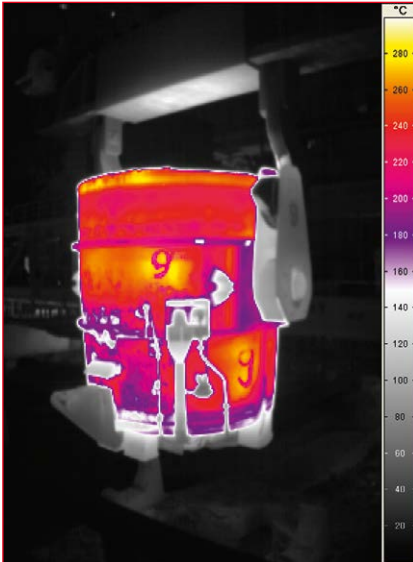


Ladle Hot Spot Detection

Thermography-based Ladle Monitoring System

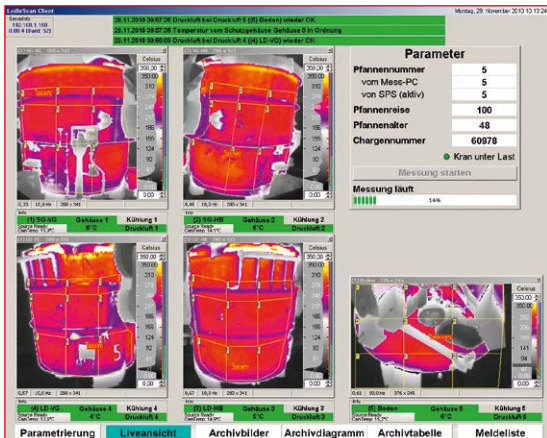
System Description



The Ladle Hot Spot Detection (LHSD) system uses Infrared (IR) technology to monitor the temperature of the ladle steel structure. Five thermography cameras observe the ladles while they are moved with the crane to the casting. The temperature measurements are made fully automatically without the need of any manual interaction. Optionally the ladle number can be recognised from characters on their surface. LHSD automatically raises the alarm if an adjustable temperature threshold is overrun. This reliably prevents dangerous and loss-making breakouts of liquid steel.

LHSD automatically tracks the temperature development of all ladles in circulation. This allows to maximize the ladle refractory lifetime without cutback of security and helps to save remarkable costs. LHSD comes with highly reliable components in a flexible structure and thus is easily adoptable to the different situations and operational modes in steel plants.

System Features



- Full automatic operation without stopping the crane
- Reliable alarm release at defined pre- and main alarm limits
- Temperature trend recording and analysis for all ladles
- Customised system alignment and adjustment
- Main window allows parameterisation, supervision, operation, display, evaluation and playback
- Decentralised monitoring of system status and measured values
- Recall of all recorded data for comparison and optimisation
- Easy to operate data presentation in the steel plant network
- Remote access available

Benefits of the LHSD System

- Complete automatic thermographic temperature screening of the outer shell of all ladles in circulation
- Early detection of hotspots let keep you the close control of the refractory lining of your entire ladle fleet
- Secure protection against ladle breakouts saves life, investments and long term operating ability of your shop
- Optimisation of your ladle fleet deployment improves the quality and saves time and energy
- Prolongation of the ladle refractory lifetime without cutback of security
- Flexible structure for customised adoption to your operational modes
- Return on investment within less than a year

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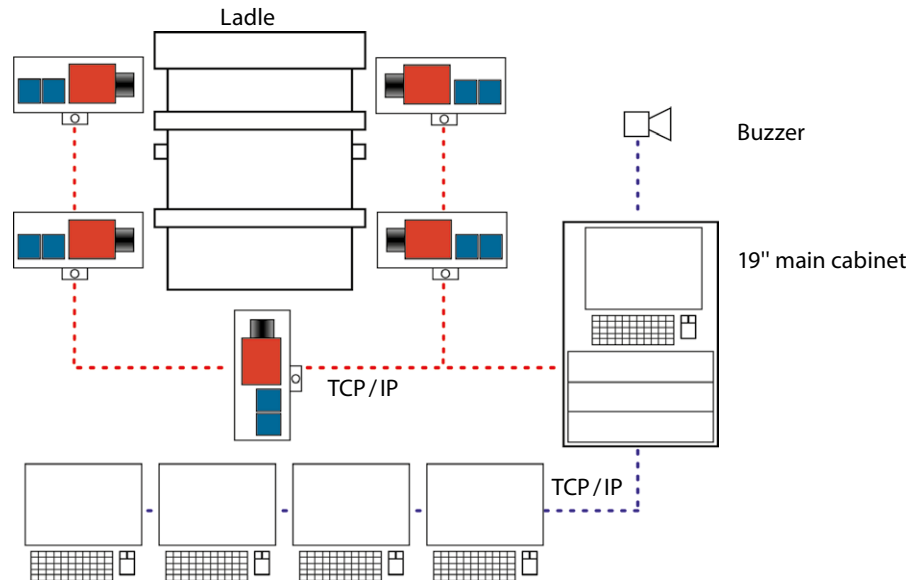
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Ladle Hot Spot Detection

Thermography-based Ladle Monitoring System

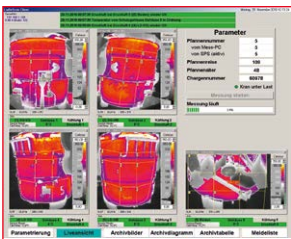
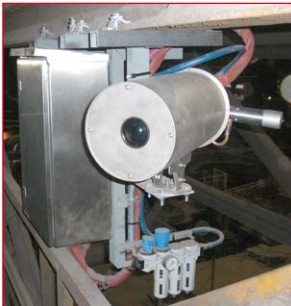
System Structure

IR cameras built in protective housing with junction box



Parameterisation, supervision, operation, display, evaluation and playback on standard PC at different sites (user-level dependent)

Construction / Design



- Reliable 19"- industrial standard main cabinet
- Protective housing made of stainless steel with air purge and Vortex-cooling designed to withstand the harsh environmental conditions in a steel plant
- VarioCAM® hr head IR camera with (384 × 288) IR pixels guarantees long term exact and reliable temperature measurements
- Nearly maintenance-free, no wearing parts
- Decentralised installable components (IR-cameras, PC, alarm unit); fibre optic cable for interference-free data transmission
- TCP/IP based flexible structure allows customised adoption to the specific steel plant situation
- Easy to use LHSD software allows flexible customisation

