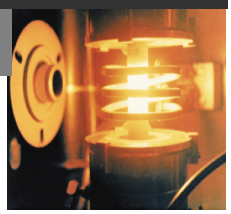


Lead Wire Sealing

Temperature Monitoring in the Production of Light Bulbs

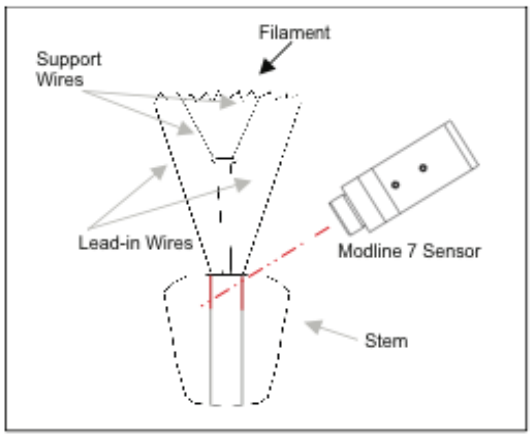
Q
Question

How can temperature be measured accurately during the sealing process of light bulb lead wires?

A
Answer

Situation Analysis

During the production process of incandescent light bulbs, both lead wires are pressed into the molten glass stem at temperatures about 1000°C (1832°F). This process is extremely temperature sensitive and accurate temperature measurement is critical to a stable process. The EU directive 2000/53/EG demands that lead-free glass must be used exclusively for the production of light bulbs with the consequence that the optimum process temperature range has been narrowed compared to the former lead glass production process.
Because of the small area that needs to be temperature controlled, placement of the sensor head and optical resolution must be carefully considered.



The inner structure of an incandescent light bulb. The vertical red lines mark the sealed wire.

IRCON®
Fluke Process Instruments

A

Answer

Solution and Improvements

The ideal solution for monitoring the melt down process of the lead-in wires is the Modline® 7, 77 Series pyrometer. The 5 µm spectral response of this sensor is capable of measuring the glass surface exclusively and not through the glass.

Optical resolution up to D/70 and a minimum spot size of 2.9 mm make the Modline 7 pyrometer ideally suited for measuring the small target in the lamp. With the help of through-the-lens sighting, sensor alignment is performed simply and precisely. The fast 10 msec response time provides the ideal solution for optimum process control.

For elevated ambient temperatures, a integral water cooling jacket provides an additional 35°C increase in operating capability over the standard uncooled sensors. For high ambient temperatures up to 2315°C (599°F), the WJ-7 Water-Cooled Housing would be required.

Ircon Product

Modline 7, 77 Series

Accessories

- SB-7 Swivel Base
- APA-7 Air Purge

Benefits

- Increased Productivity
- Improved Light Bulb Quality