June 3, 2024

GGI PIM MATERIALS OFFERING

METALS

Material Group	Material Grade	Standards	Min. Density (g/cm^3)	Min. Yield Strength, $R_{p0.2}$ (MPa [KSI])	Min. Ultimate Tensile Strength (MPa [KSI])	Min. Elongation %	Hardness
Low Alloy Steel	4340 (heat treated)	ISO-22068	7.5	1350 [195]	1500 [217]	4	32 - 50 HRC
	4140 (heat treated)	ASTM-B883, ISO-22068, MPIF-35	7.4	1400 [203]	1550 [224]	4	32 - 50 HRC
Stainless Steel	316L	ASTM-B883, ISO-22068, MPIF-35	7.8	150 [22]	480 [70]	25	60 HRA
	17-4 PH (H900)	ASTM-B883, ISO-22068, MPIF-35	7.6	970 [140]	1070 [155]	5	41 - 47 HRC
	465 PH (H900)	ASTM F899	7.8	1448 [210]	1586 [230]	7	44 - 50 HRC
	420A (heat treated)	ASTM-B883, ISO-22068, MPIF-35	7.5	1088 [157]	1903 [276]	7	49 - 52 HRC
Heavy Alloy	95W-3.5Ni-1.5Fe	ASTM B777-07	18.0	655 [95]	930 [135]	10	32-38 HRC
Titanium Alloy	TI 6Al -4V	ASTM-F2885, ISO-22068	4.2	827 [120]	896 [130]	10	25 HRC
Copper	Cu	MPIF-35	8.7	30 [4.5]	200 [29]	35	75 HV

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CERAMICS

Material	Min. Density (g/cm^3)	Hardness	Young's Modulus (GPa)	Bend Strength (MPa)	Fracture Toughness (MPa √m])	Expansion Coefficient (K^{-1})	Conductivity (W/mK)	Thermal Shock Resistance (°C)	Resistance (Ω m)	Dieletric Constant
Alumina - 99.8%	3.85	2000 HV	400 Gpa	350-450 MPa	3.5	8×10^{-6} 10×10^{-6}	30 W/mK	200 °C	10.0 e12	10
Yttria stabilized Zirconia	6	1350 HV	200 Gpa	600-800 MPa	6.0-9.0		2 W/mK	350 °C	10.0 e8	22
Yttria stabilized Zirconia	5.9	1350 HV	200 Gpa	600-800 MPa	6.0-9.0	10×10^{-6}	2 W/mK	350 °C	10.0 e8	22