

LAND

AMETEK®

USING THERMAL IMAGING TO REINFORCE PORTABLE TEMPERATURE MEASUREMENT FOR BETTER GLASS QUALITY AND ENERGY

There are many challenges facing operators in glass operations.

Within the glass-melt furnace, for instance, temperature measurements need to be taken in a variety of locations. Trends established by temperature measurements throughout the furnace are also important. These include:

- Crown temperature and port arch long-term temperature trending
- Temperature of the melt line and batch transit time re-ordering and comparison
- Temperature “visualisation” of cold spots in the refractory wall – indicative of air leaks caused by structural issues
- The impact of fluctuating temperatures on the process and the furnace itself



FURNACE MEASUREMENTS USING A PORTABLE PYROMETER

Typically, a portable infrared thermometer such as AMETEK Land's Cyclops C100L is used to take measurements inside the glass furnace – gauging the time of reversal intervals and determining if they are too long or too short.

The Cyclops C100L handheld pyrometer provides accurate temperature readings of molten glass from different positions around the tank. It is a calibrated and traceable instrument using the ISO 17025 standards provided by AMETEK Land's internal laboratories in the UK, India, or the US.

The operator flips open a viewing port on the side of the furnace, waits for a reversal when there is no flame, and measures the temperature of the port arch on the opposite side of the tank.

However, when a reversal occurs, the refractory surface temperature drops rapidly from the moment the flame stops. In general terms, if the operators are 10 seconds late taking the measurement, the temperature will read 10 °C less than it was at the point of reversal.

This brings the timeliness, accuracy and repeatability of the measurements into question.



CYCLOPS 100L

A premium quality, highly accurate hand-held instrument, the ergonomic, single-handed-use, non-contact thermometer provides easy, accurate, point-and-measure temperature readings.

Temperature range:
600 to 3000 °C (1112 to 5432 °F)

Spectral response:
1 µm with advanced spectral filtering

Response speed:
30 ms

Accuracy (uncertainty):
≤0.25% (K)

Repeatability:
≤1 °C (2 °F)



A NEW APPROACH FOR CLEANER FURNACES

As the world moves towards new fuels and new technology aimed at reducing emissions and carbon footprints, a new approach to design, monitoring and measurement is needed.

AMETEK Land's NIR-B-2K-Glass infrared borescope imaging camera produces high-definition thermal images with three million pixels. Accurate temperature measurements between 600 °C and 1800 °C (1112 °F and 3272 °F) can be made from any point in that image.

This provides several advantages compared with visual imaging and point temperature measurements. A permanently installed thermal imager can actively record all necessary and useful data, allowing the video to be stopped at any frame – measurements can be taken of all ports at exactly the same point in the process, allowing reversals to be tuned more accurately.

The imager can also rapidly detect the beginning of any structural damage caused by high temperatures. If a crack is developing in the refractory,

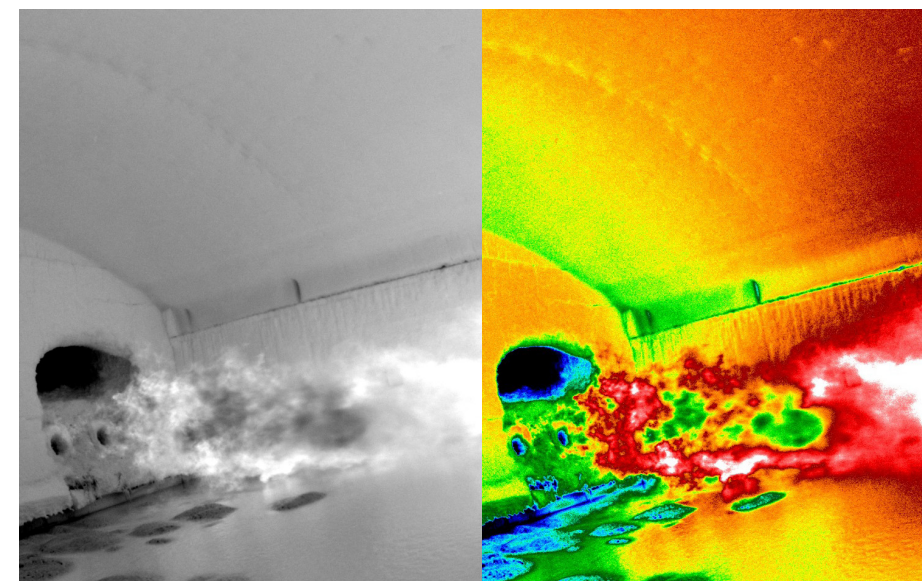
it may show up as a colder area where air is being pulled in.

