Drying & storing filament

Damp filament prints badly and turns brittle. This card says which material to dry when – and how to keep moisture out in the first place.

Many plastics draw water from the air. During printing it flashes to steam at the hot nozzle: crackling, bubbles, rough surface, strings – and in the worst case, at high heat the water breaks the polymer chains and the part becomes permanently weaker. Drying and dry storage prevent this.

DRYING TABLE

MATERIAL	MOISTURE HUNGER	TEMPERATURE	DURATION
PVA (support)	very high	45 °C	long, sensitive
PA / Nylon	high	70–80 °C	8–12 h
PC	high	70–90 °C	6–12 h
TPU / TPE	medium-high	50–65 °C	4–8 h
PETG	medium	60–65 °C	4–6 h
ASA	low-medium	60–70 °C	4 h
ABS	low	60–70 °C	4 h
PLA	low*	40–45 °C	4–6 h

* PLA draws little water but is sensitive to hydrolysis: damp + hot = chain scission. Always dry below softening, otherwise the windings stick together.

HOW TO SPOT DAMP FILAMENT

During printing

→ crackling/popping at the nozzle

→ steam/bubbles in the strand

In the result

→ poor layer adhesion

→ part breaks easily/brittle

→ lots of strings (stringing)

→ rough, matte surface

→ uneven flow

→ fluctuating diameter

STORE IT RIGHT

✓ DO

- ✓ sealed box + desiccant (silica gel)
- ✓ humidity indicator visible
- ✓ opened spools straight back in the box
- ✓ print sensitive materials from a dry box

✗ DON'T

- ✗ leave spools out in the room
- ✗ store in a damp cellar/bathroom
- ✗ dry above the softening temperature
- ✗ "looks dry" – when in doubt, dry it

Why this is so (polymer chemistry, hydrolysis, all materials) is in the materials foundation:

→ Polymer Science for Additive Manufacturing (PDF)

No cooperation with the weapons, military or defence industry

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Guideline values; the manufacturer data sheet of the batch is authoritative