

## Technology Brief

# TESTING AND CERTIFICATION OF INDUSTRIAL ABRASIVES MANUFACTURED FROM RECYCLED GLASS

## Background

Previous research and experience has indicated that recycled glass abrasives have a number of inherent advantages, including:

- glass sand particles are angular to subangular and have the ability to cut many coatings exceptionally well;
- glass sand can produce a “white metal” finish which may be superior to other abrasives;
- glass may have the potential for lower dust generation;
- glass abrasives may be reused more than some other lower cost abrasives before becoming “spent”;
- glass is less dense than other abrasives, producing more volume per ton, which may be favorable for productivity; and
- recycled glass contains essentially none of the heavy metals present in some smelter slag-derived abrasives.

This technology brief summarizes laboratory and field testing of industrial abrasives manufactured from post-industrial and post-consumer recycled glass made in Washington State. Tested abrasives were from *TriVitro Corporation (TriVitro)*, a Seattle, Washington-based company that manufactures abrasives and other products from recycled glass. Work performed on this project was conducted by AERCO, Inc., of Lynwood, Washington.

## Key Words

**Materials:** Recycled Glass.

**Technologies:** Glass-based Industrial Abrasive Manufacturing.

**Applications:** Abrasive Blasting.

**Market Goals:** Increased use for post-industrial and post-consumer glass.

**Abstract:** Evaluation of field testing of industrial abrasives manufactured from recycled glass.

## Testing

Three representative bulk samples of mixed post-industrial and post-consumer recycled crushed glass sand abrasive were prepared for testing (VibroGrit #16, VibroGrit #30, and VibroGrit #40).

The testing program included certification testing by the *California Air Resources Board (CARB)* for dust-generation characteristics. This testing was needed to enable TriVitro’s products to qualify for the Federal Qualified Products List (QPL). This testing was successful and the abrasives received certification.

In addition to *CARB* testing, additional abrasive blasting tests were conducted to compare side-by-side productivity with two other competing slag abrasive products and to determine optimum blast parameters. The report also included results of an



earlier study by *KTA-Tator, Inc.* (breakdown rate, dust generation, embedment, or rust back). Tests performed by AERCO, Inc., included blasting tests under varied pressures, substrates, coatings, and nozzle sizes. Each test included sieve analysis of spent grit. Based upon the productivity rates observed, costs per square foot blasted were calculated using typical cost factors for labor, abrasive, and disposal of spent grit.

## Results and Conclusions

Higher productivity and lower costs were associated with larger nozzle sizes and higher blast pressures. Dust generation was also higher with higher blast pressures. Labor was the most significant cost factor when estimating blasting costs per square foot. However, there is a tradeoff between abrasive consumption rates and cleaning rates. Lower cleaning and consumption rates are partially offset by reduced abrasive and disposal costs.

Surface profile tests conducted after blasting indicated that the recycled glass abrasives yielded an acceptable profile for anchoring new coating. The surfaces appeared bright and were observed to resist rust back for an extended period of time.

Further, additional replications of tests for VitroGrit #16 are recommended to provide additional evidence of whether increasing nozzle size and decreasing blast pressures may be the preferable method of blasting

with glass abrasives. Also, testing VitroGrit #50 on additional mill scale samples is recommended because this product seems well suited for mill scale removal with a moderate profile.

**Data from the tests indicated that abrasives manufactured from recycled glass are competitive in the industrial marketplace on a performance basis.**

*Fact Sheet Issue Date:* February 1998

### ***For More Information***

For a copy of the report, *Testing and Certification of Industrial Abrasives Manufactured From Recycled Glass use the CWC Publication Order Form* or for more information you can contact the CWC at (206) 464-7040, email [info@cw.org](mailto:info@cw.org), or visit the CWC Internet Website at [www.cw.org](http://www.cw.org).

This technology brief was prepared by CWC, Managing Partner of the **Recycling Technology Assistance Partnership (ReTAP)**. ReTAP is an affiliate of the national Manufacturing Extension Partnership (MEP), a program of the U.S. Commerce Department's National Institute of Standards and Technology. ReTAP is also funded by the U.S. Environmental Protection Agency and the American Plastics Council.

**CWC is a division of the Pacific North West Economic Region, 2200 Alaskan Way, Suite 460, Seattle, Washington, 98121**