TECHNICAL DATA SHEET - ABS

IDENTIFICATION OF THE MATERIAL	
Trade name	ABS
Chemical name	Acrylonitrile Butadiene Styrene
Chemical family	Thermoplastic Copolymers
Use	3D printing
Brand	3dcolors

GUIDELINE FOR PRINT SETTINGS - Settings are based on a 0.4 mm nozzle	
Nozzle temperature	240 ± 10 °C
Bed temperature	80-100 °C
Bed modifications	Tape
Active cooling fan	No/Yes (up to 25%)
Layer height	0.08 - 0.2 mm
Layer thickness	0.4 - 0.8 mm
Print speed	40 ≥ 80 mm/s

MATERIAL PROPERTIES		Test Method
Melt temperature	Not Applicable	ASTM D3418
Glass transition temperature	~ 105 °C	ASTM D3418
Melt flowrate*	43.1 g/10 min	ISO 1133
Melt volume rate*	45.9 cm^3/10 min	ISO 1133
Density	1.04 g/cm^3	ASTM D1505
Odor	Odorless	/
Solubility	Insoluble in water	/

*Test conditions T = 210 °C ; m = 2.16 kg

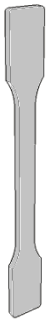
Think it, make it!

TECHNICAL DATA SHEET - ABS

MECHANICAL PROPERTIES - TENSILE TEST - 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)

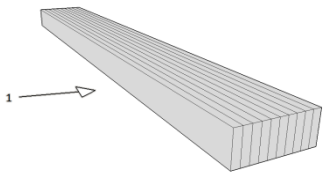
Infill	50%	100%	50%	100%
Tensile strenght (Mpa)	4.4 ± 0.6	6.5 ± 1.8	17.0 ± 0.8	29.3 ± 0.8
Force at break (Mpa)	2.7 ± 1.8	7.8 ± 1.3	13.6 ± 0.8	26.4 ± 1.8
Elongation at max force (%)	0.5 ± 0.1	0.7 ± 0.1	2.3 ± 0.1	2.4 ± 0.1
Elongation at break (%)	0.5 ± 0.2	0.7 ± 0.1	4.8 ± 0.9	3.7 ± 0.9
Relative tensile strenght (MPa/g)	0.7 ± 0.1	0.8 ± 0.2	2.5 ± 0.1	3.0 ± 0.1
Emodulus (MPa)	1031 ± 53	1358 ± 139	1072 ± 38	2030 ± 45

MECHANICAL PROPERTIES - IMPACT TEST - ISO 179

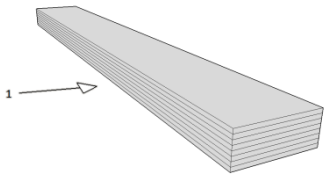
All test specimens were printed using an Ultimaker 2 +under the following conditions:

printing temperature: 210 °C
heated bed temperature: 60 °C
print speed: 40 mm/s
number of shells: 2
infill under 45%

Impact direction →



Charpy (en)



Charpy (ep)

Infill	100%	100%
Tensile strenght (Mpa)	39.3 ± 3.3	35.4 ± 3.4
Force at break (Mpa)	1500.0 ± 134.4	1371.6 ± 125.9

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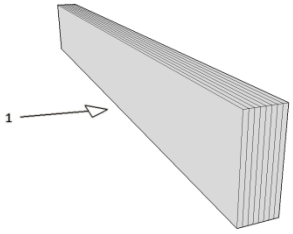
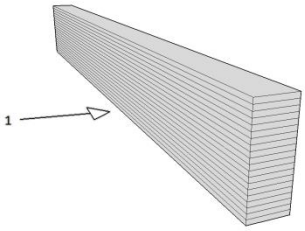
TECHNICAL DATA SHEET - ABS

MECHANICAL PROPERTIES - FLEXURAL TEST - 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%





bending direction →	normal	parallel
Infill	100%	100%
Flexural modulus (Mpa)	1965.3 ± 115.5	1680.8 ± 127.9
Maximum force (Mpa)	67.3 ± 2.3	72.6 ± 1.0
Deformation (%)	4.3 ± 0.1	4.4 ± 0.1

FILAMENT SPECIFICATIONS AND TOLERANCE

Diameter 1.75	1.75 ± 0.05 mm
Max. roundness deviation 1.75	0.05 mm
Net weight on reel	750 g ± 2%

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LIST OF COLORS AND CERTIFICATIONS*

Colour	Code	RAL	10/2011 [1]	FDA [2]	2011/65 [3]	EN 71-3 [4]
Black	0002	9005	Yes	Yes	Yes	Yes
White	0001	N/A	Yes	Yes	Yes	Yes
Red	0004	3020	Yes	No	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	No	Yes	Yes
Silver	0021	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	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)