

// MATERIAL · BAMBU LAB · FDM

PLA BASIC GRADIENT

PLA Basic whose colour slowly shifts along the strand — a two-tone print from a single spool, no material changes and no purge waste.

PREIS IM SOFORTPREIS-RECHNER	0,12 €/g inkl. MwSt. + 1,50 €/Druckstunde + 3,90 € je Auftrag
VERFÜGBARKEIT	Auf Bestellung – Versand in mindestens 7 Werktagen
MINDESTBESTELLWERT	8,90 € · Versand 4,90 €, frei ab 59 € · Abholung in Berlin kostenlos
DATEIEN	STL, OBJ, 3MF, PLY, AMF, STEP, IGES, BREP bis 100 MB
SOFORTPREIS	Datei hochladen auf www.3ddruckberlin.org – Preis in Sekunden, ohne Konto
INHALT DIESES DATENBLATTS	8 Seiten: Eigenschaften, Alltag, Druckparameter, Kennwerte (TDS), Vergleich mit anderen Marken

PLA Basic Gradient

PLA Basic whose colour slowly shifts along the strand — a two-tone print from a single spool, no material changes and no purge waste.

1 · In plain words

2 · Living with it

3 · How it is printed

4 · The numbers

5 · Compared with other brands

PLA Basic Gradient is exactly the same plastic as PLA Basic. The only difference is in the colouring: two pigments are blended so that the colour changes continuously along the length of the filament, from one shade to the other and back again every eight to ten metres. As the printer consumes the spool the colour of the part drifts from, say, sky blue to meadow green with no visible seam. It is the simplest way to get a multi-colour look on a single-extruder printer, and it wastes nothing, because no filament is purged between colours.

FEELS LIKE

Identical to PLA Basic

Same hardness, gloss and strength — only the colour behaves differently

THE EFFECT

Continuous colour fade

One full transition every 8-10 m of filament

BEST ON

Larger objects

Small parts print inside a single colour band and show no gradient

COLOUR PAIRS

8 two-tone combinations

White-to-teal, orange-to-white, blue-to-green, pink-to-red and others

EASE OF PRINTING

As easy as PLA Basic

Any printer, any standard nozzle

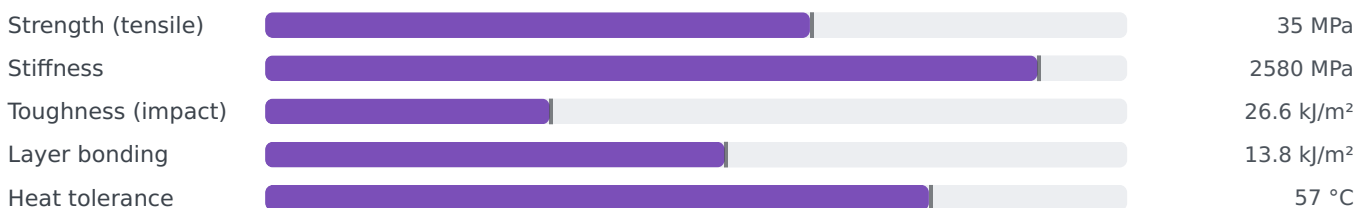
CONTROL

Not repeatable

Where the colour lands on the part depends on how much filament came before it

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 Gradient ■ PLA Basic reference

Good for

- Vases, planters, lamp shades and tall decorative pieces where the fade has room to unfold
- Busts, figurines and sculptural prints in a single colour slot
- Batches of small items printed together on one plate so the run uses enough filament

Not the right choice for

- Small parts under about 50 g, which will print in a single colour
- Anything that must be reproduced identically — the gradient position cannot be set
- Prints that may need to be paused and resumed; a restart lands at the wrong point in the fade

- Printers without a multi-material unit
- Gifts and market pieces where every part is deliberately a little different

- All the situations PLA Basic is wrong for: heat, sun, sustained load, food contact

How the fade actually works

The spool is not two filaments spliced together; it is one filament whose pigment mix changes gradually during extrusion at the factory. Because the colour is a function of filament length, the appearance of a print depends on its size and infill, not on any slicer setting. A vase that uses 60 g of material shows roughly one and a half transitions; a 15 g keychain shows none. Printing several copies in one job makes each copy a slightly different colour, which many people treat as a feature. There is no way to choose where the transition falls, and a failed print restarted from the same spool will not match the first attempt.

2 · Living with a PLA Basic Gradient print

Everything about living with a Gradient print is the same as PLA Basic, because it is PLA Basic. The points below are repeated for completeness so this guide stands on its own.

