



502-1400-96



502-1400-96 + Glazing



502-1400-998



502-676

DENSE CERAMICS — ALUMINUM OXIDE, ALUMINUM NITRIDE, MAGNESIUM OXIDE, ZIRCONIUM OXIDE

Material Properties ¹	502-1400-96	502-1400-998	502-1835	502-676	502-1900-MSZ	502-1900-YTZP
Composition-Purity	Aluminum Oxide 96% ²	Aluminum Oxide 99.8%	Aluminum Nitride 98%	Magnesium Oxide ² 99.4%	Zirconia Magnesia Stabilized (3.5%)	Zirconia Yttria Stabilized (12.0%)
Thermal Properties						
Max Use Temperature, °F (°C)	3100 (1700)	3050 (1675)	1830 (1000) ³	3270 (1800)	2200 (1200)	930 (500)
Coefficient Thermal Expansion, in/in/°F x 10⁻⁶ (°C)	3.5 (6.3)	3.6 (6.5)	2.6 (4.6)	7.7 (13.9)	4.9 (8.9)	3.8 (6.9)
Thermal Conductivity, W/m-K	23	30	170	2.2	3	2.2
Mechanical Properties						
Compressive Strength, psi (MPa)	300,000 (2,070)	325,000 (2,240)	51,000 (350)	120,000 (830)	270,000 (1860)	360,000 (2,485)
Flexural Strength, psi (MPa)	52,000 (360)	55,000 (380)	59,000 (410)	35,500 (240)	90,000 (620)	138,000 (950)
Fracture Toughness, MPa.m^{0.5}	4–5	3–4	2.5	—	12	10
Hardness, Rockwell R-45N	81	86	70	70	78	80
Electrical Properties						
Volume Resistivity, ohm-cm	> 1 × 10 ¹⁴	> 1 × 10 ¹⁴	> 1 × 10 ¹²	1 × 10 ¹²	> 1 × 10 ¹³	> 1 × 10 ¹³
Dielectric Strength, volts/mil	250	290	787	150	300	240
Dielectric Loss, 1 MHz	0.0004	< 0.0001	—	—	0.0016	—
Dielectric Constant, 1 MHz	9.1	9.8	8.8	9.6	22.7	30.0
Physical Properties						
Density, g/cc	3.71	3.91	3.32	3.45	5.72	6.02
Gas Permeability	Gas Tight	Gas Tight	—	—	Gas Tight	Gas Tight
Water Absorption, %	0.0	0.0	—	4.5	0.0	0.0
Color	White	Ivory	Light Gray	Light-Brown	Light-Yellow	Ivory

Reference Notes

¹ Property measurements were taken at 25 °C. Additional data at elevated temperatures may be available upon request.

² Slip-cast crucibles and flanged lids are available in stock shapes up to 6" diameter and 10" high.

³ This temperature limit applies to an oxidizing atmosphere only. Product can be used in vacuum/inert atmospheres to 2900 °F (1600 °C).

