

CASE STUDY

THAI GLASS INCREASES PRODUCTION QUALITY OF GLASS MELT TANK WITH NIR-B-656-GLASS

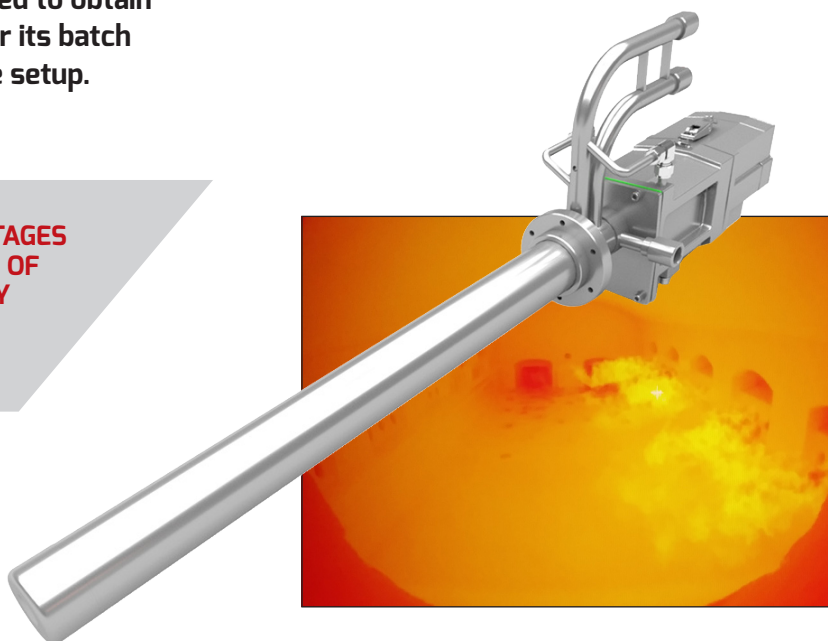
INTRODUCTION

Thai Glass, one of the leading glass producers in Thailand, is optimizing production quality after installing AMETEK Land's advanced thermal imaging technology.

In 2020 the company decided to optimize its production quality by acquiring a high-performance temperature monitoring system, AMETEK Land's NIR-Borescope-656-Glass (NIR-B-656-Glass) with auto-retraction and IMAGEPro-Glass software. The company replaced its traditional CCTV cameras in its glass melt tanks with AMETEK Land's advanced thermal imaging cameras, therefore introducing both visual and temperature measurement into its process control. Thai Glass wanted to obtain clearer resolution images to monitor its batch line/flow and improve the batch line setup.

ABOUT THAI GLASS

Thai Glass is one of the leading container glassware producers in Thailand, with a production capacity of 2,400 tons per day, serving both local and Southeast Asia regions. Over the years, it has expanded its business with a joint venture with Owen Illinois and the acquisition of glass manufacturers in Malaysia and Vietnam to provide high-quality production to serve local market demands.



"WE HAVE SEEN SIGNIFICANT ADVANTAGES OF USING NIR-B-656-GLASS IN TERMS OF PROCESS OPTIMIZATION AND QUALITY CONTROL."

THAI GLASS INCREASES PRODUCTION QUALITY OF GLASS MELT TANK WITH NIR-B-656-GLASS



NIR-B-656-GLASS Near Infrared Process Imaging For the Glass Industry 1000 to 1800 °C / 1832 to 3272 °F

HOW DOES IT WORK

The NIR-B-656-Glass thermal imaging solution is a short wavelength radiometric infrared borescope imaging camera designed to produce high-definition thermal images and provide accurate temperature measurements, in the range of 1000 °C to 1800 °C, from any of the temperature points in the image. It provides a true-temperature radiometric image, enabling live continuous temperature values to be obtained 24/7 from 324,064 pixels and resulting in a better understanding of product and furnace conditions and judgement in process decision making.

