

## AL

# Alumina Textiles & Bulk Fiber

The Only Source for Fibrous Alumina Materials Made With the ZIRCAR Process

### Six Different Product Formats Offered

- Thin and Thick Felt
- Tricot Knit Cloth
- Square Weave Cloth
- Satin Weave Cloth
- Bulk Fiber

### AL Features

- 99% Pure Alumina
- Trace Level of Silica
- 100% Inorganic - No Binders
- Low Thermal Conductivity
- No Outgassing
- Designed for Uses in Extremely Corrosive, High Temperature Environments
- Dimensional Stability in Hydrogen
- Extreme High Temperature Stability
- Usable in Multiple Atmospheres

### The Zircar Fibrous Ceramics Advantage

Low Mass,  
Low Heat Storage &  
Low Thermoconductivity  
means  
High Thermal Shock Resistance,  
High Insulation Performance,  
Higher System Efficiency &  
Lower Energy Costs



### High Purity Alumina... Chemically Inert...

Ideal for hydrogen environments.

### Product Information

Zircar Alumina ( $Al_2O_3$ ) Type AL fibers and textiles are made by the same unique ZIRCAR process used for manufacturing yttria-stabilized zirconia cloths and felts at our plant in Florida, NY, USA. This process yields an alumina fiber with only trace amounts of silica, making it more stable in hydrogen environments than the more commonly found sol-gel alumina fibers that have 3% silica. After high firing, AL products transition to greater than 90 percent alpha alumina.

Alumina fiber textiles are used as insulation for glass melting furnaces and for fiber optic furnaces. ALBF, can be used as bulk fill insulation. Alumina fiber cloth is used as insulation in differential scanning calorimeters (DSC's). Alumina fiber textiles can be used as gaskets for fuel cells.

Our high purity alumina fiber and textiles are offered in six different standard product forms:

**ALBF** Bulk Fiber  
**ALF-50 and ALF-100** Felts  
**ALK-15** Tricot Knit Cloth  
**ALW-15** Square Weave Cloth  
**ALW-30** Satin Weave Cloth

For more information,  
phone: (845) 651-3040  
email: [sales@zircarzirconia.com](mailto:sales@zircarzirconia.com)  
website: [www.zircarzirconia.com](http://www.zircarzirconia.com)

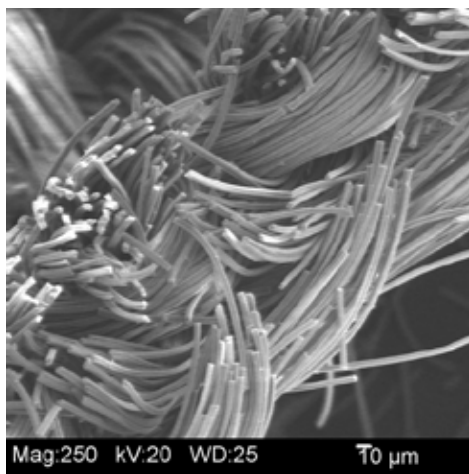
## Properties & Characteristics

Properties (Nominal)	ALF-100	ALK-15
Bulk Density, lb/ft <sup>3</sup> (g/cm <sup>3</sup> )	8 (0.13)	31 (0.49)
Porosity, %	97	88
Melting Point, °C (°F)	2015 (3630)	2015 (3630)
Tensile Strength, lb/in width	0.28	.9
Loss on Ignition, Wt%	3.8	1.4
Outgassing	Nil	Nil
% Shrinkage, 1 hr. @ 1650 °C (3002 °F)	15	7
<b>Chemical Composition (Nominal)</b>		
<b>Oxide</b>	<b>Wt%</b>	
Al <sub>2</sub> O <sub>3</sub>	99+	

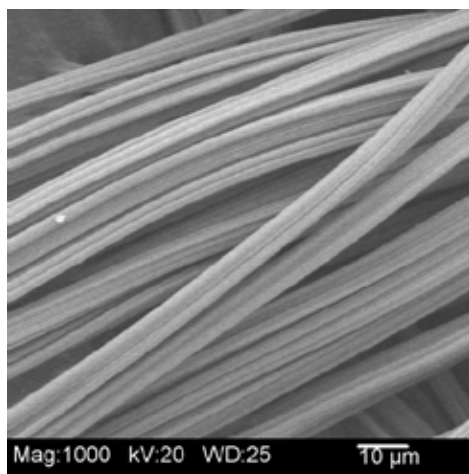
There are six different products offered, in addition to the items above, ALF-50, ALW-15 and 30, and ALBF.

