

PROPERTIES AND APPLICATIONS

Glass is an inorganic material that has been used to store and transport food and beverages for thousands of years.

In modern food packaging, soda-lime glass is used. This type of glass is made up of sand, soda ash, limestone, and metal oxides.

Glass bottles and containers usually require closures or lids made of other materials, such as metals, plastics, and cork.

COMPOSITION OF GLASS PACKAGING

Glass consists of a random network of silicon dioxide and metal oxides. The constituents of glass are strongly retained in the material. Because of its molecular structure, glass has very high barrier properties. Hence, even small chemicals (like oxygen) cannot pass through glass, and glass also cannot absorb chemicals from the food it contains.



CHEMICAL SAFETY

The transfer of glass constituents into food is of low concern due to its structural properties. However, lids and closures are a source of [chemical migration](#), which is dependent on different factors, such as the material and food composition as well as the processing and storage conditions. Although the surface area of these closings is relatively small, some materials have shown high migration of, e.g., plasticizers.

END-OF-LIFE

When treated carefully, glass is very durable and stable. These properties make glass very suitable for reuse. Glass can also repeatedly be recycled without loss of quality.

However, due to its properties, glass does not degrade in landfills. It persists even during incineration and remains in the slag.



RECYCLING of glass food packaging

In many countries across the world, recycling of container glass and beverage bottles is common practice. Glass can be recycled over and over again. Recycling rates are influenced by the waste management systems in place and their acceptance and support from the population.

It is most effective to collect glass separately from other materials and separate it by color. In addition, other types of glass (e.g., crystal glass, tableware, mirrors) can disturb the recycling process and reduce the quality of the recycled glass. Hence, these products should not enter the recycling process.



How is glass recycled?

RECYCLING PROCESS

Glass recycling is an energy-intensive process, as the glass is melted at temperatures above 1500°C. However, compared to the production of virgin glass, the process saves up to 25% of energy. Depending on the color, different amounts of virgin glass need to be added during recycling: Green, brown, and white glass can be recycled from up to 100%, 70%, and 60% glass cullet of the respective color.

What needs to be addressed?

GLASS TYPES

During recycling, the lead content of container glass may increase and needs to be controlled, for example, by sorting out crystal glass. Migration of lead from glass can occur, but it is limited to surface interactions. Organic contaminants do not play a role when addressing the safety of recycled glass, because they do not withstand the process conditions during recycling.

Can it get better?

OPTIONS FOR REUSE

The properties of glass allow for recycling this material many times. Additionally, the properties of glass also support reuse because glass does not take up contaminants and its surface can be easily cleaned and sanitized. Considering the high energy demand of glass recycling, reusing glass containers and beverage bottles can be advantageous over recycling.

