

Thermal Imaging Systems

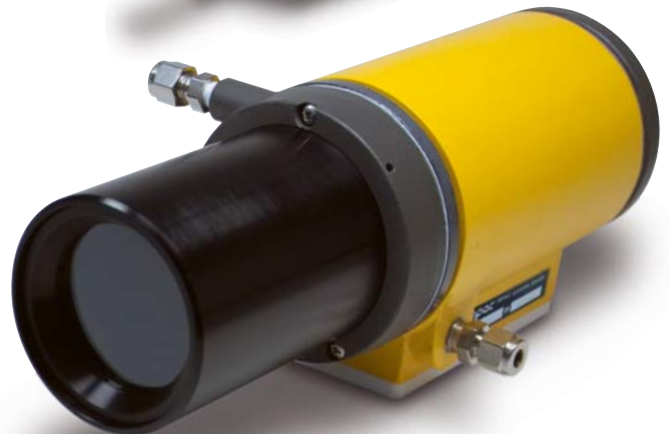
System Solutions for Industrial Applications

-20°C



3600°C

- ◆ Fixed Installation Line Cameras
- ◆ Fixed Installation Thermal Imagers
- ◆ Software
- ◆ Services

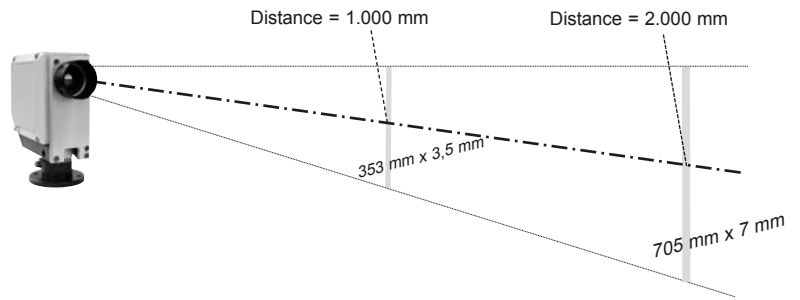


Fixed Installation Line Cameras

Our line cameras are fixed installation cameras designed for industrial use. Therefore, the cameras are built in robust housings – with options such as: air purging for lens cleaning, water-cooling system and fibre optic data transmission.

Depending on the model, the uncooled microbolometer array detects a line of 128 or 246 data points. If measuring a moving object the cameras display the temperature distribution of a surface in two dimensions.

The line cameras achieve very fast measuring rates between 128 lines per second (higher sensitivity) and 512 lines per second (higher measuring speed). This makes them suitable to a wide range of applications.

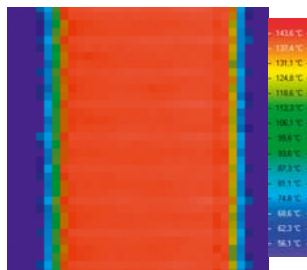


ILS 265 with FOV of 20° – different measurement lines (256 points) depending on measurement distances (approximation of values)

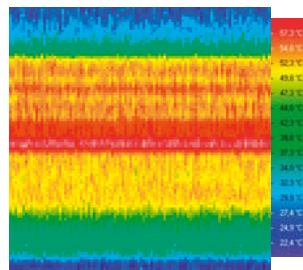
Typical applications of line cameras



Line camera ILN 128



Pic. 1



Pic. 2

Measurement on non-metal surfaces

Pic. 1: Temperature distribution of plastics on a calender roll.

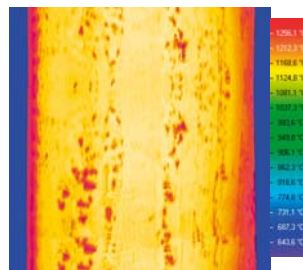
Pic. 2: Measurement of temperature in stress relieving of glass application.



Line camera ILS 256



Pic. 1



Pic. 2

Measurement on metal surfaces

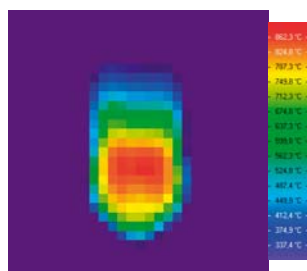
Measurement of temperature distribution on a steel slab before rolling.

