

## ZYFB-3, ZYFB-6 & FBD

### High Temperature Ytria Stabilized Zirconia Insulation

**Zircar** Zirconium Oxide Fibrous Ceramic Insulation Types ZYFB-3, ZYFB-6 & FBD are rigid refractory structures composed of our own ZYBF Bulk Fibers which are openly porous. These materials are nearly 100% zirconia phase stabilized with yttria (YSZ). They have extremely low thermal conductivity, are rated for use to as high as 2000 °C and can be exposed to higher temperatures, up to 2200 °C, depending on the application.

We use the highest purity raw materials in our products. The products contain only minimal trace oxides and no organics that off-gas when heated. Because our zirconia fibers are yttria stabilized, they do not undergo the disruptive phase transitions of pure zirconia.

The zirconia products we manufacture at Zircar Zirconia, Inc. are unique due to the open and closed porosity of our zirconium oxide fibers. This is a one-of-a-kind porosity and is exclusive to **Zircar**. Our products are the best performing ZrO<sub>2</sub> fibrous ceramics in the industry, outperforming all others when challenged with extreme temperatures and severe environments.



Properties (Nominal)	ZYFB-3	ZYFB-6	FBD
Bulk Density, lb/ft <sup>3</sup> (g/cm <sup>3</sup> )	30 (0.48)	60 (0.96)	90 (1.4)
Porosity, %	92	84	76
Rated Continuous Use Temperature, °C (°F)	1800 (3272)	1800 (3272)	2000 (3632)
Maximum Use Temperature, °C (°F) <sup>(1)</sup>	2200 (3992)		
Melting Point, °C (°F)	2590 (4694)		
Specific Heat (BTU/lb °F)	0.18		
Flexural Strength, MPa (psi) Normal to Fiber Plane	0.60 (85)	2.10 (300)	8.27 (1200)
Compressive Strength, MPa (psi) @ 10% Compression Normal to Fiber Plane	0.29 (42)	1.59 (230)	5.52 (800)
Outgassing in Vacuum	Nil		
Thermal Expansion Coefficient RT- 1425 °C (2600 °F)	10.7x10 <sup>-6</sup> /°C (6x10 <sup>-6</sup> /°F)		
Dilatometric Softening Temperature at 10 psi °C (°F)	1180 (2156)	1240 (2264)	1400 (2552)
<b>Linear Shrinkage, % (Perpendicular to Thickness)</b>			
1 hour at 1650 °C (3002 °F)	1.2	1.0	0.0
24 hours at 1650 °C (3002 °F)	2.8	1.7	0.9
<b>Chemical Composition (Nominal)</b>			
<b>Oxide</b>	<b>Wt%</b>		
ZrO <sub>2</sub> <sup>(2)</sup>	90		
Y <sub>2</sub> O <sub>3</sub>	10		

<sup>(1)</sup> Use temperature is dependent on variables such as the chemical environment and stresses; both thermal and mechanical.

<sup>(2)</sup> 1-2% weight hafnia (HfO<sub>2</sub>) occurs naturally with zirconia (ZrO<sub>2</sub>) and does not affect performance.

### Applications

**ZYFB-3** as hot face insulation in fused quartz processing.

**ZYFB-3** as the zone separator in directional solidification furnaces used to manufacture jet turbine blades.

**ZYFB-6** as the IR source insulation in FTIR Spectrometer.

**ZYFB-6 & FBD** as insulation in nuclear meltdown experiments.

**FBD** as gasketing in high temperature wind tunnels.

**FBD** as insulation for laser machining applications.

**FBD** as hotface insulation in solar thermochemical reactors.

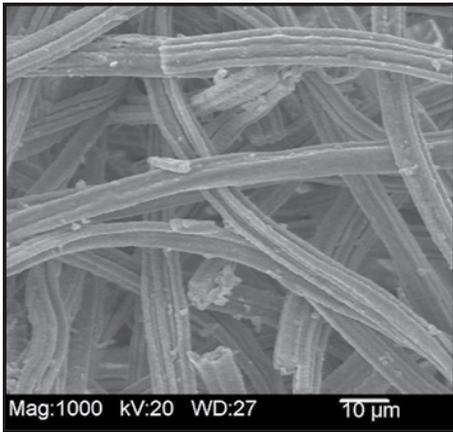
**FBD** as crucible insulation in crystal growth stations.

