

Technical Data Sheet

Pro1 by Innofil3D BV

Filament suitable for all commercially available leading brands 3D FDM/FFF printers

IDENTIFICATION OF THE MATERIAL

Trade name	Pro1
Chemical name	Polylactic Acid compound
Chemical family	Compound of Polylactic Acid
Use	3D-Printing
Origin	Innofil3D BV

GUIDELINE FOR PRINT SETTINGS

Nozzle temperature	210 ± 10 °C
Bed temperature	Approx. 60 °C
Bed modification	Tape or glue below 60 °C
Active cooling fan	Yes
Layer height	0.08 – 0.2 mm
Shell thickness	0.4 – 0.8 mm
Print speed	40 - ≥ 150 mm/s

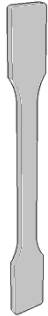

Settings are based on a 0.4 mm nozzle

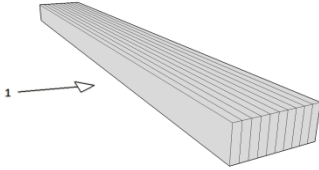
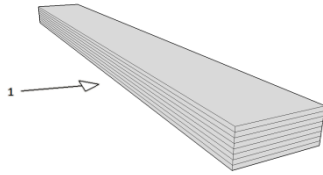
MATERIAL PROPERTIES

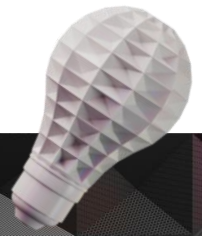
		Test Method
Melt temperature	170 – 180 °C	ASTM D3418
Glass transition temperature	~ 60 °C	ASTM D3418
Melt Flow Rate ¹	20.3 g/10min	ISO 1133
Melt Volume Rate ¹	18.5 cm ³ /10min	ISO 1133
Density	1.25 g/cm ³	ASTM D1505
Odor	Odorless	/
Solubility	Insoluble in water	/

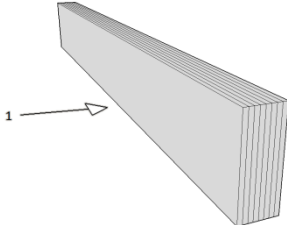
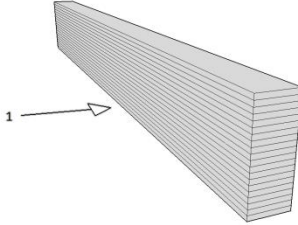
¹Test conditions: T = 210 °C; m = 2.16 kg



MECHANICAL PROPERTIES TENSILE TEST			Test Method	ISO 527
<p>All test specimens were printed using an Ultimaker 2+ under the following conditions: printing temperature: 210 °C heated bed temperature: 60 °C print speed: 40 mm/s number of shells: 2 Infill under 45°</p>	 <p>Printed vertical (Z-axis)</p>		 <p>Printed horizontal (X,Y-axis)</p>	
	Infill	50%	100%	50%
Tensile strength (MPa)	14.5 ± 0.8	21.8 ± 0.8	29.3 ± 0.2	48.0 ± 1.1
Force at break (MPa)	14.3 ± 0.8	21.3 ± 0.7	7.7 ± 2.7	9.7 ± 0.1
Elongation at max force (%)	0.8 ± 0.1	0.9 ± 0.1	2.6 ± 0.0	2.7 ± 0.1
Elongation at break (%)	0.8 ± 0.1	0.9 ± 0.1	8.7 ± 0.8	21.9 ± 2.9
Relative tensile strength (MPa/g)	1.4 ± 0.1	1.7 ± 0.1	3.0 ± 0.1	3.8 ± 0.1
Emodulus (MPa)	2111 ± 47	2930 ± 90	1993 ± 23	3166 ± 41

MECHANICAL PROPERTIES IMPACT TEST			Test Method	ISO 179
<p>All test specimens were printed using an Ultimaker 2+ under the following conditions: printing temperature: 210 °C heated bed temperature: 60 °C print speed: 40 mm/s number of shells: 2 Infill under 45° 1 →: impact direction</p>	 <p>Charpy (en)</p>		 <p>Charpy (ep)</p>	
	Infill	100%	100%	100%
Impact strength (kJ/m ²)	18.8 ± 0.7	18.8 ± 0.7	20.4 ± 0.6	20.4 ± 0.6
Impact energy (mJ)	755.4 ± 27.3	755.4 ± 27.3	813.1 ± 2.1	813.1 ± 2.1



MECHANICAL PROPERTIES FLEXURAL TEST		Test Method	ISO 178
<p>All test specimens were printed using an Ultimaker 2+ under the following conditions: printing temperature: 210 °C heated bed temperature: 60 °C print speed: 40 mm/s number of shells: 2 Infill under 45° 1 →: bending direction</p>	 <p>Normal</p>	 <p>Parallel</p>	
	Infill	100%	100%
Flexural modulus (MPa)	2822.5 ± 74.0	2340.2 ± 87.9	
Maximum force (MPa)	92.4 ± 0.9	99.1 ± 1.8	
Deformation (%)	4.3 ± 0.1	4.4 ± 0.1	

FILAMENT SPECIFICATIONS		Test Method
Diameter 1.75	1.75 ± 0.05 mm	Innofil3D
Diameter 2.85	2.85 ± 0.10 mm	Innofil3D
Max. roundness deviation 1.75	0.05 mm	Innofil3D
Max. roundness deviation 2.85	0.10 mm	Innofil3D
Net weight on reel	750 g ± 2%	Innofil3D



LIST OF COLORS AND CERTIFICATIONS*

Colour	Code	RAL nr.	Certifications/approvals			
			10/2011 ¹	FDA ²	2011/65 ³	EN 71-3 ⁴
Black	7502	9005	Yes	Yes	Yes	Yes
White	7503	9010	Yes	Yes	Yes	Yes
Silver	7521	9006	Yes	Yes	Yes	Yes

* This overview is generated using information obtained from the raw material suppliers.

Certifications/approvals	Description
¹ Regulation EU No 10/2011:	Union Guidelines on Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food (Europe)
² FDA:	Food and Drug administration approval (U.S.A.)
³ Directive 2011/65/EU:	The restriction of the use of certain hazardous substances in electrical and electronic equipment (Europe)
⁴ Directive 2009/48/EC; EN 71-3:	Safety of toys – Part 3: Migration of certain elements (Europe)