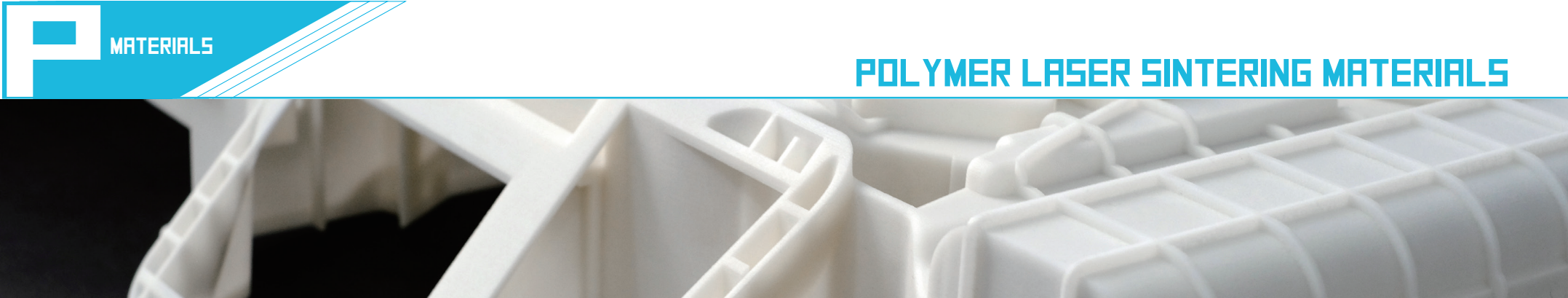




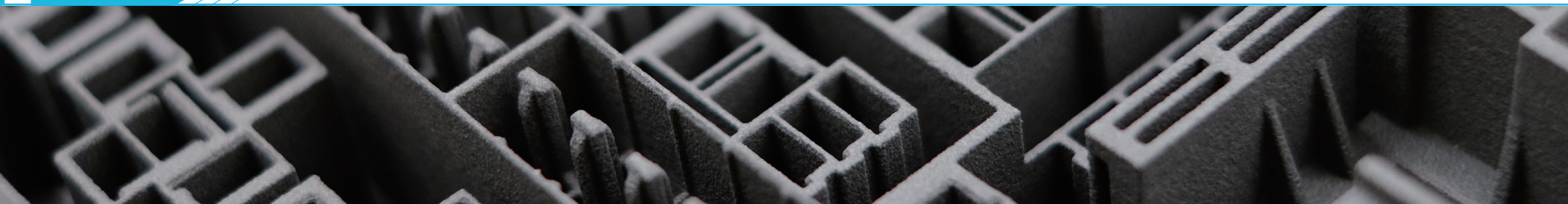
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Metal & Polymer Materials for Additive Manufacturing



General Properties	FS 3300PA PA 1212-based powder	FS 3401GB Glass bead filled	FS 3400CF Carbon fiber filled	FS 3250MF Mineral fiber filled	FS 4100PA PA 11 powder
Bulk Density	0.48 g/cm ³	0.67 g/cm ³	0.51 g/cm ³	0.55 g/cm ³	0.49 g/cm ³
Part Density	0.95 g/cm ³	1.26 g/cm ³	1.08 - 1.10 g/cm ³	1.20 g/cm ³	1.03 g/cm ³
Color	White	Gray	Black	Light gray	White
Thermal Properties					
Melting Point (10°C /min) ISO 11357.1:1997	183 °C	184 °C	184 °C	183 °C	203 °C
Heat Deflection Temp (HDT) @ 1.82 MPa ISO 75-2:2003	83.5 °C	68.8 °C	72 °C	129 °C	49 °C
Heat Deflection Temp (HDT) @ 0.45 MPa ISO 75-2:2003	146.2 °C	152.4 °C	168 °C	171 °C	150 °C
Mechanical Properties					
Tensile Strength ISO 527.2:1993	46 MPa	44 MPa	65-70 MPa	51 MPa	49 MPa
Tensile Modulus ISO 527.2:1993	1602 MPa	2644 MPa	4700 - 6500 MPa	6130 MPa	1542 MPa
Elongation at Break ISO 527.2:1993	36 %	9.3 %	3.0 - 4.0 %	5 %	58 %
Flexural Strength ISO 178:2001	46.3 MPa	60.3 MPa	94 - 113 MPa	76 MPa	60 MPa
Flexural Modulus ISO 178:2001	1300 MPa	2210 MPa	4500 - 5600 MPa	4633 MPa	1463 MPa
Izod Impact Strength (notched) ISO 180:2000	4.9 KJ/m ²	6.6 KJ/m ²	4.3 KJ/m ²	5.59 KJ/m ²	25 KJ/m ²
Izod Impact Strength (unnotched) ISO 180:2000	13.2 KJ/m ²	31.1 KJ/m ²	16 KJ/m ²	20.78 KJ/m ²	No break

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General Properties	Ultrasant X043 PA6 powder	Ultrasant X028 PA6 powder	FS 8100PPS PPS powder	FS 1092A-TPU TPU powder	FS 1088A-TPU TPU powder
Bulk Density	0.52 g/cm ³	0.52 g/cm ³	0.57 g/cm ³	0.64 g/cm ³	0.46 g/cm ³
Part Density	1.14 g/cm ³	1.15 g/cm ³	1.28 g/cm ³	1.12 g/cm ³	1.20 g/cm ³
Color	Black	Light yellow	Light yellow	White	White
Thermal Properties					
Melting Point (10°C /min) ISO 11357.1:1997	225 °C	220°C	295 °C	169 °C	160 °C
Heat Deflection Temp (HDT) @ 1.82 MPa ISO 75-2:2003	93 °C	100 °C	116 °C	n/a	n/a
Heat Deflection Temp (HDT) @ 0.45 MPa ISO 75-2:2003	191 °C	199 °C	220 °C	n/a	n/a
Mechanical Properties					
Tensile Strength ISO 527.2:1993	74 MPa	78 MPa	47 MPa	18 MPa	20 MPa
Tensile Modulus ISO 527.2:1993	3457 MPa	3550 MPa	3412 MPa	61 MPa	30 MPa
Elongation at Break ISO 527.2:1993	4.0 %	13.0 %	3.8 %	276 %	340 %
Flexural Strength ISO 178:2001	99 MPa	121 MPa	63 MPa	6.2 MPa	n/a
Flexural Modulus ISO 178:2001	2842 MPa	3300 MPa	2906 MPa	86 MPa	27 MPa
Izod Impact Strength (notched) ISO 180:2000	10.5 KJ/m ²	3.1 KJ/m ²	2.1 KJ/m ²	No break	No break
Izod Impact Strength (unnotched) ISO 180:2000	67.2 KJ/m ²	9.7 KJ/m ²	5.7 KJ/m ²	No break	No break

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