**FBD** as oxygen / carbon protector sleeve in industrial sensors.

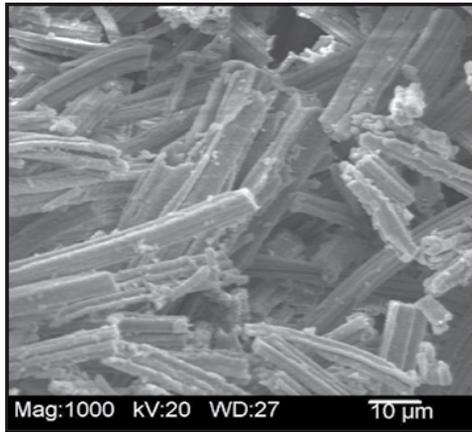
**ZYFB-3, ZYFB-6 & FBD** as machinable insulation for setters and fixtures in continuous and batch high temperature processes.

**ZYFB-3, ZYFB-6 & FBD** is best anywhere a lightweight, low thermal conductivity, high temperature, ZrO<sub>2</sub> advanced fibrous ceramic insulation is required.

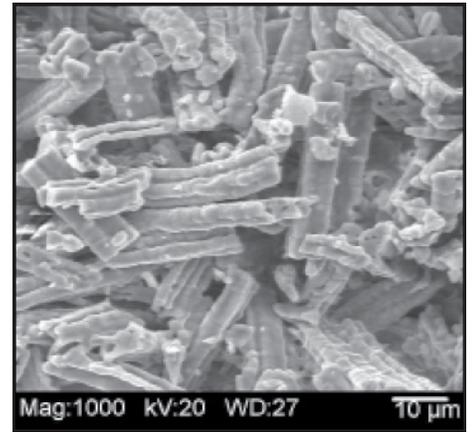
## Product Micrographs



**ZYFB-3**

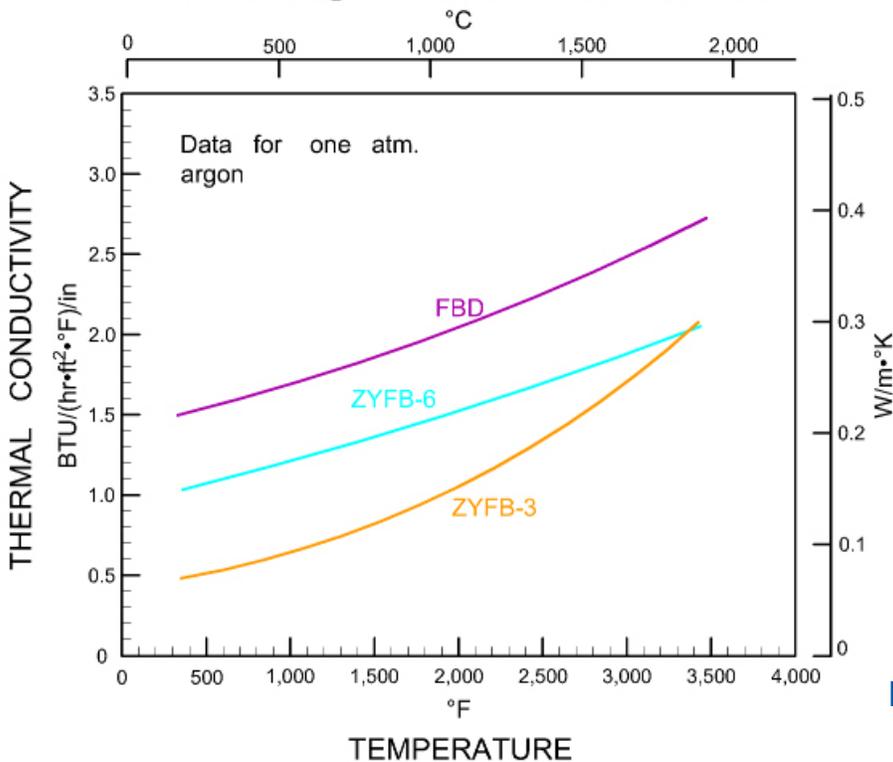


**ZYFB-6**



**FBD**

## THERMAL CONDUCTIVITY OF ZIRCAR ZrO<sub>2</sub> FIBROUS CERAMIC INSULATION



Zirconia has the lowest thermal conductivity of any commercial refractory and is one of the most studied ceramic materials in the world.

**Contact Us For A Quotation  
For a Standard Size or Custom Part**

Call: 845-651-3040

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

## Zirconia Boards

Size	Item Number		
	ZYFB-3	ZYFB-6	FBD
12.00"W x 12.00"L x 0.50"Tk	AA009	AB009	AD035
12.00"W x 12.00"L x 1.00"Tk	AA011	AB011	AD037
9.00"W x 18.00"L x 0.50"Tk	AA041	AB034	AD071
9.00"W x 18.00"L x 1.00"Tk	AA030	AB032	AD073



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