

E-Glass Furnaces

GREATER GLASS QUALITY, INCREASED EFFICIENCY & IMPROVED OPERATING FLEXIBILITY



GLASS PLANTS
BATCH & CULLET SYSTEMS
GLASS FURNACES
EMISSION CONTROL
WORKING END & FOREHEARTH
PROJECT MANAGEMENT
INSTALLATION
REBUILDS



TECO

ENGINEERING THAT FITS YOUR EQUATION.

TECO: technology at work

Recuperative Furnaces

TECO pioneered the use of recuperators in conjunction with E-Glass melting. The use of special steels and refinements to the design allows the recuperators to be successfully used on furnaces to melt E-Glass, allowing higher melting rates and more efficient energy consumption. Apart from the recuperator itself, the whole combustion system is designed to suit the melting of E-Glass, with special hot-air burners for either oil or natural gas and furnace pressure control as an intrinsic part of the system.



Recuperative furnace melting E-Glass, performing at 65 metric tonnes/day (72 US tons/day)

Melter Design

TECO incorporates refractories in E-Glass melters which are resistant to the very corrosive glass, and which are specifically chosen to minimize glass defects while maximizing campaign life. Today, many different grades of material are available, including the use of precious metals in strategic positions, allowing the furnace to be designed using the best materials for each location. The melter superstructure is also subject to heavy wear, and improvements in refractory materials have allowed the life to be extended. In addition, the exhaust flue and lower stack have to be resistant to the flow of liquids which condense from the exhaust gases and run down the recuperator and stack. New refractory materials have improved the wear characteristics in this location.

Melter Enhancements for Higher Glass Quality

Bubbling is a standard feature of TECO's E-Glass melters. It stabilizes the convection currents within the melter, and enhances glass quality and output. Bubbling can be used in combination with electric boosting, which increases the melting rate. TECO furnaces have successfully produced fine fiber, down to seven-micron diameter.

Batch is fed into the furnace using a screw-charging system installed into a sealed doghouse. E-Glass batch is normally made up of very fine mesh raw materials, which present storage and flow problems. TECO's batch-mixing and material-handling systems are designed for controlled flow.

Systems to recycle waste glass fiber have been developed and can be incorporated, if required.

Environmental Considerations

E-Glass batch contains a number of volatile components, which lead to high levels of particulate materials in the exhaust gases. Some of these condense and are retained in the heat recovery system, but many pass through the system and can be collected by a suitable capture device. Since some of the emissions will be non-condensable acid gases, an alkaline reaction stage has to be incorporated to turn them into solid material. The capture device can be either a fabric filter or an electrostatic precipitator.

NOx generation is minimized at the design stage by paying attention to details of the combustion system, the insulation level and the hot-sealing of the furnace.



Scrubber and electrostatic precipitator for E-Glass

Oxy-Fuel Melting Reduces Fiber Break Rate



Oxy-fuel E-Glass furnace operation

Oxy-fuel furnaces are a natural way of avoiding pollution because they virtually eliminate nitrogen from the combustion process.

Depending on the requirements, a TECO oxy-fuel furnace can be provided to:

- Increase output
- Improve efficiency
- Simplify furnace operation
- Reduce NOx emissions
- Improve glass quality
- Reduce fiber break rate

TECO oxy-fuel furnaces are designed for long campaign life and high-quality glass production. Refractory selection is matched to campaign life and capital cost requirements. To ensure NOx is kept to a minimum, a sealed doghouse system incorporating screw-chargers is used.

Distribution Channels & Bushing Forehearth for Ideal Forming

TECO offers gas-fired distribution channels and bushing forehearth for E-Glass melting units in a variety of configurations, feeding up to 100 or more fiberizing bushing positions. The TECO forehearth system delivers molten glass to the bushings at the correct temperature with minimum variation throughout the forehearth system, thus helping to maximize production efficiency. Even at forehearth temperatures, the relatively high boron content of E-Glass is subject to significant volatilization which, as a condensate, is very aggressive towards the distributor channel and bushing forehearth superstructure refractories. TECO's many years of experience in superstructure design and refractory selection ensure that condensate is kept outside the flow-channel areas so glass quality is maintained and service life is maximized. In certain circumstances, it is desirable to provide bottom drains and other features to prevent stagnation of glass at low flow rates.

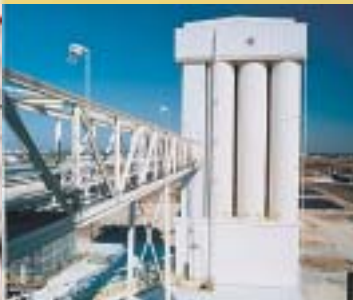


E-Glass forehearth application

Batch Plants

TECO batch plants and associated fine mesh material-handling systems are designed as an integral part of the glass-making process and focus on mixed batch quality using statistical process control to produce highly consistent batch quality. The raw materials used for E-Glass vary according to economics and availability, and TECO batch plants are provided with material-handling equipment that accommodates a wide range of material flow characteristics.

Another characteristic of a TECO batch plant is that they are designed with provisions for production capacity increase, when required.



E-Glass plant for handling 200 metric tonnes/day (220 US tons/day) of production

