Ardagh Group
Glass

Introduction to Ardagh Group, Glass – Milford, MA

11/10/15
Ardagh Group operates globally through two business segments; Glass and Metal packaging.

In both segments, the Group has secured leading positions in the key end markets it serves.
Ardagh Group, Glass – North America manufactures glass packaging for the leading brands in the US beer, beverage, spirits and wine markets in a wide variety of award-winning designs, shapes and sizes.

- 5,100 employees
- 15 glass manufacturing facilities; 1 distribution center (Fairfield, CA)
- 10 billion bottles and jars manufactured annually

Brands including AB InBev, Pepsi, Constellation, Bacardi, ConAgra Foods, Bells, Arizona, Diageo, Heaven Hill Distilleries, Kraft, Moonehead, Sprecher, E&J Gallo Winery, Pernod Ricard, Tabasco, Chateau Ste Michelle, Sazerac, Jarden, Mizkan.
Ardagh Group, Glass – North America: Milford, MA

Began operations in 1973 on 34 acres
Approximately 230 hourly - (GMP) union represented and salaried employees
Manufactures approximately 2.4 million glass containers each day for the beer market
Two furnaces melt about 570 tons of batch material per day
378,000 total building square footage
- **ENERGY STAR® Plant Certification** in 2010, 2012, 2013, 2014 and 2015, by:
  - Increasing available **recycled glass** (**cullet**) in batch mix
  - Aggressive optimization of energy efficiency in both furnaces
  - Retrofitting old lighting with energy efficient LED fixtures
  - Reducing/recycling water usage in the manufacturing process

- **ISO 14001 Certified - Environmental Quality Management Standard**

- **Emission controls**
  - NO$_x$, SO$_2$– One Oxyfuel furnace; One Selective Catalytic Reduction (SCR) furnace
  - Electrostatic Precipitator (serves both furnaces)

- **Reduced NO$_x$ emissions equivalent to the annual heating of 30,000 homes.**
Glass Bottle 101

- It takes about 10 seconds to create a beer bottle.

- Production speeds may be as fast as 700 containers per minute.

- Recycling just one glass bottle saves enough energy to power a television for 20 minutes.

- Six tons of recycled, remelted container glass equals one ton of carbon dioxide / greenhouse gas reduced
Glass: Why Are We Focused on Increasing Cullet?

It’s the right thing to do for our planet and it’s good for business!

100% endlessly recyclable

A 10% increase in cullet reduces:

• Energy requirements by 3-4%
• Particulates by 8%
• Nitrogen Oxide by 4%
• Sulfur Oxides by 10%

Extends furnace life

Provides a hedge against high utility costs (especially in the NE region)

Saves natural resources

• One ton of cullet saves approximately 1.125 tons of the earth’s natural resources
• Reduces energy for mining and transportation

For every six tons of recycled glass used, one ton of CO$_2$ is reduced

In 2014, we utilized enough cullet to save nearly 14.5 million cubic feet of landfill space. These recycled containers laid end-to-end would circle the earth more than 16 times — or enough to reach the moon and return halfway
High Quality Cullet Is Critical to Our Operations

- Milford plant receives the majority of its cullet from several regional and local suppliers:

- 90% of Milford’s batch mix is high quality cullet, in large part due to Massachusetts's container deposit.

- Milford has one of the top cullet usage rates in the world, providing high quality products at a low cost to its customers.
Points of Interest

- Cullet specifications
  - Prefer 5/8” pieces. Provides optimal melting and a high level of contamination control
  - Required cullet color is dependent on product mix
- Cullet must be processed by an authorized cullet supplier
  - Suppliers must deliver to Ardagh specifications (color, size, etc.)
  - Suppliers are subject to routine audits
  - Cullet is verified at the plant through established Ardagh quality control standards and protocol
- The national cullet market growth on average is relatively flat, but where opportunities exist, Ardagh is pursuing
- Ardagh is actively protecting current container deposit laws
- Federal, state and local governments would do well to keep glass in their collection streams as a beneficial feedstock to glass container manufacturers and support value added recycling efforts
Unscrambling eggs!
Tulsa Recycle & Transfer, Inc. – Courtesy of Robert Pickens

• Get the glass and metal out first
  – All single Stream material runs over eccentric rollers.
  – Screens and air remove fines and light NGR’s
  – Remove ferrous metal as part of the cleanup process by using a magnetic head shaft (Batteries, Makeup Containers, Dog Chains, Small Hand Tools, bolts & nuts and nails & screws, etc.).
  – TRT removes 9/yds of heavy NGR’s captured with the magnet per week, averaging 3,750/lbs or 8.12/ton per month
  – Use screens and air to remove fines and light NGR’s
  – 2” minus drops into 3-Mix.
  – 3 to 5 truckloads/week goes to the cullet processor

• Equipment Manufacturer – Bulk Handling Systems (BHS)
Tulsa Recycle and Transfer Layout

3 Mix Collection

Inbound Single Stream

Eccentric Rollers and Magnetic Head Shaft

Plastic/Paper/Non Ferrous Metal sorting

3 Mix Result - No Fines
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