

## Technical Data Sheet

### PP by Innofil3D BV

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

#### IDENTIFICATION OF THE MATERIAL

Trade name	Innofil3D PP
Chemical name	Polypropylene
Chemical family	Thermoplastic polymer
Use	3D-Printing
Origin	Innofil3D BV

#### GUIDELINE FOR PRINT SETTINGS

Nozzle temperature	230 ± 10 °C
Bed temperature	60 ± 10 °C
Bed modification	PP tape
Active cooling fan	Yes (up to 100%)
Layer height	0.1 – 0.2 mm
Shell thickness	0.4 – 1.0 mm
Print speed	40 – 80 mm/s

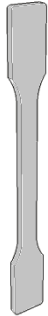

Settings are based on a 0.4 mm nozzle

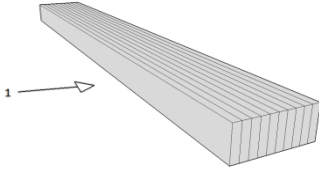
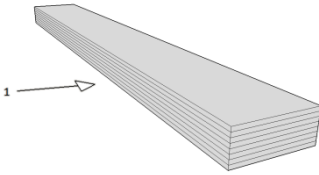
#### MATERIAL PROPERTIES

		Test Method
Melt temperature	141 °C	ASTM D3418
Glass transition temperature	N/A	ASTM D3418
Melt Flow Rate <sup>1</sup>	5.47 g/10 min	ISO 1133
Melt Volume Rate <sup>1</sup>	7.43 cm <sup>3</sup> /10 min	ISO 1133
Density	0.9 g/cm <sup>3</sup>	ASTM D1505
Odor	Odorless	/
Water solubility	Insoluble	/

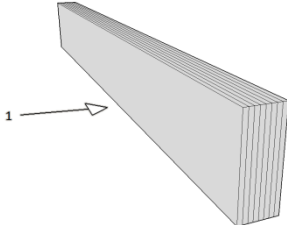
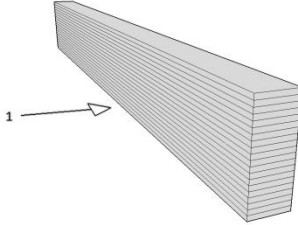
<sup>1</sup>Test conditions: T = 210 °C ; m = 2.16 kg



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)	8.5 ± 0.6	8.9 ± 2.5	6.1 ± 0.7	11.9 ± 1.2
Force at break (MPa)	7.5 ± 0.6	8.3 ± 2.5	7.5 ± 0.3	12.2 ± 0.7
Elongation at max force (%)	7.4 ± 1.0	3.0 ± 1.3	12.3 ± 0.7	11.9 ± 0.5
Elongation at break (%)	8.5 ± 1.5	3.2 ± 1.4	>200	>200
Relative tensile strength (MPa/g)	1.4 ± 0.1	1.1 ± 0.3	1.0 ± 0.1	1.5 ± 0.1
Emodulus (MPa)	360 ± 13	554 ± 25	371 ± 119	470 ± 28

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> )	1.4 ± 0.1	1.4 ± 0.1	61.0 ± 8.6	61.0 ± 8.6
Impact energy (mJ)	1503.6 ± 129.5	1503.6 ± 129.5	2280.9 ± 327.7	2280.9 ± 327.7



<b>MECHANICAL PROPERTIES   FLEXURAL TEST</b>		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)	1512.4 ± 559.7	2465.5 ± 428.4
	Maximum force (MPa)	19.6 ± 1.3	24.5 ± 0.7
	Deformation (%)	11.2 ± 1.2	11.6 ± 0.6

<b>FILAMENT SPECIFICATIONS</b>		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 <sup>1</sup>	FDA <sup>2</sup>	2011/65 <sup>3</sup>	EN 71-3 <sup>4</sup>
Natural	4401	N/A	Yes	Yes	Unknown	Unknown

\* 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)