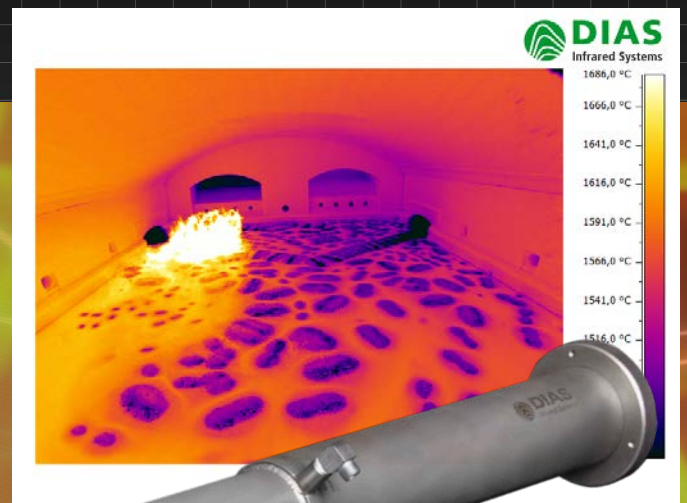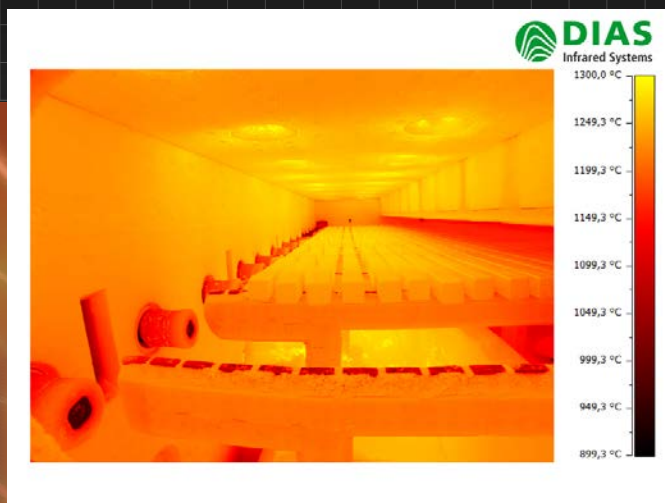