PPprint

Technical data sheet: P-support

P-support is a thermoplastic polymer specially developed for 3D printing of polypropylene (PP), which fulfils all the functions of a "breakaway" support material. It has very good adherence to PP and can be easily removed from the finished part after heating to about 100°C without leaving residues.

Material description

Trade name	P-support
Manufacturer	PPprint GmbH
Polymer group	Thermoplastic polymer
Chemical name	Polyolefin
Use	Extrusion-based 3D printing

Suggested 3D print settings (nozzle diameter 0.4mm)

Nozzle temperature	200 - 220 °C
Bed temperature	20 °C (50 - 80 °C recommended for the first layer, 100 – 110 °C for non-destructive removal after completion)
Chamber temperature	not required
Bed modification	P-surface 141
Active fan cooling	recommended
Layer height	0.1 – 0.4 mm
Print speed	15 – 40 mm/s

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Removal of P-support from the printed part

P-support adheres very strongly to the printed PP part in 3D printed state. To remove P-support, the printed part must be heated to 100 - 110°C. A conventional heating oven can be used for this purpose. It is also possible to use a boiling water bath for heating. At approx. 100°C P-support becomes "chewing gum-like" soft and formable. P-support can be removed immediately when hot or after cooling it can be pulled down using a little more force.

Material properties

Melt temperature	90-100 °C	-
Melt Flow Rate[1]	15.4 g/10 min	ISO 1133
Melt Volume Rate[1]	15.7 cm^3/10 min	ISO 1133
Density	0.98 g/cm^3	-
Odor	odorless	-
Color	natural	

[1] Test conditions: T = 210 °C; m = 5.0 kg

Adherence of P-support to with P-filament printed parts

Tensile test	For the investigation, dog bones were manufactured standing upright in accordance with DIN EN ISO 527 using extrusion-based 3D printing. In the narrow parallel middle section, three alternating layers, composed each of five layers of P-support and five layers of P-filament, were printed in the middle. Under tensile load, the dog bone breaks at the P-filament/P-support interface.
E-Modul (MPa)	450 ± 30
Strain at break (%)	0.5 ± 0.2

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Mechanical properties: Tensile test

All specimens were punched out of printed square tubes consisting of two shells, which were 3D printed with a Raise3D Pro2 3D printer and applying the following printing conditions:

Nozzle temperature: 210 ° C

Bed temperature: 70 ° C

Chamber temperature: 70 ° C

Print speed: 30 mm/s

Layer height: 0.2 mm

90°

punched dog bone: S 3A with an orientation of 90 ° to the nozzle movement direction

0°

punched dog bone: S 3A with an orientation of 0 ° to the nozzle movement direction

E-Modul (MPa)	505 ± 40	1200 ± 250
Yield strength (MPa)	11.9 ± 1.3	33.5 ± 1.3
Tensile strength (MPa)	12.0 ± 1.3	26.0 ± 5.8
Strain at break (%)	16.4 ± 6	158 ± 90

Certifications/ approvals*

Regulation EU Nr. 10/2011	Union Guidelines on Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food (Europe)
FDA	Food and Drug administration approval (USA)

* These data are generated using information obtained from the raw material suppliers.

Filament specification

Diameter 1.75	1.75 ± 0.10 mm	PPprint
Diameter 2.85	2.85 ± 0.10 mm	PPprint
Ovality	0.05	PPprint
Netto weight on spool	600 g ± 5%	PPprint

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Annotation

The data and properties presented here are averages of a standard batch. The 3D printed square tubes from which the specimens were punched out were produced in Slic3r version 1.3.0.

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