

Print Recommendations – Filament PM

FRJet – Self-Extinguishing PETG (UL94 V0)

What to expect from this profile

FRJet is a self-extinguishing PETG-based filament containing 20% flame retardant. It meets the UL94 V0 classification – the strictest self-extinguishing rating, verified by the flame test (UL 94 / ČSN EN 60695-11-10): after the flame is removed, the sample extinguishes itself, doesn't drip, and doesn't ignite its surroundings. When ignited, a charred crust forms on the surface that blocks oxygen and smothers the fire.

The material is intended mainly for enclosures and insulating parts in electronics, and for components near a potential fire source. Mechanically and thermally it's close to regular PETG: softening temperature 85 °C, heat deflection temperature (HDT) 70 °C, flexural strength 2,500 MPa, impact strength 23 kJ/m², density 1.27 g/cm³.

However, the flame-retardant additives change the melt behavior compared to pure PETG: the material is more prone to stringing, more hygroscopic (absorbs moisture), and tolerates aggressive cooling less well. Printing is therefore somewhat more demanding than with regular PETG and is especially sensitive to cooling, which directly determines layer bonding strength.

Golden rules

- 1. Almost no cooling = strong layers.** This is the single most important rule for FRJet. The flame retardant disrupts melt homogeneity and weakens layer bonding. If you run aggressive fan cooling from a regular PETG profile on this material, the part will start to break along layers – across the entire temperature range, so raising the temperature alone won't fix it. The cause of brittleness is cooling, not temperature or moisture.
- 2. Dry the material.** FRJet absorbs moisture more than regular PETG. Moisture produces practically the same symptoms as poor cooling – brittleness and layer failure – plus stringing and a rough surface. Dry material is the first condition to satisfy before you start tuning anything else.

Procedure: Dry the filament for roughly 6–12 hours at around 65 °C before printing. For longer prints, keep the spool in a dry box for the entire duration of the print.

- 3. Keep the nozzle temperature at the upper end.** For good layer bonding, FRJet needs the upper end of its temperature range. Unlike filled materials, though, it still stays within the TDS – 250 °C is the technical datasheet ceiling, no exceptions. A temperature tower across 240–260 °C confirmed the best cohesion right at the top.
- 4. Textured or satin plate, not smooth.** Self-extinguishing PETG tends to bond too strongly to smooth PEI (which can damage the plate), while elsewhere it holds worse than regular PETG. A textured or satin surface solves both problems at once.

Procedure: On the P1S, print on textured PEI; on the Core One, print on satin PEI. If first-layer adhesion is weak, use an adhesion spray (e.g. 3DLAC) or a glue stick as a separator.

5. **Respect the volumetric flow limit of your machine.** Maximum volumetric speed is the hotend's physical ceiling (how much material it can melt per second), and for FRJet it varies from machine to machine. The Bambu hotend on the P1S can go higher, while the Nextruder on the Core One is more conservative with this material. Pushing above the real ceiling leads to under-extrusion and, in turn, weak layers.
6. **FRJet “drools” a little – watch and clean the nozzle.** The self-extinguishing additives make FRJet ooze a bit more than regular PETG. It's nothing dramatic and doesn't spoil print quality – material can just build up on the nozzle over time, char, and end up embedded in the print as a burnt lump. If you keep an eye on the nozzle and keep it clean, FRJet prints beautifully.

Procedure: Check the nozzle occasionally during printing and wipe off any buildup. Enabling nozzle wipe after retraction helps. For longer or serial prints, check the nozzle between parts.

Which printers

The profiles are verified by real-world printing on two platforms:

- Bambu Lab P1S – BambuStudio slicer, hardened steel nozzle 0.4 mm.
- Prusa Core One – PrusaSlicer slicer, hardened brass nozzle 0.4 mm.

FRJet itself is not abrasive, so a hardened nozzle isn't required the way it is for filled materials. If your machine already has one, though, it won't cause any issues.

Key print parameters

Values are verified by printing on both platforms. The profile for each printer is based on the manufacturer's tuned PETG / FRJet profile in that slicer; below are the values you should verify or deliberately set – leave the rest at the default profile.

Parameter	Bambu Lab P1S	Prusa Core One
Slicer	BambuStudio / OrcaSlicer	PrusaSlicer
Nozzle	250 °C	250 °C
Bed	80 °C	80 °C
Build plate	textured PEI	satın PEI
Chamber	unheated	unheated
Cooling (fan)	body 0%, short layers up to 15%, overhangs/bridges 20%, off for first 3 layers	body 0%, short layers up to 15% (layer < 12 s), overhangs/bridges 20%, off for first 3 layers
Max. volumetric flow	17 mm ³ /s	15 mm ³ /s

Every part deserves fine-tuning

The values above are a verified baseline, not dogma. Every part has different geometry and different requirements:

- Large solid parts: watch first-layer adhesion – add a brim or adhesion spray if needed.
- Parts with overhangs and bridges: check whether the minimal cooling is enough. If overhangs “drip,” add cooling only to the overhangs, not globally – global cooling will hurt strength again.
- Stringing: FRJet strings more than pure PETG. If it appears, address retraction speed first, then temperature, and adjust retraction distance only as a last step.

Summary

Print FRJet like PETG with one key exception: almost no cooling. Dry material, temperature at the upper end of the window (250 °C), a textured or satin plate, and minimal cooling = a reliable self-extinguishing part☺

One last tip: A good-looking part doesn't necessarily mean a strong part. For self-extinguishing material used in electronics enclosures, layer-bond strength is what matters – and neither appearance nor a test boat will show you that. Once you've tuned the settings, take a real part and try to snap it by hand along the layers. If it holds, the print is dialed in.