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PETG BASIC

The tough, weather-tolerant everyday plastic: bottle-grade PET made printable — stronger than PLA, twenty degrees more heat, and the material to reach for when a part has to work.

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The tough, weather-tolerant everyday plastic: bottle-grade PET made printable — stronger than PLA, twenty degrees more heat, and the material to reach for when a part has to work.

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PETG Basic is the workhorse of the range for anything that lives outside a display cabinet. Where PLA is rigid and brittle, PETG yields a little and comes back; where PLA softens in a hot car, PETG shrugs it off; where PLA chinks in the sun, PETG holds up for years. The trade is a slightly softer surface finish, more care with moisture, and a melt that clings to everything including the print bed. This is the reformulated 2026 version, relaunched after the high-flow variant was withdrawn: it prints at moderate speed (200 mm/s), is noticeably stiffer and stronger than its predecessor in the datasheet, and is fully cleared for the automatic material systems. If a part will be handled, screwed, clipped, taken outdoors or left in a car, this is the default choice.

FEELS LIKE

Smooth, slightly glossy, faintly soft

Like a good plastic bottle wall: hard but not glassy

STRENGTH

Strong and forgiving

51 MPa tensile — the strongest plain material in this series — and it bends before it breaks

HEAT

About 70 °C

Survives parked cars, hot tap water, sunny sills; not boiling water or dishwashers

OUTDOORS

Yes, with care

Water and UV tolerant in practice; colours fade slowly over years

COLOUR RANGE

7 colours (2026)

Black, White, Grey, Red, Blue, Brown, Yellow

EASE OF PRINTING

Easy once dry

Dry it, use glue on the bed, keep the fan low; strings when wet

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).

Strength (tensile)		51 MPa
Stiffness		2780 MPa
Toughness (impact)		34.2 kJ/m ²
Layer bonding		10.5 kJ/m ²
Heat tolerance		71 °C

■ PETG Basic ■ PLA Basic reference

Good for

- Enclosures, housings, brackets and mounts that carry load or get screwed together

Not the right choice for

- Fine cosmetic detail and razor-sharp edges — the surface is a touch softer than PLA

- Replacement parts, hooks, clips and mechanical prototypes that must survive handling
- Outdoor signs, garden fittings, bike and car accessories kept out of engine heat
- Vases and planters — watertight in vase mode with a suitable wall
- Anything that will be dropped, flexed or left somewhere warm

- Parts above about 70 °C: near motors, ovens, hot lamps, or the dishwasher
- Food contact — the resin family is food-grade, but this filament carries no certification
- Printers with no drying routine; wet PETG strings badly
- Ultra-fast printing — this grade is limited to 200 mm/s; the withdrawn HF grade ran faster

What changed in the 2026 relaunch, and what "PETG" gives you over PLA

The manufacturer retired its original PETG Basic in 2024 in favour of a high-flow grade, then withdrew that in mid-2026 and brought PETG Basic back with a new formulation aimed at less moisture sensitivity and less stringing at speed. The new datasheet is not a small revision: stiffness roughly doubled (Young's modulus 2780 against 1460 MPa), tensile strength edged up to 51 MPa, and toughness came down (34 against 53 kJ/m² unnotched). It now prints on the same plate range as PLA and is cleared for every material system including the AMS lite. Against PLA Basic the case for PETG is simple: 45 % higher tensile strength, a heat deflection temperature of 71 °C instead of 57, and a ductile failure mode — a PETG bracket bends and whitens where a PLA one snaps. What you give up is the last bit of crispness in overhangs and small features, and the convenience of a material that does not care about humidity.

2 · Living with a PETG Basic print

A PETG print is the low-maintenance member of the family. Most of the everyday warnings that apply to PLA are relaxed here; the ones that remain concern real heat and strong chemicals.

Heat	Softens from about 70 °C (glass transition 69 °C, HDT 71 °C under light load). Parked cars, radiators and hot tap water are fine; boiling water, ovens and dishwashers are not.
Sunlight	Tolerates outdoor UV far better than PLA; expect slow colour fading over years rather than embrittlement in months. Dark colours in strong sun can still warm toward the softening point.
Water and damp	Insoluble, unaffected by rain and humidity in use; suitable for planters, bird feeders and bathroom fittings. Vase-mode prints can be made watertight.
Chemicals	Resists most oils and greases; not resistant to strong acids or alkalis and attacked by some solvents (acetone clouds it). Isopropyl alcohol is safe for cleaning.
Food	No food-contact certification for the filament. The polymer family is used for food packaging, but pigments, additives and the layered surface are not covered. Use PLA Pure if certification matters.
Children and pets	Odourless, non-hazardous material; small parts remain a choking hazard.
Load over time	Creeps less than PLA at room temperature and holds threads and snap-fits well. Under sustained load in a warm place it will slowly deform like any thermoplastic.
End of life	General waste or a 3D-print recycling stream. Not accepted in bottle or packaging recycling despite being a PET relative.

