



Alumina Type AL-30AAH

General Information

ZIRCAR Ceramics' Alumina Type AL-30AAH is a premium-grade refractory structure composed of Polycrystalline Alumina Fiber (PCW) and high-purity inorganic alumina binder. AL-30AAH exhibits the highest Al_2O_3 purity of ZIRCAR Ceramics' commercially available products. Its composition is engineered at 98.4% Al_2O_3 existing predominantly in the alpha crystal phase. As AL-30AAH contains no free silica it is appropriate for use in advanced high-temperature systems such as copper vapor lasers and furnaces with reducing atmospheres - where silica cannot be tolerated.

AL-30AAH products are pre-fired to an extremely high temperature which contributes to its outstanding stability and hot strength. AL-30AAH's uniformly bonded, fine, open-pore structure enables it to be cut and readily machined to close tolerances.

AL-30AAH exhibits 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

Typical Composition, %	
Al_2O_3	98.4
SiO_2	1.6
Typical Impurities, %	
Na_2O	0.03
CaO	0.02
Other Metal Oxides	0.04
Density, g/cc (pcf)	0.51 (32)
Open Porosity, %	84
Maximum Use Temperature*, °C (°F)	1700 (3092)
Melting Point, °C (°F)	1870 (3392)
Color	White
Specific Heat, J/kg°K (BTU/lb°F)	0.25 (1047)
Linear Shrinkage, %, 1 hr at 1650°C (3002°F)	
Length [‡]	0.2
Width [‡]	0.6
Volume	1
CTE, room temp. to 1000°C (1832°F)	$7.5 \times 10^{-6}/^{\circ}C$ ($4.2 \times 10^{-6}/^{\circ}F$)

ZIRCAR Ceramics, Inc.

PO Box 519
100 N. Main St., Florida, NY 10921-0519
Telephone: (845) 651-6600
E-mail: sales@zircarceramics.com

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Characteristics & Properties Continued

Thermal Conductivity, ** ASTM C177-76 W/m ² K (BTU/hr ft ² °F/in)	
250°C (482°F)	0.09 (0.65)
525°C (977°F)	0.12 (0.85)
800°C (1472°F)	0.16 (1.10)
1075°C (1967°F)	0.19 (1.30)
1350°C (2462°F)	0.23 (1.60)
1650°C (3002°F)	0.27 (1.85)

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 Copper Discharge Lasers operating to 1600°C (2912°F).

Primary thermal insulation in low-mass furnaces and thermal process systems operating to 1700°C (3092°F) with vacuum, reducing, or inert, or other application where the absence of silica is desired.

High-temperature setters, supports and process fixtures.

Launders, distribution boxes, pouring spouts, hot tops and others involving lithium alloyed molten aluminum metal contact.

Backup thermal insulation in furnaces and thermal process systems operating to temperatures exceeding 2000°C (3632°F).

Electrical insulation in high-temperature systems operating to 1700°C (3092°F).

Availability

AL-30AAH is manufactured to order on a custom basis. In addition to being manufactured in flat board, cylinders and custom shapes, AL-30AAH can be fired to a variety of high-temperatures regimens to impart certain application driven characteristics.

To Order

Custom boards fired to the highest possible temperature have been manufactured as large as 16" x 16" x 1.5".

Cylinders can be manufactured monolithically with IDs from 1" to 10" with 0.5" to 1.5" wall thickness in lengths up to 12" Longer cylinder assemblies can be made with the use of precision machined lap joining.

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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