



Application note

Maximizing PET bottle quality through precise preform temperature control

Sector

PET bottle blow molding –
Plastics

Application

Preform temperature
monitoring

Product

Exergen non-contact
Micro IRt/c sensors

PET bottle production demands a careful balance between high-speed output and consistent quality. Blow molding machines must produce bottles of various sizes and shapes while maintaining quality standards. The preform heating stage determines final bottle quality. Preforms rotate continuously through heating systems before entering the molding station, where pressurized air shapes them into bottles. Temperature control during this heating phase is critical to prevent defects.

Challenges

Temperature inconsistencies during preform heating create costly quality issues. Overheating causes holes in bottles, while insufficient heating results in incomplete extension. Uneven temperature distribution produces wall thickness variations. These defects lead to product rejection and increased waste. The preforms rotate continuously during heating, ruling out contact sensors. Ambient temperature near heaters fluctuates significantly, requiring sensors that maintain accuracy despite environmental changes. Machines operate 24/7, demanding reliable sensor solutions without downtime.



Solutions

Exergen Micro IRt/c sensors from CleverIR enable non-contact measurement of rotating preforms throughout the heating cycle. With response times between 25 and 100 milliseconds, they track temperature changes in real time without slowing production. The sensors feature patented ambient temperature compensation that ensures accurate readings despite fluctuating environmental conditions. Self-powered and hermetically sealed, these IRt/c sensors deliver consistent performance throughout their operational life without requiring calibration or maintenance.

Benefits

The sensors enable automatic correction of heating parameters based on continuous temperature monitoring, ensuring optimal quality at maximum production speed. Repeatability error of just 0.01°C (0.02°F) provides consistent measurements over years of operation, while interchangeability error of $\pm 1\%$ means replacement sensors deliver identical performance without reprogramming. This consistency extends across multiple production lines, ensuring uniform quality standards. The maintenance-free design eliminates service interruptions, supporting continuous 24/7 operation that maximizes throughput and profitability.



Fast-response IRt/c sensors prevent bottle defects by ensuring uniform preform heating, directly improving yield, reducing waste and cutting downtime.

Results

Integrating Exergen sensors optimizes blow molding operations across quality and efficiency metrics. Real-time temperature monitoring prevents defects before they occur, dramatically reducing rejection rates and scrap costs. Operators can safely push production speeds higher while maintaining quality standards, directly increasing output per machine. Consistent temperature control improves bottle wall thickness uniformity, enhancing product quality and customer satisfaction. The sensors' maintenance-free operation eliminates unplanned downtime,

keeping lines running continuously and protecting profit margins.

Conclusion

High-speed PET bottle production requires precise preform temperature control. Exergen infrared sensors provide the accuracy, speed and environmental stability needed to maximize quality while optimizing throughput. Their patented compensation technology and maintenance-free operation make them ideal for demanding 24/7 production environments where reliability cannot be compromised.