Trendsetting furnace visibility – all thanks to LAND

Glass furnaces remain among the most energy-intensive assets in industrial manufacturing, with performance governed by complex interactions between combustion, batch behaviour, heat transfer and refractory condition. Traditional point measurements and visual inspections offer limited visibility - leaving operators to balance energy consumption, emissions and glass quality largely through experience and manual adjustment. Here the Near Infrared Borescope (NIR-b) portfolio from LAND addresses this gap by delivering continuous, in-furnace thermal imaging that's specifically designed for harsh glass-making environments

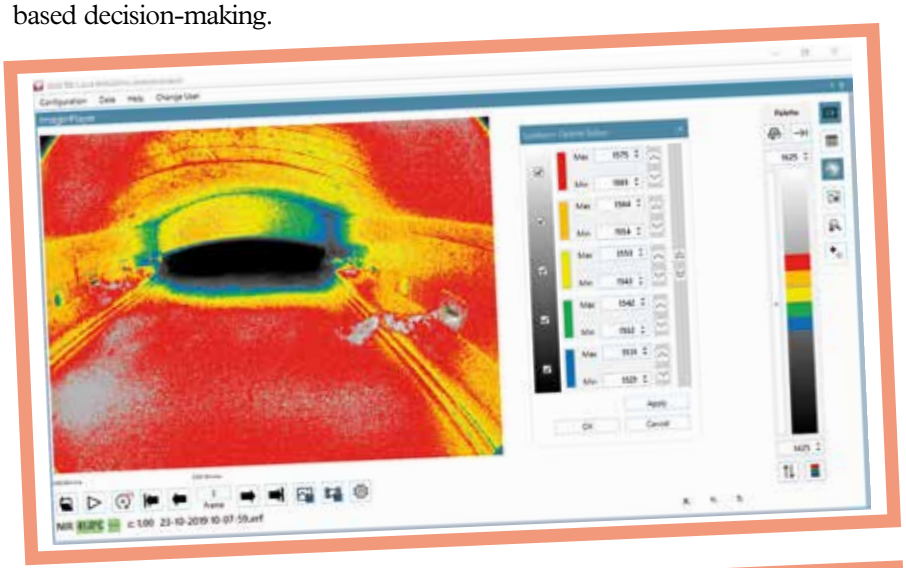
VISIBILITY

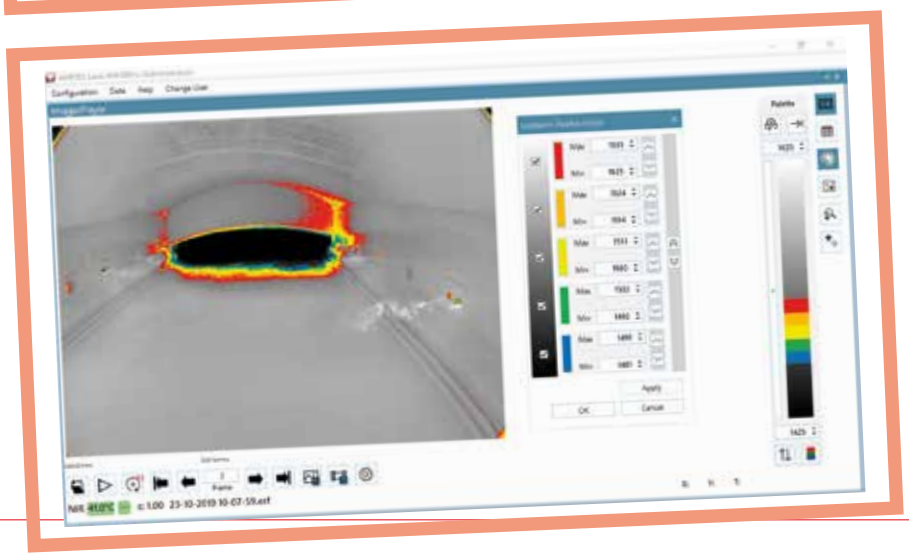
At the core of the system is the NIR-b-2K HD camera, which increases image resolution by an order of magnitude compared with earlier generations. With pixel-level thermal detail, operators can observe temperature gradients across the crown, sidewalls, regenerators, and batch blanket in real time. This higher definition is not cosmetic; it allows precise identification of hot spots, cold zones, flame impingement, and asymmetric heat transfer that directly affect melting efficiency and refractory life.