Heat	Softens from about 55 °C. Keep prints out of parked cars, off radiators and away from cookers. Hot tap water is borderline; dishwashers will deform it.
Sunlight	Fine indoors on a windowsill. Prolonged direct sun over years fades pigments and makes the surface chalky; the two pigments may fade at different rates, altering the gradient.
Water and damp	Insoluble and unaffected by humidity. Not recommended for permanently wet outdoor planters.
Chemicals	Resists oils and greases; attacked by strong acids, alkalis and some solvents. Isopropyl alcohol is safe for cleaning.
Food	Not certified for food contact. Use PLA Pure where that matters.
Children and pets	Non-hazardous material; small parts remain a choking hazard.
Load over time	Rigid at room temperature but creeps under sustained heavy load.
End of life	General waste or 3D-print recycling; only compostable industrially.

Looks and feel

A smooth, semi-gloss surface like PLA Basic, with a soft colour drift that follows the print's build order — bottom to top on a single object. The transition is gradual enough that no line is visible; from a distance the object reads as one colour with a warm or cool end.

Care

- Wipe with a damp cloth or mild soap; no dishwasher
- Keep away from heat sources and long-term direct sun
- Wet-sand from 240 grit upward if needed; sanding does not affect the colour, which runs through the material
- Paint and glue exactly as PLA Basic

Planning the colours

Each transition is 8–10 m of filament, roughly 25–30 g. To see a full fade from one colour to the other on a single object, design for at least 30 g of material; for the colour to come back round, 60 g or more.

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

Use the PLA Basic profile — the manufacturer's own instruction. Nothing in the slicer needs to change for the gradient, though a few choices affect how it looks: fewer walls and lower infill stretch the fade over more height, and printing objects one at a time (by object) keeps each one's fade continuous.

Manufacturer print window

Nozzle temperature	190–230 °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
Bed adhesive	Glue stick or liquid glue recommended
Chamber	25–45 °C, no enclosure needed
Print speed	Up to 300 mm/s
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
Print order for multiple objects	"By object" keeps each part's gradient continuous; "by layer" spreads each colour band across all parts

Hardware and compatibility

Nozzle sizes	0.2, 0.4, 0.6 and 0.8 mm
Nozzle material	Any; hardened steel not required
Abrasive	No
Automatic material systems	Compatible with all AMS generations
Spool identification	RFID tag; loads the PLA Basic profile

Format	Sold on the reusable spool; also as a refill
--------	--

Moisture, drying and storage

Low moisture uptake like PLA Basic; dry only if the spool has been open for weeks or has become brittle.

Forced-air oven or filament dryer	55 °C for 8 hours
Heated print bed method	65–75 °C for 12 hours, covered
Storage	Sealed with desiccant, below 20 % relative humidity
Warning	Not a kitchen oven or microwave

Tips that make a visible difference

- Preview the gradient by weight: divide the slicer's filament estimate by ~28 g to know how many transitions the print will span
- For a slow fade over a tall object, use two walls and 10–15 % infill; for a fast fade, more walls and higher infill
- Vase (spiral) mode gives the cleanest gradient because every gram goes into the visible wall
- Avoid pausing; a resume after a filament runout will not match the colour position

Known problems and their fixes

No gradient visible

The part is too small: it printed inside one colour band. Scale up, print several copies in one job, or accept a single-colour result.

Copies in a batch are different colours

Expected behaviour — each copy consumed a different stretch of the spool. Print by object if you want each copy to show its own complete fade.

Colour "jump" after a restart

A resumed print continues from a later point on the spool. Reprint in one go if the seam matters.

All the standard PLA Basic issues

Moisture embrittlement, Cool Plate adhesion, heat creep in warm rooms — see the PLA Basic guide; the fixes are identical.

4 · The numbers — technical datasheet

The manufacturer publishes no separate property set for the Gradient colourway and instructs users to apply the PLA Basic profile. The figures below are therefore the PLA Basic Technical Data Sheet V3.0 values (specimens printed at 220 °C / 35 °C bed / 200 mm/s, 100 % infill, dried 55 °C for 8 hours). See the data notes for the older V2.0 sheet that circulates under the Gradient file name.

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

Property	Test method	Value
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

Values are those of PLA Basic V3.0; the Gradient colourway has not been separately characterised by the manufacturer.

What the mechanical numbers mean in practice

Read these exactly as for PLA Basic: a rigid, moderately tough plastic with good layer fusion (Z tensile about 89 % of X-Y) and a heat limit in the mid-50s °C. Pigment loading in PLA is small — a few per cent — and colour changes of this kind do not measurably alter stiffness or strength, which is why the manufacturer does not publish a separate sheet. Design gradient parts with the same rules as any PLA part: round inside corners, orient layers across the main load, keep away from heat.

