

MININGS AND METALS

Non-Intrusive Ultrasonic Flow Measurement Technologies for the Metals and Mining Industry

No Wear | Rugged | Flexible

FLEXIM


EMERSON

Volume and Mass Flow

Concentration – Density – Equipment Performance

The mining industry faces some of the harshest industrial environments. Accurate, reliable and durable flow monitoring is crucial to maintain well balanced and optimized minerals processing.

Where conventional meter technologies fail, Flexim offers the superior solution. Mounted outside the pipe wall and robustly engineered, FLUXUS® ensures reliable and precise flow measurement of liquids, slurries and gasses with no decreasing performance and without any process downtime.



Significant Cost Savings

Flexim clamp-on metering systems don't require any pipe modification or process interruption **ensuring full plant availability**. Highly durable installation materials means high system longevity with zero maintenance costs. With a broad range of transducers that are fully interchangeable with each transmitter, it is possible to **significantly reduce spare inventories** and cover every application.



Designed to Endure

FLUXUS® is designed to withstand the harshest environments. IP68-rated transducers can even be used in buried installations. **Global hazardous area approvals and SIL certification ensure the best application fit.**



Flexim Stands for Flexibility

FLUXUS® can be used in virtually any mining or metals application, independent of pipe materials and dimensions (**from several millimeters up to 12 m diameter**), temperatures (**from -190°C up to +600°C**) and pressure (**no limitation**). The meters can also be relocated as mines evolve.



Fit & Forget!

FLUXUS® clamp-on meters are based on the non-contact Time of Flight measurement principle. In combination with rugged build design and solid pipe couplant (no gels or grease), FLUXUS® is virtually maintenance-free and ensures **highest operational safety with no potential for leaks.**

Application Versatility

Water Stewardship

Corrosive Fluids

Above and Below Ground Utilities

Sulphuric Acid

Steam

Pump Performance

Slurries

Tailings

Compressed Air

Backfill

Mass Balancing

Process Control

Refining

Applications

Water Stewardship- Fixed and Portable Meters to Evolve with the Mine

Large OD Pipe Mag Meter Replacement - Water Balances - Tailings - Water Abstraction - Water Treatment Plants

Independent of the individual application, measuring volumetric water flow rates is often crucial for effectively running mine and plant operations.

With a combination of fixed and portable meters Emerson is able to provide all the necessary flow measurements for a comprehensive water audit allowing for ease of reporting, identification of leaks and losses and meeting the industries target of responsible water use and management.

Application Highlight - Water Loss Prevention and Usage Monitoring

A major copper deposit is found in the Atacama desert of Chile. Given the challenging operating conditions and the cost of securing and transporting water long distances Flexim was an ideal technology for this project. Some of the measuring locations were extremely remote so through partnering with our customer, a solar powered and remote data transmission system was developed. Flexim are the only clamp-on manufacture to acoustically match their transducers which minimizes the unknowns caused by slight differences in transducer frequencies, and you are truly able to measure low flows which is what is needed in leak detection applications.

The meters are used in the monitoring and leak detection of the bulk water supply, in addition our portable meters are used to conduct audits of equipment and to make sure that no drops are wasted. Water Stewardship is key component of a mines social and legal license to operate, and we can provide the perfect solution.



Applications

Sulphuric Acid – Production and Distribution

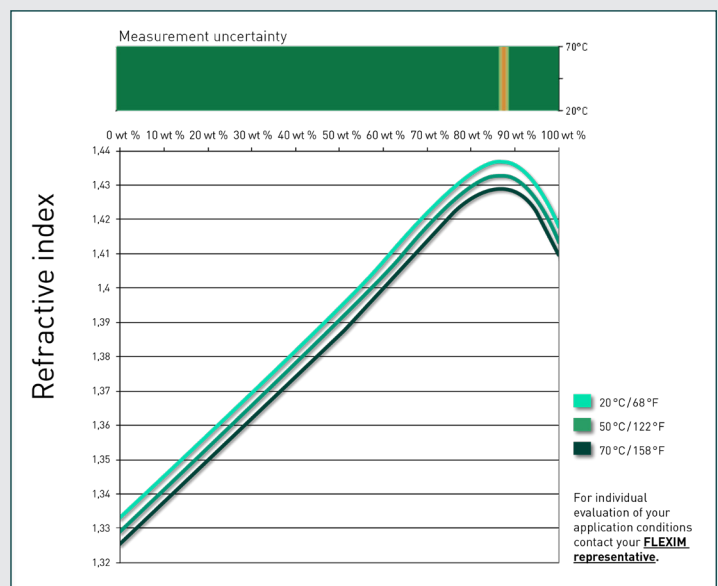
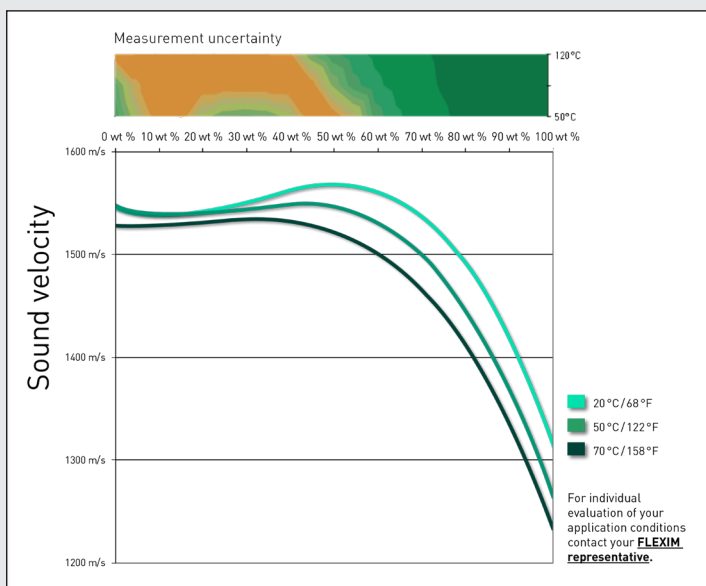
Acid gas plant control and measurement – Sulphuric acid leaching – Pregnant leach solutions sulphuric acid transport and distribution – Truck and train loading – Acid consumption – Raffinate recycling