Pic. 1: Visual picture

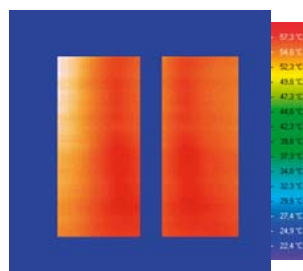
Pic. 2: Thermal picture



Line camera ILN 128/5



Pic. 1



Pic. 2

Measurement on glass surfaces

Pic. 1: Temperature distribution in the production process of filament bulbs.

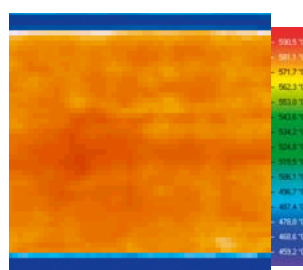
Pic. 2: Measurement of temperature in the production process of glass plates.



Line camera ILPE 128



Pic. 1



Pic. 2

Measurement of special applications

Measurement of temperature distribution of a rotary kiln mantel.

Pic. 1: Visual picture

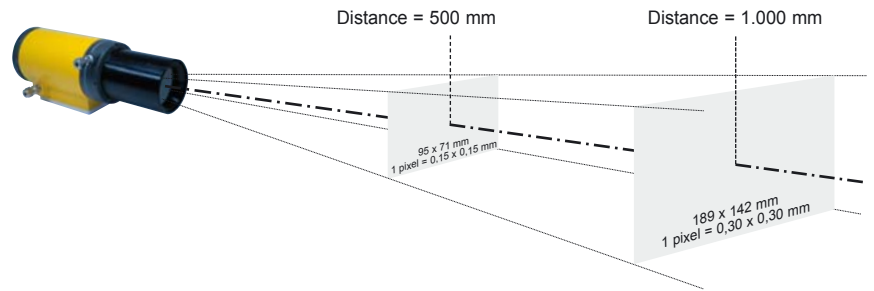
Pic. 2: Thermal picture

Fixed Installation Thermal Imagers

Our thermal imagers are fixed installation cameras, designed for long-term use in industrial plants for process and quality control.

The thermal imagers are suitable for the measurement of many different materials in temperature ranges between -20 and 3600°C. If required the cameras can be equipped with systems for lens purging and water-cooling.

Depending on the model, the imagers detect the surface temperature of an object with 76,800 or 307,200 pixels and achieve measurement rates between 30 and 60 frames per second.

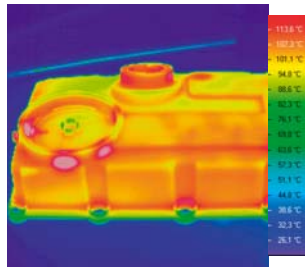


IVS 9103 with FOV of 10,8° x 8,1° – different measurement fields depending on distance (approximation of values).

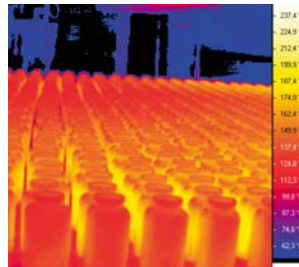
Typical applications of thermal imagers



Thermal imager IVN 3200



Pic. 1



Pic. 2

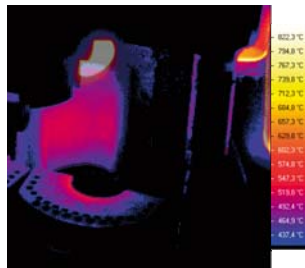
Measurement on non-metal surfaces

Pic. 1: Temperature distribution of a plastic injection moulding part.

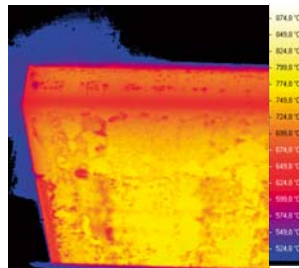
Pic. 2: Measurement of temperature in stress relieving of glass application.



Thermal imager IVGA 7900



Pic. 1



Pic. 2

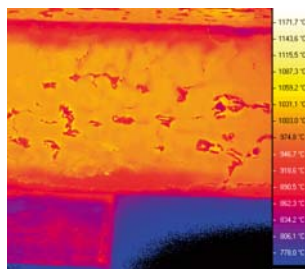
Measurement on metal surfaces

Pic. 1: Measurement of mould temperature for glass forming.

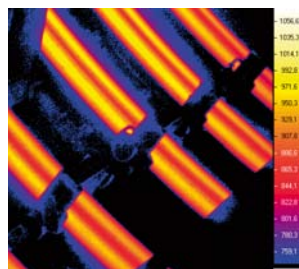
Pic. 2: Temperature distribution on steel slab.



