

Technical Data Sheet

PLA by Innofil3D BV

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

IDENTIFICATION OF THE MATERIAL

Trade name	Innofil3D PLA
Chemical name	Polylactic Acid
Chemical family	Thermoplastic Polylactic Acid
Use	3D-Printing
Origin	Innofil3D BV

GUIDELINE FOR PRINT SETTINGS

Nozzle temperature	220 ± 10 °C
Bed temperature	Approx. 60 °C
Bed modification	Tape or glue below 60 °C
Active cooling fan	YES; 100%
Layer height	0.08 - 0.2 mm
Shell thickness	0.4 - 0.8 mm
Print speed	40 - 80 mm/s

Settings are based on a 0.4 mm nozzle

MATERIAL PROPERTIES

MATERIAL PROPERTIES		Test Method
Melt temperature	145 - 160 °C	ASTM D3418
Glass transition temperature	~ 60 °C	ASTM D3418
Melt Flow Rate ¹	6.09 g/10min	ISO 1133
Melt Volume Rate ¹	6.73 cm ³ /10min	ISO 1133
Density	1.26 g/cm ³	ASTM D1505
Odor	Odorless	/
Solubility	Insoluble in water	/

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



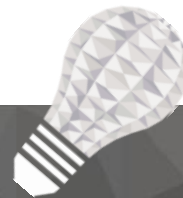
MECHANICAL PROPERTIES TENSILE TEST			Test Method ISO 527	
All test specimens were printed using an Ultimaker 2+ under the following conditions: Printing temperature: 210 °C Heated bed temperature: 60 °C Print speed: 40 mm/s Number of shells: 2 Infill under 45°	<p>Printed vertical (Z-axis)</p>		<p>Printed horizontal (X,Y-axis)</p>	
	Infill	50%	100%	50%
Tensile strength (MPa)	13.6 ± 2.6	28.8 ± 4.2	24.1 ± 0.6	38.1 ± 0.9
Force at break (MPa)	13.4 ± 2.5	28.6 ± 4.1	23.9 ± 0.7	36.3 ± 1.2
Elongation at max force (%)	0.7 ± 0.2	1.1 ± 0.3	2.2 ± 0.1	2.1 ± 0.0
Elongation at break (%)	0.7 ± 0.2	1.1 ± 0.3	2.4 ± 0.1	2.8 ± 0.2
Relative tensile strength (MPa/g)	1.5 ± 0.3	2.4 ± 0.4	2.7 ± 0.1	3.3 ± 0.1
Emodulus (MPa)	2028 ± 59	3150 ± 54	1760 ± 38	2852 ± 88

MECHANICAL PROPERTIES IMPACT TEST		Test Method ISO 179		
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>Charpy (en)</p>		<p>Charpy (ep)</p>	
	Infill	100%		100%
Impact strength (kJ/m ²)	14.2 ± 0.7		13.1 ± 0.7	
Impact energy (mJ)	521.5 ± 26.8		501.7 ± 31.1	



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)	2409.5 ± 206.3	2551.4 ± 100.8
	Maximum force (MPa)	65.7 ± 5.3	86.2 ± 3.2
	Deformation (%)	4.1 ± 0.2	3.8 ± 0.2

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
Naturel	0001	N/A	Yes	Yes	Yes	Yes
Black	0002	9005	Yes	Yes	Yes	Yes
White	0003	9010	Yes	Yes	Yes	Yes
Red	0004	3020	Yes	<u>No</u>	Yes	Yes
Blue	0005	5002	Yes	Yes	Yes	Yes
Yellow	0006	1003	Yes	Yes	Yes	Yes
Green	0007	6018	Yes	Yes	Yes	Yes
Orange	0009	2008	Yes	<u>No</u>	Yes	Yes
Pearl White	0011	1013	Yes	Yes	Yes	Yes
Chocolate Brown	0013	8017	Yes	Yes	Yes	Yes
Gold	0014	1036	Yes	Yes	Yes	Yes
Light Blue	0015	5012	Yes	Yes	Yes	Yes
Violet	0016	4008	Yes	Yes	Yes	Yes
Pink	0020	N/A	Yes	<u>No</u>	Yes	Yes
Silver	0021	9006	Yes	Yes	Yes	Yes
Magenta	0022	4010	Yes	<u>No</u>	Yes	Yes
Grey	0023	7045	Yes	<u>No</u>	Yes	Yes
Bronze	0032	8008	Yes	Yes	Yes	Yes
Sky Blue	0035	N/A	Yes	Yes	Yes	Yes
Orange Translucent	0010	1028**	Yes	Yes	Yes	Yes
Blue Translucent	0024	5022**	Yes	Yes	Yes	Yes
Dark Green Translucent	0025	6005**	Yes	Yes	Yes	Yes
Ice Blue Translucent	0026	5024**	Yes	Yes	Yes	Yes
Ocean Blue Translucent	0027	5001**	Yes	Yes	Yes	Yes

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

** RAL number used to manufacture the (semi-)transparent colour.

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)