

Guidelines – Glass Recycling

Issued by: Inspection Department – Operations Section

1.0 Introduction

Ports, Customs and Free Zone Corporation (PCFC) has been certified for EMS ISO 14001 and has taken up Environmental Management System as a continuous improvement method for the satisfaction of its customers.

Recycling, along with source reduction, and disposal in landfills, is a key component of an integrated municipal solid waste.

The supply of scrap glass has three components: transition glass, pre-consumer cullet, and post-consumer cullet.

Cullet is simply crushed scrap glass. Transition glass is made up of un-marketable glass products created by glass manufacturers. Pre-consumer cullet is finished glass that breaks at bottling or distribution plant. Most transition glass and much pre-consumer cullet are re-melted by the plant.

2.0 Facts About Glass

Glass recycling is the process of turning waste glass into usable products. Depending on the end use, this commonly includes separating it into different colours. Glass normally comes in a number of colours. The major types are:

- Flint Glass (clear glass)
- Green Glass
- Brown / Amber Glass

Glass makes up a large component of household and industrial waste due to its weight and density. The glass component in municipal waste is usually made up of bottles, broken glassware, light bulbs and other items. Glass recycling uses less energy than manufacturing glass from sand, lime and soda. Every ton of glass used for producing new glass items saves 315 kg of carbon dioxide. Glass that is crushed and ready to be remelted is called Cullet. The term "cullet" derives from the practice of remelting flawed containers which have been "culled" from production lines.

Glass Recycling has been around in the US since glass has been used in the manufacturing of containers; for almost 100 years. Glass is one of the easiest commodities to recycle and there are many of different uses for it. In the early days and up until recently, glass bottles were returned to the company and cleaned for re-use. Today the majority of glass that is recycled is crushed and used to manufacture new containers or fiberglass insulation, but other secondary uses are developing quickly.



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752,000 tons of glass is now recycled annually in the United Kingdom. Glass is an ideal material for recycling and where it is used for new glass container manufacture it is virtually infinitely recyclable. The use of recycled glass in new containers helps save energy. It helps in brick and ceramic manufacture, and it conserves raw materials, reduces energy consumption, and reduces the volume of waste sent to landfill.

Many types of glass can be recycled. Glass food and beverage containers are 100 percent recyclable and can be reused an infinite number of times. The only glass items that cannot be recycled are light bulbs, ceramic glass, dishes, and plate glass.

3.0 Strategies for Glass Recycling

3.1 Alternative Uses

Many non-returnable glass containers are suitable for household uses such as foodstuffs and do it yourself bits and pieces.

3.2 Recycling

For glass remaining after exhausting the scope for returning or other uses, recycling is preferred. It takes 2,000-3,000 bottles and jars to make a ton of 'cullet' (crushed glass). The average household discards 1.4 Kilos of glass or 4 to 5 containers per week. PCFC has recognized this waste as a source of income.

4.0 Advantages of Glass Recycling

4.1 Raw Material Conservation

In the manufacture of new glass, up to 40% of the raw material may be in the form of cullet. The use of old glass can achieve considerable savings in raw material and the energy needed to melt the glass. While the main components for container glass i.e.14% soda ash and 12% limestone are imported. Their supply and transport have environmental impacts. These can be reduced by recycling of glass.

4.2 Energy Conservation

The addition of cullet assists in the melting process of glass manufacture and as recycled glass melts at a lower temperature in the furnace than raw materials, less fuel is required. On average, for every additional 10% of cullet used in the raw material batch, energy costs are reduced by 1%. Recycling can contribute to an improvement in our balance of payments. Recycling two glass bottles saves enough energy to boil the water for five cups of tea!

4.3 Savings in the Cost of Waste Disposal



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It is estimated that glass products constitute approximately 7.5% of domestic waste. Recycling reduces the work and expense incurred by in disposing of this. It also reduces the demand for expensive landfill space.

4.4 Public Participation and Environmental Awareness

Glass recycling is a practical way for everyone to contribute to conservation and protection of the environment. In the process a person's awareness of, and appreciation for, the wise managements of our natural resources are increased. Recycling schemes help to promote a general recycling mentality among the public.

4.5 Environmental Improvement

Recycling should reduce the amount of carelessly disposed of (broken) glass in the environment. A greater appreciation of the value of waste glass will help to eliminate one feature of the litter problem. It reduces the space in landfills that would otherwise be taken up by used bottles and jars. Glass produced from recycled glass reduces related air pollution by 20% and related water pollution by 50%.

4.6 Source of Income

The potential for glass recycling to become a source of income for deserving causes should be examined carefully by organizations or groups with funding problems.

