Preparation date: 29-05-2017 Version No.: 1.0

Technical Data Sheet

HiPS by Innofil3D BV

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

IDENTIFICATION OF THE MATERIAL	
Trade name	Innofil3D HiPS
Chemical name	High impact Polystyrene
Chemical family	Thermoplastic polymer
Use	3D-Printing
Origin	Innofil3D BV

GUIDELINE FOR PRINT SETTINGS	
Nozzle temperature	260 ± 10 °C
Bed temperature	100 ± 10 °C
Bed modification	(Blue painters) Tape
Active cooling fan	No / Yes (up to 50%)
Layer height	0.1 – 0.2 mm
Shell thickness	0.8 – 1.0 mm
Print speed	40 – 80 mm/s

Settings are based on a 0.4 mm nozzle

MATERIAL PROPERTIES		Test Method
Melt temperature	N/A	ASTM D3418
Glass transition temperature	97 °C	ASTM D3418
Melt Flow Rate[1]	8.61 g/10 min	ISO 1133
Melt Volume Rate[1]	9.06 cm^3/10 min	ISO 1133
Density	1.04 g/cm^3	ASTM D1505
Odor	Odorless	/
Water solubility	Insoluble	/

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

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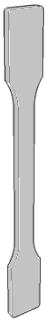
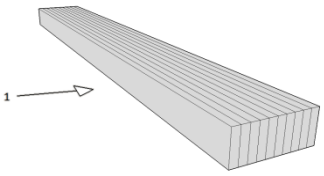
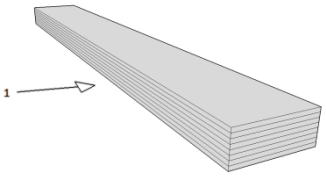
MECHANICAL PROPERTIES | TENSILE TEST			Test Method	ISO 527
All test specimens were printed using an Ultimaker 2+ under the following conditions: printing temperature: 210°C heated bed temperature: 60°C print speed: 40 mm/s number of shells: 2 Infill under 45°	 Printed vertical (Z-axis)		 Printed horizontal (X,Y-axis)	
Infill	50%	100%	50%	100%
Tensile strength (MPa)	3.0 ± 1.8	11.1 ± 2.5	10.6 ± 1.0	19.3 ± 0.4
Force at break (MPa)	5.8 ± 1.1	12.2 ± 0.4	5.6 ± 0.9	13.8 ± 0.4
Elongation at max force (%)	0.8 ± 0.2	1.2 ± 0.1	1.4 ± 0.1	1.5 ± 0.04
Elongation at break (%)	0.8 ± 0.2	1.3 ± 0.2	4.7 ± 1.3	12.3 ± 7.4
Relative tensile strength (MPa/g)	0.4 ± 0.2	1.0 ± 0.2	1.4 ± 0.1	1.9 ± 0.04
Emodulus (MPa)	951 ± 29	1403 ± 23	967 ± 59	1547 ± 57

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	 Charpy (en)	 Charpy (ep)	
Infill	100%	100%	
Impact strength (kJ/m^2)	34.0 ± 3.3	2.1 ± 0.1	
Impact energy (mJ)	1374.4 ± 138.2	1215.2 ± 140.6	

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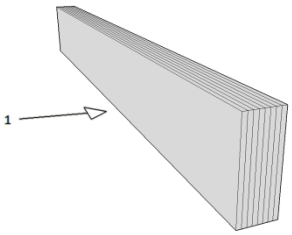
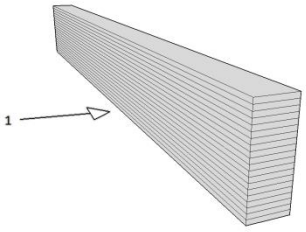
MECHANICAL PROPERTIES | FLEXURAL TEST		Test Method ISO 178
All test specimens were printed using an Ultimaker 2+ under the following conditions: printing temperature: 210°C heated bed temperature: 60°C print speed: 40 mm/s number of shells: 2 Infill under 45° 1→: bending direction	 Normal	 Parallel
Infill	100%	100%
Flexural modulus (MPa)	2927.8 ± 316.8	2310.4 ± 99.3
Maximum force (MPa)	38.0 ± 0.5	68.9 ± 1.2
Deformation (%)	8.8 ± 5.4	17.3 ± 1.1

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

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LIST OF COLORS AND CERTIFICATIONS*						
			Certifications/approvals			
Colour	Code	RAL nr.	10/2011[1]	FDA[2]	2011/65[3]	EN 71-3[4]
Natural White	4001	N/A	Yes	Yes	Unknown	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)

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