

# WHY CRUSHED GLASS ABRASIVES?



## ABRASIVE PROPERTIES

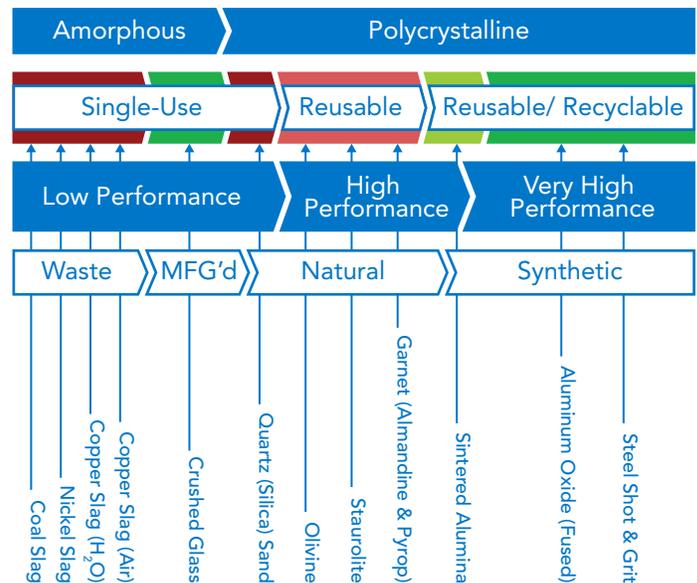
Mineral slags and crushed glass are amorphous abrasives, meaning they have very little molecular organization. Amorphous abrasives tend to be less dense and less hard than either polycrystalline or crystalline abrasives. Amorphous abrasives make up nearly 3,000,000 tons of the blasting abrasives used annually in the United States. While they are less dense and less hard than the polycrystalline types, they are also significantly less expensive, and tend to be available in much wider range of sizes (particularly coarse sizes) than the polycrystalline types, which are typically naturally occurring minerals and normally quite scarce relative to amorphous types. Amorphous abrasives are plentiful domestically, while the polycrystalline types are typically imported from developing countries. This has resulted from time-to-time in spot shortages of abrasives, like garnet.

The two most critical properties of any abrasive are its density (specific gravity), and its hardness (Knoop Hardness – Hk). An abrasive is effective when it is dense and hard. The kinetic energy directed at the work piece is directly proportional to the density of the abrasive. The amount of kinetic energy that transfers from the particle to the workpiece during blasting is directly proportional to the hardness of the abrasive. Therefore, the best abrasives are those that are both dense and hard.

Density is function of the elemental building blocks that make up the molecular structure of the abrasive particle itself. The typical primary elements found in most blasting abrasives are silica, alumina, and iron. Other minor constituents might include calcium, and magnesium. Trace and ultratrace elements can vary widely, and depending upon the abrasive, may even include toxic and heavy metals.

Hardness is a function of the level of molecular organization (morphology) of the elemental constituents. The level of molecular organization runs from amorphous (highly unorganized), to polycrystalline (groupings of highly organized structures), to crystalline (highly organized molecular structures). The rate cooling and the pressure the material is cooled at directly impacts the level of crystallinity in the final material.

## Polycrystalline Continuum



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## SAFE, CLEAN ABRASIVES

One the most significant choices to make when selecting an abrasive is to choose an abrasive that is safe for both workers and the environment. TruAbrasives™ recycled crushed glass is a safe, clean alternative to mineral slags and silica sand.

OSHA has determined that “the best available evidence indicates that there is signi cant risk of Chronic Beryllium Disease (CBD) and lung cancer to workers in construction and shipyards based on the exposure levels observed”

when blasting with mineral slags. Furthermore, blasting with silica sand presents the danger of silicosis, a serious and debilitating lung disease.

For years now, OSHA has encouraged employers to blast with safe alternatives to silica sand and mineral slags.