The NIR-B-2K-Glass is highly effective for this monitoring application, as it accurately profiles the temperature of the entire furnace, requiring only a small opening in the furnace wall.

This gives the operator access to data which, previously, would have been either time-consuming or impossible to collect. The operator is free to focus on specific areas of interest, measure live data points and store the data for future analysis.

By monitoring the live thermal video, the operator can begin to increase melt-tank efficiency, improving product quality and reducing process costs.

In this way, thermal imaging can be used to monitor conditions inside the melt tank, maintaining high-quality glass production and extending the life of the furnace and reinforce the use of the Cyclops 100L.



Determining peak flames in an end fired furnace



NIR-B-2K-GLASS

A borescope thermal imaging camera specifically developed to return precise temperature measurements in glass furnace applications.

Temperature range:
1000 to 1800 °C (1832 to 3272 °F)

Spectral response:
1 µm (centre)

Accuracy (uncertainty):
1% of reading (K)

Repeatability:
1 K

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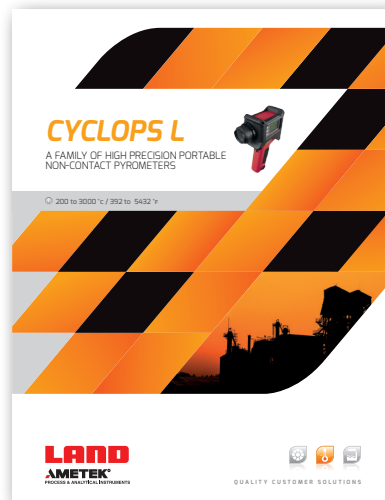
Our global service centres provide after-sales services to ensure you get the best performance from your system. This includes technical support, certification, calibration, commissioning, repairs, servicing, preventative maintenance and training. Our highly trained technicians/engineers can also attend your site to cover planned maintenance schedules and repair emergency breakdowns.

CYCLOPS L

A range of premium quality, highly accurate hand-held instruments, these ergonomic, single-handed-use, non-contact thermometers provide easy, accurate, point-and-measure temperature readings.



 **PORTABLE THERMOMETERS**

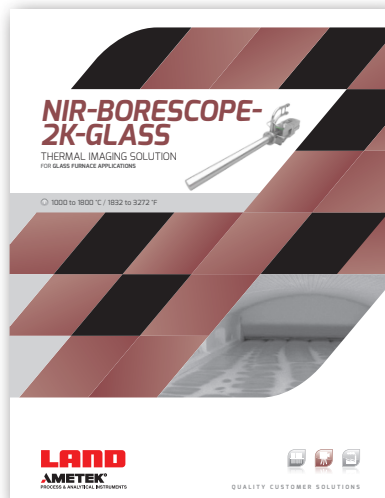


NIR-B-2K-Glass

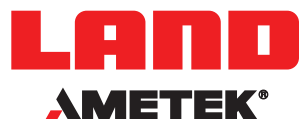
A borescope thermal imaging camera specifically developed to return precise temperature measurements in glass furnace applications.



 **FIXED THERMAL IMAGERS**



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MARCOMS_DOC-009

Using thermal imaging to reinforce portable temperature measurement for better glass quality and energy

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We are fully committed to Quality Assurance. See all our accreditations at AMETEK-LAND.COM/QUALITY

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