Thermal imaging supports the primary goals of melting: maintaining a stable temperature profile for consistent glass quality, minimising wall and stack losses, optimising combustion, and reducing overall fuel consumption. Unlike PID-controlled processes, most glass furnaces rely on manual control. NIR-b data provides the quantitative feedback needed to make informed adjustments, transforming subjective judgement into evidence-based decision-making.

CONTROL

Multiple visualisation modes enhance operational insight. Black-and-white palettes reveal air ingress and batch patterns, while rainbow isotherms segment hot and cold regions into defined temperature bands. Flame shape and intensity monitoring highlights





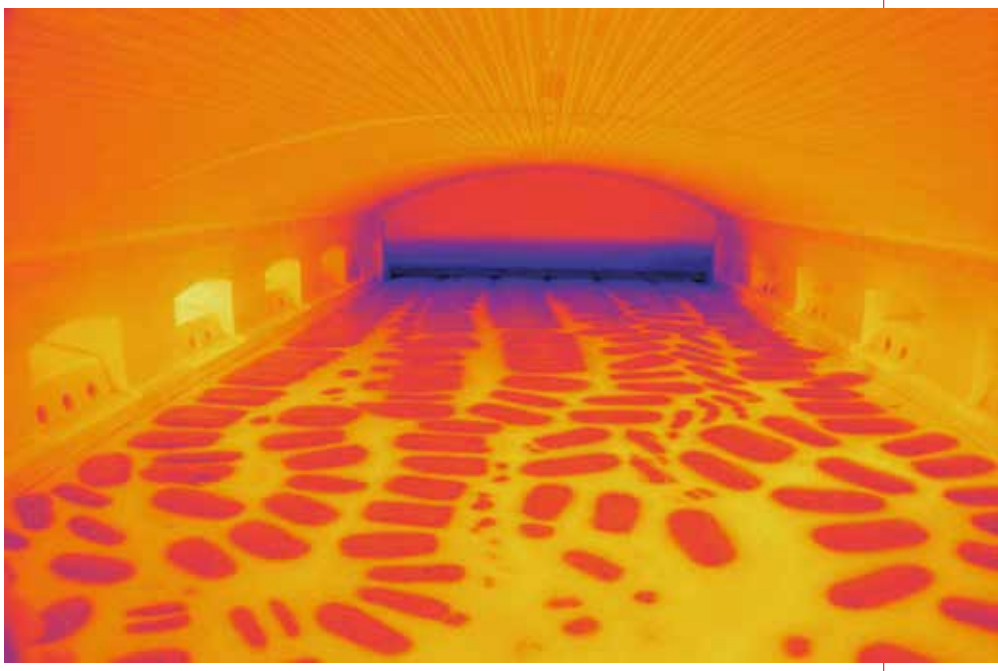
LAND introduces advanced near-infrared thermal imaging that enables glass manufacturers to visualise furnace behaviour with unprecedented clarity - all to link real-time temperature data, combustion dynamics and batch tracking to measurable gains in energy efficiency, emissions reduction, asset protection and day-to-day operational control across furnace types.

zones of incomplete combustion or excessive radiant loading, supporting emissions reduction strategies in both air-fuel and oxy-fuel furnaces. Continuous temperature trending across defined regions of interest enables monitoring of highest, average, or lowest temperatures depending on operational priorities.

For oxy-gas and hybrid furnaces, the benefits extend further. Thermal profiling combined with isotherms allows accurate batch line positioning, identification of burner block fouling or overheating, assessment of flame impact on refractories, and early detection of abnormal conditions requiring maintenance intervention. Survey mode configurations, supported by water-cooled probes and transportable kits, enable temporary inspections during heat-up, cool-down or troubleshooting phases without permanent installation.

INTELLIGENCE

Digitalisation is reinforced through ImagePro V2 Glass software, which introduces advanced analytics and user interfaces tailored to glass operations. Neural-network-based batch tracking, derived from modified U-Net semantic segmentation architectures, delivers pixel-level classification of batch coverage regardless of furnace design. Compared with traditional threshold-based methods, this approach improves accuracy and robustness, providing reliable batch line determination and enabling data exchange with SCADA systems via Modbus or OPC UA.



The result is a comprehensive thermal intelligence platform rather than a standalone camera. By combining continuous monitoring, AI-assisted analysis and optional AMECare advanced services such as thermal surveys, LAND supports combustion optimisation, predictive maintenance, quality traceability and extended asset life. The technology provides operators with a practical, data-driven way to balance energy efficiency, emissions compliance and stable glass production across small, medium and large furnaces. ■

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