



APPLICATION REPORT Iron, Steel & Metal

Temperature monitoring in a continuous casting plant

- Continuous casting guide system with high ambient temperatures
- Continuous control of temperature development of driver motor gear mechanism
- Thermally resistant and stable measuring insert



1. Background

The Krupp Mannesmann GmbH (HKM) smeltery operates two continuous casting lines at their Duisburg location for the production of round bar steel to manufacture alloyed boiler tubes, ball bearing steel and other forging goods. The liquid steel is poured from the pan into a distributor and then flows through five or six water-cooled casting dies that form the continuously cast rounds (180 to 406 mm / 7 to 16 in). The steel is conveyed through the casting machine via four or five driver machines per strand.



Cast round steel

2. Measurement requirements

Due to the continuously cast rounds, the area surrounding the first three driver machine rows behind the ingot mould in particular is heated up to several hundred degrees Celsius. The motors that power the driver machines must therefore be permanently cooled using fans and a cooling water circuit. It is also necessary to monitor the operating temperature of the expensive gear mechanism to prevent constant overheating (>50-60°C / 122-140° F).

New temperature meters were installed on one of the two casting lines. However, they could not withstand the extreme requirements and had to be replaced several times after only a few short weeks. HKM thus started looking for a stable, reliable temperature measuring solution for the 15 gear mechanisms in the first three motor series.

3. KROHNE solution

HKM made the decision to use 15 OPTITEMP TRA-P14 resistance thermometers to monitor the temperature of the gear mechanisms. When it came to contact temperature measurement, Pt100 temperature sensors were inserted approx. 100 mm / 4 in into the gear box via a clamp-compression fitting. The thermometer connection heads are mounted directly on the water-cooled cladding of the motor.

OPTITEMP TRA-P14 connection heads are made of stainless steel. In addition, special heat-resistant gaskets as well as a suitable cable gland were used. The resistance signal is applied in the connection head to a temperature-resistant ceramic clamping socket. A thermal jacket then provides protective insulation for the cable and it is through this that the 4-wire resistance signal is forwarded to a central control room.



OPTITEMP TRA-P14 connection head mounted on water-cooled motor cladding

4. Customer benefits

With the KROHNE OPTITEMP units, HKM once again has thermally-resistant thermometers that are constantly stable. They are capable of reliably monitoring the temperature development of the gears, even at high ambient temperatures. This way, the thermometers make a valuable contribution for steel specialists to the timely detection and avoidance of constant overheating and thus destruction of the expensive gearing mechanism on continuous casting. Using the Pt100 sensors prevents prolonged interruption of the production process.



Measuring insert of a Pt100 sensor in the gear mechanism of the drive motor

5. Product used

OPTITEMP TRA-P14

- Insertion-type thermometer with maximum thermal resistance
- Measuring the temperature of gases, liquids, vapours and solid bodies in industrial processes with advanced requirements
- Long-term stable Pt100 RTD in wire-wound or thin film version
- Maximum measuring range: -200...+600°C / -328...1112°F
- Temperature transmitter with analogue and digital output signals



Contact

Would you like further information about these or other applications?
Do you require technical advice for your application?
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