



APPLICATION NOTE Minerals & Mining

Air flow measurement for the bio-oxidation facility of a gold mine

- Monitoring the oxygen and CO₂ supply for biological oxidation of refractory gold ores
- Cost-effective Vortex flow measurement in large air pipes up to DN300
- Wide dynamic flow range and low installation costs thanks to flowmeter with integrated nominal diameter reduction

1. Background

A leading gold producer operates an underground gold mine in West Africa with a depth of around 1500 m / 4921 ft. In order to make gold extraction more profitable, a comprehensive redevelopment project has been initiated for this mine. This project is designed to automate the plant and make underground operations future proof.

2. Measurement requirements

In this context, the sulphide treatment plant has also been updated. This includes a bio-oxidation facility consisting of several tank reactors with agitators in which oxidation of sulphides in the mined ore takes place. Bio-oxidation is a preparatory measure for the subsequent cyanidation in the carbon-in-leach (CIL) process. This is because the gold ore mined is inherently refractory and encapsulated in sulphide minerals. It must first be made accessible for cyanide leaching. This is done by bio-oxidation, in which the insoluble metal sulphides are oxidised by bacteria and converted into water-soluble sulphates.

For the desired bioreaction, ideal conditions for the bacteria must always exist. Temperature, pH and air supply (oxygen and carbon dioxide) are the essential control parameters to achieve the best possible oxidation of the sulphide gold ores. In order to be able to continuously monitor the air supply, the mine operator was looking for robust and reliable, yet cost-effective flow instrumentation.

3. KROHNE solution

The gold mine operator decided on the installation of a total of 24 OPTISWIRL 4200 Vortex flowmeters. The KROHNE measuring devices have been provided as remote versions with field housing (F). The remote signal converters could therefore be installed up to 50 m / 164 ft away from the flow sensors. In this way, the readings from difficult to access installations can be conveniently taken where they are needed.

The installation was carried out via flange into pipes with large nominal diameters:

- 8 x with DN250 flange, PN10
- 16 x with DN300 flange, PN10

A product variant with integrated nominal diameter reduction was used. This ensures a large measurement span even with the given air pipe diameters.



Vortex flowmeters prior to shipment

4. Customer benefits

The use of the OPTISWIRL 4200 helps the mine operator to achieve a constantly high oxidation of the sulphur in the ore. Air supply is ensured, and bio-oxidation can take place in a targeted manner. In this way, optimum conditions are created for significantly increasing gold extraction in the subsequent carbon-in-leach circuit, while reducing cyanide consumption.

Even in the event of this very short-term order with correspondingly short delivery times, KROHNE have once again been able to qualify as a reliable partner to the mining industry. Thanks to the integrated nominal diameter reduction of the flowmeters, the operator benefits from an increased dynamic flow range. Installation costs could also be reduced as expensive pipe constrictions did not have to be made. The risk of potential leaks is significantly minimised from the outset by the reduced nominal diameter design of the OPTISWIRL 4200.



OPTISWIRL 4200 F with integrated nominal diameter reduction

5. Product used

OPTISWIRL 4200 F

- Vortex flowmeter for utility applications in mining and other industries
- For liquids, (wet) gases, saturated and superheated steam (+240°C / +464°F)
- Integrated P+T measurement possible: direct output of mass, nominal flow, energy, gross/net heat
- With flange or space-saving sandwich (wafer) design
- Optional integrated nominal diameter reduction for a large measurement span even in pipelines with large diameters
- Installation of signal converter 50 m / 164 ft away from the sensor possible



Contact

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Do you require technical advice for your application?
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