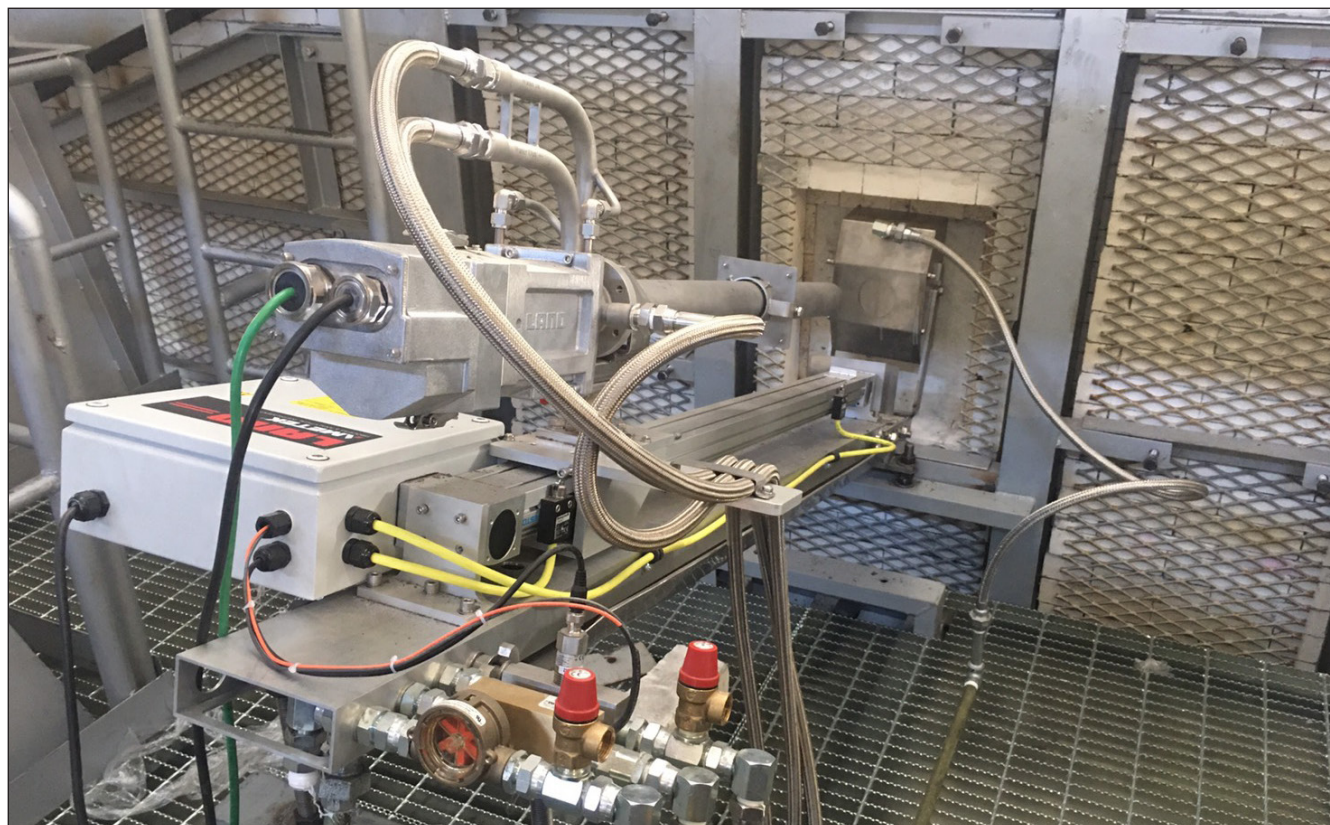
SOLUTION

The NIR-B-656-Glass thermal imaging camera installed into the melt tanks provides 24/7 monitoring, allowing a Thai Glass operator to view the melting of the batch and

the refractory conditions within the furnace. This enables accurate and repeatable temperature measurements for efficient control and optimization of glass manufacture and processing.

Using NIR-B-656-Glass, Thai Glass can now obtain a variety of temperature measurements in different locations and can trend measurements at important points, such as the crown, ports, and burner blocks. In addition, Thai Glass can also view cold spots in the refractories as a precaution against air leaks (air ingress) typically caused by structural issues or the condensation of volatiles.

As there is an inherent risk of damage to the burner blocks in the furnaces when condensation can start to deflect the flame and potentially damage the burner blocks, the over-temp alarm function of NIR-B-656-Glass means Thai Glass can look out for hot spots as well as continuous monitoring on the burners. By setting minimum or maximum temperature, the alarm function of NIR-B-656-Glass allows a snapshot to be taken of the whole image and stored for



NIR-B-656-Glass mounted on the Electrical Auto-Retract (AR) System

future analysis. An 'area' function of the software also enables multiple areas to be configured. Enhanced functionality brings the monitoring of the furnace performance to a whole new level.

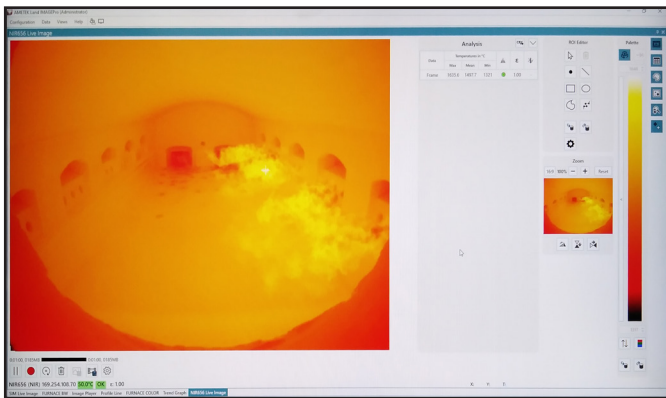
For Thai Glass, the most suitable location for installing the NIR-B-656-Glass was at the centreline of the furnace to provide a good field of view of the refractories, including crown, sidewalls, burner blocks and batch line.

OUTCOME

The IMAGEPro-Glass software has taken Thai Glass' understanding of glass furnace operations to a new level by allowing temperature measurements to be taken of the melt line, batch coverage and batch transit time for recording and comparison. AMETEK Land's software also enables points of temperature measurement to be exported to a furnace control system (DCS) and is designed to meet criteria of Industry 4.0 standards for fast digital data transfer.

