Best Practices in Glass Recycling

Non-Ferrous Metal Contaminant Removal

Material: Recycled Glass

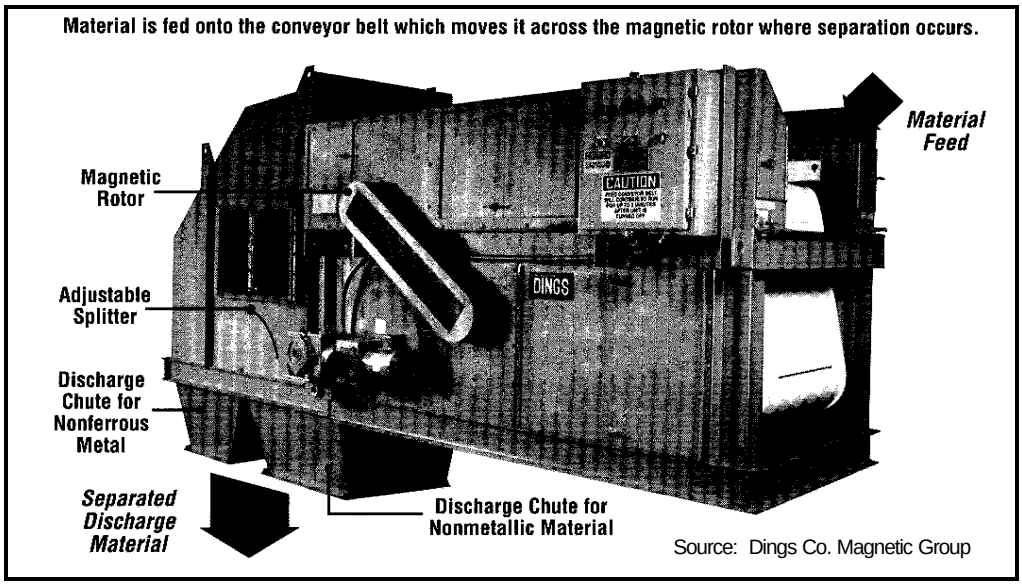
Issue: *Non-ferrous metals such as brass, some stainless steel, lead, and aluminum cause quality control concerns in recycled glass processing. Depending on the end-use application, undetected metal contaminants can cause costly problems with equipment and products. Non-ferrous metals can cause damage to furnaces and glass forming equipment in container and fiberglass manufacturing. Non-ferrous metals also may cause compatibility problems where processed recycled glass is used in composition materials. Finally, the presence of non-ferrous metals can cause a disclosure problem if not detected and quantified in Materials Safety Data Sheets for specialty processed glass.*

Magnetic removal of ferrous metals is straightforward because ferrous metals physically react to magnetic fields, facilitating their removal (see Magnetic Separation Technologies *Best Practice). Non-ferrous metals and ceramic contaminants pose greater challenges because the technology for their effective removal is more complicated. These contaminants also become increasingly difficult to remove in proportion to the fineness of the processed material being cleaned.*

Best Practice: The two steps for non-ferrous contaminant screening are detection and removal. Several manufacturers produce equipment for non-ferrous metal separation. The most prevalent technology is known as an "eddy-current" detection system. An eddy current is an electric current induced within a conductor (in this case the non-ferrous metal) when that conductor either moves through a non-uniform magnetic field or is subjected to a change in magnetic flux. When non-ferrous metals in a glass stream are exposed to an alternating magnetic field, an eddy-current system can detect their presence with a proximity sensor. This technology is well suited to identify non-ferrous metals within a commingled stream of material such as recycled glass.

After the non-ferrous material is detected it must be removed from the stream. This is done with a diverter mechanism to reject contaminants. The diverter may be either a mechanical gate or a pneumatic blast. Diverter mechanisms must function very rapidly to remove metal particles and to prevent diverting an excess quantity of glass. High sensitivity detectors can sense particles down to less than ¼ inch in size. The removal mechanism is timed to reject a small portion of the contaminated cullet including the non-ferrous metal. The rejected materials are discharged through a different port to ensure segregation. Some systems include cascading secondary and tertiary detection conveyor systems to compound contaminate removal efficiency.

Implementation: The efficiency of an eddy-current system should be tailored to the characteristics of a given material stream, including size of material and speed to mass ratios. The magnetic field size and length of time the material is exposed to detection are set to the physical characteristics of recycled glass. Today's automated eddy current systems have sophisticated controls allowing several dozen contaminant particles to be independently identified simultaneously.



Benefits:

The high costs of non-ferrous contaminants in glass manufacturing warrant significant investment in removal technologies. Eddy-currents are the leading technology used in removing non-ferrous metal contaminants in cullet. The amount of cullet that is rejected along with metal contaminants varies depending on system sensitivity and redundancy.

Application Sites:

Glass processing plants, Material recovery facilities.

Contact:

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

References:

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