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TEMPERATURE MEASUREMENT SPECIALISTS

APPLICATION NOTE

Metal-industry

TEMPERATURE MONITORING IN THE METAL CASTING PROCESS

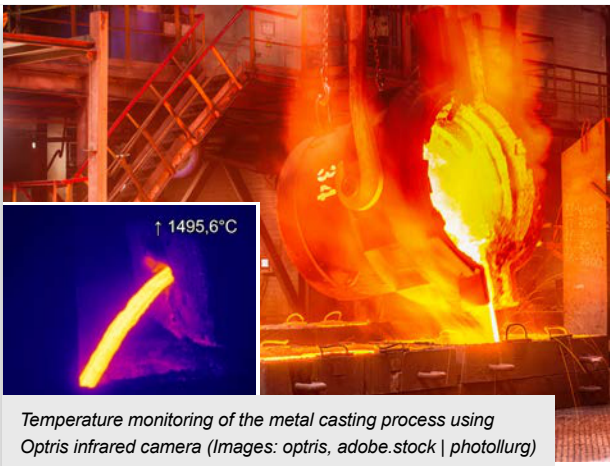
Process control by the compact optris PI 05M IR camera

Metal casting | High temperature process | Quality control

Application request

During metal casting, the liquid material is poured into a mould, which, after solidification, becomes a solid body. Both too high and too low casting temperatures can lead to quality defects. If the temperature of the liquid metal is too low, it may cool down too quickly in the mould and stop melting. As a result, it is not completely filled. Too hot casting, in turn, promotes gas porosity in the cast part and also delays the solidification process. This can lead to grain coarsening in the microstructure.

Temperature monitoring of the liquid casting material is therefore indispensable for quality assurance.



Temperature monitoring of the metal casting process using Optris infrared camera (Images: optris, adobe.stock | photollurg)

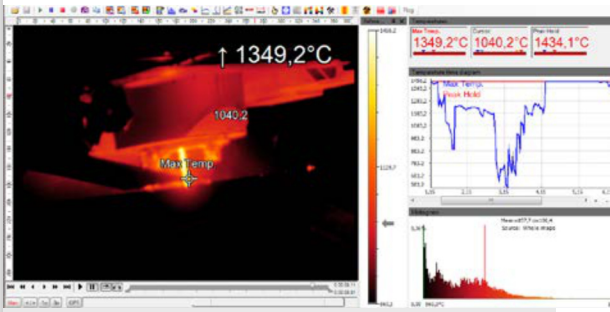
Solution from Optris - Infrared temperature monitoring

With the help of Optris infrared cameras, the casting process can be monitored. Both the temperature of the liquid metal and that of the mould are constantly monitored so that the quality-critical cooling phase can be influenced.

The compact thermal imaging camera optris PI 05M is primarily used for this purpose. Due to the spectral range as well as the continuous measuring range from 900 to 2450 °C, it is especially suitable for the temperature measurement of molten metals.

Details:

- Resolution:
  - 764 × 480 pixels @ 32 Hz
  - 382 × 288 pixels @ 80 Hz
  - 72 × 56 pixels @ 1 kHz
- Thermal sensitivity:
  - < 2 K (< 1400 °C)
  - < 4 K (< 2100 °C)
- Temperature range: 900–2450 °C
- Spectral range: 500–540 nm
- Ambient temperature: 0–50 °C
- System accuracy (at ambient temperature 23 ±5 °C):
  - ±1 % of measured value for 27/32/80 Hz/ for object temperature < 2000 °C
- Degree of protection: IP67



User interface of optris PIX Connect software during temperature monitoring (Image: optris)

Further advantages

The compact Optris PI 05M and PI 1M infrared cameras have been specifically designed for metal industry applications. The short wavelength PI 05M is ideal for measuring molten metals in the casting process, as the new spectral range of 500 nm provides more accurate measurement with changing emissivities and is less sensitive to atmospheric influences. The optris PI 1M is mainly used in metal processing. Here it is used e.g. for temperature monitoring during hardening, forming and welding of metals.

Optimal for applications in the metal industry

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