BENEFITS

Thai Glass said: "We have seen significant advantages of using NIR-B-656-Glass in terms of process optimization and quality



NIR-B-656-Glass and IMAGEPro Software

control. The data we obtain from the IMAGEPro-Glass software is invaluable in enabling us to monitor batch flow closely and to ensure optimum efficiency in the operation of the melt tank."

AMETEK Land's Glass Sector Manager Philippe Kerbois explains: "It is great to hear that Thai Glass is reaping the benefits of using NIR-B-656-Glass in its melt tank. Glass producers are looking for more robust thermal imaging solutions which offer them so



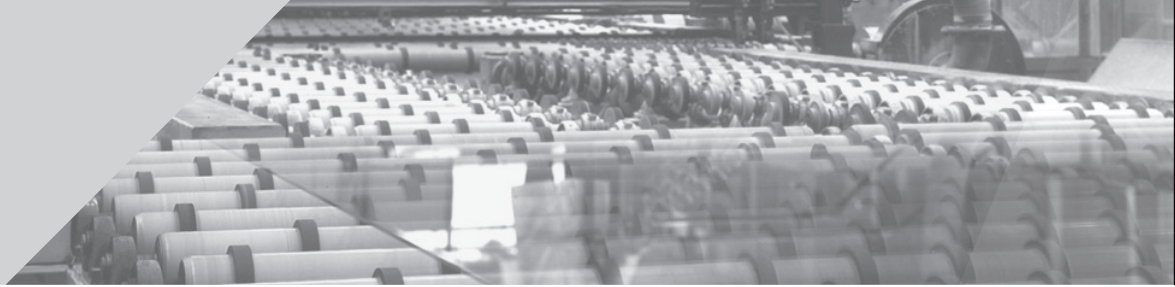
NIR-B-656-Glass System Installation

much more than just CCTV images. The wide functionality of NIR-B-656-Glass combined with the innovative software offers glass producers a truly unrivalled data-driven solution to the challenge of effective temperature measurement of glass melt tanks."

Glass furnaces are a highly aggressive environment, resulting in blurred images and inconsistent measurements by traditional CCTV cameras. However, in using NIR-B-656-Glass, a clear image is visible due to the high-quality lens. The equipment's auto-retract function provides additional protection from damage by overheating in the event of loss of water flow, air pressure, electricity supply or high borescope tip temperature alarm.

CONCLUSION

The result is that Thai Glass can now monitor its glass melt tank's production quality more effectively to ensure consistent temperatures and thermal profiles, which also helps extend the furnace's campaign life.



SPECIFICATIONS

NIR-B-656-GLASS CAMERA UNIT

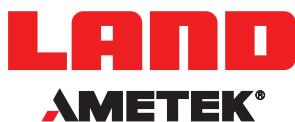
Measurement Range:	600 - 1000 °C / 1112 - 1832 °F 800 - 1400 °C / 1472 - 2552 °F 1000 - 1800 °C / 1832 - 3272 °F
Spectral Response:	0.78 to 1.1 µm
Frame Rate:	30 fps (Gigabit Ethernet)
Image Pixels:	656 x 494
Accuracy:	1%
Sealing:	IP65 / NEMA 4
Repeatability:	1 °C
Data Out:	Digital data over Gigabit Ethernet
Software:	Complete Land Image Processing Software (LIPS) package for Windows
Standard Accessories:	Power supply, cables, software, close up lenses, water cooled/purged mounting and tube
Field of View (Horizontal x Vertical):	44° x 33° or 90° x 67.5°
Instantaneous Field of View:	1.2 mrad (44°) / 2.4 mrad (90°)
Focus Range:	1000 mm to infinity
Probe Length:	305, 610 or 915 mm (12", 24" or 36")
Probe Diameter:	61 mm (2.4")
Mountings:	Choice of 3" ANSI 150 RF Flange & Gasket or PN16 DN80 Flange & Gasket with a 12" standpipe
Dimensions:	254 x 560 x 810 mm* (* or 1120 or 1420 mm) 10" x 22" x 32" ** (** or 44" or 56")
Power Rating:	24 V dc, 3 watts
Weight:	15 kg (for 24" variant)

POWER SUPPLY UNIT (PSU)



Components & Connections:	Power supply, Ethernet communications (switch), Fibre optic data connection (option)
IP Rating:	IP65 / NEMA 4
Size:	380 x 380 x 211 mm / 15" x 15" x 8.3"
Weight:	15 kg (33.07 lbs)
UL Approval:	Listed to UL508A & CSA-C22.2 No. File Number E499440

ELECTRICAL AUTO-RETRACT (AR) SYSTEM

Dimensions (Auto-Retract Mechanism & Borescope):	486 x 709 x 1900 mm/ 19 x 28 x 75 in
Weight (Auto-Retract Mechanism & Borescope):	95 kg / 223 lb
Dimensions (Control Box):	730 x 530 x 277 mm/ 30 x 22 x 11.5 in
Weight (Control Box):	28 kg / 61.7 lb



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