

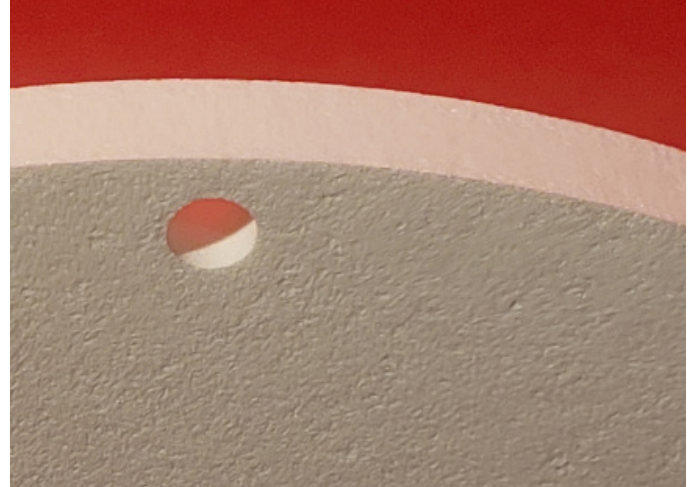


# Alumina Type ZAL-12

## General Information

ZIRCAR Ceramics' Alumina Type ZAL-12 is a low-density, rigid refractory structure, composed of high-alpha polycrystalline alumina fibers and high-purity inorganic binders. ZAL-12 was engineered to deliver the lowest possible density and is manufactured to a tight +/-1.0 pcf density. Despite its very low density, this unique material also exhibits good machineability. ZAL-12 exhibits high electrical resistivity at elevated temperatures and is also very transparent in microwave and RF energy fields. ZAL-12 is pure white and exhibits high reflectance.

ZAL-12 is pre-fired, contains no organic binders and will produce no smoke or odors when heated. ZAL-12 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)	0.19 (12.0)
Maximum Use Temperature*, °C (°F)	
Continuous	1550°C (2822°F)
Intermittent	1600°C (2912°F)
Thermal Shrinkage, volume %	
1 hr. at 1350°C (2462°F)	1.20
1 hr. at 1450°C (2642°F)	2.30
1 hr. at 1550°C (2822°F)	4.00
24 hr. at 1550°C (2822°F)	4.00
Thermal Expansion Coefficient Room temperature to 1000°C (1832°F) ‡	5.0 x 10-6/°C (2.8 x 10-6/°F)
Permittivity, At Room Temperature ‡, ε'	
@ 4 GHz	1.22
@ 17 GHz	1.21
Open Porosity, %	94
Specific Heat, J/kg°K (BTU/lb°F)	1047 (0.25)

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Technical Data Bulletin  
Alumina Type ZAL-12  
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# Alumina Type ZAL-12

## Characteristics & Properties Continued

Compressive Strength, MPa (psi) at 10% Compression,	
Parallel to Formed Thickness	0.15 (21.1)
Perpendicular to Formed Thickness	0.69 (100)
Flexural Strength, MPa (psi)	
Parallel to Formed Thickness	0.83 (120.4)
Perpendicular to Formed Thickness	0.98 (141.9)
Thermal Conductivity**, (ASTM C177-76) W/m-C (BTU-in/hr-ft <sup>2</sup> -F)	
400°C (752°F)	0.13 (0.89)
800°C (1472°F)	0.22 (1.55)
1200°C (2192°F)	0.37 (2.54)
1400°C (2552°F)	0.43 (2.97)

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 high temperature systems.

Precision-machined thermal insulation in scientific analytical instruments.

Reflector tiles in infrared paper-drying equipment.

Thermal and electrical insulation in high energy microwave and RF systems.

## Availability

ZAL-12 is manufactured on a custom basis.

**Typical flat boards** that are manufactured include 18"W x 24"L x 1"T to 18"W x 24"L x 2"T.

**Custom boards** in other sizes can also be manufactured.

**Custom shapes:** Our extensive vacuum forming experience combined with 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) , colloidal silica (SI-RIG) or coating with alumina cement (AL-CEM) are all available.

## To Order

Contact ZIRCAR Ceramics, provide drawings or describe requirements and we will provide an offer.



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