Thermal imager IVS 9103



Pic. 1



Pic. 2

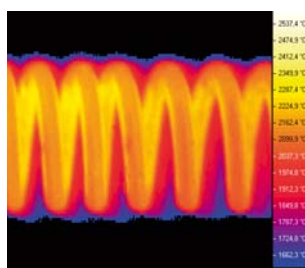
Measurement on metal surfaces

Pic. 1: Temperature measurement before forging in order to control and optimise process.

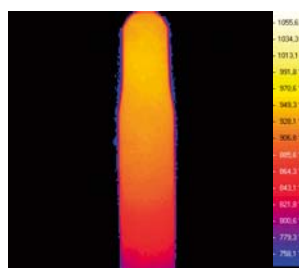
Pic. 2: Measurement of temperature on continuous casting (avoidance of material damage).



Thermal imager IVS 9104 for development and laboratory use



Pic. 1



Pic. 2

Measurement on metal surfaces

Pic. 1: Monitoring of temperature distribution of a bulb filament coil.

Pic. 2: Measurement of temperature on a heater plug.

Specifications of Line Cameras

	ILN 128	ILN 256	ILN 128-L	ILN 128-H	ILN 256-H
Type	ILN 128	ILN 256	ILN 128-L	ILN 128-H	ILN 256-H
Feature	Line camera for measurements on non-metal surfaces	Line camera for measurements on non-metal surfaces	Line camera with higher sensitivity for measurements on non-metal surfaces	Line camera with higher measuring speed for measurements on non-metal surfaces	Line camera with higher measuring speed for measurements on non-metal surfaces
Measurement range	0 ... 80°C or 50 ... 500°C	50 ... 550°C	0 ... 80°C	0 ... 80°C or 50 ... 500°C	100 ... 800°C
Spectral range	8 ... 14 µm	8 ... 14 µm	8 ... 14 µm	8 ... 14 µm	8 ... 14 µm
Data points	128 x 1	256 x 1	128 x 1	128 x 1	256 x 1
Field of view	40° option: 56°	40° option: 56°	40° option: 56°	40° option: 56°	40° option: 56°
Frame rate	256 Hz	256 Hz	128 Hz	512 Hz	512 Hz

	ILS 128 / ILS 256	ILN 128/5	ILN 256/5	ILPE 128	ILPE 256
Type	ILS 128 / ILS 256	ILN 128/5	ILN 256/5	ILPE 128	ILPE 256
Feature	Line camera for measurements on metal surfaces	Line camera for measurements on glass surfaces	Line camera for measurements on glass surfaces	Line camera for measurements of special applications e.g. metal and ceramics from 200°C	Line camera for measurements of special applications e.g. metal and ceramics from 450°C
Measurement range	600 ... 1300°C	250 ... 800°C or 450 ... 1250°C	450 ... 1250°C	200 ... 800°C or 450 ... 1250°C	450 ... 1250°C
Spectral range	1,4 ... 1,8 µm	4,8 ... 5,2 µm	4,8 ... 5,2 µm	3 ... 5 µm	3 ... 5 µm
Data points	128 / 256 x 1	128 x 1	256 x 1	128 x 1	256 x 1
Field of view	60° option: 40° / 20°	60° option: 40°	60° option: 40°	60° option: 40°	60° option: 40°
Frame rate	256 Hz	256 Hz	256 Hz	256 Hz	256 Hz

Specifications of Thermal Imagers

	IVN 3200	IVN 3200/5	IVPE 3200	IVN 3200/39
Type	IVN 3200	IVN 3200/5	IVPE 3200	IVN 3200/39
Feature	Thermal imager for measurements on non-metal surfaces	Thermal imager for measurements on glass surfaces	Thermal imager for measurements of special applications e.g. metal and ceramics from 100°C	Thermal imager for measurements in flame heated furnaces (through flames and hot gases)
Measurement range	-20 ... 500°C or -20 ... 900°C	200 ... 500°C or 400 ... 1250°C	100 ... 500°C	600 ... 1250°C
Spectral range	8 ... 14 µm	4,8 ... 5,2 µm	3 ... 5 µm	Narrow band at 3,9 µm
Data points	320 x 240	320 x 240	320 x 240	320 x 240
Field of view	29° x 22° (further options)	32° x 24°	32° x 24°	32° x 24°
Frame rate	50 Hz	50 Hz	50 Hz	50 Hz