Product format

Diameter	1.75 mm ± 0.03 mm
Net weight	1 kg
Transition length	8–10 m per colour transition
Spool	Reusable basic spool; refill format also offered
Colour pairs	8: Arctic Whisper, Solar Breeze, Ocean to Meadow, Blueberry Bubblegum, Cotton Candy Cloud, Pink Citrus, Mint Lime, Dusk Glare
Identification	RFID tag

Safety, certifications and chemical resistance

- Polylactic acid with colour pigments; 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 for this grade
- Resistant to oils and greases; not to acids, alkalis or some organic solvents
- Disposal as PLA Basic

5 · Compared with Polymaker and SUNLU

Gradient and rainbow filaments are a niche both other brands serve, but with a different finish philosophy: Polymaker's gradients are matte or satin, SUNLU's are gloss, silk or transparent. Neither makes a plain semi-gloss gradient directly comparable to this product.

Polymaker Panchroma Gradient Matte PLA · Panchroma Gradient Satin PLA (formerly PolyTerra Gradient) Polymaker's gradients are built on its filled matte or satin bases, so they are softer-looking and noticeably weaker than a plain PLA (the matte base is quoted at about 23 MPa tensile). No gradient-specific data is published; the Panchroma family sheet applies. Sold on cardboard spools at a premium over the single-colour matte.	
Base material	Matte or Satin PLA
Tensile X-Y (matte base)	23.2 ± 0.5 MPa
Tensile X-Y (satin base)	31.1 ± 0.8 MPa
Nozzle / bed	190–230 °C / 25–60 °C
Max speed	up to 300 mm/s
Spool	cardboard, 1 kg

SUNLU SUNLU PLA Rainbow · Silk PLA+ Rainbow · PLA Transparent Rainbow SUNLU's rainbow products cycle through several colours rather than fading between two, and its published figures for them are higher than for its plain PLA (a sign that they share a different base resin). No Z-direction or impact data is given, and no transition length is stated.	
Tensile (PLA Rainbow)	50 ± 5 MPa
Bending (PLA Rainbow)	85 ± 6 MPa
HDT (PLA Rainbow)	57 ± 3 °C
Nozzle / bed	185–225 °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. Choose this product for a soft two-tone fade with PLA Basic's mechanical behaviour and RFID convenience. Choose Polymaker's gradients for a matte or satin look and accept lower strength. Choose SUNLU's rainbows for a multi-colour cycle at a lower price.

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/cm ³ material contains about 5 % less printable length than a 1 kg spool at 1.24 g/cm ³ — 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

- The file distributed as the "PLA Basic Gradient Technical Data Sheet" is headed PLA Basic V2.0 and gives markedly higher impact values (61.2 kJ/m² unnotched, 20.3 kJ/m² notched) than the current PLA Basic V3.0 sheet. This guide uses the V3.0 figures because the manufacturer states the Gradient product should be treated as PLA Basic.
- Transition length (8–10 m) and the colour list come from retailer listings, not from a datasheet.

Sources

- Bambu Lab, PLA Basic Technical Data Sheet V3.0 — <https://files.bbystatic.com/G8TU2klvsR6MVeDE4zgPkw==/Bambu%2BFilament%2B-Technical%2BData%2BSheet>
- Bambu Lab, file titled PLA Basic Gradient Technical Data Sheet (contents: PLA Basic V2.0) — https://store.bblcdn.com/s7/default/c313aa76fa3b433a94c20b9b83e57575/Bambu_PLA_Basic_Gradient_Technical_Data_Sheet.pdf
- 3D Universe, Bambu Lab PLA Basic Gradient product page (transition length, colour pairs, profile instruction) — <https://shop3duniverse.com/products/bambu-lab-pla-basic-gradient-1-75mm-1kg>
- Bambu Lab Wiki, PLA Usage Guide — <https://wiki.bambulab.com/en/filament/pla>
- Bambu Lab Wiki, Filament guide material table — <https://wiki.bambulab.com/en/general/filament-guide-material-table>
- Polymaker, Panchroma family page and product data sheet — <https://shop.polymaker.com/pages/panchroma> ; https://cdn.shopify.com/s/files/1/0548/7299/7945/files/TDS_PANCHROMA_V2.pdf
- SUNLU, filament parameter table — <https://www.sunlu.com/wiki/43>

Independent guide compiled from published Bambu Lab, Polymaker and SUNLU technical data sheets, product pages, wiki articles and the cited third-party tests; all wording is original. Not affiliated with, sponsored by or endorsed by any of these manufacturers. Product names are trademarks of their respective owners. Figures are the manufacturers' own laboratory values for standardised test specimens and are intended for comparison, not as guaranteed properties of any particular printed part. Verify critical applications by testing the actual part. Compiled 20 September 2026.