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PLA TRANSLUCENT

A frosted, light-diffusing PLA for lamps, lanterns and stained-glass effects — surprisingly the strongest and stiffest PLA in the range, and the slowest to print.

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PLA Translucent is PLA made without the opaque pigments and fillers that block light, tinted instead with transparent dyes. Held to a lamp, a thin wall glows evenly in colour; a thick wall diffuses light like frosted glass. It is not water-clear and never will be — the layered structure of a 3D print scatters light at every interface — but with the right settings it can come close to the look of sea glass. An unexpected bonus is in the datasheet: without fillers or impact modifiers the polymer is at its most crystalline and rigid, and Translucent posts the highest tensile strength (55 MPa) and stiffness of any PLA in the range. The price is a very thick melt, which caps printing speed at 150 mm/s.

FEELS LIKE

Hard, smooth, glassy

Cooler and more rigid in the hand than PLA Basic

THE EFFECT

Coloured frosted glass

Even glow when lit from behind; more transparent with thicker, slower lines

STRENGTH

Highest tensile in the range

55 MPa flat; stiffness 2880 MPa

WEAK POINT

Layers and heat

Z strength half of flat; glass transition 54 °C, the lowest here

COLOUR RANGE

About 10 tints

Pink, Yellow, Blue, Red, Teal, Orange, Purple, Light Green, Lavender, Light Blue

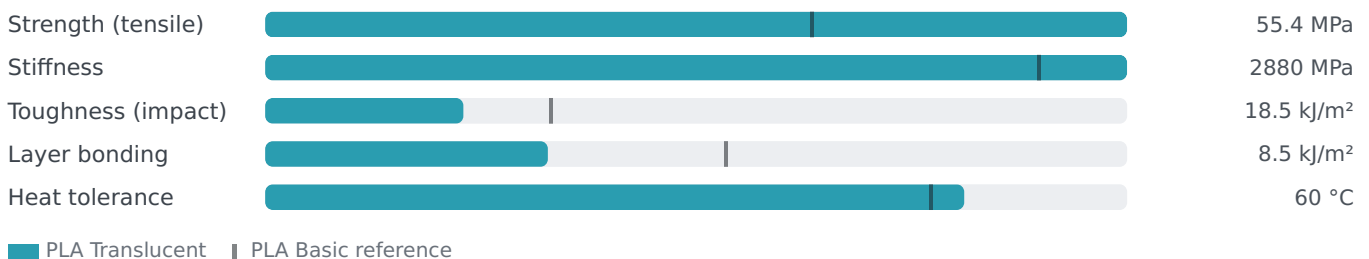
EASE OF PRINTING

Easy, but slow

Max 150 mm/s; clarity needs a 0.8 mm nozzle, no fan and patience

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).



Good for

- Lamp shades, night lights and lanterns with LED sources
- Stained-glass-style panels, sun-catchers and window ornaments kept out of direct heat
- Vases and bowls that glow when lit

Not the right choice for

- Anything meant to be water-clear like acrylic — use PETG or a resin for that
- Hot lamps: halogen and incandescent bulbs will soften it; LED only

- Light pipes, indicator windows and diffusers for LED strips
- Decorative pieces where colour depth matters

- Sunny windows in summer, where the low softening point and absorbed heat combine
- Parts loaded across their layers
- Fast production runs; it is the slowest PLA in the range

Why prints are frosted rather than clear, and how to get closer

A printed wall is hundreds of side-by-side lines, and light bends a little at every boundary between them and at every trapped micro-bubble. Fewer, fatter lines with no gaps give fewer boundaries, which is the whole logic of the manufacturer's clarity recipe: a 0.8 mm nozzle, a single wall loop, wide lines, zero top and bottom layers, 100 % straight-line infill in one direction, a higher nozzle temperature and slightly higher flow to fill every gap, the cooling fan switched off so the lines cool slowly and fuse, and filament dried thoroughly so no steam bubbles form. Even then, the manufacturer is clear that complex geometry defeats the recipe and that PETG, an amorphous polymer, is inherently clearer than semi-crystalline PLA. Polishing the finished surface helps further. For a diffused glow rather than clarity, none of this matters: standard settings produce an attractive frosted result.

2 · Living with a PLA Translucent print

Translucent prints spend their lives near light sources, which is exactly where PLA is most vulnerable. Choose the light source carefully and the print will last.

Heat	Glass transition 54 °C, the lowest in the range. LED bulbs are fine; halogen, incandescent and hot enclosed fixtures are not. Keep away from radiators and out of parked cars.
Sunlight	Transparent dyes fade faster than opaque pigments under UV, and a dark tint in direct sun absorbs heat. Best for indoor windows facing away from the afternoon sun.
Water and damp	Insoluble; lower moisture uptake than PLA Basic (0.34 %). Fine as a vase with a glass insert.
Chemicals	As PLA. Isopropyl alcohol cleans it without clouding.
Food	Not certified for food contact.
Clarity over time	Scratches show as white lines; a light polish restores them.
Load over time	Very stiff but creeps like all PLA when warm; keep loads light.
End of life	General waste or 3D-print recycling.

