



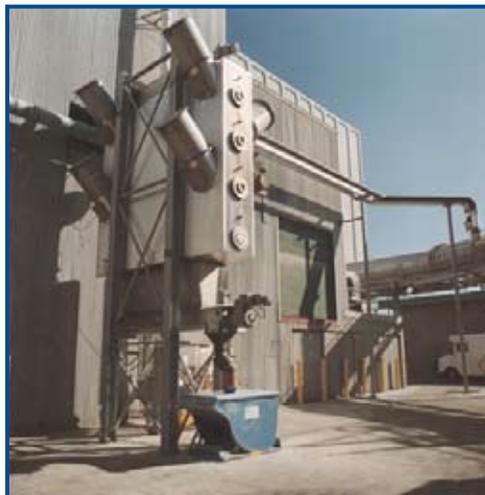
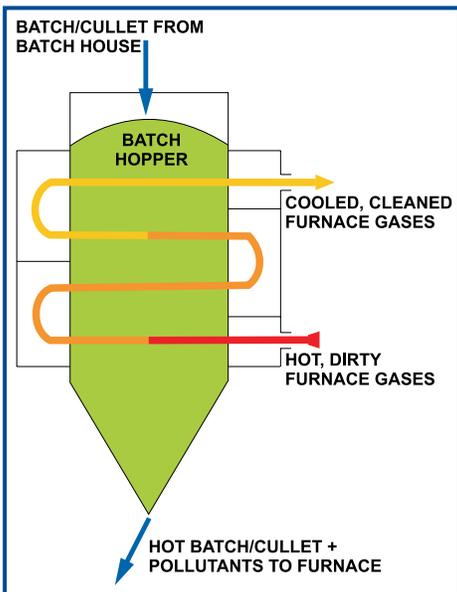
## INDUSTRIAL TECHNOLOGIES PROGRAM

# Electrostatic Batch Preheater System

## New System Uses Furnace Exhaust to Preheat Batch and Cullet and Abate Emissions in Glass Melting

As the U.S. glass industry faces growing pressure from competitors, environmental regulations that require costly emissions control equipment are increasing glassmaking production costs. The industry needs a lower cost means of melting glass that can also meet emissions regulations. BOC Gases is working on the development and demonstration of a technology that can satisfy all of these requirements without high implementation costs. The technology will use exhaust heat from an oxy-fuel fired glass furnace to preheat mixed glass batch and abate emissions.

The electrostatic batch preheater system, also called E-batch, will save significant amounts of energy in glassmaking. Elevated batch and cullet temperatures will reduce heat requirements for melting. Preheating will also lower heat requirements by reducing the moisture content of the batch. In addition, the technology contains an electrostatic particulate removal system and the means to abate SOx. The integration of E-batch with the oxy-fuel glass furnaces will significantly enhance the competitiveness of the glass industry. The payback period is estimated to be less than three years based on the energy savings alone; this is significantly reduced when considering the environmental benefits.



Schematic of E-batch process and photo of pilot-scale system



### Benefits for Our Industry and Our Nation

- Reduced melting fuel and oxygen requirements by 15% or equivalent increase in glass production
- Reduced emissions
- Increased productivity

### Applications in Our Nation's Industry

E-batch can function independently on any furnace. The combination of E-batch and the oxy-fuel furnace offers the greatest potential energy and environmental benefits. Combining these two technologies has the potential to improve performance in all sectors of the glass industry.

## Project Description

**Goal:** To design and develop a technology that incorporates electrostatics directly into the preheater system for an oxy-fuel fired glass melting furnace.

E-Batch is based on the integration of a proven cross-counter-flow glass batch preheater and a proprietary electrostatic technology. The technology also abates particulate emissions to very low levels and eliminates the need for external downstream control devices. Performance will be further improved by combining this system with oxy-fuel melting.

Laboratory and pilot-scale testing of E-batch have been highly successful. The equipment has demonstrated the ability to operate reliably, preheat batch and cullet with any mixture ratio, and reduce particulate and SO<sub>x</sub> levels to well below the strictest regulatory limits. During this project, a full-scale demonstration will be conducted on a container glass furnace to resolve issues associated with particulate and SO<sub>x</sub> collection performance, tube cleaning, and electrostatic operating parameters.

The application of E-Batch technology on oxy-fuel fired furnaces is expected to yield the following benefits:

- 50-90% reduction in total controlled air emissions
- 15% reduction in melting fuel requirements
- Annual savings of 5.2 trillion Btu for 25 installed units

## Progress and Milestones

- Designed a full-sized E-Batch system for installation on an oxy-fuel fired furnace in a glass container manufacturing facility.
- The project was terminated in 2002 after the host site declined to move forward with the full-scale demonstration and BOC was unable to locate an alternate host site.

## Project Partners

BOC Gases  
Murray Hill, NJ

Leone Industries  
Bridgeton, NJ

## For additional information, please contact

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## A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.



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**Energy Efficiency  
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Bringing you a prosperous future where energy  
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