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ifm Solution for Arc Furnace Tundish Flow

Technology for Mining Industry

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ifm Solutions for Arc Furnace Tundish Flow

Which are the challenges in monitoring the cooling Furnaces?

DC Arc furnaces are used in the production of Ferrochrome, Platinum, Nickel, etc. Typically two types of furnaces are used, Takraf and Pyromet. Carbon rods are suspended into the raw material which causes an electrical circuit to generate heat to melt the raw materials. Temperatures reach up to 1.200° C.

- The furnace wall is lined with fire resistant brick inside with a copper-plate lines outside through which the cooling water flow;
- Water leaks into furnace;
- Insufficient water for cooling;
- High temperatures on water;
- Confined spaces;
- Risk of burning multicore cable;
- Traditionally conductivity probes was used to determine whether there was water present or not. It was inexpensive and did not require a full pipe for flow measurement but was unreliable and not able to measure exact flows. No local indication was available for comparison and temperature required an additional PT100 probe for measurement.

What solutions does ifm offer?

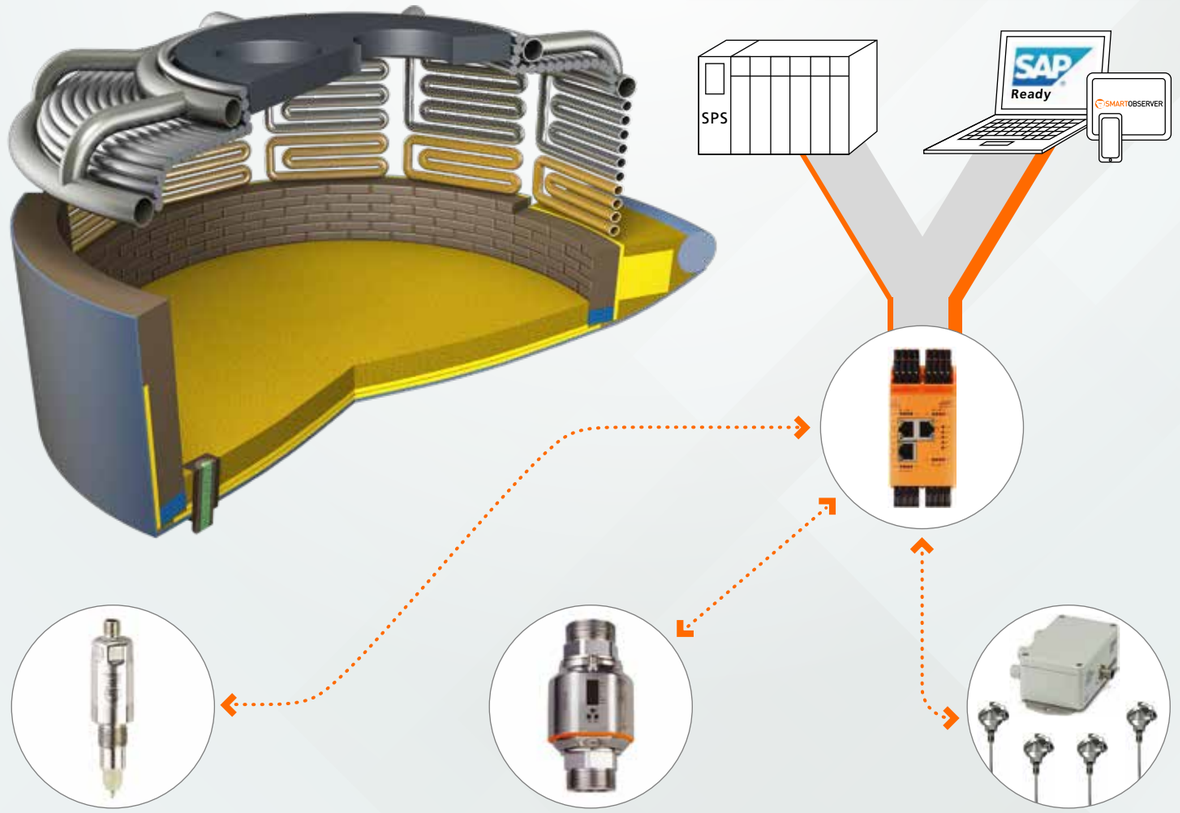
- ifm sensors ensure reliable, uninterrupted low-maintenance operation. Magnetic-inductive flow meters provide the information necessary to monitor the water flow in the cooling water circuit that protects the furnace walls.
- Precise measurement of flow, consumption and medium temperature of the cooling water.
- If water leaks into the furnace causes the build-up of hydrogen which may lead to an explosion inside the furnace. IO-Link modules collect the sensor signals on the flow circuit and transmit them to a controller. This reduces wiring costs and makes complex cable trees obsolete.

How to ensure process quality?

Pipe work is critical for the flow meter SM to function correctly as the flow meter requires the correct up and down stream lengths to measure accurately. It also requires a fully filled pipe to function correctly. The SM type flow meter operates according to Faraday's law of induction. The conductive medium flowing through a pipe in a magnetic field (M) generates a voltage which is proportional to the flow velocity (v) or volumetric flow quantity. This voltage is tapped via electrodes (E) and converted in the evaluation unit. Its resistant materials mean the sensor is suitable for a multitude of media. A high protecting rating and a robust, compact housing distinguish the sensor in the field.

How to maintain process availability?

Each furnace, depending on the type can have from 50 up to 400 temperature points which vary between PT100 and thermocouples.These are used at strategic points on the furnace wall to determine if the furnace liner is secure on the inside. If the liner starts to fail then the temperature will go up, ifm offers a way to wire the thermocouples type J or K better. The temperature of the thermocouple is converted into a digital signal and transmitted via IO-Link modules. There is no loss of the signal.



Protection against accidents with people and equipment

If water leaks into the furnace causes the build-up of hydrogen which may lead to an explosion inside the furnace. It is therefore important that this information is reported just in time and transmitted promptly. IO-Link modules collect the sensor signals in the flow circuit and transmit them to a controller. This reduces wiring costs and makes complex cable trees obsolete. All the information taken back to SCADA and PLC via IO-Link.

Item	Quantity	Description
SM0510	50	Magnetic inductive flow meter - IO-Link capable
EVC003	50	Straight connecting cable with socket - 10meters
AL1900	7	Profinet IO-Link Master - 8 port
QA0011	1	IO-Link parameter setting software
DN4013	2	24 V DC 10 Amp Power supply
LDL100	1	Conductive conductivity Sensor
QLS030	7	Smart Observer Monitoring Software
QW0501	7	Service contract of system support
QDI001	1	Service a Turn-Key of the Solution
QDS300	2	Training Days

Application Package Suggestion!