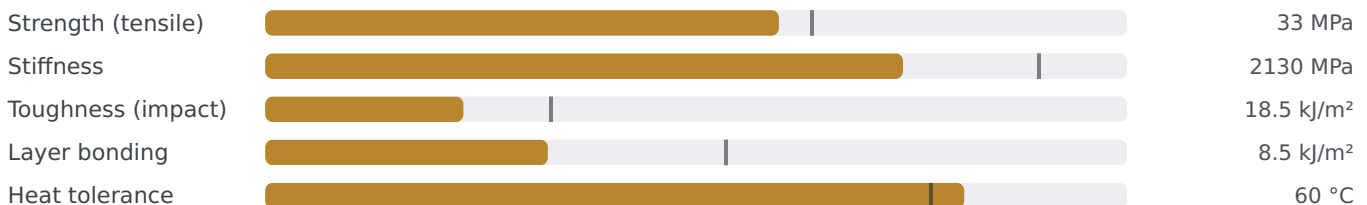
EASE OF PRINTING

Easy, but slow for best results

Outer walls at 40–60 mm/s; speed changes show as gloss changes

Where it sits in the range

Each bar shows this material against the strongest value found anywhere in this series of guides, PLA and PETG together (bar full = best in the series). The dark tick marks plain PLA Basic, the material most people know, so you can see at a glance where this one gives up or gains something. Values come from the manufacturer's own datasheets, measured on test bars printed flat (X-Y).



■ PLA Silk+ ■ PLA Basic reference

Good for

- Vases, bowls, sculptures and ornaments with sweeping curved surfaces
- Trophies, awards, medals and gift pieces

Not the right choice for

- Anything structural, load-bearing or likely to be dropped
- Thin, tall or slender features — these break during printing and in use

- Figurines and busts that will not be handled roughly
- Jewellery-style pieces, pendants and decorative boxes
- Lamp bodies and shades where the sheen catches light

- Parts with large flat top surfaces as the main feature; the gloss lives on the walls
- Multi-speed prints where the outer wall speed varies — banding results
- Food contact, heat, sun: the general PLA limits

Where the shine comes from, and why speed matters

The silk additive lowers the friction of the melt so each extruded bead levels into a smooth, mirror-like ribbon before it freezes. Given time and heat to flow, the surface is glossy; extruded fast and cooled quickly, it keeps micro-ridges that scatter light and look dull. That is why the manufacturer recommends 40–60 mm/s for outer walls and a slightly higher nozzle temperature, and why a model whose outer-wall speed changes between regions shows visible bands of differing sheen. Only the walls carry the effect; the top surface is far less glossy unless printed with a concentric or Archimedean infill pattern. The same additive weakens the bond between layers, which is where silk's fragility comes from; Silk+ has reduced but not removed that weakness.

2 · Living with a PLA Silk+ print

A silk print is a showpiece. It lives happily on a shelf and less happily in a hand, a bag or a toy box.

Heat	Softens from about 57–60 °C. Vicat softening 66 °C is the highest of the silk family, but the usual rules stand: no cars, radiators or dishwashers.
Sunlight	The glossy surface shows UV chalking more than matte finishes do. Indoors is fine; direct sun for years dulls it.
Water and damp	Insoluble; moderate moisture uptake (0.40 %). Dry before printing for the best gloss.
Chemicals	As PLA. Isopropyl alcohol is safe and restores shine after handling.
Food	Not certified for food contact.
Handling	Fingerprints and scuffs show. Thin sections snap with little force.
Load over time	Creeps like PLA and is weaker across layers; keep it decorative.
End of life	General waste or 3D-print recycling.

Looks and feel

A deep, liquid gloss with a pearlescent or metallic quality depending on the colour. Gold, silver and rose gold genuinely read as metal from a short distance. Layer lines are visible as fine bright lines, and on well-printed curved surfaces they add to the effect rather than detract from it.

Care

- Dust with a microfibre cloth; wipe fingerprints with isopropyl alcohol
- Keep away from heat and direct sun
- Do not sand — sanding destroys the gloss and cannot be reversed short of polishing with fine compounds
- Clear acrylic varnish deepens the shine and protects against scuffs
- Superglue bonds well; keep excess off visible surfaces, which it clouds

Thin means fragile

Elongation at break is 2.8 % flat and 1.5 % across layers. A slender vase neck or a figure's finger will break in the hand. Design with thicker sections and more walls than you would for PLA Basic.

What PLA actually is

PLA stands for polylactic acid. It is a polyester made by fermenting plant sugars — usually corn starch or sugarcane — into lactic acid and then linking those molecules into long chains. That plant origin is why PLA is often described as a bioplastic: the carbon in it was recently in a field, not in an oil well. It is the most widely used material in desktop 3D printing for a practical reason: it melts at a low temperature, barely shrinks as it cools, and therefore prints reliably on almost any machine without an enclosure.