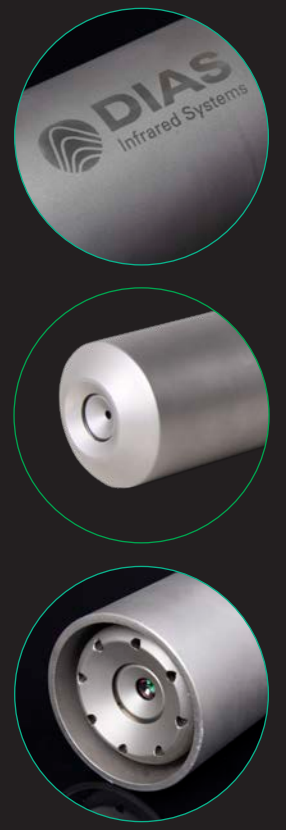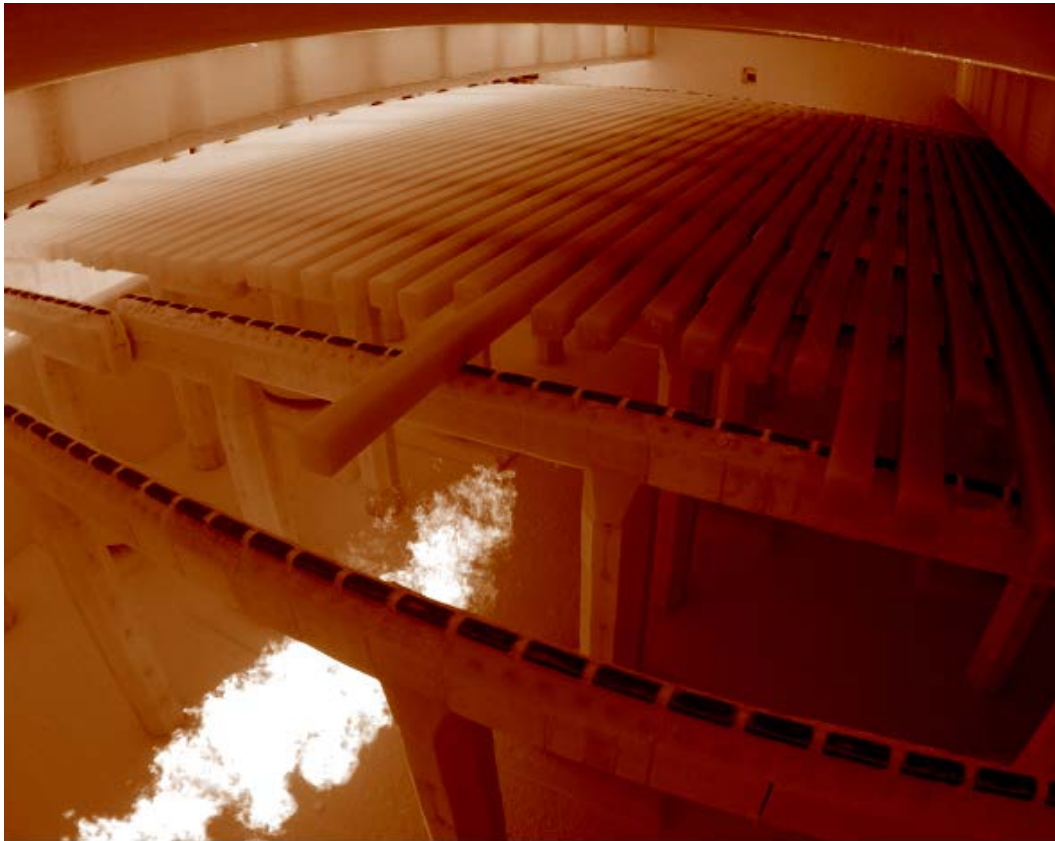# PYROINC

