

Technology Brief

TESTING RECYCLED GLASS FOR MONITORING WELL PACKING

Crushed, graded, recycled glass sand was tested for its performance as a monitoring well filter pack. Sand packing for wells prevents migration of the surrounding soil into the well intake and provides high permeability around the intake area. Monitoring well sand pack has the medium-volume, medium-value application for recycled window glass, an abundant recycled material.

Project Description

TriVistro Corporation in Seattle currently processes recycled glass for a number of industrial minerals uses. This project tested their processing capabilities and the potential market value of the recycled glass sand for well packing. However, the filtration and long-term flow and durability characteristics were not tested.¹ Post-industrial flat glass was the raw material used for this project because it was less likely to contain residual organic materials than post-consumer recycled containers.

The objective of the project was to generate data about the recycled glass sand and compare the physical characteristics of it to the locally available commercial sand (Colorado Sand). Samples of commercial and recycled glass sand with similar gradation ranges (#10-20, #20-40 and #16-30) were tested for the following parameters.

¹*See 'Crushed Recycled Glass as a Filter Medium for Onsite Treatment of Waste Water' (Report #GL-95-5) and 'Evaluation of Crushed Recycled Glass as a Filtration Medium in Slow Rate Filtration' (Report #GL-95-4) for more information on these topics.



Key Words

Materials: Recycled Glass.
Technologies: Filtration media.
Applications: Monitoring well filter pack.
Market Goals: Establish new industrial minerals market for glass.
Abstract: Describes the test methods for comparing recycled glass sand to commercial sand.

Test Parameters

Particle Morphology

Visual descriptions of the materials under ten times magnification were estimated for their form, sphericity, and roundness. Colorado Sand has a high degree of sphericity and roundness. Conversely, recycled glass sand has a low degree of roundness. The Colorado Sand appears rough, pitted, and having a frosted texture. The recycled glass sand has a relatively smooth surface containing a series of stepped fracture ridges from crushing.

Specific Gravity

Specific gravity was used to establish the materials' density-volume. The Colorado Sand was 2.63 while the recycled glass sand was 2.49.

Sieve Analysis

The particle size and shape uniformity of the recycled glass sand is comparable to that of the Colorado

Sand. The recycled sand samples designated 16N1420 and 16N2435 have grain size distributions that closely match the Colorado Sand #10-20. The Coefficient of Uniformity of the recycled glass sand was highly uniform ($C_U < 2$).

Permeability

Permeability testing was conducted using a specially-designed falling head apparatus into which the sand was poured through a column of water and packed by flushing or surging (simulating well construction and development). The permeability test indicates the recycled glass samples, comparable by particle size criteria (i.e., COL1020 vs. TriVidro 16N and COL 2040 vs. TriVidro 35N), had similar permeability values as the sand. In contrast, the density and porosity estimates that were made at the time of permeability testing are quite dissimilar. These results suggest that the recycled glass samples formed a somewhat more porous pack than the sand with comparable permeability (see report for a discussion).

Test Results

The particle size and permeability of the recycled glass sand indicate that it is comparable to the Colorado Sand. Therefore, using recycled glass sand for monitoring well filter pack is a feasible option. However, further evaluation is recommended and should consist of a field-scale comparison of these materials in functioning wells constructed under similar field and geologic conditions. Evaluating the monitoring wells' performance side-by-side would provide a practical forum for comparing the characteristics of the recycled glass sand to the Colorado Sand.

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For More Information

For a copy of the report, *Testing Recycled Glass for Monitoring Well-Packing (GL-97-1)*, call the CWC Publication Order Form. If you want more information call CWC (206) 443-7746, email info@cw.org, or visit the CWC Internet Website at www.cw.org.

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