Staurolite Abrasives Offer Sustainable Solution to Garnet Shortage

Though many may think of garnet as just a beautiful gemstone, the mineral is also used extensively for industrial purposes. When bridges, water tanks, or buildings need to be cleaned and prepped for weather-proof painting, abrasive (sand) blasting is most commonly used. To cut steel, rubber, glass and other materials, abrasive waterjet cutting is employed. Both techniques use compressed air or water to propel abrasive particles of sand to clean or cut through tough surfaces.

For years, sand composed of garnet minerals has been the most readily available, low-cost choice for these applications, but a shortfall in the global supply is driving a need for substitute abrasives. India, China, and Australia are the leaders in a massive $70-billion sand

Staurolite abrasives (above) produced less dust than garnet (facing page) in Starblast's blast-cleaning trials.

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GRADES OF CHEMOURS STAUROLITE ABRASIVES		
Starblast	General-purpose grit; used in steel fabrication, bridge maintenance, rust removal; low dust generation improves blasting visibility, enabling precision and consistent results	Also used in waterjetting High durability and low friability (does not crumble on impact), allowing recycling and reuse up to 5 times Available in bags from 50 to 4,000 pounds and in bulk truckloads or rail cars
Starblast XL (Military Mil-Spec/QPL approved)		
Starblast Ultra	More aggressive than Starblast and Starblast XL, used for heavy rust or coating removal	
Starblast Coarse	Most aggressive Starblast grit, used for heavy coating removal or when a deeper profile is required, such as monument cutting and etching	
Biasill	Fine grit, used mostly for removing flash rust prior to painting and for blasting with lesser profile requirements	

industry, driven by booming demand. Sand is needed to make glass, roads, concrete and electronics, as well as for shale gas extraction, beach replenishment and construction. To fuel these growing industries, sand and gravel are the most extracted materials in the world, being mined at a greater rate than can be naturally replenished.

Allegations, particularly in India, suggest that beach sand is being illegally mined, calling international attention to the potential devastation of coastal ecosystems.[1] Certain mining operations that use environmentally hazardous extraction methods, can cause coastal erosion, pollution and habitat destruction.[2] These harmful techniques, compounded with an already-high extraction rate, have led to a global garnet shortage, causing disruptions for companies dependent on the material. In many regions, to protect this dwindling supply of sand and to preserve the environment, laws now impose fines, require stricter licenses and enforce coastal protection regulations.

A competitive alternative to garnet is staurolite, a cost-effective abrasive solution with decades of proven usage and a stable, abundant supply. The abrasive is sustainably mined in the U.S. by the minerals segment of The Chemours Company's Titanium Technologies business, using reclamation methods that return the land to near pre-mining condition. The sand is mined and pumped over a spiral separator, from which only 3 percent of the sand is collected. Unused sand is returned, and the land is brought back to grade level. Topsoil is returned and then the reclaimed area is planted with trees. Water used in the mining process is recirculated and, therefore, does not cause a strain on fresh-water aquifers. This reclamation process mitigates any environmental impact of the operation.

According to users, the high density of the staurolite particles yields high production rates at a low sand consumption rate. This efficiency reduces labor costs, reduces disposal costs and prevents the need for rework. □

1. Sandhya Ravishankar, "The Madras high court is inching closer to a final verdict on allegations of large-scale loot, with official collusion, of precious minerals from the coast of Tamil Nadu," *The Wire*, https://thewire.in/environment/countdown-begins-tamil-nadus-beach-sand-mining-cartel
2. Dennis CJ, "Adverse effects of rampant sand mining starting to show in Asia," *Research Matters*, https://researchmatters.in/news/adverse-effects-rampant-sand-mining-starting-show-asia