Alumina
Type ALC-AA

General Information

ZIRCAR Ceramics' Alumina Type ALC-AA is an engineered low-density, rigid refractory structure of high-alpha polycrystalline alumina fiber and high-purity inorganic alumina binder - in cylindrical form. ALC-AA's fine, open-pore structure makes it an excellent thermal insulator with good machinability - exhibiting good hot strength and dimensional stability in industrial applications with continuous operating temperatures to 1500°C (2732°F) with intermittent use to 1600°C (2912°F). The high purity alumina binder gives this low-density fiber body a very high degree of chemical inertness and is therefore useful in reducing and other corrosive atmospheres. ALC-AA exhibits high electrical resistivity at elevated temperatures and is also transparent in microwave and RF energy fields. ALC-AA is pure white and exhibits high reflectance. ALC-AA is pre-fired, contains no organic binders and will produce no smoke or odors when heated. It shows excellent resistance to chemical attack and is not affected by oil or water. It is, however, affected by hydrofluoric acid, phosphoric acid and strong alkalis.

Characteristics & Properties

Nominal Composition, wt.%	
Al_2O_3	97
SiO_2	3
Organic Content	0
Density, g/cc (pcf)	0.24 (15)
Bond	Alumina
Maximum Use Temperature*,°C (°F)	
Continuous	1500 (2732)
Intermittent	1550 (2822)
Melting Point, °C (°F)	1870 (3992)
Open Porosity, %	93
Specific Heat, J/kg°K (BTU/lb°F)	1047 (0.25)
Linear Shrinkage‡,	
1 hr. at 1550°C (2822°F)	2
1 hr. at 1650°C (3002°F)	6
Compressive Strength**, MPa (psi) at 10% Compression	0.34 (50)

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Characteristics & Properties Continued

Flexural Strength**, MPa (psi) at 40% Strain	0.69 (100)
Thermal Expansion Coefficient, Room temp. to 1000°C (1832°F)	$7.5x10^{-6}$/°C ($4.2x10^{-6}$/°F)
Thermal Conductivity**, (ASTM C177-76) W/m°K (BTU/hr ft² °F/in)	
400°C (752°F)	0.07 (0.5)
800°C (1472°F)	0.13 (0.9)
1100°C (2012°F)	0.19 (1.3)
1400°C (2552°F)	0.26 (1.8)
1650°C (3002°F)	0.28 (1.9)

The data presented herein is intended to help the user to determine the appropriateness of this material for their application.
This data is a nominal representation of this product's properties and characteristics and therefore should not be used in preparing specifications.
* Maximum use temperature is dependent on variables such as stresses, both thermal and mechanical, and the chemical environment that the material experiences. ** Properties expressed parallel to thickness. ‡ Properties expressed perpendicular to thickness.

Suggested Applications

Primary thermal insulation in thermal process systems with hydrogen gas, oxydizing and inert atmospheres operating to 1550°C (2822°F).
Thermal insulation, supports and fixtures in high-temperature Solid Oxide Fuel Cells and Copper Vapor Lasers.
Molten Non-Ferrous metal transport and contact were SiO_2 cannot be tolerated.
Electrical insulation in high-temperature systems operating to 1550°C (2822°F).
Thermal insualtion in high-temperature microwave systems.

Availability

Custom Cylinders: ALC-AA is manufactured on a custom basis. Many forming molds are available that can be used in manufacturing a very wide range of sizes. Cylinders typically produced have 1" to 16"ID, ½" to 2" wall thickness and are up to 36" long.

To Order

Custom cylinders and shapes: specify quantity, product type and size. Example: 24ea, ALC-AA, 3"ID x 4.65"OD x 15.3"L, or supply drawing.

Standard Tolerances for ALC-AA Cylinders are +/-0.060" on ID and OD and +/-0.13" on L.

Custom shapes: our state-of-the-art tight-tolerance machining techniques allow a wide variety of sizes and shapes to be made.

Surface treatments including rigidization with colloidal alumina (AL-R/H) or colloidal silica (SI-RIG) or coating with alumina cement (AL-CEM) are all available.

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