### Product Micrographs

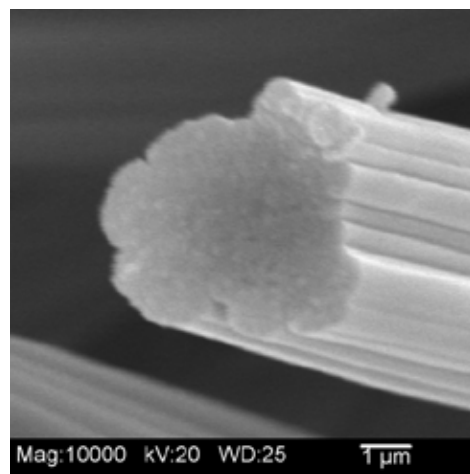
Alumina Cloth ALK-15 has the unique advantage of being a knit structure. This structure allows irregular shapes to be cut that do not unravel or fray. The SEM photomicrograph to the left shows the cut edge of ALK-15 and the individual filaments of the knit threads. The middle SEM photomicrograph shows individual fibers arranged mostly parallel to each other in a thread. These filaments show the serrated nature of all "ZIRCAR Process" fibers. The SEM photomicrograph to the right shows the end of an individual fiber in ALK-15. The individual submicron crystallites which make up the near theoretical density fiber can be seen clearly. Fiber diameter is approximately 6 microns.



ALK-15 magnified at 250x.



ALK-15 magnified at 1000x.



ALK-15 magnified at 10000x.



Zircar Zirconia, Inc.  
87 Meadow Road  
P.O. Box 287  
Florida, New York 10921

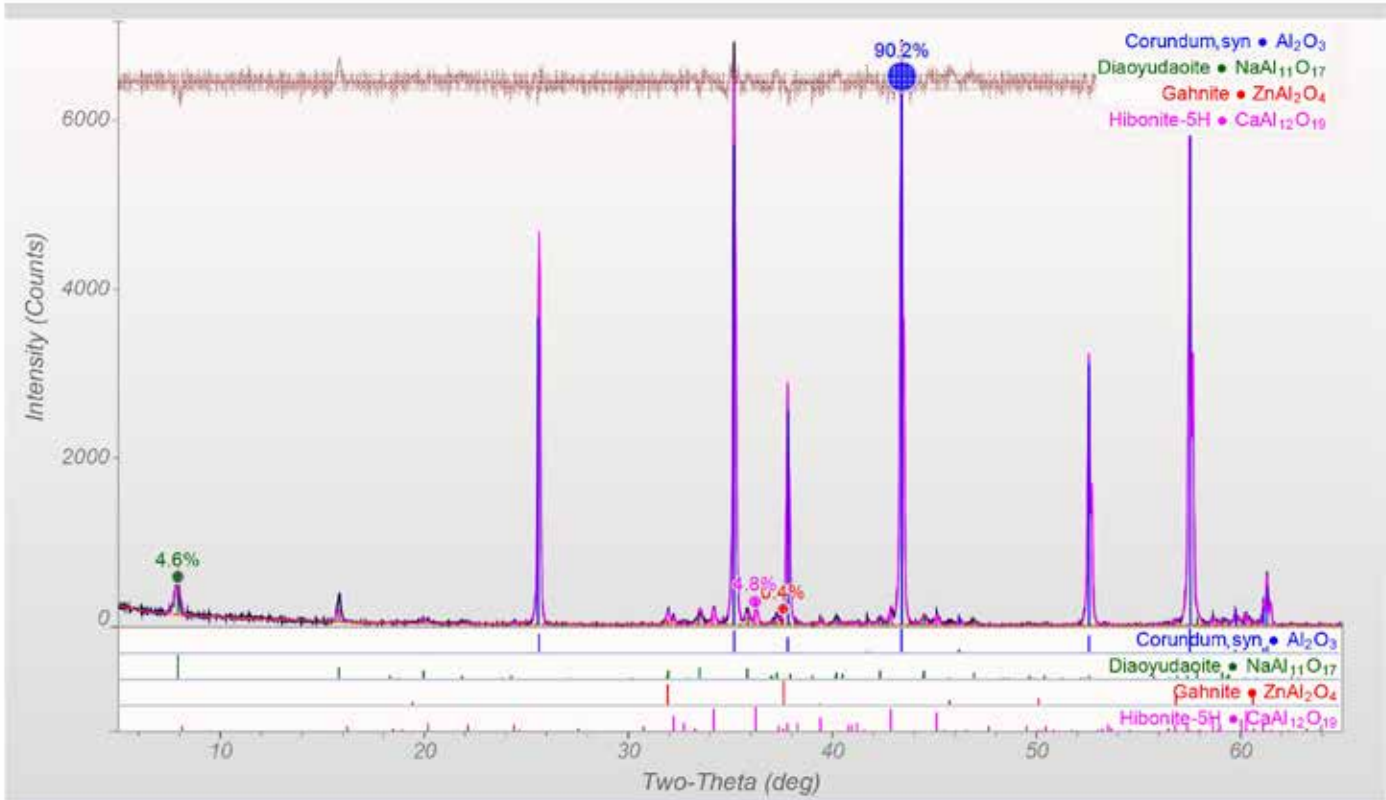
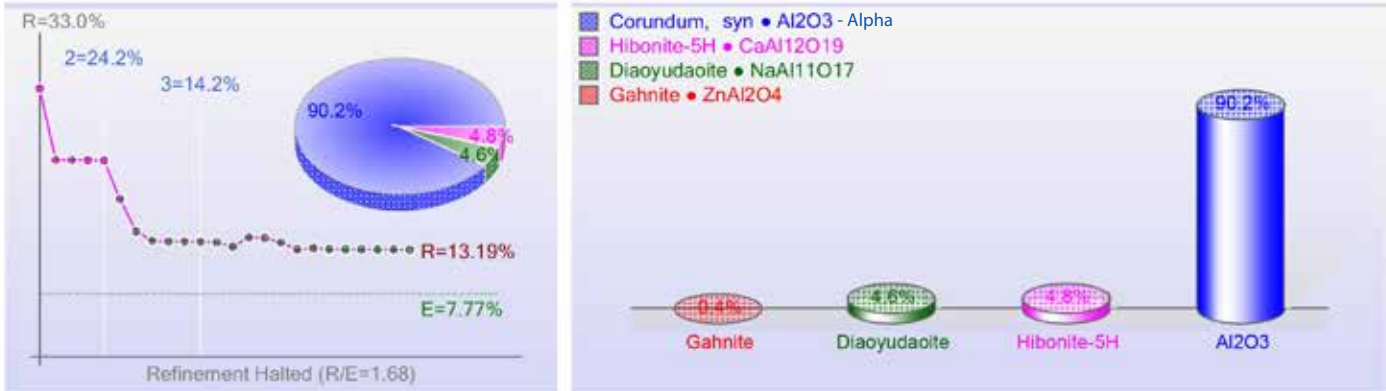
Phone: (845) 651-3040  
Fax: (845) 651-0074  
Email: sales@zircarzirconia.com  
www.zircarzirconia.com

