Biasill™ Staurolite Sand

Product Information

Chemours produces Biasill™, a staurolite sand, from its own heavy mineral deposits in Starke, Florida. This naturally occurring, rounded staurolite sand (general formula $FeAl_5Si_2O_{12}OH$) is washed and graded to ensure freedom from dust, dirt, and ultrafines. The staurolite sand is magnetically separated from other heavy minerals to produce a highly uniform grade.

Uses of Biasill™ Sand

Biasill™ staurolite sand has uses in both the abrasive blasting and foundry industries.

Abrasive Blasting

Biasill™ sand is used as a low free silica abrasive for air sandblasting. Biasill™ cleans faster, safer, and more efficiently than silica sand.

Biasill™ is most useful where mill scale and light rust are to be removed and in applications where a shallow profile is desired. Because it is a finer grade sand, Biasill™ also can be used on softer substrates such as aluminum, composites, fiberglass, and similar materials.

Biasill™ is a slightly finer grade of staurolite sand than our coarser Starblast™ blasting abrasives.

Foundry

Biasill™ sand is used as a foundry mold sand where its low coefficient of thermal expansion and high thermal conductivity reduce casting defects and yield improved metal surfaces.

Nonferrous Applications

It is used most extensively in foundries because its AFS grain fineness number of 66–75 makes it suitable for most foundry mold applications involving the following metals:

- aluminum
- magnesium
- brass and bronze
- ferrous metals (limited to specialized applications described in the following paragraphs)

The low melting point of Biasill™ (1370–1540 °C [2500–2800 °F]) limits its use to small thin sectioned castings.

Ferrous Applications

In applications where it can be used to produce small iron castings, Biasill™ blended with silica sand offers the following benefits:

- lower binder demand (approximately 25% less), less gas evolution, and easier sand reclamation
- lower thermal expansion, very good control over expansion defects, rattails, veining, and good casting definition and dimensional accuracy
- more dense structure, which reduces strip times, improves cure times, and improves casting detail through less compaction around the pattern
- more dense metal structure, which varies with the amount of silica sand used in the sand blend
- promotes chill for metal solidification

General Advantages as Foundry Mold Sand

Staurolite Property	Benefits
Low thermal expansion versus silica sand (see Figure 1)	Reduces thermal cracking and warpage. Improves dimensional accuracy.
High thermal conductivity	Finer grained castings. Reduces shell and hot box cure cycles. Improves shakeout because binder burnout is more complete.
Clean, round grains; free of fines	Reduces binder demand. Less gas evolution. No clay; low Acid Demand Value (ADV).
Hard, durable grains	Less fracture in mulling and reclamation. High recovery for recycle.
Useful in sand blends, (20–50%) with silica	Low thermal expansion at minimum cost.
As a flour, Biasill™ is adequate for many mold washes and offers a significant cost savings. It provides foundries with low thermal expansion and refractoriness at a much lower cost than zircon and other flours used in wash applications.	

Personal Safety

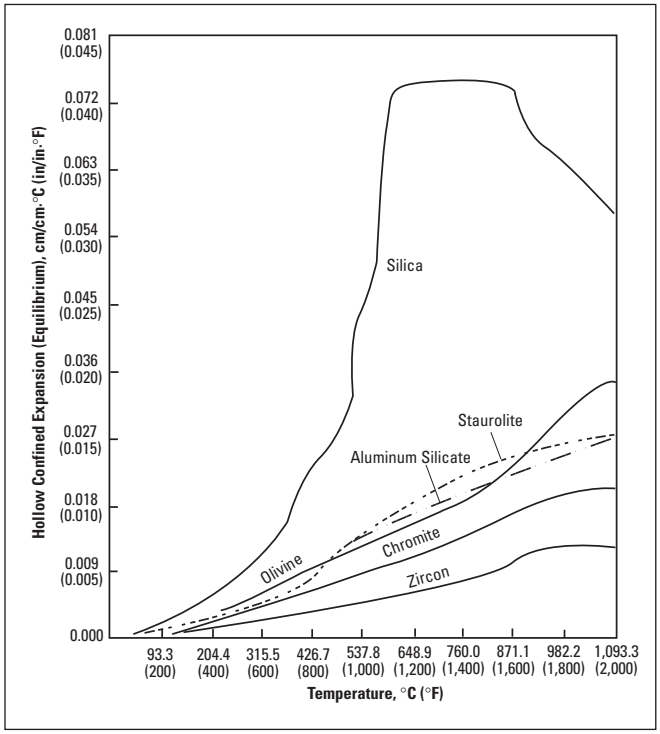
Chemours™ Biasill™ abrasives, as shipped, do not pose any inhalation health hazard, because Biasill™ contains essentially no particles in the respirable size range. However, if during handling or use, Biasill™ particles are broken down to a size that can be inhaled, the dust may be harmful to the respiratory system.

Chemours staurolite abrasive products may contain up to 5% crystalline silica (quartz). Long-term overexposure to respirable crystalline silica may cause silicosis. Each user should consult and follow the current governmental regulations, such as Hazard Classifications, Labeling, Food Use Clearances, Worker Exposure Limitations, and Waste Disposal Procedures for the products described in this literature. Avoid breathing dust. Wash thoroughly after handling. In emergencies or when dust levels exceed OSHA time weighted average limit, dust masks or respirators approved by NIOSH for such dusts must be used.

Packaging

Biasill™ sand is available in 22.7-kg (50-lb) multiwall paper bags and 4,000-lb bulk bags. Department of Transportation (DOT) Hazard Classification:* NOT REGULATED.

Figure 1. Thermal Expansion Coefficients of Mineral Sands



* Due to changing governmental regulations, such as those in the Department of Transportation, Department of Labor, U.S. Environmental Protection Agency, and the Food and Drug Administration, references herein to governmental requirements may be superseded. Each user should consult and follow the current governmental regulations, such as: Hazards Classifications, Labeling, Food Use Clearances, Worker Exposure Limitations, and Waste Disposal Procedures for the products described in this literature.

Physical, Mineral, and Chemical Properties of Chemours™ Biasill™ Foundry Sand

Typical Screen Analysis		
U.S. Sieve No.*	Sieve Opening, µm	Retained on Sieve, %
40	420	<1
50	300	6
70	212	26
100	150	43
140	106	19
200	75	4
270	53	1
PAN	<53	Trace
AFS Grain Fineness Range 66–75 (Grit #70/90)		

*U.S. Sieve Series according to ASTM E-11-70

Physical Properties	
	Range
Bulk Density (uncompacted)	2080 kg/m^3 (128 lb/ft^3)
Specific Gravity	3.8–3.85
Hardness (Mohs)	6.5–7.0
Melting Point	1370–1540 °C (2500–2800 °F)
Coefficient of Linear Expansion	14.2 x 10^{-6} cm/cm·°C (7.9 x 10^{-6} in/in·°F)

Mineral Composition	
	Typical, %
Staurolite Minerals	87
Titanium Minerals	6
Kyanite	2
Zircon	3
Quartz (Free Silica)	2

Chemical Composition	
	Typical, %
TiO_2	4
Al_2O_3	49

For more information, visit www.titanium.chemours.com

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