**TruAbrasives™ recycled crushed glass abrasive is the right choice.**

# WHY CRUSHED GLASS ABRASIVES?



## WHAT IS TRUABRASIVES™ RECYCLED CRUSHED GLASS ABRASIVE?

TruAbrasive™ recycled crushed glass abrasive (unlike mineral slag) is a carefully engineered soda lime glass product, manufactured to rigid quality standards and at temperatures in excess of 3000° Fahrenheit. Recycled crushed glass abrasives retain all of their original properties from the manufacture of glass. High-quality, crushed glass abrasive is free of toxic and heavy metals, deleterious levels of chlorides and conductivity, and the levels of crystalline silica are below detection, even at <0.1% by weight.

In contrast, mineral slags (like coal and copper slags) are industrial waste products diverted from landfills. They contain both toxic and heavy metals at concentration levels high enough to be an environmental, health, and safety (EHS) concern when blasted or disposed of, and contain levels of crystalline silica (typically just under 1.0% by weight) greater than those of high-quality recycled crushed glass.

## GLASS VERSUS MINERAL SLAGS & SILICA SAND

When abrasive blasting with TruAbrasive™ crushed glass, it is possible to achieve consumption rates, cutting speeds, and white metal finishes equal to - and even superior to - those of mineral slags and silica sand. (Table 1).

Density and hardness are the two most critical properties of abrasives, and crushed glass compares very favorably to slag and quartz sand (Table 2).

When TruAbrasive™ are carefully matched with similarly sized grades of mineral slag and silica sand, it delivers comparable or even superior profile, cut speed, and consumption across the spectrum of amorphous abrasives.

## AMORPHOUS ABRASIVE PROPERTIES

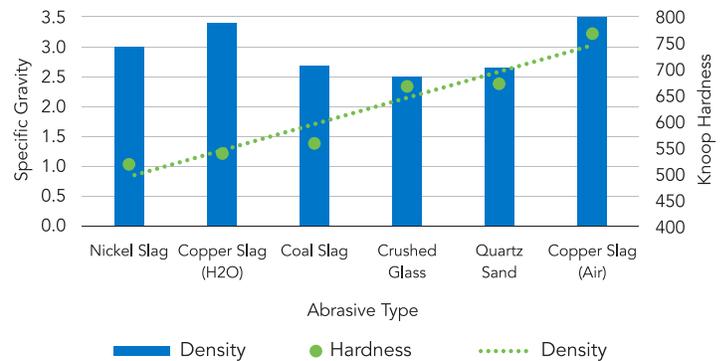


Table 2.

COATED PANELS - 90 PSI				Cleaning Rate	Consumption Rate	Speed	Usage		Blasting 1000 <sup>1</sup>	
Abrasive	Size	Typical APS (μ)	Profile	Ft <sup>2</sup> /min	Lbs./Ft <sup>2</sup>	Ft <sup>2</sup> /Hr	Lbs./Hr	Lbs./Min	Time {Hrs}	Lbs
TRUAbrasive	Coarse	907	4.1	1.52	2.6	91.2	237.1	3.95	10.96	2,600
Black Diamond	12x40	1,107	4.1	1.65	3.2	99.0	316.8	5.28	10.10	3,200
TRUAbrasive	Med-Coarse	448	3.5	1.86	2.1	111.6	234.4	3.91	8.96	2,100
Black Beauty	Fine	647	3.2	2.11	2.3	126.6	291.2	4.85	7.90	2,300
Black Diamond	20x40	602	3.2	2.08	2.9	124.8	361.9	6.03	8.01	2,900
TRUAbrasive	Coarse	907	4.1	1.52	2.6	91.2	237.1	3.95	10.96	2,600
Blast Sand	#3	1,413	4.0	1.49	1.9	89.4	169.9	2.83	11.19	1,900
TRUAbrasive	Med-Coarse	448	3.5	1.86	2.1	111.6	234.4	3.91	8.96	2,100
Blast Sand	#4	639	3.2	2.40	1.8	144.0	259.2	4.32	6.94	1,800

Table 1. Independent Test Lab Results, KTA-Tator, Inc. (2017)



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