Its two well-known limits follow from the same chemistry. PLA is a semi-crystalline polymer with a glass transition around 55–60 °C, so it starts to soften at temperatures a car dashboard or a sunny windowsill can reach. And although it is compostable in principle, that only happens in an industrial composting plant at around 60 °C with the right microbes; in a garden heap, in soil or in the sea it behaves like any other plastic for many years. Printed PLA should go into general waste or a dedicated 3D-print recycling stream, not the organic bin. Every variant in this series is a PLA base with something changed — a filler, a pigment system, an additive package or a foaming agent — and each guide explains what that change does to the material's behaviour.

3 · How it is printed

Silk+ prints on standard hardware but repays specific settings. The manufacturer's datasheet window is below; its silk printing guide adds the practical advice that gloss is controlled by temperature and speed — higher and slower respectively for more shine — and that going above 100 mm/s costs both finish and layer strength.

Manufacturer print window

Nozzle temperature	210–240 °C (silk guide: 225–235 °C for best gloss; 215–220 °C at low speed)
Bed temperature	35–45 °C
Build plates	Cool Plate SuperTack, Smooth PEI, Textured PEI
Bed adhesive	Glue stick or liquid glue
Chamber	25–45 °C, no enclosure
Print speed	Up to 250 mm/s overall; outer walls 40–60 mm/s for gloss; not above 100 mm/s if finish and strength matter
Part cooling fan	On
Retraction	0.6–1.0 mm at 20–40 mm/s
Max overhang without support	About 55°
Max unsupported bridge	About 30 mm
Support material	Support for PLA

Hardware and compatibility

Nozzle sizes	0.2, 0.4, 0.6 and 0.8 mm; 0.4 mm recommended
Nozzle material	Any; not abrasive
Abrasive	No
Automatic material systems	Compatible with all AMS generations including AMS lite
Spool identification	RFID tag
Slicer options	"Don't slow down outer walls" and "Silent" mode keep wall speed constant and reduce gloss banding

Moisture, drying and storage

The manufacturer lists Silk+ among the PLA variants that should be dried before printing: moisture causes stringing and dulls the surface.

Forced-air oven or filament dryer	55 °C for 8 hours
Heated print bed method	65–75 °C for 12 hours, covered (usage guide: 70 °C, 12 h)
AMS 2 Pro / AMS HT	55 °C for 8 hours (usage guide)
Storage	Sealed with desiccant, below 20 % relative humidity
Annealing (optional)	50–55 °C for 6–12 hours; may warp

Tips that make a visible difference

- Print a speed test tower (10, 60, 120 mm/s) once per colour to see the gloss you are getting, then set outer walls to the speed you liked
- Set all outer-wall speeds equal and disable overhang slowdown on the outer wall; variable speed is the cause of banding
- For shiny top surfaces, use the Archimedean spiral or concentric top pattern
- Orient the load in the X-Y plane and add walls; Z strength is the limitation
- Slow down further and add supports under long, thin, unsupported features — they snap from vibration while printing

Known problems and their fixes

Bands of dull and shiny areas on the walls

Outer-wall speed varied between regions. Equalise wall speeds, enable "Don't slow down outer walls", print in Silent mode, and consider a slightly higher nozzle temperature.

Part splits along a layer

Inherent weakness of silk. Raise the nozzle temperature, slow down below 100 mm/s, add walls and infill, orient the load along the layers.

Thin, tall features break during printing

Vibration plus brittleness. Reduce speed, add manual supports, thicken the feature.

Stringing and matte, fuzzy surfaces

Moisture. Dry at 55 °C for 8 hours.

Top surface looks dull compared with the walls

Normal. Use the Archimedean or concentric top pattern, or design the piece so the walls are the feature.

4 · The numbers — technical datasheet

Figures are from the PLA Silk+ Technical Data Sheet V1.0 (specimens printed and dried per the manufacturer's standard protocol). The earlier PLA Silk sheet is quoted in the data notes for comparison.

