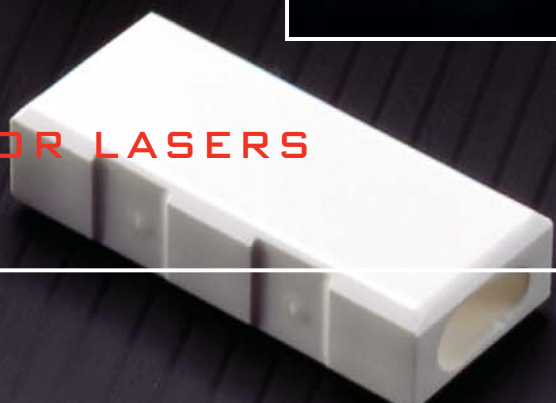


CERAMICS FOR LASERS



ADVANCED CERAMICS FOR HIGH-PERFORMANCE LASER EQUIPMENT

Experts in Technical Ceramics

CoorsTek, the largest technical ceramics manufacturer in North America, provides advanced material solutions to virtually every industry in the global economy – and has for over 90 years.

CeraLase™ Ceramics – Designed for Laser Equipment

CoorsTek CeraLase ceramics are engineered specifically for high-performance, long-life laser equipment components. These advanced materials provide:

- High reflectance (see chart at right)
- Excellent dielectric strength
- Superior corrosion resistance
- Exceptional thermal stability
- High strength and hardness
- Inherent cleanliness

Variety of Materials for a Variety of Applications

CoorsTek manufactures custom ceramic components for numerous types of lasers and laser applications:

- | | |
|---------------------|---------------------------------|
| Lasers: | Applications: |
| • Excimer | • Diffuse reflectors |
| • CO ₂ | • Feedthroughs |
| • Solid state/NdYag | • Insulators, channeled cooling |
| • Diode pump | • Laser waveguides |
| • Ion lasers | • Ion laser tubes |

Advanced Manufacturing Capabilities

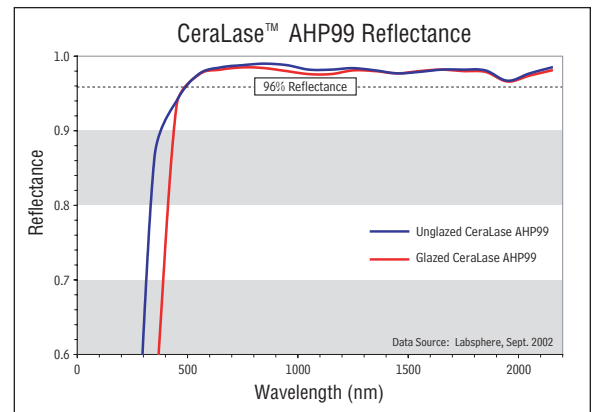
Our state-of-the-art forming methods and statistically controlled processing ensure leading-edge, low-cost manufacturing. Advanced capabilities in green machining and precision grinding enable extreme customization of design to meet the most demanding applications.

Secondary Processing Capabilities

- Metallizing
- Brazing
- Glazing
- Component assembly
- Hermeticity/helium leak testing

CeraLase Diffuse Reflectors Maximize Pump Chamber Performance

CoorsTek CeraLase AHP-99 high-purity alumina is specifically engineered for laser reflector/pump chamber applications. This material provides a highly-diffuse reflecting surface with greater than 96% reflectance for wavelengths 500 nanometers and higher (see chart below). CeraLase ceramic reflectors offer superior durability in high-energy laser applications and can be glazed for additional protection where active cooling is required.



Expert Engineering Assistance

CoorsTek engineers offer assistance:

- Selecting the best material for your application
- Designing for manufacturability:
 - Optimize performance
 - Minimize manufacturing cost
 - Ensure fit/function compatibility
- Engineering quality through manufacturing process

Advanced Materials and Experience for Amazing Results

Our long-term experience, broad range of materials, variety of cost-effective manufacturing techniques, and unparalleled capacity (over two million square feet of manufacturing capacity) provide peace of mind for manufacturers around the globe.

Call us today at +1-303-277-4116 for assistance on your next project.

Property	Units	Test	CeraLase Ceramics for Laser Equipment				
			AD-94 94% Alumina	AD-96 96% Alumina	FG-995 98.5% Alumina	AD-995 99.5% Alumina	AD-998 99.8% Alumina
Density	gm/cc	ASTM-C 20	3.70	3.72	3.80	3.90	3.93
Flexural Strength (MOR), 20 °C	MPa (psi X 10 ³)	ASTM-F417	352 (51)	358 (52)	375 (54)	379 (55)	390 (58)
Elastic Modulus, 20 °C	GPa (psi X 10 ³)	ASTM-C848	303 (44)	303 (44)	350 (51)	370 (54)	370 (54)
Poisson's Ratio, 20 °C	*	ASTM-C848	0.21	0.21	0.22	0.22	0.22
Compressive Strength, 20 °C	MPa (psi X 10 ³)	ASTM-C773	2103 (305)	2068 (300)	2500 (363)	2600 (377)	2700 (390)
Hardness	GPa	ROCKWELL 45N	78	78	82	83	83
Thermal Conductivity, 20 °C	W/m K	ASTM-C408	22.4	24.7	27.5	30.0	30.0
CTE, 25-1000 °C	1x10 ⁻⁶ /°C	ASTM-C372	8.2	8.2	8.2	8.2	8.2
Volume Resistivity, 25 °C	Ohm-cm	ASTM-D1829	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴

Note: These charts are intended to illustrate typical properties. Engineering data is representative. Property values vary somewhat with method of manufacture, size, and shape of part. This data is not to be construed as absolute and does not constitute a warranty for which we assume legal responsibility



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