

**Technical Bulletin VG-001:
Superior Abrasive Blasting**

Less Expensive

- Less hourly labor as a result of faster, more productive abrasive blasting.
- Less blasting media required to achieve equal or better results.
- Reduced disposal costs due to lighter media weight and reduced consumption.

Safer to Use

- Lack of heavy metals present in the abrasive media minimizes risk and liability exposure from air borne dust during blasting.
- 100% recycled material in compliance with federal and state affirmative procurement policies regarding the use of recycled and environmentally preferable products.

Outstanding Results

- Exceptionally good abrasive for thick, rubbery elastomeric coatings—much faster than slags.
- Can be blended with lead abatement compounds such as Blastox, or used with pre-coating compounds such as Pretox.
- Very clean, bright metal or exceptionally clean concrete surfaces, with an aggressive profile for better coating, cathodic protection or overlay performance.

Cleans Efficiently
Steel • Aluminum • Stainless • Concrete
Fiberglass • Wood • Stone Surfaces

VitroGrit® is a crushed glass abrasive especially suited for preparing a variety of surfaces for painting. It is particularly recommended where the health and safety of workers and environmental concerns are critical issues. In addition to meeting the military specification MIL-A-22262B (SH) on the Qualified Product List of the Department of Defense, VitroGrit® has many benefits for the user.

Federal Specification

The United States Naval Sea Systems Command have designated TriVitro Corporation's VitroGrit® 16, 16/30, and 30/50 as approved for Qualified Product Listing under specification MIL-A-22262-B (SH). Achieving this specification, which took 2-1/2 years of government-witnessed testing, inspection and quality control checks, is significant proof that VitroGrit® abrasives represent an approved, viable technology for abrasive blasting.

As a prerequisite to the Navy specification, the California Air Resources Board for outdoor blasting also certified VitroGrit®.

Proven Applications

VitroGrit® crushed recycled glass has been successfully used in the private sector for over six years on dozens of public and private projects. Case studies include:

- **Long Painting
Seattle, Washington**

Under contract to Raytheon, Long Painting was required to abrasive blast the concrete surfaces of a newly constructed, specially designed chemical

weapons incinerator at the Umatilla Army Depot. They found that VitroGrit® did the job quickly and cleanly, achieving the desired surface preparation on the concrete.

A significant benefit in the use of the media was the fact that VitroGrit® contains no heavy metals. The environmental and worker safety benefits of this 100% recycled product added an important dimension to the success of this project. Long Painting has also enjoyed successful projects with VitroGrit® on several regional dam and bridge projects.

- **Interstate Coatings
Seattle, Washington**

Interstate used VitroGrit® to remove tough vinyl and zinc coatings in tanks at the Manchester Fuel Depot in 1997-98.

Interstate found the crushed glass abrasive to be significantly faster than the nickel slag they had previously used on the project, and they reported using at least 1/3 less media when they switched to crushed glass. Nickel slag previously used in this project had seriously discolored the aluminum roofs of adjacent tanks.

The significant efficiencies and waste reduction benefits involved in using VitroGrit® have been proven for many more projects for Interstate Coatings, especially in remote areas such as Hawaii and Alaska.

- **US Marine Corps Logistics Base
Barstow, California**

Use of VitroGrit® showed that it was able to remove tough coatings faster than traditionally used abrasive media (steel grit, garnet, plastic, and glass bead are commonly used there). Uniquely, crushed glass was

able to remove individual layers of CARC (chemical attack resistant) coatings as well as cut through thick coating buildup to leave a clean, bright surface.

Because of its lighter weight and aggressive cutting capability, VitroGrit® is now seen as a new technology for cleaning multiple types of metals present on various types of equipment without causing substrate damage. Crushed glass offers significant cost savings over glass bead and plastic media, and is able to remove corrosion and tougher coatings that those media cannot do.

In consideration of federal environmental procurement guidelines, the pollution prevention staff at the base was excited to hear about the use of a 100% recycled product.