Looks and feel

Semi-gloss with a slightly translucent depth in lighter colours; layer lines are visible and catch the light a little more than on matte PLA. Corners are marginally softer than PLA. The surface has a faint tackiness under a fingernail compared with PLA's hard shell.

Care

- Wipe with a damp cloth or mild soap; hand-wash only
- Keep away from ovens, hobs and anything above 70 °C
- Sands adequately with wet paper but gums up dry paper; finish with a heat gun pass for gloss
- Primer helps paint adhesion; acrylics work well
- Superglue bonds well; epoxy for structural joints

The everyday rule

If a PLA part failed because it warped or snapped, PETG is usually the answer. If it failed because it melted near real heat, PETG buys you twenty degrees, not a new category — look at ASA or PC for more.

What PETG actually is

PETG is the plastic of the clear drinks bottle, adapted for printing. The base polymer is PET — polyethylene terephthalate — and the G stands for glycol, a second building block added to the chain so that the material no longer crystallises when it cools. That one change gives PETG its character: it stays clear or evenly tinted instead of going milky, it is noticeably tougher than PLA and yields before it breaks, and it has no true melting point, only a softening range. Its glass transition sits around 65–80 °C, some ten to twenty degrees above PLA, which is enough to survive a parked car, hot tap water and most sunny windowsills.

The same chemistry brings three habits every PETG user learns. It is hygroscopic: a spool left open for a day or two absorbs enough moisture to string and bubble, so drying is part of the routine rather than a fix. Its melt is sticky, which is why it strings between towers and why it bonds so well to a smooth print bed that it can pull chips out of the surface — glue on the plate acts as a release layer, not an adhesive. And it dislikes strong cooling: fan speeds that suit PLA weaken PETG's layer bonds. PET is one of the most recycled plastics in the world, but a printed PETG part is not accepted in household bottle recycling; it goes to general waste or a dedicated 3D-print recycling stream. Every PETG in this series is the same polymer with a different additive package, flow modifier, colourant or fibre, and each guide explains what that change does.

3 · How it is printed

PETG prints on standard hardware but has its own habits: it must be dry, it wants glue on the bed as a release layer, it prefers a low fan and a warm chamber, and it strings if pushed. The manufacturer's published window for the 2026 formulation is below, including full drying figures for the in-AMS dryers.

Manufacturer print window

Nozzle temperature	230–260 °C
Bed temperature	65–75 °C
Build plates	Cool Plate SuperTack, Textured PEI, Smooth PEI; the plain Cool Plate is not recommended for PETG

Bed adhesive	Glue stick or liquid glue recommended — on smooth PEI it protects the plate from over-adhesion
Chamber	35-50 °C; an enclosed printer with the door closed helps layer bonding
Print speed	Up to 200 mm/s
Part cooling fan	0-60 % — high fan speeds weaken layer bonds
Retraction	0.4-0.8 mm at 30-60 mm/s
Max overhang without support	About 70°
Max unsupported bridge	About 30 mm
Support material	Support for PETG; PLA can serve as a breakaway interface on some machines

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	AMS, AMS 2 Pro, AMS HT and AMS lite all listed as compatible for the 2026 formulation
Spool identification	RFID tag
Format	Spool and spool-free refill

Moisture, drying and storage

PETG absorbs moisture faster than PLA and shows it sooner: stringing, popping, rough surfaces and weak layers. The manufacturer treats drying as required before use, and the 2026 sheet gives full figures including the AMS dryers.

