

PLA	Nominal Value *	Unit	Test Method
Physical			
Specific Gravity	1.24	g/cc	ASTM D 1505

Hardness			
Shore D Hardness	84		ASTM D 2240

Mechanical			
Tensile Modulus (73.4° F)	480000/560000	psi	ASTM D 882
Tensile Strength - (Yield, 73.4° F)	16000/21000	psi	ASTM D 882
Tensile Strength - (Break, 73.4° F)	NA	psi	
Elongation - (Yield, 73.4° F)	NA	%	
Elongation - (Break, 73.4° F)	160/100	%	ASTM D 882
Flexural Modulus (73.4° F)			

Impact			
Notched Izod Impact (73.4° F)	.3 - .35	ft-lb/in	ASTM D 256

Thermal			
Heat Deflection Temperature Under Load	NA		
(66 psi, Unannealed)	NA	°F	
(264 psi, Unannealed)	NA	°F	
Vicat Softening Temp	NA		

Electrical			
Volume Resistivity	NA		
Surface Resistivity	NA		

Flammability			
Flame Rating	V2		UL 94

Recommended settings			
Nozzle Temperature	190 - 215	°C	
Heated Bed Temperature	Ambient - 45	°C	
Nozzle	1.75	mm	
Print Speed	up to 200	mm/s	
Layer Height:	0.1-0.4	mm	
Infill	As needed up to 100%		
Perimeter	minimum 0.9	mm	
Minimal Layer Time:	4	seconds	

*ASTM & ISO Properties /// note - Typical properties: these are not to be construed as specifications

ABS	Nominal Value	Unit	Test Method
Physical			
Specific Gravity	1.04	g/cc	ASTM D 792

Hardness			
Rockwell R Hardness	112	-	ASTM D 785

Mechanical			
Tensile Modulus (73.4° F)	328559	psi	ASTM D 638
Tensile Strength - (Yield, 73.4° F)	6258	psi	ASTM D 638
Tensile Strength - (Break, 73.4° F)	4694	psi	ASTM D 638
Elongation - (Yield, 73.4° F)	2	%	ASTM D 638
Elongation - (Break, 73.4° F)	24	%	ASTM D 638
Flexural Modulus (73.4° F)	332826	psi	ASTM D 790

Impact			
Notched Izod Impact (73.4° F)	5.879	ft-lb/in	ASTM D 256

Thermal			
Heat Deflection Temperature Under Load	NA		
(66 psi, Unannealed)	201.2	°F	ASTM D 648
(264 psi, Unannealed)	176	°F	ASTM D 648
Vicat Softening Temp	208		ISO 306

Electrical			
Volume Resistivity	NA		
Surface Resistivity	NA		

Flammability			
Flame Rating	HB		UL 94

Recommended settings			
Nozzle Temperature	210 - 245	°C	
Heated Bed Temperature	110 - 120	°C	
Nozzle	1.75	mm	
Print Speed	up to 200	mm/s	
Layer Height:	0.1-0.4	mm	
Infill	As needed up to 100%		
Perimeter	minimum 0.9	mm	
Minimal Layer Time:	2	seconds	

Color	Pantone	PLA		ABS	
Black	Black C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Green	360 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Blue	285 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Red	186 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
White	N/A	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Yellow	Yellow C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Purple	268 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Orange	1585 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Gray	Cool Gray 6 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Neon Green	804 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Neon Orange	802 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
Pink	212 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
MakeShaper Blue	299 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
MakeShaper Navy	7694 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm
MakeShaper Green	390 C	1.75 mm	2.85 mm	1.75 mm	2.85 mm

No Pigment					
Natural	N/A	1.75 mm	2.85 mm	1.75 mm	2.85 mm

Diameter & Accuracy		Nominal 1.75 mm \pm 0.03 mm	Nominal 2.85 mm \pm 0.03 mm
Ovality Accuracy		\pm 0.03mm	\pm 0.03mm

Retail Packaging		Vacuum sealed bag with desiccant in a cardboard box	
Labeling		Tamper Evident Label with UPC GTIN-12, Manufacture date, Recommended optimal print temperature and Spool specifications	
Small Box - 220g / Student Spool		152mm x 152mm x 50.8mm	
Medium Box - 1 kg / 650 g Spool		214.4mm x 214.4mm x 75.4mm	
Master Box Quantity	Pack Quantity		
Small Box - 220g / Student Spool	13		
Medium Box - 1 kg / 650 g Spool	6		

Spool	Small	Medium	Large
Spool Diameter	152.4 mm	212 mm	203.2 mm
Spool Width \ Thickness	35.44 mm	40 mm	73.15 mm
Hub Hole Diameter	53.9 mm	52.71 mm	52.71 mm
Material Net Weight	220 g \pm 5 g	650 g \pm 5 g	1 kg \pm 5 g
Gross Weight	430.58g	894g	1728g



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