

Large electric melter installations: The way forward?

Richard Stormont* discusses two large electric melter installation projects at Zimbabwe Glass Industries and Cameron Family Glass Packaging in the USA, outlining challenges and results.

Nearly 15 years ago UK electric melting specialist Electroglass commissioned what was at that time one of the largest all-electric glass melters ever built, a 130 tonnes/day unit at Zimbabwe Glass Industries. That was twice the size of its nearest relative in terms of design concept.

Scaling up electric furnace designs requires extreme care. In many cases simply enlarging a relatively successful smaller furnace design and adding more electrodes and power, results in disappointing performance in terms of energy efficiency and glass quality. This is due to the energy release pattern and the resulting temperature distribution created by immersed electrodes. Scaling up is a particular problem with design concepts employing sidewall, shelf or top electrodes installed over the sidewalls. However, the electrode configuration used in the Zimbabwe furnace overcame the energy distribution problems and the furnace is still in operation today.

Largest melter

Two years ago, serious interest was developing in another big step in all-electric melter size, notably for a planned new container glass plant in the Western USA. The Cameron Family Glass Packaging (CFGP) project at Kalama, Washington State, eventually required a furnace of 254 tonnes/day (280 US tons/day) capacity.

After many months of development, laboratory modelling and design work, this latest Electroglass furnace, incorporating a number of important design advances, was commissioned in late October 2008. It met its guaranteed stability, output, energy consumption and glass quality levels in performance tests in early November 2008.

To Electroglass' knowledge, this is by a significant margin the largest cold-top

electric glass melter in the world. The heat up and commissioning of such a large furnace of a new design presented some challenges as might be expected. In the cold-top electric melting process, the high level of retention of batch ingredients also means that both lower levels and careful adjustment of minor ingredients are required, especially when dealing with a 'new' composition.

Reduced glasses

It is widely believed that reduced amber and green glasses cannot be satisfactorily melted in a cold-top electric furnace and that the transition between oxidised and reduced compositions presents unavoidable batch blanket problems. Indeed, some historical attempts to melt reduced glasses have resulted in serious batch blanket disruption, with foam formation under the blanket and a variety of associated difficulties.

Following the shut down of its other furnace, Zimbabwe Glass Industries wanted to melt both amber and emerald green glasses in the Electroglass furnace,

which was originally designed for flint glass. It was Electroglass' view that with the design features of this generation of Electroglass electric furnaces, and in particular the energy and temperature distributions achieved and suitable adjustment of traditional batch mixes, reduced glass production would be possible. Following a carefully planned procedure, witnessed by the writer, a successful transition to amber was made in 2005. Since that time the furnace has produced mostly amber of very high export quality, with periodic runs of emerald green and flint.

With the CFGP furnace already having demonstrated an output of more than 230 tonnes/day at an energy consumption of just over 700 kWh/tonne with 35% cullet, perhaps it is time to look at the next step in the development of large electric melters for both flint and coloured soda-lime glasses. ■

* Richard Stormont, Managing Director, Electroglass, UK.
Website: www.electroglass.co.uk



The Cameron Family Glass Packaging plant in the USA required a furnace of 254 tonnes/day capacity, almost double the size of its nearest Electroglass relative.