- **Concrete Barrier
Mukilteo, Washington**

VitroGrit® was used very successfully for bridge deck surface preparation on the Fourth Street Bridge in Fall 2002. Concrete Barrier found cleaner, better blasting results on the concrete bridge deck, and their consumption of abrasives fell to a fraction of the amount of material required per square foot when they switched from copper slag to VitroGrit®.

Industrial Hygiene

Recently NIOSH completed a three-year study of a wide range of slag and mineral abrasives in an effort to evaluate the effectiveness and industrial hygiene of alternatives to silica sand for abrasive blasting. The resulting report is titled: [Evaluation of Substitute Materials for Silica Sand in Abrasive Blasting](#), NIOSH, September 1998, Report No. PB99105553.



Copies of the NIOSH report available at:

www.ntis.gov

or

www.cdc.gov/niosh/pdfs/ab_p3rep.pdf

Data tables available at:

www.cdc.gov/niosh/pdfs/ab_p3rep.pdf

Since OSHA has warned for years of the acute risks of blasting with silica sand, the NIOSH study explored alternatives to silica, during which they also discovered other and perhaps more serious risks inherent from slag and mineral abrasives—except ground/crushed glass.

After extensive performance and safety tests of 40 samples of 13 different types of abrasives, including ground/crushed glass, the NIOSH report calls for fundamental reconsideration of the safety of abrasive blasting with most of the slag and mineral products commonly used. The findings of the study were striking in the occurrence and extraordinary concentrations of heavy metals present in airborne dust from blasting with copper, nickel and coal slags, as well as several other mineral abrasives.

For example, the geometric mean concentration of all arsenic detection tests during copper slag blasting was 89.1mg/m³, which is nine times greater than OSHA regulations allow (OSHA “Permissible Exposure Limit (PEL) is 10 mg/m³). In one test of copper slag, concentrations of arsenic exceeded 24,000 mg/m³. Copper slag is frequently used in the Northwest, whereas coal slag and silica sand are often used in the Midwest. In another common abrasive type, nickel slag, chromium concentrations were 60% higher than OSHA regulatory limits. Even coal slag often has higher metal content than ground/crushed glass.

NIOSH Recommendations

As a result of finding the above-referenced high concentrations of hazardous health-related agents in slag and mineral abrasives, the NIOSH report recommendations include:

- “1. In order to reduce the airborne concentrations of the eleven hazardous health-related agents, consider the use of ground (crushed) glass...”
- “4. Given the potential exposures to multiple contaminants from both the abrasive, as well as the painted surface, worker protection programs should be expanded to address all potential metals (e.g. as opposed to the current focus on worker lead protection programs)...”
- “6. Evaluate the potential for correlations between the concentration of health-related agents in all virgin abrasives and in particular coal slag, copper slag, garnet and steel grit, and the resulting airborne concentrations, for use as a selection criteria.”

From an industrial hygiene perspective, the NIOSH report points out the glaring facts about heavy metal concentrations in commonly used abrasives. Beyond risks to workers, these heavy metals present unnecessary environmental risks as well. In contrast, glass contains virtually no heavy metals and no free silica. Crushed recycled glass abrasives are far safer for workers and for our environment.

Sometimes, engineers and specifiers are reluctant to specify an abrasive product. Instead, they may require only that a surface be cleaned to a certain level, or prepared so that a new coating will adhere to it.



Without regard to the worker safety issues addressed on the previous page, there are considerable differences in the properties and characteristics of post-consumer recycled glass abrasives that merit consideration for specification, which translate into considerable advantages for customers of abrasive blasting services.

Unique Performance Advantages

- *Crushed post-consumer recycled glass abrasives are lighter, so considerable savings in transportation costs can be expected, thereby creating significant energy savings.*

Specifically, glass' density of approximately 80 lbs./cubic foot is 27% lighter than copper slag's 110-115 lbs./cu.ft, or 20% lighter than silica sand's 100 lbs./cu.ft. Abrasive costs are measured by weight, both for purchase and disposal. There is plenty of field experience to show that, for many types of projects, savings in media can exceed 30% to 50% because of performance efficiency and lighter weight. More specific information is available as to the types of projects where these savings can be expected.

