

# 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 (up to 100%)
Layer height	0.08 - 0.2 mm
Shell thickness	0.4 - 0.8 mm
Print speed	40 - 80 mm/s

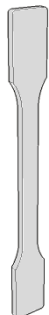

Settings are based on a 0.4 mm nozzle

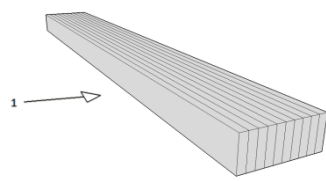
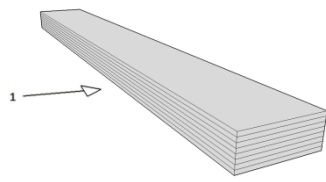
### MATERIAL PROPERTIES

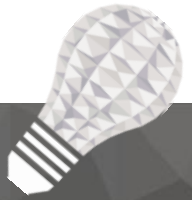
		Test Method
Melt temperature	145 - 160 °C	ASTM D3418
Glass transition temperature	~ 60 °C	ASTM D3418
Melt Flow Rate <sup>1</sup>	6.09 g/10min	ISO 1133
Melt Volume Rate <sup>1</sup>	6.73 cm <sup>3</sup> /10min	ISO 1133
Density	1.26 g/cm <sup>3</sup>	ASTM D1505
Odor	Odorless	/
Solubility	Insoluble in water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

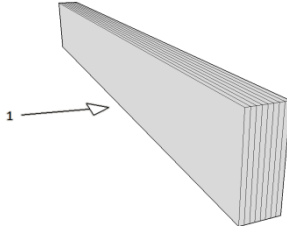
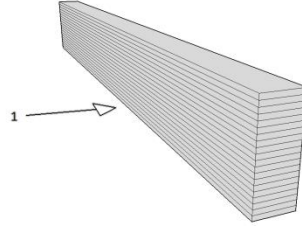
<sup>1</sup>Test conditions: T = 210 °C; m = 2.16 kg



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)	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		
<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 <sup>2</sup> )	14.2 ± 0.7	13.1 ± 0.7	13.1 ± 0.7	13.1 ± 0.7
Impact energy (mJ)	521.5 ± 26.8	501.7 ± 31.1	501.7 ± 31.1	501.7 ± 31.1



MECHANICAL PROPERTIES   FLEXURAL TEST		Test Method	ISO 178
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>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./ Pantone	Certifications/approvals			
			10/2011 <sup>1</sup>	FDA <sup>2</sup>	2011/65 <sup>3</sup>	EN 71-3 <sup>4</sup>
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
Army Green	0009	6003	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
Apricot Skin	0019	7415C	Yes	<u>No</u>	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
<sup>1</sup> 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)
<sup>2</sup> FDA:	Food and Drug administration approval (U.S.A.)
<sup>3</sup> Directive 2011/65/EU:	The restriction of the use of certain hazardous substances in electrical and electronic equipment (Europe)
<sup>4</sup> Directive 2009/48/EC; EN 71-3:	Safety of toys - Part 3: Migration of certain elements (Europe)

Part number	Colour	Diameter	Weight
10762	Army Green	1.75mm	750g
10763	Army Green	2.85mm	750g
10750	Black	1.75mm	750g
10751	Black	2.85mm	750g
10756	Blue	1.75mm	750g
10757	Blue	2.85mm	750g
10794	Bronze	1.75mm	750g
10795	Bronze	2.85mm	750g
10772	Chocolate Brown	1.75mm	750g
10773	Chocolate Brown	2.85mm	750g
10774	Gold	1.75mm	750g
10775	Gold	2.85mm	750g
10760	Green	1.75mm	750g
10761	Green	2.85mm	750g
10784	Grey	1.75mm	750g
10785	Grey	2.85mm	750g
10790	Ice blue	1.75mm	750g
10791	Ice blue	2.85mm	750g
10776	Light Blue	1.75mm	750g
10777	Light Blue	2.85mm	750g
10782	Magenta	1.75mm	750g
10783	Magenta	2.85mm	750g
10748	Natural	1.75mm	750g
10749	Natural	2.85mm	750g
10764	Orange	1.75mm	750g
10765	Orange	2.85mm	750g
10768	Pearl White	1.75mm	750g
10769	Pearl White	2.85mm	750g
10778	Pink	1.75mm	750g
10779	Pink	2.85mm	750g
10754	Red	1.75mm	750g
10755	Red	2.85mm	750g
10780	Silver	1.75mm	750g
10781	Silver	2.85mm	750g
10796	Sky Blue	1.75mm	750g
10797	Sky Blue	2.85mm	750g
10786	Translucent Blue	1.75mm	750g
10787	Translucent Blue	2.85mm	750g
10788	Translucent Dark Green	1.75mm	750g
10789	Translucent Dark Green	2.85mm	750g
10792	Translucent Ocean Blue	1.75mm	750g
10793	Translucent Ocean Blue	2.85mm	750g
10766	Translucent Orange	1.75mm	750g
10767	Translucent Orange	2.85mm	750g
10770	Violet	1.75mm	750g
10771	Violet	2.85mm	750g
10752	White	1.75mm	750g
10753	White	2.85mm	750g
10758	Yellow	1.75mm	750g
10759	Yellow	2.85mm	750g