

## Data Sheet

# Alumina (AL998A)

### Description

High purity alumina with a minimum purity of 99.8%. Specifically developed for semiconductor processing applications.

### Prime Features:

- High resistance to semiconductor etch chemistries
- Excellent chemical resistance to acids, bases and organics
- Small grain size, low porosity, high polishability
- High volume resistivity
- Superior mechanical wear resistance
- Less than 100 ppm soda and silica impurity levels
- Maintains surface integrity in corrosive environments

### Specifications

- Quality Assurance to ISO 9001:2008

### Physical Properties

	Test	AL998A
Colour		Ivory
Density g/cm <sup>3</sup>	ASTM C373	3.94
Crystal Size (average) microns	ASTM E112-96	<6
Water Absorption %	ASTM C373	<0.004
Gas Permeability Torr – L/sec	He Leak detection	<1 x 10 <sup>-10</sup>
Flexural Strength (20°C) MPa	3-Point Bend	361
Weibull Modulus	ASTM C1161, C1239	25
Modulus of Elasticity GPa	ASTM C848	391
Poisson's Ratio	ASTM C848	0.19
Hardness Rockwell 45N	Rockwell	86
Fracture Toughness MPa√m	NIST Indentation	4.3-4.6
Inclusions >0.8mm dia	3x visual	0
Impurities (as SiO <sub>2</sub> )	GDMS	<100 ppm

	Test	AL998A
Thermal		
Thermal Diffusivity m <sup>2</sup> /s	ASTM E1461 (100°C)	7.6 x 10 <sup>-6</sup>
Thermal Conductivity W/m-K	ASTM C408 (100°C)	27
Specific Heat J/g-K	ASTM E1461 (100°C)	0.911
Thermal Expansion Coefficient x 10 <sup>-6</sup> /°C	ASTM C372 (40- 400°C)	7.4
Thermal Expansion Coefficient x 10 <sup>-6</sup> /°C	ASTM C372 (40- 800°C)	8.1
Thermal Shock Resistance (ΔT)°C	ASTM C1525	212

Please note that all values quoted are based on test pieces and may vary according to component design. These values are not guaranteed in anyway whatsoever and should only be treated as indicative and for guidance only.

### Typical Applications:

- Semiconductor components for etch, PVD, CVD, CMP, implant and litho processes
- High power laser insulators
- Wear-resistant rotary components
- Blood seals and valves
- Piston & sleeve pump sets
- High vacuum components

### Production Capabilities

- Process application support
- Isostatic, monostatic & uniaxial pressing
- Lapping & polishing to 2 microinch Ra
- Manual, CNC and high precision machining
- Straight right cylinder straightness to <10 microinch per inch and roundness to <20 microinches

	Test	AL998A
Electrical		
Dielectric Strength KV/mm	ASTM D149	>23
Dielectric Constant	ASTM D2520 (1.0 MHz)	9.6
Dielectric Loss	ASTM D150 (1 MHz)	3.0 x 10 <sup>-4</sup>
Volume Resistivity ohm-cm	ASTM D257 (RT)	1.0 x 10 <sup>14</sup>
Volume Resistivity ohm-cm	(300°C)	4.0 x 10 <sup>11</sup>
Volume Resistivity ohm-cm	(700°C)	4.0 x 10 <sup>7</sup>