Looks and feel

Like tinted frosted glass. Thin single walls transmit colour brightly; thicker sections are milkier. Layer lines appear as faint parallel ridges that catch light. Colours are saturated and luminous when back-lit and paler by reflected light.

Care

- Wipe with a soft damp cloth; isopropyl alcohol for fingerprints
- Keep away from hot lamps and heaters; LED only
- Polish scuffs with a plastic polish or very fine (2000+) wet paper followed by compound
- Clear gloss varnish increases apparent transparency by filling surface texture
- Superglue clouds the surface — use a UV-cure or clear epoxy adhesive for visible joints

LED only

A 5 W LED bulb runs at a surface temperature of 40–60 °C; a 40 W halogen exceeds 150 °C. The first is safe inside a Translucent shade with ventilation, the second will collapse it within minutes.

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

Two very different sets of settings apply: the manufacturer's standard window for an ordinary frosted result, and the clarity recipe for maximum transparency. The standard window is below; the clarity recipe is under tips.

Manufacturer print window

Nozzle temperature	200–240 °C
Bed temperature	35–65 °C
Build plates	Cool Plate, Cool Plate SuperTack, Smooth PEI, Textured PEI
Bed adhesive	Glue stick or liquid glue
Chamber	25–45 °C, no enclosure
Print speed	Up to 150 mm/s — the lowest limit in the PLA range
Part cooling fan	On for normal prints; off for clarity
Retraction	0.6–1.0 mm at 20–40 mm/s
Max overhang without support	About 55°
Max unsupported bridge	About 30 mm

Hardware and compatibility

Nozzle sizes	0.4, 0.6 and 0.8 mm; 0.8 mm for clarity work; 0.2 mm stainless not recommended
Nozzle material	Any; not abrasive

Abrasive	No
Automatic material systems	Compatible with all AMS generations
Spool identification	RFID tag
Slicer profile	A dedicated transparent-PLA profile (0.4 mm nozzle) is published by the manufacturer for download

Moisture, drying and storage

The manufacturer lists Translucent among the PLA variants that should be dried before printing, at a gentler temperature than most: moisture is the main cause of bubbles and haze.

Forced-air oven or filament dryer	50 °C for 8 hours
Heated print bed method	60–70 °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)	50–60 °C for 6–12 hours — note that annealing increases crystallinity and therefore haze

Tips that make a visible difference

- Clarity recipe: dry ≥ 8 h · 0.8 mm nozzle · 0.1 mm layers · 0.5 mm line width · 1 wall loop · 0 top and 0 bottom layers · 100 % rectilinear infill at a single angle · nozzle toward the top of the range · flow ratio slightly raised · all fans off · slow, steady speed
- For a lampshade, vase mode with a 0.6–0.8 mm nozzle gives an even single wall with the fewest internal boundaries
- Fewer walls = more light; two walls glow, four walls diffuse
- Keep the outer-wall speed constant — speed changes show as bands of differing haze, as with silk
- Do not anneal a piece you want clear; crystallinity is what makes PLA milky

Known problems and their fixes

Cloudy, bubbly or rough surface

Moisture. Dry at 50 °C for 8 hours and print promptly.

Haze even with dry filament

Too many line boundaries or trapped gaps. Larger nozzle, single wall, zero top/bottom, higher temperature and flow, fans off. Accept that PLA is never fully clear.

Under-extrusion at speed

Very thick melt (MFI 4). Stay under 150 mm/s and use the dedicated profile.

Deformation or spots in vase mode

Reported by several users, usually near the base. Slow down, reduce the first layers' speed, and check bed temperature is not above 45 °C on cool plates.

Print softened in its lamp

Wrong light source. Replace with LED and add ventilation openings.

4 · The numbers — technical datasheet

Figures are from the PLA Translucent Technical Data Sheet V3.0.

Physical and thermal properties

Property	Test method	Value
Density	ISO 1183	1.22 g/cm ³
Melt flow index (210 °C, 2.16 kg)	ISO 1133	4.08 ± 1.5 g/10 min
Melting temperature	DSC, 10 °C/min	156 °C
Glass transition temperature	DSC, 10 °C/min	54 °C
Vicat softening temperature	ISO 306	61 °C
Heat deflection temperature, 0.45 MPa	ISO 75	60 °C
Heat deflection temperature, 1.8 MPa	ISO 75	55 °C
Saturated water absorption (25 °C, 55 % RH)	—	0.34 %

Mechanical properties

Property	Test method	X-Y (flat)	Z (across layers)
Young's modulus	ISO 527	2880 ± 190 MPa	2550 ± 150 MPa
Tensile strength	ISO 527	55.4 ± 5 MPa	28.9 ± 4 MPa
Elongation at break	ISO 527	11 ± 3.1 %	9.6 ± 1.7 %
Bending modulus	ISO 178	3000 ± 120 MPa	2650 ± 140 MPa
Bending strength	ISO 178	85 ± 3 MPa	42 ± 4 MPa
Charpy impact, unnotched	ISO 179	18.5 ± 3.7 kJ/m ²	8.5 ± 1.2 kJ/m ²
Charpy impact, notched	ISO 179	6.7 ± 2.2 kJ/m ²	not published

