On the level

Grahame Stuart explains there are a number of accepted techniques for measuring and recording glass level. Most have evolved over many years into the accurate systems available today and form part of the highly automated process that glass melting has become

Systems vary in their complexity, from simple dipping probes that calculate glass level by measuring the variations in cycle timing, to the radioactive isotope systems, preferred where real-time glass level information is required. Many of these systems require either water or air cooling and in some cases, a combination of both. In the case of the radioactive system, certain legislation must be followed and frequent staff training and assessment is also needed. In addition, some of these systems have mechanical moving or wearing parts that require maintenance throughout their operating life.

For many years, Electroglass looked at ways of tackling what it saw as limitations with the existing technology available across the industry, including the need for cooling and moving parts. In doing so, Electroglass faced several challenges as it developed its own approach to level control.

NO COOLING REQUIRED

The original Electroglass level sensor set out to remove the need for cooling of any sort and to make the system a static one, removing the need for moving parts. By doing this, it was conceived that the equipment would be practically maintenance-free and would be capable of giving many years' service without the risk of maintenance-related failure.

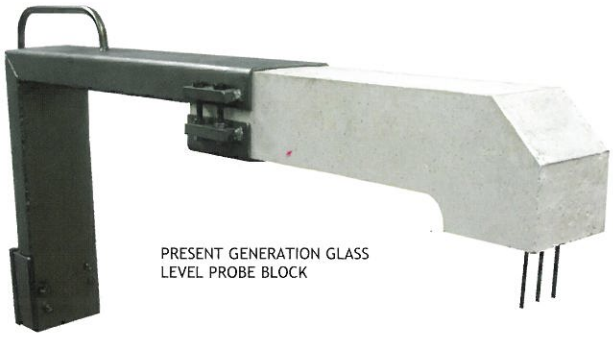
The original concept comprised a static refractory body, requiring no water or air cooling, fitted with two platinum pins that remained permanently in the glass. Power from the control system would have been passed along one pin into the glass and returned to the control system through the other. The control system would measure the resistance of this current path to determine glass level. For example, the greater the glass depth, the greater the amount of pin in contact with the glass, therefore the lower the resistance.

However, the resistance could also be affected by changes in glass temperature altering the overall glass conductivity, effectively creating an 'offset' in the glass level, calculated by the control system. To overcome this, a thermocouple was installed within the probe body and the control system compensated for any change in temperature/conducivity when calculating the glass level, thereby removing the offset.

The original Electroglass system had overcome the need for cooling and moving parts and was providing real-time glass level information. However, although very accurate when operated in one glass type or colour, it was generally necesary to recalibrate the control system whenever there was a change in glass composition that altered overall glass conductivity. The success of the original system prompted Electroglass to develop the system further, keeping all the useful features of the original but eliminating the need for the thermocouple and the need to recalibrate whenever the glass composition/conductivity changed.

The present generation of Electroglass glass level sensors is the result of these developments. Free from moving parts and water or air cooling, the system can be installed without the need of future recalibration to compensate for conductivty changes caused by alterations in glass composition or changes in operating temperature. Accuracy and control down to ±0.1mm, as well as real-time glass level feedback make the system perfect where accurate level is required in the process, particularly in tubing and lightweight container production.

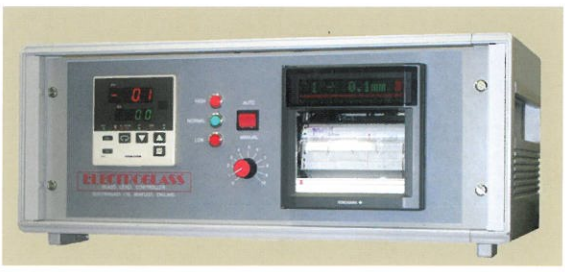
It is available in two variants, the Level Sensor and the Level Controller. The Level Sensor consists of the probe block assembly and a small panel-mountable electronics module with display. Output signals of 0-5 volt and 4-20mA are provided and can be connected to an existing glass level control system to provide real-time glass level information.



PRESENT GENERATION GLASS LEVEL PROBE BLOCK

The Level Controller comprises the probe block assembly and a larger desktop control module. The desktop control module features a PID controller and a paperless chart recorder to allow recording of glass level. Output signals of 0-10 volt or 4-20mA are provided for connection to the vibratory feeder or screw charger control system.

A key benefit of both systems is the ability to install during the furnace campaign. The probe block requires an opening in the working end or a forehearth to be made with dimensions of 180mm wide and 250mm high. This technology is now being operated in a range of glass types, including soda-lime containers, tubing and tableware, borosilicates, insulator glass, flouride opal, TFT and CRT glasses, crystaline and lead crystal. ■



LEVEL CONTROLLER DESKTOP MODULE

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