Forced-air oven or filament dryer	65 °C for 8 hours
Heated print bed method	80 °C for 12 hours, covered
AMS 2 Pro / AMS HT	65 °C for 8 hours
Storage	Sealed with desiccant, below 20 % relative humidity; keep desiccant in the AMS
Annealing	Not recommended (little gain, deformation risk); if attempted, 60-70 °C for 6-12 hours

Tips that make a visible difference

- Glue on smooth PEI is a release agent for PETG, not an adhesive: skip it and the part can tear the coating off the plate
- Bed at 60-65 °C and a cool-down before removal make parts release cleanly; freezing a stuck plate for ten minutes works
- Start the fan at 30 %; go to 60 % only for bridges and small features, and expect weaker layers where it is high

- A silicone sock on the hotend and a slightly lower nozzle temperature reduce the black blobs PETG leaves on the nozzle
- Use "print by object" and avoid long travel moves over open air to limit stringing

Known problems and their fixes

Stringing and hairs everywhere

Moisture first, temperature second. Dry at 65 °C for 8 hours; then drop the nozzle 5–10 °C and increase retraction slightly.

Part tore chunks out of the smooth PEI plate

Over-adhesion. Always use glue on smooth PEI, lower the bed to 60 °C, let it cool fully before removing.

Layers separate or the part is weak

Too much cooling or too cold a chamber. Fan below 40 %, door closed, chamber 35–50 °C, nozzle toward 250 °C.

Blobs and zits on the surface

Nozzle build-up from the sticky melt. Silicone sock, clean nozzle, slightly lower temperature, dry filament.

White marks or ghosting left on the textured plate

Residue from PETG on textured PEI, reported by users. Glue stick or hairspray as a release layer; wash the plate with washing-up liquid.

Under-extrusion at high speed

This grade is limited to 200 mm/s; profiles written for the HF grade will starve it.

4 · The numbers — technical datasheet

Figures are from the PETG Basic Technical Data Sheet V3.0 (the 2026 relaunch). The retired 2023 formulation (V2.0) had markedly different values; both are quoted in the data notes. Melt flow was measured at 245 °C on this sheet, so it cannot be compared with the 210 °C figures on PLA sheets.

Physical and thermal properties

Property	Test method	Value
Density	ISO 1183	1.25 g/cm ³
Melt flow index (245 °C, 2.16 kg)	ISO 1133	22.9 ± 2.4 g/10 min
Melting temperature	DSC, 10 °C/min	not applicable (amorphous)
Glass transition temperature	DSC, 10 °C/min	69 °C
Vicat softening temperature	ISO 306	69 °C
Heat deflection temperature, 0.45 MPa	ISO 75	71 °C
Heat deflection temperature, 1.8 MPa	ISO 75	68 °C
Saturated water absorption (25 °C, 55 % RH)	—	0.45 %

Mechanical properties

Property	Test method	X-Y (flat)	Z (across layers)
Young's modulus	ISO 527	2780 ± 65 MPa	2550 ± 100 MPa
Tensile strength	ISO 527	51 ± 1 MPa	35 ± 6 MPa

Property	Test method	X-Y (flat)	Z (across layers)
Elongation at break	ISO 527	9.5 ± 0.7 %	5.2 ± 1.4 %
Bending modulus	ISO 178	1950 ± 50 MPa	1740 ± 40 MPa
Bending strength	ISO 178	75 ± 3 MPa	56 ± 4 MPa
Charpy impact, unnotched	ISO 179	34.2 ± 4.1 kJ/m ²	10.5 ± 1.8 kJ/m ²
Charpy impact, notched	ISO 179	not published	not published

The V3.0 sheet gives no notched impact value; the retired V2.0 formulation listed 21.6 kJ/m² notched.

What the mechanical numbers mean in practice

The 2026 PETG Basic is the strongest plain material in this series in a slow pull — 51 MPa flat against 35 for PLA Basic — and, unusually for a PETG, also among the stiffest at 2780 MPa. Z-direction tensile strength holds 69 % of flat, better than most filled PLAs. Toughness is where it sits back: 34 kJ/m² unnotched is only a little above PLA Basic and well below the old PETG formulation's 53, and Z impact of 10.5 kJ/m² is ordinary. In practice PETG still fails more gracefully than PLA because it yields before fracture, which the elongation figure of 9.5 % only partly captures. The thermal block is the real reason to choose it: Tg 69 °C and HDT 71 °C under light load give a working ceiling around 65 °C, fifteen degrees above PLA.