Physical and thermal properties

Property	Test method	Value
Density	ISO 1183	1.27 g/cm ³
Melt flow index (210 °C, 2.16 kg)	ISO 1133	14.5 ± 1.2 g/10 min
Melting temperature	DSC, 10 °C/min	158 °C
Glass transition temperature	DSC, 10 °C/min	57 °C
Vicat softening temperature	ISO 306	66 °C
Heat deflection temperature, 0.45 MPa	ISO 75	60 °C
Heat deflection temperature, 1.8 MPa	ISO 75	56 °C
Saturated water absorption (25 °C, 55 % RH)	—	0.40 %

Mechanical properties

Property	Test method	X-Y (flat)	Z (across layers)
Young's modulus	ISO 527	2130 ± 210 MPa	1850 ± 140 MPa
Tensile strength	ISO 527	33 ± 4 MPa	25 ± 4 MPa
Elongation at break	ISO 527	2.8 ± 0.6 %	1.5 ± 0.2 %
Bending modulus	ISO 178	2460 ± 150 MPa	2150 ± 160 MPa
Bending strength	ISO 178	75 ± 4 MPa	30 ± 5 MPa
Charpy impact, unnotched	ISO 179	18.5 ± 1.6 kJ/m ²	8.5 ± 1.1 kJ/m ²
Charpy impact, notched	ISO 179	10.3 ± 0.5 kJ/m ²	not published

What the mechanical numbers mean in practice

In the flat direction Silk+ is nearly as strong and stiff as PLA Basic — 33 MPa tensile, 75 MPa in bending — so a thick, well-oriented silk part is not weak. Across the layers it is another material: bending strength collapses from 75 to 30 MPa and impact toughness is 8.5 kJ/m², about 62 % of PLA Basic's 13.8. The elongation figures are the lowest of any plain-finish PLA in the range (2.8 % and 1.5 %), which is the datasheet's way of saying that silk snaps without warning. Notched impact at 10.3 kJ/m² is, surprisingly, better than PLA Basic's 7.9 — the additive seems to blunt cracks in the flat plane even as it weakens the layer interface. Thermally it is a normal PLA with a slightly higher softening point.

Product format

Diameter	1.75 mm ± 0.03 mm
Net weight	1 kg
Spool	ABS, 200 × 67 mm, rated to 70 °C; reusable spool

Colours	13: Gold, Silver, Titan Gray, Blue, Purple, Candy Red, Candy Green, Rose Gold, Baby Blue, Pink, Mint, Champagne, White
Identification	RFID tag
Datasheet version	V1.0

Safety, certifications and chemical resistance

- Declared composition polylactic acid (silk additive not named); odourless, no skin hazard listed
- Flammable; combustion products water and carbon oxides
- RoHS and REACH compliance stated across the filament line
- No food-contact or toy certification
- Resistant to oils and greases; not to acids, alkalis or some organic solvents

5 · Compared with Polymaker and SUNLU

Silk PLA is offered by every major brand and behaves similarly everywhere: gloss in exchange for layer strength. Polymaker's Panchroma Silk (formerly PolyLite Silk) and SUNLU's Silk PLA+ are the direct equivalents.

Polymaker

Panchroma Silk PLA (formerly PolyLite Silk PLA)

Polymaker quotes a higher flat tensile strength (41 MPa) and a better notched impact (13.8 kJ/m²) than Silk+, with a Z tensile of 24 MPa that is almost identical to Bambu's 25. Density is lower at 1.24 g/cm³, so slightly more metres per kilogram. Speed is capped at 250 mm/s like Silk+. No elongation, HDT or Z impact is published for the silk grade. Sold on a cardboard spool.

Density	1.24 g/cm ³
Tensile X-Y / Z	41.1 / 23.8 MPa
Young's modulus X-Y	2403 MPa
Charpy notched X-Y	13.8 ± 1.3 kJ/m ²
Vicat	64.7 °C
Nozzle / bed	190-230 °C / 25-60 °C
Max speed	up to 250 mm/s
Spool	cardboard, 1 kg

SUNLU

SUNLU Silk PLA+

SUNLU's silk is built on its PLA+ base and quotes the highest flat tensile of the three (50 MPa) and an HDT of 57 °C, printed hot at 210-230 °C. As with all SUNLU data there is no Z-direction, impact or modulus figure, so the layer weakness that defines silk cannot be assessed from the sheet. Typically the cheapest of the three per kilogram.

Density	1.23 g/cm ³
Tensile	50 ± 4 MPa
Bending strength	78 ± 5 MPa
HDT	57 ± 3 °C
Nozzle / bed	210-230 °C / 50-60 °C
Diameter	1.75 ± 0.02 mm
Spool	cardboard, 1 kg

Reading cross-brand numbers fairly

Manufacturer datasheets are produced by different labs on different printers, and two numbers are comparable only when the test standard, specimen orientation and impact method match. Charpy and Izod impact results are not interchangeable; notched and unnotched results differ by a factor of three or more; and Polymaker publishes Z-direction data where SUNLU publishes none. Treat cross-brand figures as an indication of class, not a ranking. Where a brand's marketing claim is not backed by its own datasheet, this guide says so.

