Lightweighting improvements

GRAHAME STUART EXPLAINS HOW SUPPLEMENTAL ELECTRIC HEATING CAN HELP WITH GLASS LIGHTWEIGHTING

A lot of time and resources have been dedicated to developing forming processes and coatings that allow the container manufacturer to produce lighter, more environmentally-friendly packaging to suit today's market requirements. However, little has been said of the glass quality improvements that are necessary to make lightweighting a success.

The gob condition will directly influence the quality of the final product. Small variations in gob weight, temperature, homogeneity and shape can result in loss of productivity through increased defects, particularly in coloured glasses. Problems with gob condition can be amplified as the width of the forehearth channel is increased, and with many large-scale container manufacturers operating larger forehearths, there may be significant scope for improvements.

Wide gas-fired forehearths can be difficult to heat evenly, with the result that the hottest glass travels along the centreline while cooler glass moves along the sides and bottom of the channel. Uniform temperatures can be achieved much more easily in an electric forehearth, where special heating elements and immersed electrodes can be designed to heat the coolest areas whilst allowing the hottest area, typically along the centreline, to cool naturally.

ADDITIONAL ELECTRICAL HEATING

In glass manufacturing plants where gas-fired forehearths are already in place, it can be possible to provide additional energy by adding in-glass electric heating. The Electroglass Temptrim is one such system. Initially developed as a means of improving glass conditioning on smaller, more specialist sealed forehearths, the equipment is increasingly being used by large-scale container manufacturers.

The system allows small amounts of power, usually only a few kilowatts, to be accurately applied directly to the glass. Using special dry electrodes at selected points in the forehearth, it can correct inconsistent temperatures of the glass entering the spout, improving gob shape, forming and overall productivity.

The system consists of single or multiple heating zones and can be individually configured to combat specific problems or for different types of glass. Each heating zone usually consists of two or more electrodes powered from an air-cooled transformer, with automatic power and temperature control. Independent heating on each side of the forehearth can make adjustments for uneven temperatures. Typical improvements include a reduction in gob weight differences to just 1-2 grams and the near elimination of rejects due to gob shape and temperature.

DESIGN ADVANTAGES

The system's dry electrodes have been designed to prevent contact between different metals to help prevent the risk of oxidisation of the molybdenum. They do not require water cooling, and have no need of electrode advancing during normal forehearth operation. The usual service life of these matches the full forehearth campaign.

A TYPICAL ELECTROGLASS DRY ELECTRODE ASSEMBLY

Electrodes can be manufactured to suit different immersions and forehearth constructions and can be mounted horizontally or vertically. They can also be made with a special protective coating, allowing them to be installed prior to glass.

A major advantage of the system is its ability to be installed without the need to stop the forehearth. Installation by an Electroglass specialist hot drilling engineer can take just one to two days, ensuring a machine downtime of no more than 12 hours.

MINIMAL MAINTENANCE

The system requires very little maintenance, other than the routine recording of operating data and the inspection of electrodes and cabling. For over 20 years, Electroglass has invited all customers to submit operating data, which the company analyses to monitor the system's operation and provide appropriate advice at no extra cost. ■

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