

Glass

For centuries, glass has served as a universal packaging container, holding precious commodities like wine and olive oil. Today, manufacturers use glass to hold everything from soda and peanut butter to champagne and perfume. Glass manufacturers and consumers continue to appreciate glass for its aesthetic value but also recognize its practicality. The glass in many items, from your soda bottle to your computer, can be recycled over and over while retaining its strength.



Just the Facts

- Americans generated 13.2 million tons of glass in the municipal solid waste (MSW) stream in 2006.
- About 22 percent of the glass was recovered for recycling.
- Recovery increased from 750,000 tons in 1980 to more than 2.9 million tons in 2006.
- Soft drink, beer, food, wine, and liquor containers represent the largest source of glass generated and recovered for recycling.
- Glass in durable goods, such as furniture, appliances, and especially consumer electronics, round out the sources of postconsumer glass.

Recycling Glass

The glass containing your soda today might be the glass containing your spaghetti sauce tomorrow. That's because glass, especially glass food and beverage containers, can be recycled over and over again. In fact, 90 percent of recycled glass is used to make new containers. Other uses for recycled glass include kitchen tiles, counter tops, and wall insulation. Glass makers have always known the material's recyclability, but glass recycling has grown considerably in recent years. This growth is due to both increased collection through curbside recycling programs and glass manufacturers' increased demand for recycled glass.

Today, most glass manufacturers rely on a steady supply of recycled crushed glass, known as "cullet," to supplement raw materials. To make glass, manufacturers mix sand, soda ash, limestone, and cullet; heat the mixture to a temperature of 2,600 to 2,800 degrees F; and mold it into the desired shape. Sand is the only material used in greater volumes than cullet to manufacture glass.

Using cullet saves money and helps the environment, because:

- Cullet costs less than raw materials.
- Cullet prolongs furnace life since it melts at a lower temperature.
- Cullet demands less energy from power sources like electricity, natural gas, and coal.
- Less energy used means reduced emissions of nitrogen oxide and carbon dioxide, both greenhouse gases.

Collection and Processing

Two common ways to collect glass are at the curbside and at drop-off locations. Glass collected at the curbside is usually commingled, meaning that different colors of glass, and sometimes different types of glass, are collected together. This glass might then be sorted by color, or other characteristics, at a materials recovery facility. Some municipal and commercial recycling programs require participants to separate clear, brown, and green glass. Often, glass collected at drop-off locations is separated by color. Generally local recycling offices or departments of public works instruct residents on the types of glass that the recycling program collects and how residents should set out materials at the curb or drop-off centers. Curbside collection requires less work on the part of residents, although contamination levels can be greater.

Although all glass is made of silica and soda, the type and quantity vary slightly with different types of glass. These differences frequently cause manufacturing problems due to different melting points and chemical incompatibility. In addition, since neither brown nor amber glass is used to manufacture clear glass, it is important to sort glass by color. Glass separated by color, whether this takes place at the curbside or drop-off facility or at a materials recovery facility, yield glass cullet of higher economic value.

Sorting also can help reduce common contaminants, such as ceramic cups, plates and pottery, clay garden pots, crystal and opaque drinking glasses, heat-resistant ovenware, lead collars from wine and champagne bottles, stones and dirt, light bulbs, metal caps, lids and neck rings, and mirrors. Finally, sorting can keep broken glass from contaminating other recyclables, like newspapers.

In the materials recovery facility, workers remove large contaminants by hand and sort the glass by color where possible. Then, glass is typically crushed and travels by conveyor belt through a series of refinements. Magnets pull out metal, and air currents remove lightweight material such as paper. Some cullet suppliers use sophisticated equipment such as lasers to sort colors of crushed glass and further remove small contaminants. Scientists continue to develop mechanisms to improve materials sorting, and, therefore, the quality of the cullet.

Markets for Recovered Glass

Glass container manufacturers need a steady supply of quality cullet to make glass containers. Ninety percent of recycled glass is used to make new containers, and the demand for quality cullet is greater than the supply. Due to factors like contamination, cullet can be either high-quality or low-quality by the time it is sold. High-quality cullet is free of contaminants that can jeopardize the integrity of an entire batch of glass. The Glass Packaging Institute (GPI), a trade association representing glass and glass product manufacturers, lists a number of secondary uses of high-quality cullet: abrasives, aggregate substitute, bead manufacturing, decorative applications, fiberglass, frictionators (match tips), and fluxes in metal foundry work.

Lower-quality cullet—that is, mixed-color glass from container and non-container recycled glass—is increasingly used in secondary applications, such as in the manufacture of fiberglass insulation, roadbed aggregate, driving safety reflective beads, and decorative tile.

Source Reduction/Lightweighting

Source reduction is the process of reducing the amount or toxicity of waste that is generated. Lightweighting—reducing the volume of material used to make a specific product—saves a considerable amount of energy and raw materials. Money and resources saved by reducing the volume of glass containers help make glass more cost effective for glass container manufacturers, who face competition from aluminum and plastic container manufacturers. Using advances in design and manufacturing technology, the glass container industry continues to reduce the weight of glass containers. For instance, manufacturers reduced the weight of non-returnable glass containers by about 44 percent from 1972 to 1987, according to a 1992 Franklin Associates study, "Analysis of Trends in Municipal Solid Waste Generation."

Source: United States Environmental Protection Agency