

// MATERIAL · BAMBU LAB · FDM

PLA BASIC

The everyday 3D-printing plastic: plant-based, easy, colourful — and the yardstick every other PLA in this series is measured against.

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If you have ever held a 3D-printed object, there is a good chance it was PLA Basic or something very like it. It is a plain, unfilled polylactic acid made from corn and sugarcane, tuned for fast, trouble-free printing. It has no special effect, no filler and no gimmick, which is exactly why it is the reference point: everything else in the PLA family is PLA Basic with something added or taken away. If a project does not specifically need heat resistance, flexibility, outdoor durability or a special finish, this is the sensible default.

FEELS LIKE

Hard, smooth, slightly glossy plastic

Similar in hand to a good-quality toy or a phone case

STRENGTH

Rigid and strong for its weight

Comparable to many injection-moulded household plastics in a slow pull

WEAK POINT

Softens above ~55 °C

Do not leave it in a parked car or on a radiator

COLOUR RANGE

24 colours

The widest palette in the range; colours are opaque and consistent

EASE OF PRINTING

Easiest in the family

Works on any printer, any standard nozzle, no enclosure

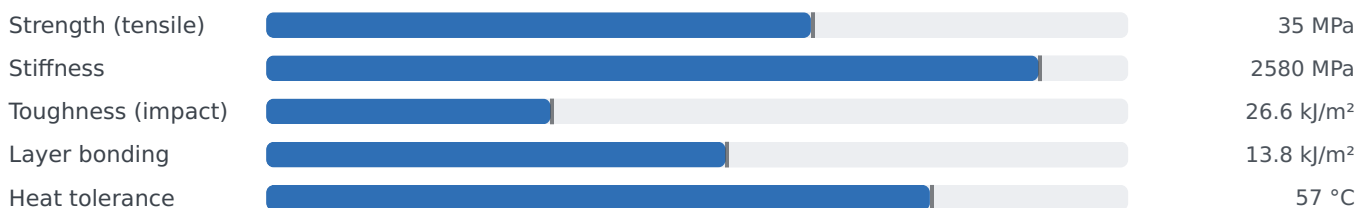
PRICE BAND

Entry level

Also sold as a spool-free refill for a reusable spool

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 Basic ■ PLA Basic reference

Good for

- Prototypes and fit checks before committing to a costlier material
- Decorative objects, figurines, vases and planters kept indoors
- Organisers, boxes, holders and desk accessories

Not the right choice for

- Parts that get hot: car interiors, near ovens, lamps with halogen bulbs, dishwashers
- Outdoor use in direct sun for more than a season
- Snap-fits and living hinges that flex repeatedly
- Food or drink containers — this grade carries no food-contact certification

- Multi-colour prints through an automatic material system
- Educational models, architectural models and display pieces
- Anything that will live at room temperature and not be dropped daily

- Tools or brackets under sustained load, which will slowly creep

What makes this the reference grade

Nothing is added to the polymer, so PLA Basic shows the underlying behaviour of the plastic itself. Its melt is unusually runny (a melt flow index around 42 g/10 min), which is what lets it be pushed through a nozzle at 300 mm/s without under-extrusion. Filled variants such as Matte, Marble or Glow give up some of that flow and some strength in exchange for their finish; toughened variants such as Tough+ trade stiffness for impact resistance. When another guide in this series says a material is "about 60 % of the layer strength", it means 60 % of the PLA Basic figures printed on this page.

2 · Living with a PLA Basic print

PLA Basic is undemanding once printed. The questions people actually ask — will it melt, will it fade, can I wash it, is it safe for my child — are answered below, and the answers apply broadly to the whole PLA family unless a specific guide says otherwise.

Heat	Softens from about 55 °C and deforms under its own weight not far above that. A closed car in summer reaches 60–70 °C. Hot tap water (up to 60 °C) is borderline; dishwashers and boiling water will ruin it.
Sunlight	Fine on a windowsill for months. Over years, UV slowly dulls colours and makes the surface chalky and brittle, and direct sun can heat a dark part enough to warp it.
Water and damp	Insoluble and unaffected by rain or humidity in normal use. Not a good long-term choice for planters kept constantly wet outdoors, because of the combined effect of moisture, heat and UV.
Chemicals	Resists most oils and greases. Attacked by strong acids and alkalis and softened by some solvents (acetone, some paint thinners). Isopropyl alcohol is safe for cleaning.
Food	Not certified for food contact. The polymer itself is benign, but pigments and additives are undisclosed and the layered surface traps bacteria. Use PLA Pure if food contact matters.
Children and pets	Odourless and classified as non-hazardous, but small printed parts and filament off-cuts are a choking hazard and should be kept out of reach.
Load over time	Holds shape well at room temperature under light loads. Under continuous heavy load it creeps: a shelf bracket will slowly bow over months.
End of life	General household waste, or a dedicated 3D-print recycling stream. Not garden compost — it only breaks down in industrial composting at around 60 °C.