# X-Ray Diffraction Analysis of ALK Calcined

Phase ID (4)	Chemical Formula	NA	NR	NP	Wt% (esd)	RIR
Corundum, syn	$\text{Al}_2\text{O}_3$	2	11	11	90.2 (1.0)	1.01
Diaoyudaoite	$\text{NaAl}_{11}\text{O}_{17}$	10	55	8	4.6 (0.2)	2.66
Gahnite	$\text{ZnAl}_2\text{O}_4$	3	9	5	0.4 (0.1)	3.63
Hibonite-5H, syn	$\text{CaAl}_{12}\text{O}_{19}$	11	58	6	4.8 (0.2)	0.71

XRF(Wt%): ZnO=0.2%, CaO=0.4%,  $\text{Al}_2\text{O}_3$ =99.2%,  $\text{Na}_2\text{O}$ =0.2%

Refinement Halted (R/E=1.68), Round=3, Iter=12, P=32, R=13.09% (E=7.77%, EPS=0.5)



Corundum is alpha alumina and is the most thermodynamically stable form of alumina. AL products are amorphous as delivered and transition to alpha alumina after heat treating.



Zircar Zirconia, Inc.  
87 Meadow Road  
P.O. Box 287  
Florida, New York 10921

Phone: (845) 651-3040  
Fax: (845) 651-0074  
Email: sales@zircarzirconia.com  
www.zircarzirconia.com

## Product Samples & Standard Products

### Contact our Sales Department for Pricing and Availability

Call: 845-651-3040

email: [sales@zircarzirconia.com](mailto:sales@zircarzirconia.com)

Product Type	1.8" x 2.8"	12" x 12"	12" x 16"	16" x 20"
ALF-50	SAMPLE-E01A			E01A03
ALF-100	SAMPLE-E01B			E01B03
ALK-15	SAMPLE-E01C		E01C01	
ALW-15	SAMPLE-E01D	E01D01		
ALW-30	SAMPLE-E01E			E01E02
Product Type	Approx 1oz	1 Lb		
ALBF	SAMPLE-E01F	E01F01		



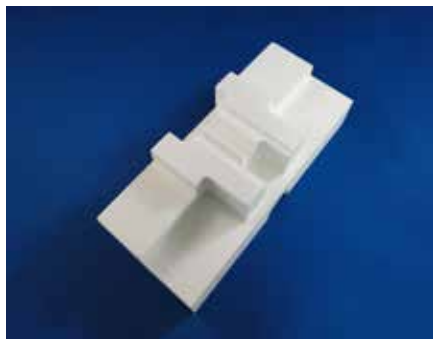
## Other Products & Capabilities

Customers who order Alpha Alumina Textiles and Bulk Fiber, may be interested in:

- Yttria Stabilized Zirconia Felts, Textiles and Bulk Fiber
- High Purity Zirconia and Yttria Products
- Buster Alumina Cement and Rigidizer
- Buster Blanket
- Ceria Felts, Textiles and Bulk Fiber

Zircar manufactures and machines custom fibrous insulation shapes to your design specifications. Our capabilities include:

- 3D CNC Machining
- Layered Configurations
- Lap Joined Boards and Cylinders
- Diamond Wire Splitting of Cylinders



Zircar Zirconia, Inc.  
87 Meadow Road  
P.O. Box 287  
Florida, New York 10921

Phone: (845) 651-3040  
Fax: (845) 651-0074  
Email: [sales@zircarzirconia.com](mailto:sales@zircarzirconia.com)  
[www.zircarzirconia.com](http://www.zircarzirconia.com)