What the mechanical numbers mean in practice

In the flat direction Translucent is the strongest and stiffest PLA in the range by a clear margin: 55 MPa tensile and 85 MPa bending against 35 and 76 for PLA Basic, with a modulus near 3 GPa. This is what unmodified, unfilled, fully crystallised PLA looks like. Across the layers it gives back most of that advantage — Z tensile is 52 % of flat and Z impact 8.5 kJ/m², about the same as Silk+. Toughness is modest in both directions (unnotched 18.5, notched 6.7 kJ/m²), so it is rigid rather than resilient. The melt flow index of 4 is the lowest in the range, which is the physical reason for the 150 mm/s limit. Thermally it has the lowest glass transition here (54 °C) despite a normal HDT, so treat its heat limit as the most conservative of any PLA.

Product format

Diameter	1.75 mm ± 0.03 mm
Net weight	1 kg (about 341 m)
Spool	ABS, 200 × 67 mm, rated to 70 °C; reusable spool
Colours	About 10 transparent tints; the exact roster varies by region and date
Identification	RFID tag
Datasheet version	V3.0

Safety, certifications and chemical resistance

- Declared composition polylactic acid with transparent dyes; odourless, no skin hazard listed
- Flammable; combustion products water and carbon oxides
- RoHS test report available; 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

Translucent PLA is offered by both other brands. Polymaker's Panchroma Translucent publishes settings but no properties; SUNLU's PLA Transparent shares its plain-PLA data row, and its Transparent Rainbow has figures of its own.

Polymaker

Panchroma Translucent PLA

Polymaker publishes only print settings for its translucent grade — no density, no mechanical data. Its documentation is unusually candid: it states that no FDA certification exists for the material and that no established recycling pathway exists for PLA prints. Sold on a cardboard spool with reinforced edges for material-system compatibility; speed up to 200 mm/s with a 16 mm³/s volumetric limit.

Mechanical data	not published
Nozzle / bed	190-230 °C / 25-60 °C
Max speed	up to 200 mm/s
Max volumetric flow	16 mm³/s
Drying	55 °C, 6 h
Spool	cardboard, 1 kg

SUNLU

SUNLU PLA Transparent · PLA Transparent Rainbow

SUNLU's plain transparent shares the generic PLA datasheet row (27-40 MPa). Its Transparent Rainbow has its own figures and claims the highest tensile in SUNLU's PLA range at 62 MPa, with a very low notched Izod of 3.5 kJ/m² — rigid and brittle, the same character as Bambu's Translucent. No Z or clarity data is published by either brand.

Tensile (Transparent)	27-40 MPa
Tensile (Transparent Rainbow)	62 ± 6 MPa
Bending (Rainbow)	94 ± 6 MPa
Izod notched (Rainbow)	3.5 ± 1.5 kJ/m²
HDT	55-57 °C
Nozzle / bed	185-230 °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. Bambu's Translucent is the only one of the three with a full datasheet and a published clarity procedure, and its numbers make it the strongest rigid PLA in this whole series. Polymaker's is a settings-only product on a material-system-friendly cardboard spool; SUNLU's is the budget option with a rainbow variant. For true clarity, all three brands would point you to PETG instead.

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

- The clarity recipe on the manufacturer's wiki is written around translucent PETG and applied to PLA by the same page title; no PLA-specific speed figure is given. A commonly repeated "20 mm/s" figure could not be traced to an official source and is not used here.
- Heated-bed drying: datasheet 60–70 °C / 12 h; the PLA usage guide's table says 70 °C / 12 h. Both are quoted.
- Colour roster: retailers list 10 tints; some regional stores add Ice Blue. Treat the list as indicative.

Sources

- Bambu Lab, PLA Translucent Technical Data Sheet V3.0 — https://store.bblcdn.com/s7/default/729a8bf233e9474db25c8d5be1e64a00/Bambu_PLA_Translucent_Technical_Data_Sheet.pdf
- Bambu Lab Wiki, PLA Usage Guide (transparency section, drying table, 0.2 mm note) — <https://wiki.bambulab.com/en/filament/pla>
- Bambu Lab Wiki, Printing tips for translucent PLA/PETG — <https://wiki.bambulab.com/en/knowledge-sharing/transparent-petg>
- Bambu Lab JP Store, PLA Translucent (plates, uses) — <https://jp.store.bambulab.com/en/products/pla-translucent>
- filament2print, PLA Translucent Bambu Lab (colours, length, AMS drying) — <https://filament2print.com/en/pla/3487-pla-translucent-bambu-lab.html>
- Bambu Lab Community Forum, vase-mode translucent PLA threads — <https://forum.bambulab.com/t/vase-mode-print-with-translucent-pla-has-deformations-at-the-bottom/246366> ; <https://forum.bambulab.com/t/vase-mode-spots-with-translucent-pla/208417>
- Polymaker Wiki, Panchroma Translucent PLA — <https://wiki.polymaker.com/polymaker-products/polymaker-filaments/panchroma-tm/panchroma-tm-translucent-pla>
- SUNLU, filament parameter table — <https://www.sunlu.com/wiki/43>

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