

# MATERIALS COMPARISON - TECHNICAL DATASHEET



## Metals

	TENSILE MODULUS	TENSILE STRENGTH	ELONGATION AT BREAK	MELTING POINT	YIELD STRENGTH	CHARPY IMPACT NOTCHED	HARDNESS	DENSITY	COMPOSITION	
	Is the mechanical stress that would generate a theoretical elongation of 100% of the initial length of a material. The higher this value, the more rigid the material is	Is the stress from which a material deforms irreversibly. This value characterizes the resistance of a material	Is the ability of a material to elongate plastically before breaking during a tensile test. The higher this value, the more ductile the material is	Is the temperature at which a crystalline material changes from a solid state to a liquid state	The yield point indicates the limit of elastic behavior and the beginning of plastic behavior. The yield strength is the stress corresponding to the yield point at which the material begins to deform plastically	Is the energy required to break a previously notched test tube (sample of material). This value measures the impact resistance of a material	Is a value scale for characterizing the hardness of a material	Is the relationship between the mass of the substance and how much space it takes up (volume).	Is the composition of the metal alloy	
<b>MATERIAL</b>										
FDM										
	<b>Ultrafuse® 316L</b>	-	XY: 561 MPa Z: 521 MPa	XY: 53% ZX: 36%	-	XY: 251 MPa Z: 234 MPa	111 J/cm2	128 HV10	7.85 g/cm <sup>3</sup> (Sintered part)	-
	<b>Ultrafuse® 17-4 PH</b>	-	XY: 760 MPa Z: 730 MPa	XY: 4% ZX: 3%	-	XY: 680 MPa Z: 700 MPa	TBA	257 HV 10 (Vickers)	>7.6 g/cm <sup>3</sup> (Sintered part)	-
DMLS / SLM										
	<b>Aluminum AISi10Mg0,6</b>	70 ± 5 GPa	410 MPa	5 ± 2%	560°C	240 MPa	-	125 HB	-	Aluminum: >89% Silicon: 9 - 10 % Magnesium: 0.2 - 0.6 %
	<b>Titanium 6Al-4V</b>	XY: 108 ± 20 GPa Z: 112 ± 13 GPa	XY: 1260 ± 40 MPa Z: 1250 ± 50 MPa	XY: 7 ± 3 % Z: 9 ± 3 %	-	XY: 1125 ± 65 MPa Z: 1130 ± 75 MPa	-	-	4.41 g/cm <sup>3</sup>	Titanium: 88 - 100 % Aluminum: 5.5 - 6.5 % Vanadium: 3.5 - 4.5 %
	<b>Stainless Steel 316L</b>	170 GPa	650 ± 50 MPa	45%	1380°C	550 ± 50 MPa	30 J/cm <sup>2</sup>	-	-	Iron: 66- 70% Chrome: 16-18% Nickel: 11- 14% Molybdenum: 2- 3%
Bender Jetting										
	<b>Steel/ Bronze 420SS/BR</b>	147 GPa	496 MPa	7%	-	427 MPa	-	93 HRB	7.86 g/cm <sup>3</sup>	Stainless Steel: Alloy 420 Bronze: 90% Cu, 10% Sn
	<b>Stainless Steel 316</b>	XY: 220 GPa Z: 186 GPa	XY: 582 MPa Z: 526 MPa	XY: 55% Z: 52%	-	XY: 224 MPa Z: 226 MPa	63 J	71 HRB	7.9 g/cc	Stainless Steel: >70% Nickel: 10% - 14 % Chromium: 16 - 18 %
Wax Casting										
	<b>Bronze</b>	-	-	-	1450°C	-	-	-	-	Copper: 90% Tin: 10%
	<b>Brass</b>	-	-	-	1450°C	-	-	-	-	Chopper: 80% Zinc: 15% Tin: 5%
	<b>Sterling Silver</b>	-	-	-	-	-	-	-	-	Silver: 93% Copper: 4% Zinc: 3%