	IVGA 7900	IVS 9103	IVS 9104
Type	IVGA 7900	IVS 9103	IVS 9104
Feature	Thermal imager for measurements of metal in lower temperature ranges	Thermal imager for measurements on metal surfaces	Special version of thermal imager IVS 9103 for development and laboratory use
Measurement range	Ranges between 300 ... 2500°C	Ranges between 600 ... 3600°C	6 switchable ranges between 600 ... 3600°C
Spectral range	Narrow band at 1,5 µm	Narrow band at 1 µm	Narrow band at 1 µm
Data points	320 x 240	640 x 480	640 x 480
Field of view	16° x 12° (further options)	10,8° x 8,1° (further options)	10,8° x 8,1° (further options)
Frame rate	30 Hz	60 Hz	60 Hz

Software

IMPAC systems develops software, based on standardised software elements, which is then customised to suit specific applications. Therefore, the measuring system (one or more thermal imaging cameras, as well as software) can be easily integrated into the customers facility – for example to control and monitor production processes.

The online-software *RTV Analyser RT* enables the system to monitor, analyse and document temperature measurements in real-time. The thermal images and sequences can also be analysed in an offline-mode and saved as standard formats on a PC.

Additionally, it is possible to analyse the thermal data on other PC's. To achieve this, IMPAC systems offers the *RTV Analyser* software, which has the off-line functionality of the *RTV Analyser RT*, i.e. to analyse images and sequences in detail.

Specification of the online software *RTV Analyser RT*

Image analysis

- ◆ Temperature display (°C, °F, K), auto temperature range
- ◆ Horizontal and vertical temperature distribution
- ◆ Temperature data: minimum, maximum, average
- ◆ 3-D profile
- ◆ Filter
- ◆ Zoom (1:1 up to 1:8)
- ◆ Real-time analysis
- ◆ Replay of sequences at 3 different rates

Regions of Interest (ROIs)

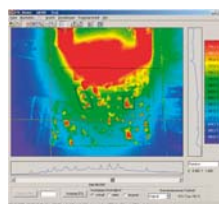
- ◆ Multiple ROIs of different shapes (line, rectangle, polygon, hotspot etc.)
- ◆ Trigger and alarm function (I/O module via TCP/IP)
- ◆ Auto temperature range
- ◆ Line profile graph
- ◆ Trends: minimum, maximum, average

Image processing

- ◆ Load and save thermal images and sequences
- ◆ Shorten sequences
- ◆ Export to standard formats (pictures) and .avi (sequences)
- ◆ Export as ASCII code
- ◆ Reporting function (individual adjustment of reports)

Further specification

- ◆ Access protection (password)
- ◆ Manual or automatic control of camera
- ◆ Interconnection of several cameras
- ◆ Monitoring of internal temperature of camera
- ◆ Language version: German, English, French (others on request)
- ◆ Compatibility to Windows™ 2000 and Windows™ XP



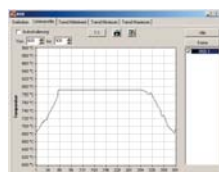
Thermal images and sequences

Online monitoring and analysis of particular thermal images and sequences; the thermal images can be saved in standard formats, the sequences as .avi.



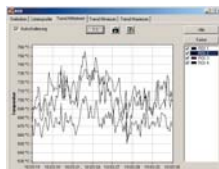
Regions of Interest (ROIs)

Analysis of temperature distribution of thermal images or sequences in specific areas (ROIs); there is also the possibility of mathematical combination of several ROIs.



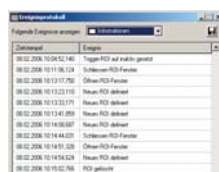
Line profile graph

Analysis of ROIs in different shapes, e.g. in lines; the data can also be exported as ASCII code for further analysis.



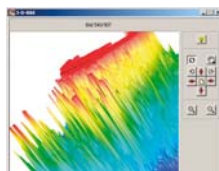
Trends

Display of temperature over time for all defined ROI-areas (min, max, avg); the data can also be exported as ASCII code for further analysis.



