

# Aluminum Recycling Facts

Aluminum cans are lightweight, convenient, portable, and keep beverages cold. Cans are often used to package soda, beer, and other beverages, and account for nearly all of the beverage packaging market for some products. When you throw your aluminum can into the recycling bin, you are contributing to a process that conserves natural resources and saves money compared to manufacturing cans from virgin materials.



## Just the Facts

- In 2006, the United States generated nearly 2 million tons of aluminum as containers and packaging, and manufacturers used about 1.3 million tons of aluminum to make durable and nondurable goods.
- The total amount of aluminum in the municipal solid waste (MSW) stream—3.3 million tons—represented 1.3 percent of total MSW generation in 2006. In 1960, aluminum in MSW was only 0.4 percent of MSW generation (340,000 tons).
- The largest source of aluminum in the MSW stream is aluminum used beverage containers (UBCs) and other packaging containers.
- Other sources of aluminum are found in durable and nondurable goods, such as appliances and automobile parts.
- Manufacturers make 99 percent of all beer cans and 97 percent of all soft drink cans from aluminum. Aluminum beer and soft drink containers were recovered at a rate of about 45 percent of generation (about 0.7 million tons) in 2006, and 36 percent of all aluminum in containers and packaging was recovered for recycling in 2006.
- In 2006, Americans discarded about 2.6 million tons of aluminum in MSW after recovery—1.5 percent of total MSW discards.
- Automobiles also contain aluminum, but this aluminum is generally not calculated in measures of MSW generation, recycling, or disposal.

## How Aluminum is Made

According to the Aluminum Association's *Aluminum: An American Industry In Profile*, manufacturers make aluminum by mining deposits of bauxite ore and refining it into alumina—one of the base ingredients for aluminum metal. Alumina and electricity are combined with a molten electrolyte called cryolite. Direct current electricity is passed from a consumable carbon anode into the cryolite, splitting the aluminum oxide into molten aluminum metal and carbon dioxide. The molten aluminum collects at the bottom of the cell and is periodically "tapped" into a crucible and cast into ingots.

## The Aluminum Recycling Process

Individuals and haulers can deposit and collect aluminum used beverage containers (UBCs) at the curbside or community drop-off centers. From there, haulers take the cans to a material recovery facility (MRF), where workers separate aluminum cans from other food and beverage containers. Since most recovered UBCs are processed into new cans, it is important that

processors generate only high-quality scrap. The recovered aluminum containers must be free from steel, lead, ferrous materials, bottle caps, plastics, glass, wood, dirt, grease, trash, and other foreign substances. The MRF or a scrap dealer then bales the cans, which brokers and can sheet manufacturers purchase.

Can sheet manufacturers typically have arrangements with toll processors to refine the metal and melt it into ingots. The can sheet manufacturers then melt the ingots into can sheet, make cans, produce lids separately, and then sell the cans back to the beverage industry.

## **Benefits of Aluminum Recycling**

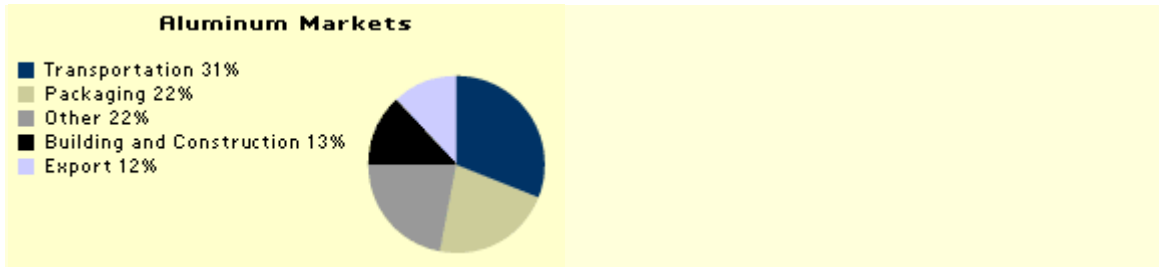
The average aluminum can contains 40 percent postconsumer recycled aluminum. Recovering aluminum for recycling saves money and dramatically reduces energy consumption. The aluminum can recycling process saves 95 percent of the energy needed to produce aluminum from bauxite ore, as well as natural resources, according to the Aluminum Association. Making a ton of aluminum cans from virgin ore, or bauxite, uses 229 BTUs of energy. In contrast, producing cans from recycled aluminum uses only 8 BTUs of energy per can.

An aluminum can that is recovered for recycling is back in the consumer stream in a short period of time. It takes about 6 weeks total to manufacture, fill, sell, recycle, and then remanufacture a beverage can. Most of the aluminum recovered from the waste stream is used to manufacture new cans, "closing the loop" for can production.

## **Markets for Recovered Aluminum**

UBCs are the largest component of processed aluminum scrap, with most UBC scrap manufactured back into aluminum cans. According to the North Carolina DENR, however, the demand for aluminum packaging is shrinking because of an increased use of plastics in soda bottles and other beverage packaging applications. To increase aluminum can recovery, the industry is assisting buy-back centers to attract more UBCs to their sites. Diecasts used by the automotive industry constitute the second largest portion of recovered aluminum. In the future, increased demand for fuel-efficient, lightweight cars is expected to make aluminum more popular in automobile manufacturing.

Demand for UBCs and other aluminum scrap depends on the supply and demand for primary aluminum derived from virgin material. The demand for primary aluminum is determined by the domestic and international demand for aluminum ingots and aluminum finished products.



The largest concentration of domestic aluminum consumption is in transportation, containers and packaging, and building and construction. Combined, these three markets account for almost two-thirds of industry consumption. The next largest grouping includes electrical, consumer durables, and machinery and equipment. Exports account for the remainder (about 13 percent), mostly to Canada, Japan, and Mexico. (The latest available data for the following market-specific information, provided by the Aluminum Association, comes from 1999.)

According to a study conducted by the North Carolina DENR, aluminum is a desirable material in the transportation industry because of its relative strength and lightweight properties. The average aluminum content per passenger car increased from 191 pounds in 1991 to 252 pounds in 1996, according to the North Carolina DENR. If the use of aluminum in automobiles continues to grow, then the prosperity of the transportation industry might determine the demand for aluminum.

### **Source Reduction/Lightweighting**

Source reduction is the process of reducing the amount or toxicity of waste generated. Because aluminum can be easily recycled, it has been able to reduce the amount of raw material needed to make the same product. In addition, data from the Aluminum Association shows that the weight of aluminum cans has decreased by 52 percent since 1972—29 cans can be made from a pound of aluminum, up from 22 cans in 1972—and the industry continues lightweighting activities.

**Source:** United States Environmental Protection Agency