High-resolution NIR furnace cameras
for temperature measurement from
600 °C to 1800 °C
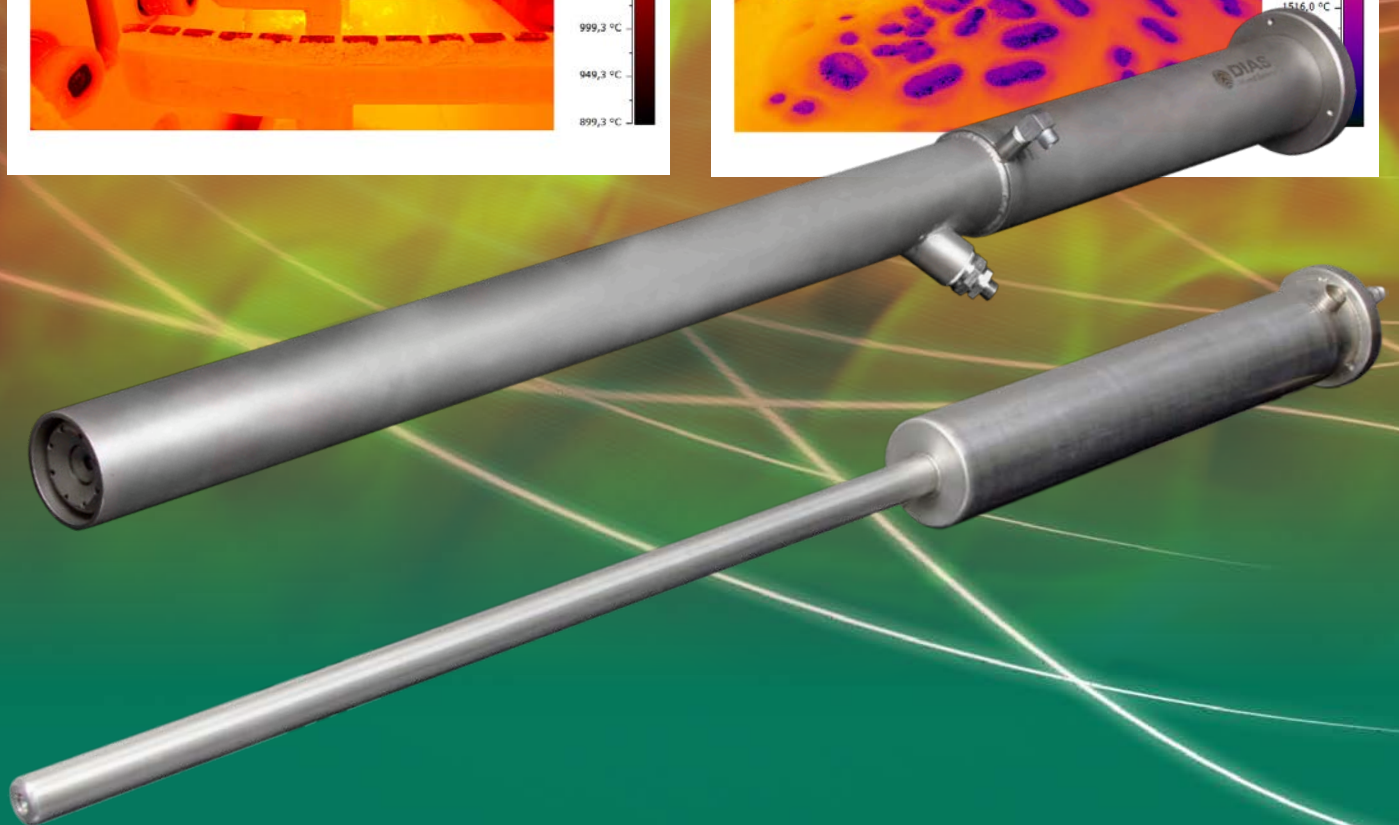
PYROINC
NIR furnace cameras for high temperature measurement