- *Crushed post-consumer recycled glass abrasives' lighter weight also merits consideration for projects posing challenges in staging and engineering controls for blasting.*

Often, blasting platforms need to be suspended at great heights or distances out from project landings. Using lighter abrasive saves expensive rigging, air compression energy, and containment system costs. In addition the lighter abrasive makes clean up of the spent grit easier than the heavier slag.

- *Crushed post-consumer recycled glass abrasives are cleaner.*

Slag abrasives can leave a dark oily residue not only on the blasted surface, but all around the vicinity of the blast. Glass has very little embedment in steel, and its blasting dust is lighter and easier to evacuate from the work area. Results are a cleaner, brighter appearance in the surface, and less time required in cleanup.

Engineers and consumers of blasting services are concerned about the condition of surfaces, particularly steel, prior to coating. The amount of embedment, chlorides content, metals content and conductivity of abrasives are of concern because of the potential for rusting or other causes of coating failure. Operationally, residual material from blasting should be cleaned off prior to coating (glass dust is easier to clean).

It is reasonable to assume that, regardless of operators' skill or diligence, risks for costly coating failures due to embedment, chlorides, conductivity, or traces of metals will be greatly reduced through the use of post-consumer recycled glass abrasives.

- *Crushed post-consumer recycled glass abrasives are unique in their ability to economically clean aluminum, brass, copper, and stainless steel.*

Until the use of this type of abrasive, these types of surfaces had to be cleaned with garnet, baking soda, glass bead, walnut shells, or other media—all of which are several factors more expensive than glass. The light, aggressive nature of crushed recycled glass allows for very productive cleaning without staining, warping, excessive profiling, or surface damage.



- *Crushed post-consumer recycled glass abrasives can be used in sensitive areas.*

In some blasting projects, it is not possible to contain the abrasive completely, or it may be impractical to recover lost or spilled spent abrasives. Because glass is inert and contains no heavy metals, the risk to the aquatic or terrestrial ecology of the work site is greatly reduced through use of this product, especially in comparison to slag abrasives, which carry considerable concentrations of heavy metals. It must be recognized that the material that is being blasted poses ecological risks (the coating removed may contain metals or other pollutants). However, certain blasting projects can involve inert surfaces and these are where use of an inert abrasive makes sense.

- *Crushed recycled glass can be used for aggressive surface cleaning of concrete and with larger grain sizes, reaching “exposed aggregate” conditions quickly and with far less media than mineral or slag abrasives.*

Finer grain sizes of crushed glass blasted at lower pressure can remove coatings, stains, graffiti, moss, and the like from concrete without causing damage to the concrete substrate. The unique properties of glass offer significant benefits for use on concrete.

- *Crushed recycled glass does a better job at feathering and avoiding unintended ricochet damage.*

This is a true advantage for spot blasting or work in areas where over blast is a concern.

Affirmative Procurement

Per county, state and federal policies and guidelines regarding the use of recycled and environmentally preferable materials, crushed recycled glass abrasives offer a significant and important way to comply and show leadership under these guidelines. Post consumer recycled glass abrasives offer a unique combination of affirmative procurement, environmental preference, reduction of toxics, waste reduction, strong performance, and cost savings.

Requirements for federal purchasing of recycled and environmentally preferable products can be found in FAR 23.404, FAR 23.704, EPA Guidance for Environmentally Preferable Purchasing (<http://www.epa.gov/opptintr/epp/finalguide.htm>), Executive Order 13101, and RCRA. TriVitro Corporation has been informed that post consumer recycled glass abrasives will be listed during 2003 in EPA's Comprehensive Procurement Guidelines (CPG). With this listing, state, and local governments using federal funds for projects will be required to use CPG designated items.

It may be helpful to know that other projects and federal agencies are now beginning to specify or call for the use of recycled glass abrasives. For example and as a precedent, Scott AFB recently specified, “recycled glass abrasives” for its Solicitation No. F11623-00-R0010 Protective Coating Maintenance IDIQ. On King County's Factoria Transfer Station painting project in 1999, recycled glass abrasives were specified. The contractor had been unfamiliar with recycled glass abrasives, and reported, along with positive comments about performance, he would not otherwise have used the material.

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