



## Best Practices in Glass Recycling

### ***Moisture Considerations in Glass Cullet Processing and Distribution***

#### **Material: Recycled Glass**

**Issue:** *Recycled glass generally contains two types of moisture. First, some containers have residual moisture from the original food content. Second, piles of glass stored outdoors retain some amount of dew and rainwater. When cullet is either too wet or too dry, processing and shipment can be difficult. Therefore, moisture control strategies may be necessary.*

**Best Practice:** Depending on the gradation, glass cullet is free-draining compared with most natural aggregates. When cullet is used as construction aggregate, its free-draining characteristics result in a relative insensitivity to moisture content during compaction. However, the moisture content of glass cullet can affect its processing efficiency, ease and cost of distribution, and remelting characteristics. This best practice illustrates the effects of moisture on processing and shipping. These considerations can impact the operation at both the materials recovery facility (MRF) which generates the cullet, and the end-user. For additional information, refer to the following Best Practices: [Fine-sizing of Recycled Glass](#); [Selecting Recycled Glass Crushing Equipment](#); [Dust Control with Glass Aggregate at Construction Sites](#); and [Dust Control Strategies for Processing](#).

Glass bottles and containers typically contain moisture from food residue and exposure to precipitation during collection or storage when they arrive at the MRF. As the moisture content in cullet increases, the surface tension at the particle interface increases, and the apparent cohesion within the cullet mass increases. This increase in apparent cohesion will cause the cullet particles to clump together and adhere to processing machinery. Because glass cullet is abrasive due to its highly angular particle shape, this adhesion to machinery can result in unexpected machine wear.

High moisture content can also cause the cullet to clog screening devices used for sizing and contaminant removal, as well as baghouses used for dust control. Reducing the particle size of the cullet increases the overall surface area of the cullet, which increases the surface tension and results in greater apparent cohesion. Therefore, excess moisture is especially detrimental to glass fine-sizing operations that produce a cullet equivalent to a No. 12 mesh or smaller. MRF's using fine-sizing equipment may find it necessary to check the moisture content of incoming cullet. If the moisture is too high, the facility may need to dry the cullet before fine sizing. To avoid excessive moisture content, stockpiles of glass should be covered or stored inside prior to and during cullet processing. This is especially necessary in wet climates or during periods of wet weather. In cold weather, moisture content in glass piles can result in piles of solid, frozen glass.

The moisture content of glass cullet should also be controlled prior to and during shipment. Wet cullet fractions smaller than 1/4 inch can be difficult to transport because they do not flow freely during loading and

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unloading. Trucks that have been loaded with glass containing too much moisture have been fined for leaking organics-contaminated water. In addition, finely graded cullet can retain up to 15% by weight of moisture, adding a significant cost to the user who pays by the pound. Cullet containing too much moisture has been known to clog the hoppers of freight cars, making removal very difficult and costly. Vibration during shipment can cause the wet cullet to densify, resulting in increasing handling time and difficulty. (The moisture facilitates the densification by serving as a lubricant, helping the relative movement of the particles in becoming a denser material.) Cullet that is free of excess moisture is otherwise easy to transport, even in subzero temperatures.

Cullet that is too dry can also be difficult to handle, as dry cullet will have minimal apparent cohesion. The material can flow relatively easily and become difficult to stockpile. Dry cullet may also have dust control problems. In these instances it may be necessary to *add* moisture to the cullet. The dust can also be controlled by the installation of baghouses, or enclosures around glass processing equipment. In general, fine-sized cullet powder should have a moisture content of at least 0.2 to 0.3% to inhibit dust. See the *Dust Control with Glass Aggregate at Construction Sites* Best Practice.

**Implementation:** Over the years, glass processors have learned strategies for dealing with moisture in glass. Today, however, there are an increasing number of processors of glass for alternative uses and an evolution of existing processors toward fine grind cullet. Both of these developments require a knowledge of moisture issues in glass processing.

**Benefits:** This information will help facilitate cullet processing, and improve the quality of the material supplied to end-users.

**Application Sites:** Recyclers, glass container manufacturers, construction sites.

**Contact:** For more information about this Best Practice, contact CWC, (206) 443-7746, e-mail: info@cw.org.

### References:

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