Product format

Diameter	1.75 mm ± 0.03 mm
Net weight	1 kg
Spool	Reusable spool; spool-free refill also offered
Colours	7 at relaunch: Black, White, Grey, Red, Blue, Brown, Yellow
Identification	RFID tag
Datasheet version	V3.0 (relaunched March 2026); V2.0 was the 2023 formulation

Safety, certifications and chemical resistance

- Declared composition PETG; odourless, no skin hazard listed
- Flammable; combustion products water and carbon oxides. The HF grade's safety data sheet (July 2025) classifies PETG filament as not hazardous under CLP
- RoHS and REACH compliance stated across the filament line
- No food-contact certification; no emissions data published
- Resistant to most oils and greases; not to strong acids, alkalis or some organic solvents
- Disposal: general waste or 3D-print recycling; not bottle recycling

5 • Compared with Polymaker and SUNLU

Plain PETG is the second-largest filament category and every brand has several. Polymaker is mid-transition from its long-running PolyLite PETG to a new high-speed Polymaker PETG; SUNLU sells a standard and a high-speed matte grade.

Polymaker

PolyLite PETG (legacy) · Polymaker PETG (new, high-speed) · PolyMax PETG (tough)

Polymaker's legacy PolyLite PETG is the most heat-tolerant plain PETG in this comparison — Tg 81 °C, HDT 75 °C under load — with tensile strength matching Bambu's (50.8 MPa) but a very low notched impact (2.6 kJ/m²), and a modest 15 mm³/s flow limit. The new Polymaker PETG trades a few degrees of heat resistance for speed (300 mm/s, 22 mm³/s) and better layer strength; PolyMax PETG is the toughened option with a notched Charpy of 11.6 kJ/m². All on cardboard spools; food safety explicitly "no data".

PolyLite: tensile X-Y / Z	50.8 / 42.8 MPa
PolyLite: Young's modulus X-Y	2117 MPa
PolyLite: Charpy notched X-Y	2.6 kJ/m²
PolyLite: Tg / HDT 1.8 MPa	81 / 75 °C
Polymaker PETG: tensile X-Y / Z	48.0 / 45.7 MPa
Polymaker PETG: max speed / flow	300 mm/s / 22 mm³/s
PolyMax: Charpy notched X-Y / Z	11.6 / 2.4 kJ/m²
Nozzle / bed (all)	230-260 °C / 60-80 °C

SUNLU

SUNLU PETG · High Speed Matte PETG

SUNLU's standard PETG quotes 48 MPa tensile, a Tg of 79 °C and an HDT of 70 °C, with a low notched Izod of 3 kJ/m² and no Z data. Its "high speed" matte grade claims up to 400 mm/s but publishes a lower melt flow than the standard grade, so the speed claim rests on marketing rather than the datasheet. Tight ± 0.02 mm tolerance and the lowest price of the three; no material-system or spool-type statements.

Tensile (standard)	48 $\pm$ 10 MPa
Flexural modulus / strength	2100 / 70 MPa
Izod notched	3 $\pm$ 1 kJ/m²
Tg / HDT	79.4 / 70 $\pm$ 5 °C
Nozzle / bed	240-260 °C / 60-70 °C
Max speed (claimed)	$\leq$ 300 mm/s
Diameter	1.75 $\pm$ 0.02 mm
Formats	0.25-5 kg spools

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 2026 PETG Basic has the best-documented stiffness and strength of the three and is the only one cleared for every material system with RFID profiles. Polymaker's PolyLite is the pick when heat resistance matters most, its new PETG when speed does, PolyMax when toughness does. SUNLU is the value option with the thinnest data.

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, Tg (°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 Tg 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, Tm (°C)	Where the crystalline regions melt, measured by DSC (a calorimeter). Printing happens well above Tm 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

- Two very different PETG Basic datasheets exist. V2.0 (2023, retired): Young's modulus 1460 MPa, tensile 48 MPa, unnotched impact 52.7 kJ/m², notched 21.6, Tg 68 °C, Vicat 78 °C, MFI 18.6 at 210 °C, speed < 200 mm/s. V3.0 (2026): as tabulated above. This guide follows V3.0.
- The manufacturer's own store comparison tables quote a third set of PETG Basic figures (e.g. 65 MPa strength, 1670 MPa stiffness) that match neither datasheet; they are not used.
- A third-party claim that the 2026 formulation prints reliably at about 300 mm/s contradicts the datasheet's < 200 mm/s and is not adopted.
- Melt flow index is measured at 245 °C on this sheet and at 210 °C on the PETG HF and PLA sheets; the values are not comparable.
- Diameter tolerance ± 0.03 mm and the refill format come from store listings, not the datasheet.

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