



## Best Practices in Glass Recycling

### Selecting Glass Crushing Equipment

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

**Issue:** *Increasing amounts of equipment are being advertised, purchased, and installed for crushing glass. There are two reasons for the proliferation of equipment. First, container manufacturers are using higher percentages of recycled glass in their batches, requiring greater supplies of recycled glass. Second, in areas where glass cannot be economically shipped to container manufacturers, or for mixed color glass that has no value to container manufacturers, local groups are investing in equipment to process collected glass for local uses. There are no “one-size-fits-all” glass processing systems. Purchasing decisions generally are reduced to a trade-off between cost and quality. Any group considering the purchase of glass processing equipment should consider the factors described in this Best Practice.*

#### **Best Practice:**

**Maintenance and warranty** Crushing equipment should be easy to operate and maintain, and training should be available from the manufacturer. In addition to the expected wear of impact surfaces, all surfaces coming into contact with the glass stream will wear. Therefore, every part of the equipment should be able to be replaced without cutting welds or special fabrication. Easy access should be available to all moving parts, especially the motor and belts, for inspection and repair. Motor, belt, and pulley assemblies should be able to be adjusted to modify the rotating speed of the equipment. The gradation of the processed glass will change as the equipment wears. One way to compensate for the gradation change is by changing the speed of the impactor. Also, airborne glass dust can contaminate open lubrication fittings and quickly wear out bearings. Therefore, sealed bearings are preferred.

In many settings, glass-processing equipment operates for only a small percentage of the workweek. Therefore, the prospective purchaser may want to consider requiring the manufacturer to base the warranty on actual running hours, confirmed by an electrical run-time meter on the main motor. On newly developed equipment, the buyer may want to specify an “acceptance period” in the purchase contract, during which the buyer may reject the system for any reason for a substantial refund.

**Safety** The crushing equipment should be safe to operate and meet all OSHA standards. Dust levels, flying glass, and noise control should be assessed. Guards should be provided to protect workers from flying glass, rotating shafts, pulleys, and other moving parts. All glass-processing systems have some glass leakage points. Accessibility to these points to maintain the cleanliness of the shop is critical.

**Electrical System** All of the standard electrical safety devices, including emergency shut-off and on-board overload protection should be included. Because large flywheels are often built into glass processing systems to maintain constant speed during impacts, the ratio of locked rotor amps to full load amps for this equipment is often greater than expected. This is an important consideration for generator-powered units. For the same reason, it is critical to confirm the actual site voltage, and coordinate voltage and current requirements with the equipment vendor.

**Cullet Quality** Cullet size, quality, and debris tolerance varies by application. The equipment seller should demonstrate the equipment producing according to the buyer’s specification. Within limits, size control

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should be possible and may involve adjustments to change a clearance or aperture through which the cullet must pass, or speed control on the equipment.

**Screens** The equipment may have a screening system to remove debris and control gradation. This could be a vibrating screen, a rotating trommel, or angled screen. Screening, especially of fine material, is sensitive to moisture, which can cause glass and contaminants to clump together, blocking screens. Screening systems should be evaluated for throughput and efficiency. Systems with internal screens should be closely evaluated for their ability to handle the range of potential moisture levels and contaminants.

**Conveyors** The *Conveyor Technologies for Glass Processing* Best Practice details some of the issues with conveyors. Some conveyor systems prevent system overload by controlling the speed of the infeed conveyor from the amperage load on the crusher motor. When the crusher motor “loads up,” the conveyor slows down.

**Wearing Surfaces** Glass is an extremely abrasive material. All impact surfaces should be easily replaceable by in-house personnel and easily fabricated by local vendors, or available for purchase in a variety of alloys from the equipment manufacturer. Easy replating or resurfacing may be a good alternative to replacement. If impact parts are only available for purchase from the equipment vendor, then the prospective purchaser should obtain a current price sheet with estimated life for wear parts for inclusion into an operating cost model for evaluation. Common steel alloys will not last in glass processing service. Manganese steel and “Nicad” are two alloys that have been used effectively in impactors. Carbide inserts and ceramic coatings have also been successfully used.

**Auxiliary Equipment** Auxiliary equipment not detailed here may include hoppers, bins, and dust control equipment. All equipment should be designed to work in conjunction with other components of the system to serve the changing needs of the facility. It is important to consider the dimensions of the equipment, size restrictions of the facility, and the processing environment before purchasing.

**Implementation:** Because so much of the equipment being offered for glass processing is either newly developed or derived from processing other materials, a prospective purchaser should make every effort to confirm manufacturers’ claims by interviewing past or present equipment users and by visiting glass processing facilities. Glass processing is extremely hard service for any equipment. Therefore, the potential buyer should confirm the lifespan and actual operating costs of the equipment while processing glass to the actual specifications. For details on types and configurations of crushing equipment, refer to the Best Practices *Types of Crushing Equipment* and *Fine Sizing of Recycled Glass*.

**Benefits:** Many glass processing operators have been surprised by the costs of glass processing. Choosing the right equipment in the beginning is the most efficient strategy.

**Application Sites** Recycling facilities, glass processing businesses.

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

### **References:**

Clean Washington Center Glass Feedstock Evaluation Project: *Equipment Evaluation*, Report GL-93-4

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