

Properties*		Units	Test	Mullite	Alumina 94%	Alumina 96%	Alumina 99.5%	Alumina 99.8%	Zirconia ZTA	
Density		gm/cc	ASTM-C20	2.80	3.70	3.72	3.90	3.92	4.01	
Crystal Size	Average	MICRONS	THIN-SECTION	10	12	6	6	6	2	
Water Absorption		%	ASTM-373	0	0	0	0	0	0	
Gas Permeability		–	–	0	0	0	0	0	0	
Color		–	–	TAN	WHITE	WHITE	IVORY	IVORY	WHITE	
MECHANICAL	Flexural Strength (MOR)	20° C	MPa (psi x 10 ³)	ASTM-F417	170 (25)	352 (51)	358 (52)	379 (55)	375 (54)	450 (65)
	Elastic Modulus	20° C	GPa (psi x 10 ⁶)	ASTM-C848	150 (22)	303 (44)	303 (44)	370 (54)	370 (54)	360 (52)
	Poisson's Ratio	20° C	–	ASTM-C848	–	0.21	0.21	0.22	0.22	0.23
	Compressive Strength	20° C	MPa (psi x 10 ³)	ASTM-C773	550 (80)	2103 (305)	2068 (300)	2600 (377)	2500 (363)	2900 (421)
MECHANICAL	Hardness	20° C	GPa	KNOOP 1000 gm	7.4 (750)	11.5 (1175)	11.5 (1175)	14.1 (1440)	14.1 (1440)	14.4 (1475)
			(kg/mm ²)	–	–	–	–	–	–	–
	R45N	ROCKWELL 45 N	70	78	78	83	83	85		
Tensile Strength	25° C	MPa (psi x 10 ³)	ACMA TEST #4	–	193 (28)	221 (32)	262 (38)	248 (36)	290 (42)	
Fracture Toughness	K(I c)	Mpa m ^{1/2}	NOTCHED BEAM	2	4 - 5	4 - 5	4 - 5	4 - 5	5 - 6	
THERMAL	Thermal Conductivity	20° C	W/m °K	ASTM-C408	3.5	22.4	24.7	30.0	30.0	27.0
	Coefficient of Thermal Expansion	25-1000° C	1X 10 ⁻⁶ /°C	ASTM-C372	5.3	8.2	8.2	8.2	8.2	8.3
	Specific Heat	100° C	J/kg°K	ASTM-E1269	950	880	880	880	880	885
	Thermal Shock Resistance	ΔTc	°C	NOTE 3	300	250	250	200	200	300
	Max Use Temperature	–	°C	NO-LOAD COND.	1700	1700	1700	1750	1750	1500
ELECTRICAL	Dielectric Strength	–	ac-kV/mm (ac V/mil)	ASTM-D1116	9.8 (248)	8.3 (210)	8.3 (210)	8.7 (220)	8.7 (220)	9.0 (228)
	Dielectric Constant	1 MHz	25° C	ASTM-D150	6.0	9.1	9	9.7	9.8	10.6
	Dielectric Loss (tan delta)	1 MHz	25° C	ASTM-D150	0.0020	0.0004	0.0002	0.0001	0.0001	0.0005
	Volume Resistivity	25° C	ohm-cm	ASTM-D1829	> 10 ¹⁴	> 10 ¹⁴	> 10 ¹⁴	> 10 ¹⁴	> 10 ¹⁴	> 10 ¹⁴
		500° C	ohm-cm	ASTM-D1829	5 x 10 ¹²	4 x 10 ⁹	4 x 10 ⁹	2 x 10 ¹⁰	2 x 10 ¹⁰	2 x 10 ⁹
1000° C	ohm-cm	ASTM-D1829	3 x 10 ⁵	5 x 10 ⁹	1 x 10 ⁶	2 x 10 ⁶	2 x 10 ⁷	3 x 10 ⁶		
WEAR	Impingement	–	NOTE 4	–	0.52	0.50	0.47	0.47	0.41	
	Rubbing	–	NOTE 4	–	–	0.60	–	–	0.49	

The chart is intended to illustrate typical properties. Engineering data is representative. Property values vary somewhat with method of manufacture, size, and shape of part. Any suggested applications are not made as a representation or warranty that the material will ultimately be suitable for such applications. The customer is ultimately responsible for all design and material suitability decisions. Data contained herein is not to be construed as absolute and does not constitute a representation or warranty.

Notes:

1. Data Measurements – All data measurements are typical and made at room temperature unless otherwise noted.

2. Composition Control – all CoorsTek ceramic compositions are controlled using modern chemical, spectrographic, and X-ray fluorescent methods.

3. Thermal Shock Resistance – Tests are run by quenching samples into water from various elevated temperatures. The change in temperature where a sharp decrease in flexural strength is observed is listed as DTC.

4. Wear Resistance – Impingement tests are run using a dry fused alumina abrasive. Rubbing tests are run using a dry 240 grit fused alumina abrasive. The indices in the chart are calculated by dividing the material volume loss by the volume loss of an AD-85 alumina control. The lower in the index, the better the wear resistance.

5. Dielectric Strength numbers represent measurements on samples that were 0.25" thick.

*Ceramic property values vary somewhat with method of manufacture, size, and shape of part. Close control of values of most properties can be maintained if specified.