Looks and feel

A smooth, semi-gloss surface with visible layer lines that catch the light. Colours are opaque and uniform. The gloss level depends on the print settings: slower outer walls and finer layers look smoother; a textured build plate gives a matte underside.

Care

- Wipe with a damp cloth or mild soapy water; do not put in the dishwasher
- Keep away from heaters, cookers, car dashboards and sunny shelves
- Sand with wet paper from 240 upwards; PLA clogs dry paper
- Primer and acrylic paints adhere well; solvent-based paints may soften the surface
- Glue with cyanoacrylate (superglue) or two-part epoxy

One number to remember: 55 °C

Almost every PLA disappointment traces back to heat. Room temperature, a cool shelf or a drawer is fine; anything you would not comfortably hold in your hand is not.

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

PLA Basic is the material printers are set up for. The manufacturer's default profile needs no changes for most models, and the filament can go straight from the sealed bag into the printer. The values below are the manufacturer's published windows; the middle of each range is a good starting point.

Manufacturer print window

Nozzle temperature	190–230 °C (test specimens printed at 220 °C)
Bed temperature	35–45 °C on the Cool Plate; 45–65 °C on smooth or textured PEI
Build plates	Cool Plate, High-Temperature Plate, Textured PEI, Smooth PEI; Engineering Plate not recommended
Bed adhesive	Glue stick or liquid glue recommended, mainly to protect the plate
Chamber	25–45 °C — no enclosure needed; open the door in hot weather

Print speed	Up to 300 mm/s
Part cooling fan	On, 50–100 %
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	Same material, or a dedicated PLA support filament for clean undersides

Hardware and compatibility

Nozzle sizes	0.2, 0.4, 0.6 and 0.8 mm all suitable
Nozzle material	Any — stainless steel or brass is fine; hardened steel not required
Abrasive	No
Automatic material systems	Compatible with all AMS generations including AMS lite, AMS 2 Pro and AMS HT
Spool identification	RFID tag on the spool; the printer loads the correct profile automatically
Enclosure	Not needed; an open printer is preferable in a warm room

Moisture, drying and storage

PLA Basic absorbs comparatively little moisture (0.43 % at 55 % humidity) and can usually be printed straight from a fresh bag. A spool that has sat open for weeks, or that snaps when bent, benefits from drying.

Forced-air oven or filament dryer	55 °C for 8 hours
Heated print bed method	65–75 °C for 12 hours, spool covered; turn the spool every 6 hours
AMS dryers	Not specified separately by the manufacturer for this grade; 55 °C for 8 hours is the general PLA figure
Storage	Sealed with desiccant, below 20 % relative humidity
Warning	Not a kitchen oven or microwave — their temperature control is too coarse and can fuse the spool

Tips that make a visible difference

- In hot weather, drop the bed 5–10 °C below default and leave the door open: the filament can soften in the extruder if the chamber creeps above about 57 °C
- After printing high-temperature materials, do a cold pull before switching back to PLA so old residue does not block the nozzle
- Clean the plate with hot water and washing-up liquid; fingerprints are the most common cause of first-layer failures
- Let the bed cool fully before removing the part — it releases itself

Known problems and their fixes

Filament snaps in the feed tube or material system

Moisture-embrittled or old filament. Dry at 55 °C for 8 hours and store sealed with desiccant.

First layer will not stick on the Cool Plate

Wash the plate, add glue, or move to a textured PEI plate at 55–65 °C.

Nozzle clogs on a warm day

Heat creep — the chamber has warmed past the softening point. Open the door, lower the bed temperature, and pause between back-to-back prints.

Part warped or sagged in use

Exposure to heat. This is a material limit rather than a print fault; redesign in PETG, ASA or an annealed high-temperature PLA if heat is unavoidable.

Stringing between towers

Slightly wet filament or too-hot nozzle. Dry the spool and try 10 °C lower.

