



## Alumina Type ALC

### General Information

ZIRCAR Ceramics' Alumina Type ALC is an engineered low-density, rigid refractory structure composed of high-alpha polycrystalline alumina fibers and high-purity inorganic binders. Manufactured in cylindrical form, ALC's uniformly bound, fine, open-pore structure makes it an excellent thermal insulator with precision machinability. ALC exhibits very good hot strength and dimensional stability in industrial applications with continuous operating temperatures to 1550°C (2822°F) and withstands intermittent use to 1650°C (3002°F). High-purity silica is the binder in ALC-which makes it one of the strongest low-density fiber bodies manufactured today. ALC exhibits high electrical resistivity at elevated temperatures and is also transparent in microwave and RF energy fields. ALC is pure white and exhibits high reflectance.

ALC is pre-fired contains no organic binders and will produce no smoke or odors when heated. ALC 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 <sub>2</sub> O <sub>3</sub>                      | 85  |
| SiO <sub>2</sub>                                    | 15  |
| Organic Content                                     | 0   |
| Density, g/cc (pcf)                                 | 0.24 (15)   |
| Bond  | Silica  |
| Maximum Use Temperature*, °C (°F)                   |   |
| Continuous  | 1550 (2882)   |
| Intermittent  | 1650 (3002)   |
| Melting Point, °C (°F)                              | 1870 (3992)   |
| Color   | White   |
| Open Porosity, %                                    | 93  |
| Specific Heat, J/kg°K (BTU/lb°F)                    | 0.25 (1024)   |
| Linear Shrinkage‡,                                  |   |
| 1 hr. at 1550°C (2822°F)                            | 1   |
| 1 hr. at 1650°C (3002°F)                            | 3   |
| Thermal Expansion Coefficient, Room temp. to 1000°C | 5.0x10 <sup>-6</sup> /°C (2.8x10 <sup>-6</sup> /°F) |

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## Characteristics & Properties Continued

|   |            |
|---|------------|
| Compressive Strength**, MPa (psi) at 10% Compression                                      | 1.2 (170)  |
| Flexural Strength**, MPa (psi) at 25% Strain  | 1.6 (225)  |
| Thermal Conductivity**, (ASTM C177-76) W/m <sup>2</sup> °K (BTU/hr ft <sup>2</sup> °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, intermediate and backup thermal insulation in low-mass furnaces and thermal process systems operating to 1650°C (3002°F).

Precision-machined thermal insulation in scientific analytical instruments.

Electrical insulation in high-temperature systems operating to 1650°C (3002°F).

## Availability

**Custom Cylinders:** ALC 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, 3" ID x 4.65" OD x 15.3" L, or supply drawing.

**Standard Tolerances** for ALC 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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