

APPLICATION NOTE



Metal-industry

TEMPERATURE MONITORING DURING ARC WELDING

Process control by the compact optris PI 1M IR camera

Application request

In arc welding, two materials are melted locally via an arc. The resulting joint melt solidifies and the components are joined. If, e.g. due to impurities, the molten mass of the two components does not bond, a stable connection cannot be made. This can be seen by comparing the temperatures of both sides of the weld in the thermal image.

Furthermore, the size and position of the heat-affected zone (HAZ) can be estimated from the thermal image. This is necessary because beading and flanging is not possible in this area.

Solution from Optris - Infrared temperature monitoring

The Optris infrared cameras are used to control the temperature of the edges of the workpieces and the process. The thermal imaging cameras detect whether the temperature is correct and the joining of the materials is taking place.

The heat-affected zone at the weld is always measured. For quality assurance, the compact and short-wave thermal imaging camera optris PI 1M is primarily used, which is particularly suitable for temperature measurements on metals.

Details:

- Resolution:
 - 764 × 480 pixels @ 32 Hz
 - 382 × 288 pixels @ 80 Hz
 - 72 × 56 pixels @ 1 kHz
- Thermal sensitivity:
 - < 2 K (< 900 °C)
 - < 4 K (< 1400 °C)
- Temperature range: 450–1800 °C
- Spectral range: 0.85–1,1 μm
- Ambient temperature: 5–50 °C
- System accuracy (at ambient temperature 23 ± 5 °C):
 - ± 2 % vof measured value for 27/32/80 Hz/ for object temperature > 1600 °C
- Degree of protection: IP67

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.

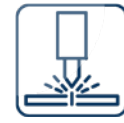
The optris PI 1M is mainly used in metal processing. Here it is used e.g. for temperature monitoring during hardening, forming and welding of metals.

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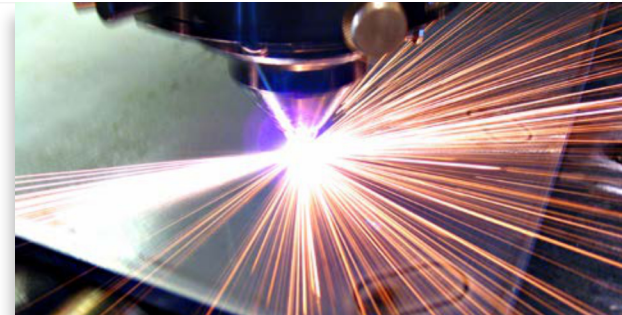
Welding application



High temperature process



Quality control



Monitoring of the welding process

(Image: adobe.stock | photlook)



The installed PI 1M monitors the process for quality assurance

(Image: Optris/ adobe.stock | Kadmy)



Optimal for applications in the metal industry