4 · The numbers — technical datasheet

All figures below are the manufacturer's values from the PLA Basic Technical Data Sheet, version 3.0, measured on specimens printed at 220 °C nozzle / 35 °C bed / 200 mm/s with 100 % infill and dried at 55 °C for 8 hours. ± values are the scatter across repeat specimens.

Physical and thermal properties

Property	Test method	Value
Density	ISO 1183	1.24 g/cm ³
Melt flow index (210 °C, 2.16 kg)	ISO 1133	42.4 ± 3.5 g/10 min
Melting temperature	DSC, 10 °C/min	160 °C
Glass transition temperature	DSC, 10 °C/min	60 °C
Vicat softening temperature	ISO 306	57 °C
Heat deflection temperature, 0.45 MPa	ISO 75	57 °C
Heat deflection temperature, 1.8 MPa	ISO 75	54 °C
Saturated water absorption (25 °C, 55 % RH)	—	0.43 %

Mechanical properties

Property	Test method	X-Y (flat)	Z (across layers)
Young's modulus	ISO 527	2580 ± 220 MPa	2060 ± 170 MPa
Tensile strength	ISO 527	35 ± 4 MPa	31 ± 3 MPa
Elongation at break	ISO 527	12.2 ± 1.8 %	7.5 ± 1.3 %
Bending modulus	ISO 178	2750 ± 160 MPa	2370 ± 150 MPa
Bending strength	ISO 178	76 ± 5 MPa	59 ± 6 MPa
Charpy impact, unnotched	ISO 179	26.6 ± 2.8 kJ/m ²	13.8 ± 0.9 kJ/m ²
Charpy impact, notched	ISO 179	7.9 ± 1.2 kJ/m ²	not published

The Z-direction impact row is labelled simply "impact strength" on the datasheet; by context it is the unnotched test.

What the mechanical numbers mean in practice

A tensile strength of 35 MPa means a 1 cm² solid cross-section holds roughly 350 kg in a slow pull before breaking, and the Z figure of 31 MPa (about 89 % of X-Y) shows unusually good layer fusion for a PLA — one reason PLA Basic prints are forgiving of orientation. The modulus of 2.6 GPa puts it firmly in the rigid class, stiffer than ABS or PETG. Elongation of 12 % says it will bend a little before it snaps, but it is not a flexible material. The impact figure of 26.6 kJ/m² unnotched is respectable but drops to 7.9 kJ/m² once a notch is cut, which is why sharp inside corners in a design are where PLA parts crack: round them off. Heat deflection of 57 °C under light load is the number that governs where a part can live.

Product format

Diameter	1.75 mm ± 0.03 mm
Net weight	1 kg
Spool	ABS, 200 mm diameter × 67 mm wide, rated to 70 °C; also sold as a spool-free refill for the reusable spool
Colours	24, opaque
Identification	RFID tag with embedded print parameters
Datasheet version	V3.0 (an older V2.0 sheet is still in circulation — see data notes)

Safety, certifications and chemical resistance

- Composition declared as polylactic acid; odourless in use, no skin hazard listed
- Flammable; burns to water and carbon oxides. Keep prints away from open flame
- Emissions: covered by UL 2904 GREENGUARD certification for 3D-printer emissions; ventilate the room regardless
- RoHS and REACH compliance stated across the manufacturer's filament line
- No food-contact or toy-safety certification is claimed for this grade
- Insoluble in water; resistant to most oils and greases; not resistant to acids, alkalis or some organic solvents
- Disposal: general waste or 3D-print recycling; industrially compostable only

5 • Compared with Polymaker and SUNLU

Plain PLA is the most crowded category in the market. The two most relevant alternatives are Polymaker's PolyLite PLA (the engineering-documented basic grade) and SUNLU's PLA and PLA+ (the budget volume products).

Polymaker

PolyLite PLA · also Polymaker PLA Pro and PolySonic PLA (high-speed)

Polymaker publishes the most complete datasheet of the three brands, including Z-direction values. PolyLite PLA is markedly stronger and stiffer than PLA Basic in a slow pull but far more brittle: its notched Charpy impact is 3.3 kJ/m² against Bambu's 7.9, and it stretches only 6 % before breaking. It is sold on a biodegradable cardboard spool and is not RFID-tagged. The PolySonic grades are the closest in spirit to PLA Basic's high-speed tuning and lose only about 5 % tensile strength between 47 and 300 mm/s.