Description and application

The very robust thermal imaging camera series **PYROINC** contains several types of NIR cameras that work within a spectral range from 0.8 µm to 1.1 µm. They can measure in **real-time** high temperatures between **600 °C and 1800 °C**. The borescope optics of the infrared camera is protected by a sapphire window. The **stainless steel probe cooling jacket** of the camera is cooled with water or air. The camera variants PYROINC endoscope have probe cooling jacket with a particularly small diameter.

The probe cooling jacket can be pulled directly through the opening in the combustion chamber wall. The small entrance opening of the optics is **air purged.** Together with the **automatic retraction system** it is guaranteed that the system withstands the high temperatures and the specific requirements of the location. The front part of the the probe cooling jacket is able to resist temperatures up to 1800 °C with a **service life between 2 and 10 years** (depending on the operating conditions).

The **highly dynamic silicon-based image sensors used** enable **a large, continuous temperature measurement range** with a resolution of **768 × 576 pixels** or in the HD range with **1600 × 1200 pixels** or **1920 × 1080 pixels**.

The thermal images are transmitted in real-time via Ethernet for visualization and further processing of the measured values. Remote access is possible at any time thanks to the **camera's internal web server.** This makes it easy to carry out remote maintenance or retrieve thermography data and the current operating status.

Application examples
Glass industry:
Measurement of the temperature of the glass melt and for checking the lining of glass melting furnaces

Steel industry:
Monitoring the temperature during hardening and tempering in walking beam furnaces

Cement industry:
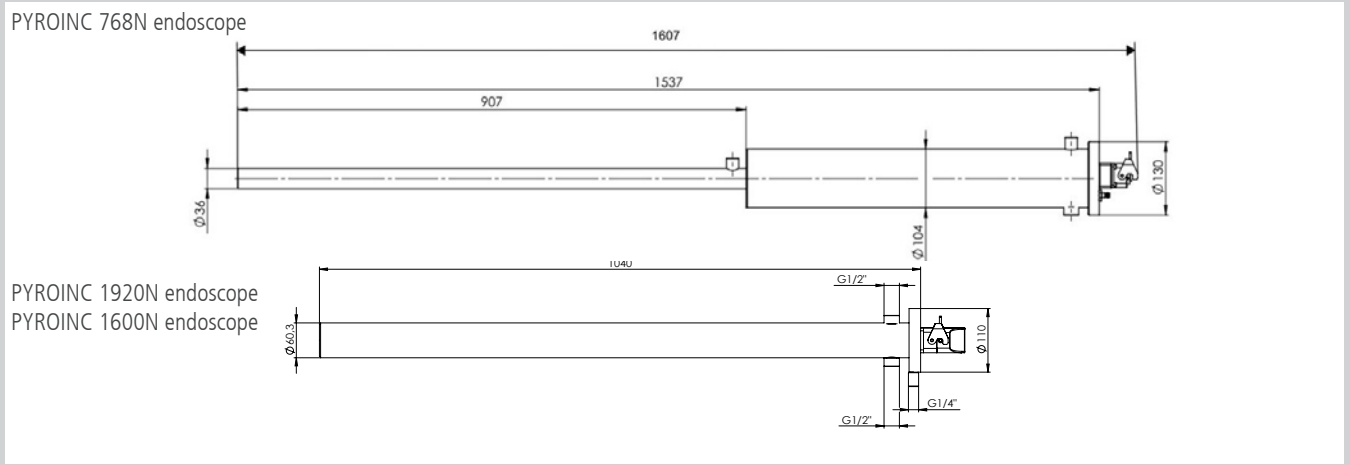Online temperature monitoring in the sintering zone to derive control variables for the burner control of rotary kilns

PYROINC
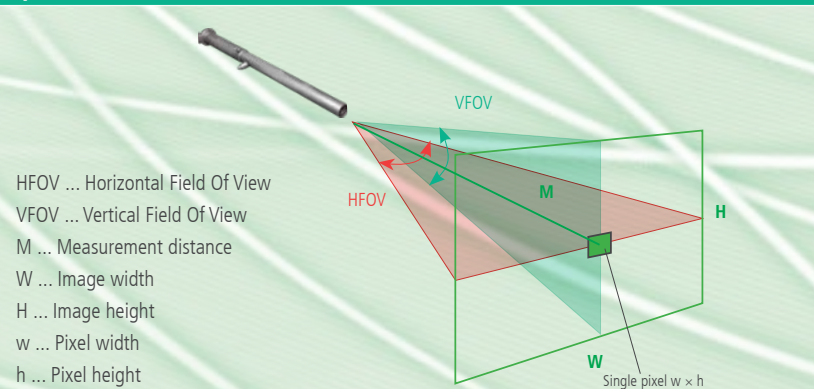## NIR furnace cameras for high temperature measurement

