

SmartMelter advances furnace inspection techniques

Yakup Bayram* discusses a furnace management solution that collects and visualises deterministic data about furnace health using radar technology. The solution has already been validated on several furnaces and gives manufacturers greater gains in furnace maintenance, risk management and a stable production.

Radar technology has created advancements in various fields of practice, from medical applications to defense operations. The latest industry to be transformed by customised radar application is glass manufacturing.

SmartMelter is a furnace management solution that collects and visualises deterministic data about furnace health. Two patented sensors launch radar waves into refractory walls to collect erosion data and measure refractory thickness.

The data is then visualised using computer tomography to give manufacturers a clear view of vulnerable areas. With this new level of insight, manufacturers can begin to perform condition-based maintenance and safely extend their furnace campaigns.

One of the key features of this technology is the ability to perform furnace inspections on an operating furnace without interrupting production. Sensors are designed to be used on the outside of furnace walls in a non-invasive manner. For example, the Refractory Thickness Sensor (RTS) can be placed directly on glass contact refractory such as



fused-cased AZS, high zirconia or Chrome refractories. The interface between the glass and the wall is recorded to produce a measurement of the residual refractory thickness. The Furnace Tomography Sensor (FTS), used on furnace bottom and sidewalls, operates from the outer layer of insulation. The FTS maps early-stage glass penetration and measures the residual thickness of the insulation and refractory layers.

Validation

The convenience of SmartMelter technology is an important step forward for glass manufacturers. However, its value is only as good as its accuracy. Is the data collected by the sensors precise? SmartMelter sensors have been validated on multiple furnaces. The first blind trial was completed on a container glass furnace that was scheduled to be drained for cold repair.

Before the drain, SmartMelter measurements were taken in 11 spots on the furnace on both sidewalls, a doghouse, and the area between the throats. When the original blocks were recovered, the actual thickness was within four millimeters of the SmartMelter Measurements.

Another successful blind trial was completed on a float line furnace when the glass line was lowered for hot repair. Eight measurements were taken with SmartMelter before the repair that were found to be within five millimeters of the actual AZS thickness.

Continued>>