Bottom line. The three silks are decorative equals with different paperwork. Silk+ has the best-documented layer behaviour and RFID profiles tuned for gloss on Bambu hardware; Polymaker's has slightly better published flat numbers and cardboard spools; SUNLU's is the value choice. Print all three slowly and hot.

How to read the datasheet

X-Y vs Z	A 3D print is a stack of layers. X-Y describes a test bar printed lying flat, where the load runs along the extruded lines. Z describes a bar printed standing up, where the load tries to pull the layers apart. Z values are always lower, and the ratio between them tells you how well the layers have fused. Real parts fail along layer lines far more often than through them.
Tensile strength (MPa)	The stress at which a bar pulled from both ends breaks. Megapascals are newtons per square millimetre: a 10 mm × 10 mm cross-section of a 35 MPa material holds roughly 3.5 kN, about 350 kg, before it snaps in a slow pull.
Young's modulus (MPa)	Stiffness — how much force it takes to stretch the material by a given amount. Higher means more rigid. It says nothing about strength: a stiff material can still be brittle.
Elongation at break (%)	How far the bar stretched before it broke, as a percentage of its original length. Low values (under 5 %) mean the material snaps with little warning; higher values mean it yields and bends first.
Bending (flexural) strength and modulus	The same two ideas measured by pressing down on the middle of a bar supported at both ends — closer to how brackets, clips and shelves are actually loaded.
Charpy impact (kJ/m²)	A pendulum hammer strikes the bar; the energy it absorbs before breaking is divided by the fracture area. This is the best single indicator of toughness — resistance to drops and knocks. Unnotched bars measure the bulk material; notched bars have a small cut that concentrates stress and give much lower numbers. Never compare a notched figure with an unnotched one, or a Charpy figure with an Izod one (a different test geometry).
Glass transition, T_g (°C)	The temperature at which the polymer's chains gain enough mobility for it to change from glassy and rigid to leathery and soft. Above T _g a loaded part will slowly creep and deform. For PLA and PETG this is the single most important thermal number.
Heat deflection temperature, HDT (°C)	The temperature at which a bar under a fixed bending load sags by a set amount. Quoted at 0.45 MPa (light load) and 1.8 MPa (heavy load); the light-load figure is always the higher of the two. Practical rule: keep loaded parts well below the 0.45 MPa figure.
Vicat softening point (°C)	The temperature at which a needle under load penetrates 1 mm into the material. Another measure of when the surface stops being hard.
Melting temperature, T_m (°C)	Where the crystalline regions melt, measured by DSC (a calorimeter). Printing happens well above T _m so the polymer flows freely.
Melt flow index, MFI (g/10 min)	How much molten material flows through a standard die in ten minutes under a fixed weight (210 °C for PLA; PETG sheets use 210–250 °C, so compare only at equal temperature). Higher means runnier and easier to push at speed; lower means more viscous, which is why some variants have lower speed limits.
Water absorption (%)	How much moisture the filament takes up from air at 55 % relative humidity. Absorbed water boils in the nozzle, causing pops, bubbles, stringing and rough surfaces — hence the drying recommendations.

Density (g/cm³)	Mass per volume. A 1 kg spool of a 1.31 g/cm³ material contains about 5 % less printable length than a 1 kg spool at 1.24 g/cm³ — heavier fillers cost you metres.
Annealing	Baking a finished print at a temperature just above Tg to let it crystallise further. It can raise heat resistance and stiffness but usually shrinks and sometimes warps the part.

Data notes and sources

Where sources disagree

- The original PLA Silk (and the current Silk Multi-Color) sheet V3.0 gives Z impact 4.6 kJ/m², Z tensile 18 MPa and density 1.32 g/cm³. The often-quoted "silk is about 65 % of PLA Basic layer strength" applies to Silk+ (8.5 / 13.8 = 62 %); the older silk is nearer 33 %.
- Nozzle temperature appears as three ranges in official material: datasheet 210–240 °C, silk guide 225–235 °C for gloss, retailers 210–230 °C. The guide's range is a gloss-optimisation window inside the datasheet range.
- A claim that silk is unsuited to the low-temperature Cool Plate could not be substantiated; every silk sheet lists a Cool Plate variant. The Engineering Plate is the one the manufacturer marks as not recommended for PLA.

Sources

- Bambu Lab, PLA Silk+ Technical Data Sheet V1.0 — https://store.bblcdn.eu/s8/default/d0de0f57694b406dbf3e9b2345b7dbb9/Bambu_PLA_Silk_Technical_Data_Sheet.pdf
- Bambu Lab Wiki, Printing with silk filaments — <https://wiki.bambulab.com/en/x1/manual/printing-with-silk-filaments>
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