By measuring non-intrusively from the pipe wall outside and never being in direct contact with the medium flowing inside, PIOX® S is the ideal solution for monitoring strong sulphuric acid and oleum.

- The system measures sulfuric acid concentration and mass flow directly on the main production lines
- It accurately determines the acid strength in real time
- It significantly increases plant and operator safety as it does not require any pipe opening or welding for installation nor any additional flanges
- The measurement is free of wear or abrasion and thus also virtually maintenance free
- High Temperatures are not an issue – up to 200°C achievable
- It can never be a source for potential leaks and sub-sequent process shut-downs

Flexim has a flow and concentration solution across the full concentration range.

Precise 0 to 100% Sulphuric Acid Strength and Mass Flow Measurement with PIOX®





Application Highlight – Pregnant Leach Solution Monitoring

In this operation copper oxide ore and other copper-containing minerals are stacked into a heap where a strong sulphuric acid leach solution is sprinkled on top of it allowing the acid solution to percolate through the heap of ore. The copper oxides become dissolved and the pregnant leach solution (PLS) eventually flows out of the heap into a collection pond.

Volumetric flow as well as concentration measurements of the leach and PLS solution are required for efficient process control.

Our expertise in corrosive chemicals is not limited to sulphuric acid our standard fluid lists covers all the major acids and caustics, and custom data sets can be constructed in our lab.



Applications

Metallurgy

Recovering the valuable metals from the ore and converting it to a high purity product requires numerous steps highly dependent on the nature of the ore and the direction taken during the flow sheet development. Emerson's meters are highly flexible covering a wide range of fluids, pipe sizes and materials. So far we have experience in the following process operations: **Leaching, Solvent Extraction & Electrolysis.**

Application Highlight – Pregnant Leach Solution Monitoring

The principal application of solvent extraction in the beneficiation process is the selective separation of metal ions with the use of an organic solution.

Measuring the flow rate of the organic solution is crucial in the process and can be challenging, as the selection of hydrocarbons include solvents such as benzene, kerosene and chloroform.

We also have a long track record measuring chemicals used in refineries such as hydrochloric acid and hydrogen peroxide providing both flow and concentration measurement.

Slurries

Our technologies are able to provide a large variety of these powerful transducers and in addition our hybridtrek allows the switching between the transit time and our noisetrek measurement principles. Noisetrek is analogous to that used by doppler type meters.

Application Highlight – Backfill Cement Slurry Measurement of 70% Solids

An underground mine in NSW, Australia, had a requirement to measure a flow of paste fill comprising cement, tailings and water. The solids content of this slurry is above 70%, with particle sizes of <math><20\ \mu\text{m}</math>. It is transported in a DN200 HDPE pipe with a wall thickness of 22 mm, located more than 1 km underground. The paste is pumped back down the mine to fill voids for stabilisation purposes. On the basis of the powerful ultrasonic signals emitted by the transducers and by help of the sophisticated internal signal evaluation and diagnostics, the non-intrusive flow meter was able to accurately and reliably measure the flowing slurry through the thick pipe wall.





Measurement Services

Emerson offers scalable measurement services ranging from the check metering of a single measurement point up to a complete measurement audits of complex networks with a multitude of measurement points from below ground in the mine, to chemicals and reagents in concentrators or refineries.

Our services can be used either to measure at points that are not equipped with a flow meters, to check existing flow meters (Independent of the employed technology and manufacturer) and evaluate their performance, certificate existing flow devices and to care for the regulatory compliance.

Emerson's measurement services are arranged according to your individual needs:

- From the flow measurement of liquids and gaseous volume and mass flows over a wide range of applications, media, temperature, and pressures.
- Thermal energy surveys of heat and cold quantities, consumption measurement or leak detection of liquids and gases.
- Calibration and evaluation of legacy metering
- Process control and balance



Summary

Unrivalled Performance – Emerson’s Flexim non-intrusive ultrasonic flow meters offer exceptional reliability and accuracy at high and low flows due to their matched, calibrated and temperature compensated transducers, advanced signal processing capabilities and diagnostics.

Operational Safety – ATEX/IECEX Zone 1 rated. The measurement system can’t cause potential pipe leaks, be prone to clogging or any other related issues that can hinder process integrity.

Flexible Technology – Suited for multiple applications (liquids, slurries & gases) in a wide range of pipe sizes.

Economical Solution – An externally mounted system means no need for process interruptions or additional engineering costs.

Maintenance Free – No contact with flowing media results in a completely maintenance free and durable product.

Plug and Play – Our meters all come pre calibrated, with a simple and logical operating system and user interface backed up with on call technical support there are no hassles or headaches in remote or hard to reach locations.



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