Technical data	768N	768N endoscope	1600N endoscope	1920N endoscope
Spectral range	0.8 µm to 1.1 µm	0.8 µm to 1.1 µm	0.8 µm to 0.9 µm	0,8 µm bis 0,9 µm
Measurement temperature range	600 °C to 1500 °C or 800 °C to 1800 °C	800 °C to 1800 °C	650 °C to 900 °C, 750 °C to 1100 °C, 850 °C to 1300 °C, 900 °C to 1400 °C, 950 °C to 1500 °C or 1100 °C to 1800 °C	650 °C to 900 °C, 750 °C to 1100 °C, 850 °C to 1300 °C, 900 °C to 1400 °C, 950 °C to 1500 °C or 1100 °C to 1800 °C
Sensor	uncooled 2D-Si-CMOS array 768 × 576 pixels	uncooled 2D-Si-CMOS array 768 × 576 pixels	uncooled 2D-Si-CMOS array 1600 × 1200 pixels	uncooled 2D-Si-CMOS array 1920 × 1080 pixels
Optics[1] — Opening angle	44° x 34°, 74° x 59°, 90° x 72°	74° x 59°	66° x 50°, 90° x 72° (optional with angled view 60°)	76° × 45°
Optics[1] — Meas. distance	from 1 m	from 1 m	from 1 m	from 1 m
Optics[1] — Motor focus	yes	yes	no	no
Measurement uncertainty [2]	2 % of measured value in °C	2 % of measured value in °C	2 % of measured value in °C	2 % of measured value in °C
NETD [3]	< 1 K (600 °C, 50 Hz)[4] or < 1.2 K (800 °C, 50 Hz)[4]	< 1.2 K (800 °C, 50 Hz)[4]	< 1.2 K (1700 °C, 25 Hz)[5]	< 1.2 K (1700 °C, 25 Hz)[5]
Measurement frequency	internal 50 Hz, selectable: 50 Hz, 25 Hz, 12,5 Hz, ...	internal 50 Hz, selectable: 50 Hz, 25 Hz, 12,5 Hz, ...	internal 25 Hz[6], selectable: 25 Hz, 15 Hz, 10 Hz, ...	internal 25 Hz[6], selectable: 25 Hz, 15 Hz, 10 Hz, ...
Einstellzeit	internal 40 ms, selectable: 2/Measurement frequency	internal 40 ms, selectable: 2/Measurement frequency	internal 80 ms, selectable: 2/Measurement frequency	internal 80 ms, selectable: 2/Measurement frequency
Interface	Ethernet (real-time, 50 Hz)	Ethernet (real-time, 50 Hz)	Ethernet (real-time, 25 Hz)	Ethernet (real-time, 25 Hz)
Connectors	HAN Modular (operating voltage, two digital inputs and outputs each, Ethernet)	HAN Modular (operating voltage, two digital inputs and outputs each, Ethernet)	HAN Modular (operating voltage, two digital inputs and outputs each, Ethernet)	
Weight	approx. 15 kg	approx. 10 kg	approx. 10 kg	approx. 10 kg
Power supply	12 V to 36 V DC, typical 7 to 10 VA	12 V to 36 V DC, typical 7 to 10 VA	12 V to 24 V DC, typical 3 VA	12 V to 24 V DC, typical 3 VA
Housing	Stainless steel housing, length 1040 mm, ⌀ 104 mm, water cooling	Stainless steel housing, length 1537 mm, ⌀ 36 mm, air or water cooling	Stainless steel housing, length 1040 mm, ⌀ 60,3 mm, water cooling	Stainless steel housing, length 1040 mm, ⌀ 60,3 mm, water cooling
Operating temperature of the camera module	−10 °C to 55 °C (inner device temperature)			
Storage conditions	−20 °C to 70 °C, max. 95 % relative humidity			
Software	PC control and display program PYROSOFT for Windows®, customized adjustments on request			

[1] Other on request. [2] Specifications for Black Body radiators and ambient temperature 25 °C. [3] Noise equivalent temperature difference. [4] ... or 0.15 % of measured value in °C, 50 Hz.
[5] ... or. < 4 K (1300 °C, 25 Hz), temperature measurement range 1100 °C to 1800 °C. [6] Maximum measurement frequency 15 Hz for measurement temperature range 650 °C to 1100 °C.

Dimensional drawing PYROINC endoscope

PYROINC 768N endoscope

PYROINC 1920N endoscope
PYROINC 1600N endoscope

Optics

HFOV ... Horizontal Field Of View
VFOV ... Vertical Field Of View
M ... Measurement distance
W ... Image width
H ... Image height
w ... Pixel width
h ... Pixel height

Single pixel w × h

| HFOV × VFOV	M [m]	B [m]	H [m]
44° × 34°	1	0.8	0.6
	10	7.9	5.9
66° × 50°	1	1.5	1.1
	10	15	11
74° × 59°	1	1.5	1.1
	10	15	11
76° × 45°	1	1.6	0.9
	10	16	9
90° × 72°	1	2	1.5
	10	20	15

