

# Si<sub>3</sub>N<sub>4</sub>

## Molten Metal Processing

EKatherm® Silicon Nitride is the state-of-the-art material for a wide variety of components used in Aluminum Alloy casting processes. The material makes a significant contribution toward casting quality, process improvement and efficiency. This in turn allows the aluminum alloy industry to meet ever-increasing market demands for high casting quality at the lowest cost.

### Thermocouple Protection Tubes

Based on service life alone, EKatherm® Thermocouple Protection Tubes offer significant cost benefits over tubes manufactured from more traditional materials. These tubes can be used for continuous temperature monitoring to give better control over melt temperatures that enhance the quality of finished casting. Typical applications include melting and holding furnaces, crucibles and casting implements.

### Riser Tubes

EKatherm® Riser Tubes help improve the overall efficiency and quality of low-pressure die-casting applications by offering excellent corrosion resistance and long life. A variety of connection systems are available including an axially sealed metal flange or an integrated flange and tube.

### Heater Tubes

EKatherm® is the ideal material for heater tubes that are increasingly used in electrical and gas fired holding and conditioning furnaces. Material benefits include excellent thermal shock resistance, process reliability and cost effectiveness.

EKatherm® components offer significant cost and performance benefits when compared with parts made from more traditional metallic and oxide ceramic materials.



### Properties

- High Temperature Resistance
- High Thermal Shock Resistance
- Low Coefficient of Thermal Expansion
- Electrically Insulating
- High Mechanical Strength
- High Thermal Conductivity
- Excellent Corrosion Resistance
- Not Wetted by Aluminum

### Applications

- Molten Metal Processing
- Melting and Holding Furnaces
- Casting Furnaces
- Metal Dosing
- Chemical Processing



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Property	EKasin® S, EKatherm®
<b>Process</b>	Gas Pressured Sintered
<b>Density (g/cc)</b>	>3.24
<b>% Theoretical Density</b>	>99.5
<b>% Open Porosity</b>	0
<b>Purity (% Si<sub>3</sub>N<sub>4</sub>)</b>	>92
<b>Mechanical Characteristics</b>	
Flexural Strength (MPa) @ RT	700
Weibull Modulus	25
Elastic Modulus (GPa)	310
Poisson's Ratio	0.25
Hardness HV (0.3) Kg/mm <sup>2</sup>	1450
Fracture Toughness (MPam <sup>1/2</sup> )	7.0
Abrasive Wear Resistance Parameter**	891
<b>Thermal</b>	
Thermal Expansion Coeff. 10 <sup>-6</sup> /°C, (RT-1000°C)	3.6
Thermal Conductivity (W/mK) @ 25°C	22
Thermal Shock Parameter (°C)***	605
<b>Electrical</b>	
Electrical Resistivity (ohm-cm)	10 <sup>12</sup>
Dielectric Constant	-
<b>Key Features</b>	High Temperature Resistance, High Thermal Shock Resistance, Electrically Insulating
<b>Applications</b>	Molten Metal Processing, Chemical Processing



\* Property values are typical and should not be considered specifications.  
 \*\* Abrasive Wear Resistance Parameter = Fracture Toughness<sup>(0.5)</sup> \* Hardness<sup>(1.43)</sup> \* Elastic Modulus<sup>(-0.8)</sup>  
 \*\*\* Thermal Shock Parameter = [Strength \* (1-Poisson's Ratio)] / (Elastic Modulus \* Thermal Expansion Coeff.)



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### Ceradyne Advanced Technical Ceramics

Ceradyne, Inc. (NASDAQ:CRDN) is a publicly traded corporation specializing in development and production of advanced technical ceramics. Manufacturing facilities are based in California, Georgia, Kentucky, Michigan, Germany and France. Ceradyne's advanced ceramics are sought for the most demanding applications in automotive, wear, semiconductor, orthodontic and armor industries.



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### ESK, a Ceradyne Company

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