4.7 Strategic Plan / Guidelines for Glass Recycling

The operation of a successful glass recycling scheme requires detailed planning, development and supervision. Before NGOs, charity organizations, schools, other organizations or individuals set up recycling schemes, they should consider the following:

- a. Cooperation with local authorities and commercial organizations is essential.
- b. Identification of collector of source for disposing of collected glass.
- c. Person responsible for planning, development and operation of the scheme must be designated.
- d. Identify whether there are sources of bulk supplies of bottles, which could be included in a collecting e.g. restaurants and hotels; or better still if these sources could deliver themselves to Recycling Center.
- e. Identify suitable sites for the location of glass Recycling Skips/ bottle banks. Sites should be regularly visited by large numbers of people, highly visible in prominent locations e.g. Round About in FZ.



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- f. Bottle banks should consist of three separate containers and should be attractive in appearance; easily cleaned and maintained; colour coded white, green and brown; easy to use.
- g. The scheme needs to be supported by a comprehensive publicity and educational campaign. A "bottle bank code" could be drawn up for the proper use of bottle banks. Promotional campaigns for the use of bottle banks need to be repeated at regular intervals.
- h. Sponsorship would need to be found. Other costs are publicity material, maintenance and transport. Costs could be shared with other organizations engaged in recycling.
- i. A poorly maintained bottle bank discourages any further use by the public. Constant removal of graffiti, litter, etc. is necessary. Over-filling can result if not emptied regularly. Users should be asked not to leave empty boxes or bags around the bank.
- j. Examine the existing schemes in the area/Community.

5.0 Colour Imbalance

The main barrier to recycling glass is the shortage of clear cullet collected in the UK. The UK predominantly produces clear and amber glass but because the UK exports a lot of clear glass, in the form of spirit bottles, and because consumers are also reluctant to deposit jars in bottle banks, little clear cullet is produced. The UK imports twice as much green glass as is manufactured, mainly in the form of wine bottles. In the past this has led to a surplus of green cullet. The industry has worked hard to increase the amount of green glass recycled and currently all the green bottles we make in the UK contain at least 85 per cent recycled green glass.

Glass cullet can also be used for aggregate in the construction industry, and the new road laying material glasphalt. Glasphalt comprises around 30% recycled glass and it has been estimated around 14 million crushed bottles were used in this way during construction in the M6 motorway project. These materials can use mixed coloured and contaminated glass, and may be a good market for green glass.

6.0 Supply Cullet

6.1 Types of Glass

a. Acceptable

Commercial container glass i.e. jars and bottles (including jam jars, coffee jars, salad cream and sauce bottles).

b. Unacceptable



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Crystal glass, Pyrex, plate glass or windows, television tubes, opal glass, e.g. Malibu bottles where a large amount of foil is glued to the bottle, car windscreens.

6.2 Glass Colours

All deliveries must be separated prior to delivery, according to colour, i.e. clear, amber, or green glass containers. Bottles, which are very light green in colour, should be with the green cullet.

6.3 Contamination and Others

- a. Paper labels on bottles are quite acceptable.
- b. If a bottle is returnable it is usually preferable to return it, rather than to recycle it.
- c. All loads to be free of metal caps. (steel crown caps) and aluminum caps, particular attention being paid to eliminating rings and bands on the necks of bottles together with the foil decoration.
- d. Never deposit light bulbs or cookware such as 'Pyrex' or 'Visionware'. These have different properties to the glass used to make bottles and can contaminate a load, resulting in a sub-standard finished product. Flat glass, such as window glass, whole or broken, should not be put in bottle banks either.
- e. Make sure that you put the bottles in the correct bank - clear, green or brown. Most importantly, ensure clear glass is not contaminated with colours as this will considerably reduce the value as a higher price is paid for uncontaminated clear glass. Bottles made from blue glass can be put in the green glass bank. Bottles with a coloured coating can be recycled as any finishes added later will burn off in the furnace. To find the original glass colour check the top of the bottle where the cap was and put the bottle in the appropriate bank.
- f. Please note, porcelain, pottery, stones, ceramic tiles and lead foil are totally unacceptable. Cullet loads found to contain any of these items will be rejected completely.
- g. Bottle bank users could be asked to rinse their bottles to avoid smells.

7.0 Future Trends

The success of glass against aluminum and plastic in the marketplace will affect the amount of cullet the glass industry will demand. Observers predict that the glass container industry will continue to see modest growth over the years. Growth in the container industry will dictate the



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overall capacity to use cullet. Consumer demand for recycled container will also affect use of cullet.

To increase the use of cullet, existing collection and beneficiation units must improve operations to all level that can guarantee cullet quality and quantity. Glass industry observers also speculate that if prices or regulations changed enough to make it more worthwhile to use cullet, more companies would be motivated to do so.

With the above tips we hope that we can minimize glass waste and eventually reduce environmental impacts and encourage its recycling.