PYROSOFT

Powerful online and offline software for DIAS infrared cameras

PYROSOFT Compact
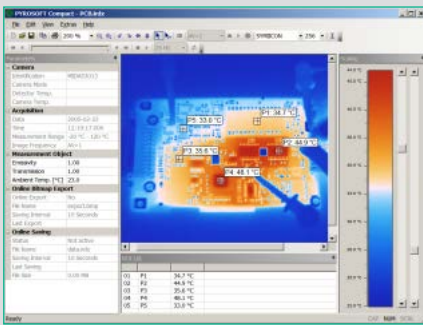
- Online data acquisition of one DIAS infrared camera
- Open and edit archived measured data and sequences
- Bitmap and video export
- Online data storage and online bitmap export
- Definition of regions of interests (ROI): points, lines and rectangle
- Generating of reports in Microsoft® Word format by integrated report function
- Context-sensitive help system (F1 key)
- Included in the scope of delivery of every PYROVIEW infrared camera

PYROSOFT Professional
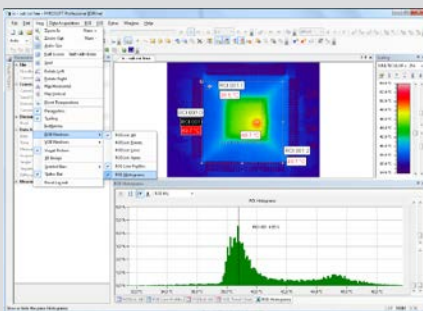
- Online data acquisition – Analyze, store and export data in real-time
- Open and edit archived measured data and sequences
- Multi document structure for several documents
- Bitmap, video and text export
- Definition of regions of interests (ROI) and values of interests (VOI) with alarm calculation, histogram and trend chart
- Numerous interface possibilities for processes (PROFIBUS, PROFINET, WAGO, TCP-Socket, Text IO)
- Reporting function, context-sensitive help system (F1 key)
- PYROSOFT Professional IO offers optionally a bidirectional data interface via PROFIBUS, PROFINET, WAGO, MODBUS, OPC, TCP Socket to process control systems, controllers and other applications

PYROSOFT Automation

DIAS has developed the software PYROSOFT Automation for the integration of infrared cameras in automation processes.
- Comfortable product management with free definable document templates
- Product choice and release control can be made manually or automatically
- Different user levels for operator, tool setter and administrator
- Functionality of PYROSOFT Professional for administrators
- Automatic logging of system messages, measured data and alarms
- Easy to use and configurable user interface for application in fabrication
- Learning functions for automatic adjustment of alarm threshold
- Offline viewer for belated data analysis
- Bidirectional data interface via PROFIBUS, PROFINET, WAGO, MODBUS, OPC, TCP Socket to process control systems, controllers and other applications

PYROSOFT DAQ
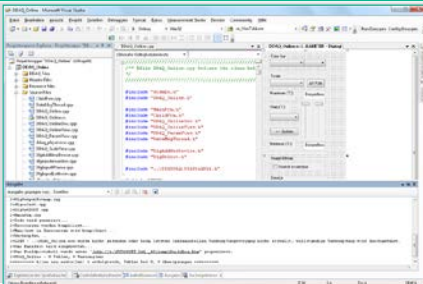
For users who want to make an integration into their software environment by themselves, we offer an own online and offline DLL interface for DIAS infrared cameras.
- API (DLL) for direct data access under Windows®
- Support for DIAS IRDX file format
- Setting of data acquisition parameters and object properties
- Query of temperature values and camera information
- Functions for displaying of images and palettes as bitmap
- Online and offline function

More software packages are available, for example:
PYROSOFT MultiCam (process software for monitoring up to 8 cameras), PYROSOFT CamZone (software for programming a stand-alone camera), application specific software like PYROSOFT FDS for DIAS fire detection systems.

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