Tensile X-Y / Z	52.3 / 40.5 MPa
Young's modulus X-Y	3427 MPa
Elongation X-Y / Z	6.3 / 1.8 %
Charpy notched X-Y	3.3 kJ/m ²
HDT 0.45 / 1.8 MPa	60 / 58 °C
Nozzle / bed	190–230 °C / 25–60 °C
Drying	55 °C, 6 h
Spool	cardboard, 1 kg

SUNLU

SUNLU PLA · PLA+ · PLA+ 2.0 · High Speed PLA

SUNLU publishes only X-Y figures, no test standards and no glass transition or modulus, and several of its products share identical datasheet rows. Its plain PLA is quoted as a range rather than a value. PLA+ 2.0 is its toughened mainstream grade, with an Izod (not Charpy) notched impact of 10 kJ/m². SUNLU's advantages are price, a tight ± 0.02 mm diameter tolerance, and the widest choice of formats: cardboard spool, spool-free refill and a reusable master spool. Independent testing by My Tech Fun found SUNLU PLA strong in tension and layer adhesion for its price class.

Tensile (PLA / PLA+ 2.0)	27–40 / 46 $\pm$ 5 MPa
Elongation (PLA+ 2.0)	10 $\pm$ 2.5 %
Bending strength (PLA+ 2.0)	83 $\pm$ 5 MPa
Izod notched (PLA+ 2.0)	10 $\pm$ 3 kJ/m ²
HDT (PLA+ 2.0)	56 $\pm$ 3 °C
Nozzle / bed	185–230 (PLA) · 205–245 (PLA+) / 50–60 °C
Diameter	1.75 $\pm$ 0.02 mm
Formats	cardboard spool, refill, master spool

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. For a beginner or a multi-colour setup on Bambu hardware, PLA Basic's RFID profiles and forgiving layer bonding are worth the small premium. Polymaker PolyLite is the choice when stiffness and documented numbers matter more than toughness. SUNLU is the value option when price per kilogram dominates and the printer is already dialled in.

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 T_g 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

- Two datasheet versions circulate. V2.0 gives unnotched impact 61.2 kJ/m² and notched 20.3 kJ/m²; V3.0 (used here) gives 26.6 and 7.9 kJ/m². The V3.0 figures are the current ones and are consistent with an unmodified PLA; treat the V2.0 impact values with caution.
- The manufacturer's general filament table quotes the nozzle window as 190–240 °C; the datasheet says 190–230 °C. The datasheet figure is used.
- No datasheet in this series carries a publication date, only a version number.

Sources

- Bambu Lab, PLA Basic Technical Data Sheet V3.0 — <https://files.bbystatic.com/G8TU2klvsR6MVeDE4zgPkw==/Bambu%2BFilament%2B-Technical%2BData%2BSheet> (mirror of wiki.bambulab.com/filament-acc/abs-asa-pc/bambu_pla_basic_technical_data_sheet.pdf)
- Bambu Lab Wiki, PLA Usage Guide — <https://wiki.bambulab.com/en/filament/pla>
- Bambu Lab Wiki, Filament guide: printer, nozzle, AMS, build plate, glue compatibility — <https://wiki.bambulab.com/en/general/filament-guide-material-table>
- Bambu Lab Filament Guide (PDF) — <https://cdn1.bambulab.com/filament/a5e185aed14e6/filament-guide-en-4.pdf>
- Bambu Lab EU Store, PLA collection — <https://eu.store.bambulab.com/collections/pla>
- Bambu Lab Blog, Introducing PLA Pure (GREENGUARD note for PLA Basic) — <https://blog.bambulab.com/introducing-bambu-lab-pla-pure-a-filament-made-for-printing-where-you-live/>
- Polymaker Wiki, PolyLite PLA TDS — <https://wiki.polymaker.com/polymaker-products/more-about-our-products/documents/technical-data-sheets/pla/polylite-tm-pla>
- Polymaker Wiki, PolySonic PLA TDS — <https://wiki.polymaker.com/polymaker-products/more-about-our-products/documents/technical-data-sheets/pla/polysonic-tm-pla>
- SUNLU, filament parameter table — <https://www.sunlu.com/wiki/43>
- SUNLU, PLA+ 2.0 product data — <https://www.sunlu.com/products/pla-plus-2-0-filament>
- My Tech Fun, SUNLU PLA test — <https://www.mytechfun.com/pla/sunlu>
- CNC Kitchen, PLA vs PLA+ tested (Polymaker) — <https://www.cnckitchen.com/blog/the-difference-of-pla-and-pla-tested-feat-polymaker>

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