



CONCENTRATION AND FLOW MEASUREMENT IN AN SO₂ ABATEMENT PLANT



METALLURGY

“Flexim’s non-intrusive ultrasonic technology is the ideal solution to retrofit Dundee’s Tsumeb sulphuric acid plant with the required flow and concentration measurements, both with respect to unimpaired plant availability as well as for logistic reasons.”



Werner Smit,
Process Instrumentation
Specialist, Actum



Measuring Task

Non-intrusive measurement of the concentration and flow of sulfuric acid at Dundee Precious Metals’ Tsumeb specialty smelter

Dundee Precious Metals’ Tsumeb Smelter is one of only a few pyro-metallurgy plants in the world that can treat complex copper concentrates. The facility consists of a primary smelting furnace, the Ausmelt furnace, two Peirce Smith Converters, bag houses and cooling towers, a slag milling plant, two high voltage distribution sub-stations, a materials handling facility, two oxygen plants, a fume extraction system and a sulfuric acid plant.

Blister copper and sulfuric acid are smelter products. During the copper smelting operation, sulfide ores are transformed into oxides. This process produces SO₂ as a by-product, and the SO₂ gas produced is then converted into sulfuric acid.

Advanced sulfuric acid flow measurement is very important in the process to ensure the accuracy of the acid produced, and to have reliable flow and sulfuric acid concentration measurement at different locations in the acid plant.



Solution

Flexim's non-intrusive measuring technology proved to be the ideal solution to ensure accuracy for the related process measurement needs. Flexim measures the flow rate using ultrasonic transducers mounted on the outside of the pipe. As a result, the measuring system is not subjected to any wear and tear by the medium flowing inside. Since it is not necessary to open the pipeline for installation, a measuring point can be set up with the clamp-on ultrasonic technology without any disruption to production.

Flexim's PIOX® S ultrasonic measurement systems were installed on the inlets to the dryer and final adsorption towers. The positioning of the flow measurements is strategic to support stable and reliable plant operation and final product quality verification. Sulphuric acid quality control is of critical importance to run the plant efficiently and safely. The outputs of the meters are tied into the plant's emergency shutdown system and are monitored in the control room to ensure the correct process parameters are maintained.

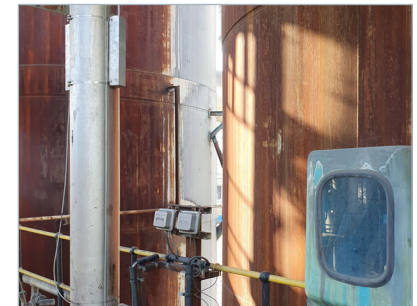
The smelter is in a remote location, so in addition to supporting Dundee with the commissioning of the PIOX® S flow and concentration meters, Flexim's local partner Actum also provided training to the plant personnel on the flow meter and its operation. While on site the Flexim portable meter was also hard at work measuring different streams from water to oxygen and to verify existing measurement of inline meters.



Dundee Precious Metals' Tsumeb Smelter © Dundee Precious Metals



The sulphuric acid plant at Tsumeb



Measuring point with the clamp-on ultrasonic transducers mounted in VARIOFIX C on the inlet to the dryer and the PIOX® S721 trans-mitter in the protection box.



Control measurements with the portable FLUXUS® G601 on a compressed air line

Measuring Points and Instrumentation

Pipelines	12", stainless steel
Medium	~ 97 – 98% sulphuric acid
Temperature	~ 140 °F – 175 °F
Measuring Device	2 stationary FLUXUS® G721 ultrasonic measuring systems for gases
	2 stationary PLOX® S721 ultrasonic measuring systems 2 pairs of CDM clamp-on ultrasonic transducers, installed in VARIOFIX C mounting rails

Advantages

- Non-intrusive measurement from the outside of the pipe – no corrosion or wear to the meter from the aggressive acid
- Simultaneous flow and concentration measurement
- Easy to install and calibrate in a remote location
- No exposure to sulphuric acid by people, plant or the environment
- Excellent support from Flexim's local distributor on multiple measurements in the plant

Customer

Dundee Precious Metals Tsumeb (Pty) Limited, Tsumeb, Namibia

Dundee Precious Metals is a Canadian-based international mining company engaged in the acquisition, exploration, development, mining and processing of precious metal properties. Their current operations are in Namibia and Bulgaria, with exploration in Bulgaria and Serbia.

Dundee Precious Metals Tsumeb (Pty) Limited, is located in Tsumeb, Namibia approximately 430 km north of the capital city of Windhoek. Tsumeb is the closest town to the Etosha National Park and has a population of 45,000 people. The smelter was constructed in the early 1960s to process concentrate from the Tsumeb copper mine and other mines in the country. It is linked by rail to the Atlantic port of Walvis Bay in Namibia. The smelter has an annual production capacity of about 190,000 tonnes of concentrate smelted and employs approximately 800 people.



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