Protocoll

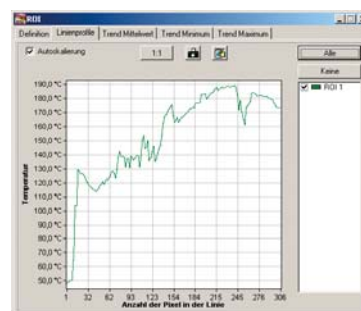
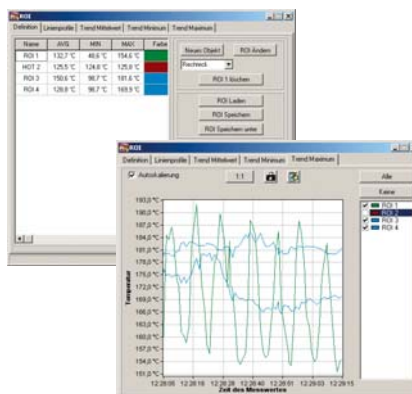
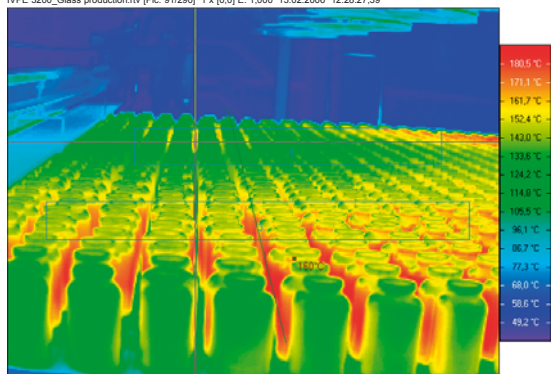
Documentation of events (information, warning, error) with time stamp.



3D Presentation

Display of temperature distribution in a 3-D picture.

IVPE 3200_Glass production.rtv [Pic: 91/290] 1 x [0.0] E: 1.000 13.02.2006 12:28:27,39



Possibility of monitoring and controlling temperature in glass production (glass stress relieving).

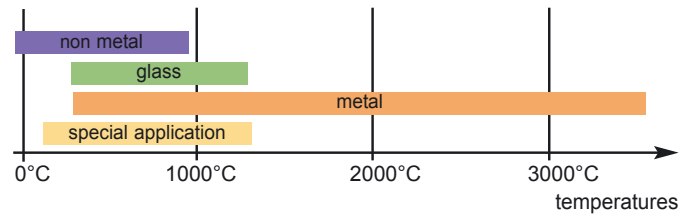
Selection of suitable line camera and thermal imager

Every object radiates infrared waves in a broad spectral range. Line cameras and thermal imagers use this radiation for non-contact temperature measurement. Depending, e.g. on the material or the temperature range of application, the cameras operate in particular spectral ranges or narrow bands. IMPAC systems can offer a solution for most applications.

For example:

8 ... 14 μm	general applications on non-metal surfaces
4,8 ... 5,2 μm	glass surface measurement
1,4 ... 1,8	measurement on metal surfaces
3 ... 5 μm	special applications in the range of 3...5 μm

To help you, different colours are used to identify the most suitable IMPAC systems line camera and thermal imager for your specific application and measurement range. Please see illustration.



Different measurement ranges of thermal imaging cameras.

Services

In many industrial areas temperature is one of the most critical factors. By maintaining the correct temperature it is possible to achieve an undisturbed production process and high product quality, as well as avoiding unnecessary costs. In recent years, non-contact temperature measurement by thermal imaging systems particularly, has been proven to increase process stability.

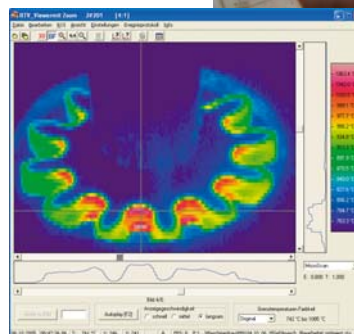
IMPAC systems is a subsidiary company of IMPAC Infrared GmbH. For over 45 years, IMPAC has been the partner to many companies in all fields of non-contact temperature measurement using infrared radiation. IMPAC provides system solutions, industry solutions and solutions for specific applications to suit individual requirements.

Due to our extensive experience you benefit from the consistent high quality, reliability and the attractive price-value ratio of all IMPAC products.

We are your competent partners in refining thermal imaging systems to match your specific application. Complete solutions offer several advantages in monitoring, analysing and documenting temperature distribution. The digital data obtained can be directly integrated in your production process.

If you have questions regarding the application of thermal imaging systems in your process do not hesitate to contact us. Our experienced staff will answer your questions and provide individually tailored solutions. With your cooperation, we analyse and optimise your processes and measuring tasks.

Additional information such as data sheets, application brochures and news etc. can be found on our web page or contact us directly at IMPAC.



Laboratory arrangement at a customer of IMPAC systems. By analysing the temperature distribution the induction hardening process is optimised.

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