Which filament should you use for a replacement part?

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Abstract. A decision table from what the broken part faces (heat, sun, load, chemicals) to a material class, with HDT, impact and absorption figures from manufacturer data sheets.

Keywords: replacement-parts, petg, asa, part-strength

1 Which filament should you use for a replacement part?

Match the filament to what killed the original: heat, sunlight, load or chemicals. PETG (glycol-modified PET) covers most indoor clips and brackets, and Prusa rates it for use below 80 °C. ASA takes sun and heat to 93 °C. Nylon takes gears and wear. PLA suits knobs and covers that stay cool and out of the sun.

1.1 The decision table

Find the row that describes the part's life. Heat deflection temperature (HDT) is where a loaded test bar starts to bend, measured here at 0.45 MPa.

Figures from the Bambu Lab technical data sheets for its PLA Basic, PETG Basic, ABS, ASA, PC and PA6-CF filaments. The qualitative rows come from the Prusa Knowledge Base material pages. All read 23 September 2026.

1.2 PETG or ABS

PETG for anything that stays below about 70 °C, ABS when the part gets hotter or meets acids and alkalis.

The two sit 16 °C apart on HDT: 71 °C for PETG Basic, 87 °C for ABS. PETG Basic pulls 51 MPa in XY against 33 MPa for ABS, and takes 34.2 kJ/m² in XY impact. ABS shrinks more on cooling, so Bambu Lab's own note on the ABS sheet is that the material is formulated to reduce warping and cracking. Prusa lists PETG as water and humidity resistant and, in its words, suitable for mechanical parts for both indoor and outdoor use below 80 °C.

Chemical exposure flips the choice. The Bambu Lab sheets rate ABS resistant to acids and alkalis and PETG not resistant. PETG resists most oils and greases, ABS does not resist some.

1.3 Nylon or polycarbonate

Polycarbonate (PC) for a stiff, hot, loaded part. Nylon for a part that slides or meshes.

PC's Bambu Lab sheet gives an HDT of 112 °C and a glass transition of 145 °C, with 62 MPa tensile in XY and 56 MPa in Z. That Z figure is the highest retention of any sheet cited here, which matters for a bracket loaded across its layers. PA6-CF has the higher HDT at 186 °C and the higher XY strength at 102 MPa, but only 48 MPa in Z.

Water separates them further. PA6-CF's saturated absorption is 2.35 percent against 0.25 percent for PC. Prusa says polyamide can take up water equal to 10 percent of its weight

Table 1. The decision table

What the part faces	Material class	The figure	Source
Room temperature, light load, indoors (knobs, covers, shelf clips)	PLA or PETG	HDT 57 °C for PLA Basic, 71 °C for PETG Basic	Bambu Lab data sheets
Repeated flexing, snaps, latches	PETG	Prusa lists PETG as tough and durable; PLA as brittle and inflexible	Prusa Knowledge Base
Hot water, steam, a dishwasher	ABS, ASA, PC or nylon	HDT 87 °C for ABS, 100 °C for ASA, 112 °C for PC, 186 °C for PA6-CF	Bambu Lab data sheets
Sunlight, outdoors	ASA	Prusa: high UV resistance, use up to 93 °C; PLA degrades under UV	Prusa Knowledge Base
A car interior	ASA or PC	Dashboards averaged 157 °F (69 °C) after one hour in the sun	ASU News on Vanos et al., 2018
Gears, bushings, sliding wear	Nylon (PA)	Prusa: low coefficient of friction, resistant to abrasion	Prusa Knowledge Base
Oils and greases	PLA, PETG, PC, PA6-CF	Resistant to most oils and greases; ABS and ASA are not resistant to some	Bambu Lab data sheets
Acids or alkalis	ABS or ASA	Listed resistant; PLA, PETG, PC and PA6-CF listed not resistant	Bambu Lab data sheets
A load that pulls across the layers	PC	PC keeps 56 MPa of its 62 MPa tensile strength in Z; PA6-CF keeps 48 of 102	Bambu Lab data sheets

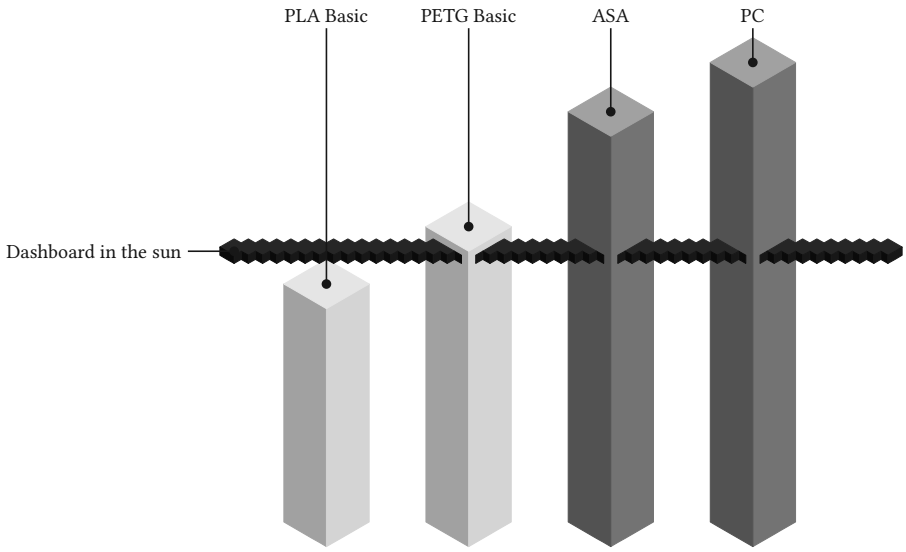


Figure 1. Column heights are the data sheet heat deflection temperatures to scale, and the black rod is the average dashboard temperature after one hour in the sun.

and lists it as highly hygroscopic, so a wet nylon part is softer than its data sheet.

Carbon-fiber nylon suits a bracket loaded along its layers, where the 102 MPa applies. Print the bracket the other way and the 48 MPa figure applies instead. Print orientation and the XY-versus-Z table are on the guide.

1.4 The car-interior case

A car cabin is a hot box. Researchers from Arizona State University and UC San Diego parked six cars on days above 100 °F in Tempe, Arizona. After one hour in the sun the cabin air averaged 116 °F (47 °C) and dashboards 157 °F (69 °C). In the shade, dashboards still averaged 118 °F (48 °C).

That puts a dashboard above the HDT of PLA Basic (57 °C) and near the glass transition of PETG Basic (69 °C), where the polymer turns rubbery. A door-pocket clip in the shade sits closer to the PETG limit. ASA at 100 °C HDT and PC at 112 °C clear the dashboard figure with margin, and ASA also carries the UV rating a sun-facing part needs.

PETG against ABS for a cabin part follows the same rule: ABS clears 69 °C by 18 °C, PETG by 2 °C.

1.5 What the original was made of

The original's material is the best hint for the print. A part that survived years of hot water or sun was made of something that could, and any material abbreviation molded into a hidden face says what. Where there is no mark, the table above decides by the conditions instead.

Dishwasher parts have their own page with the sanitize-rinse figure: which filament survives a dishwasher.

1.6 How to check it on your own print

1. Print the part in the material the table gives, with the load running along the layers.
2. Heat it to the temperature it will see (a dashboard at 69 °C, a sanitize rinse at 66 °C) in water or an oven, then press it while hot. Any give means the material is too close to its HDT.
3. Fit it and run the appliance or close the door for a week before printing a spare in the same material.

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