

## Typical Room-Temperature Strengths of Ceramic Materials

Material	MOR, MPa	MOR, kpsi	Tensile, MPa	Tensile, kpsi
Sapphire (single-crystal Al <sub>2</sub> O <sub>3</sub> )	620	90	—	—
Al <sub>2</sub> O <sub>3</sub> (0-2% porosity)	350-580	50-80	200-310	30-45
Sintered Al <sub>2</sub> O <sub>3</sub> (<5% porosity)	200-350	30-50	—	—
Alumina porcelain (90-95% Al <sub>2</sub> O <sub>3</sub> )	275-350	40-50	172-240	25-35
Sintered BeO (3.5% porosity)	172-275	25-40	90-133	13-20
Sintered MgO (<5% porosity)	100	15	—	—
Sintered stabilized ZrO <sub>2</sub> (<5% porosity)	138-240	20-35	138	20
Sintered mullite (<5% porosity)	175	25	100	15
Sintered spinel (<5% porosity)	83-220	12-32	—	19
Hot-pressed Si <sub>3</sub> N <sub>4</sub> (<1% porosity)	620-965	90-140	350-580	50-80
Sintered Si <sub>3</sub> N <sub>4</sub> (~5% porosity)	414-580	60-80	—	—
Reaction-bonded Si <sub>3</sub> N <sub>4</sub> (15-25% porosity)	200-350	30-50	100-200	15-30
Hot-pressed SiC (<1% porosity)	621-825	90-120	—	—
Reaction-sintered SiC (10-15% free Si)	240-450	35-65	—	—
Bonded SiC (~20% porosity)	14	2	—	—
Fused SiO <sub>2</sub>	110	16	69	10
Vycor or Pyrex glass	69	10	—	—
Glass-ceramic	245	10-35	—	—
Machinable glass-ceramic	100	15	—	—
Hot-pressed BN (<5% porosity)	48-100	7-15	—	—
Hot-pressed B <sub>4</sub> C (<5% porosity)	310-350	45-50	—	—
Hot-pressed TiC (<2% porosity)	275-450	40-65	240-275	35-40
Sintered WC (2% porosity)	790-825	114-120	—	—
Mullite porcelain	69	10	—	—
Steatite porcelain	138	20	—	—
Fire-clay brick	5.2	0.75	—	—
Magnesite brick	28	4	—	—
Insulating firebrick (80-85% porosity)	0.28	0.04	—	—
2600°F insulating firebrick (75% porosity)	1.4	0.2	—	—
3000°F insulating firebrick (60% porosity)	2	0.3	—	—
Graphite	28	4	12	1.8

Source: *Modern Ceramic Engineering*, Second Edition, D. Richerson, Marcel Dekker, 1992