No more corrosion and mechanical failures

PIOX® S

Non-intrusive concentration, density and flow measurement of aggressive media

Concentration & Volume Flow

Density & Mass Flow

Phase Detection

Product Recognition

Fluid Analytics

Emissions Reporting

Process Control

User Defined Values

Measuring from the outside what's flowing inside

PIOX® S stands its ground where others fail.

Whether acids or bases are flowing through pipes - PIOX® S for reliable concentration and flow measurement

PIOX® S determines the concentration, density and other parameters via the sonic velocity of the fluid. Its non-intrusive acoustic technology is the method of choice when materials and processes place high demands on safety and reliability.

Extremly Reliable

- No moving parts, no vibrations, no material fatigue
- No corrosion risk from aggressive media
- No leakage risk
- For harsh industrial environments

Highly Accurate

- Longterm stability
- No drift
- No frequent recalibration
- Highly sensitive also at low flows
- Temperature compensated

Enhanced Safety

- Non-intrusive measurement, no need to open the pipe
- Simple maintenance-free solution
- Approved for hazardous area use

Improved Control

- Real time concentration analysis
- Simultaneous flow measurement
- High data logging capability
- Accurate and reliable data source

By determining the fluid density, PIOX® S is capable of accurately calculating the **mass flow**.

For virtually any pipe size and material - whether it is steel, plastic, glass or special alloys including liners or coatings with pipe diameters ranging from DN6 to DN6000 (0.25“ to 230“ pipe).

For temperatures up to 750 °F and beyond.

For hazardous area locations - transducers and transmitters are available in FM certified versions.

100% plant availability

Simple attachment of the transducer system to the outside of the pipe during on-line operation

100% media resistant

No contact with flowing media - exotic construction materials are not required

100% leak-proof

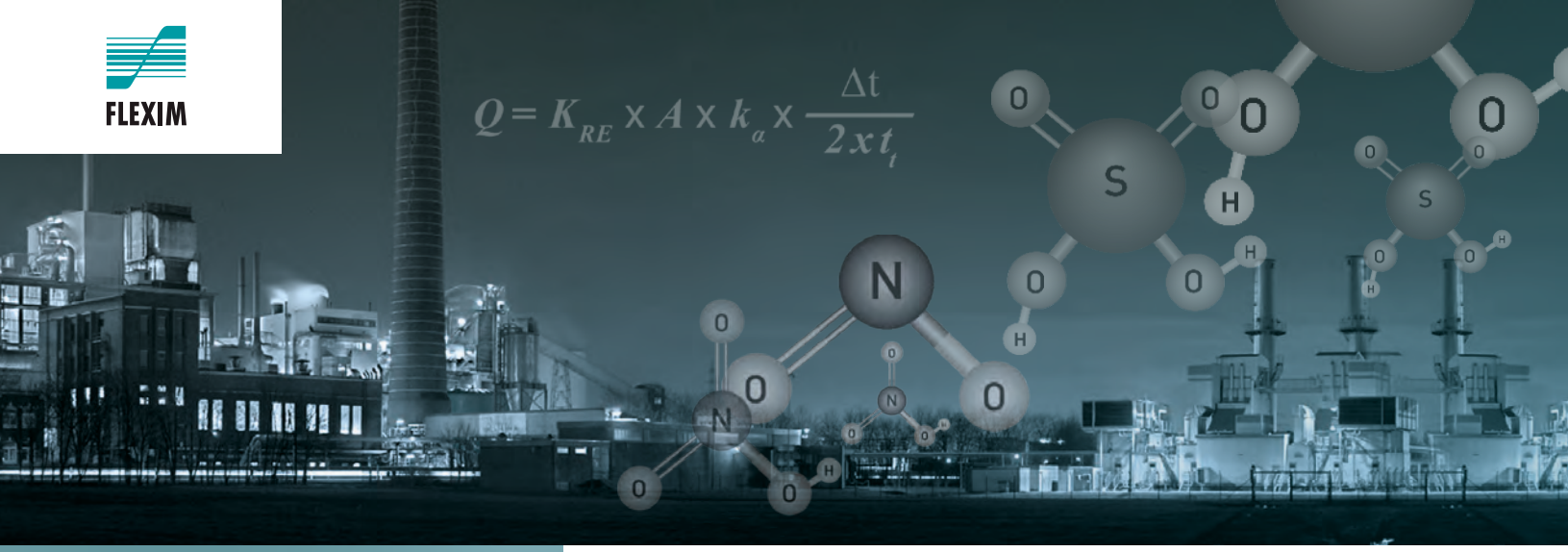
No risk of leakage caused by the measuring equipment

100% wear-free

No wear and tear by abrasive media Long-term stability, maintenance-free due to permanent coupling pads

100% pressure-resistant

No pressure limit



Field proven for the concentration and density measurement of:

- Nitric Acid
- Sulfuric Acid
- Phosphoric Acid
- Sodium/Potassium Hydroxide
- Ammonium Nitrate
- Brine
- Alcohols, Glycols
- Caprolactam

Mass Flow Measurement of Nitric Acid

At a Dutch plant of a Norwegian fertilizer producer, trucks are loaded with nitric acid at an automatic filling station in two different concentrations, 68 % and 60 %. If the lower concentration is desired, the 68 % nitric acid is diluted by adding water. To ensure the accuracy of this process, a reliable concentration measurement is required.

PIOX® S is the ideal solution for this task, as the ultrasonic transducers are simply clamped on the outside of the pipe, without contacting the media. There is no risk of corrosion or acid spills as was the case with the Coriolis meters used previously.

By simultaneously measuring the media concentration through the sonic velocity, and supervising the flow rates by the ultrasonic transit-time principle, PIOX® S can be also used to calculate the mass flow.

Advantages:

- No risk of corrosion and leaks
- Simultaneous measurement of concentration and volume flow or mass flow
- Non-intrusive, no need for process shut-down

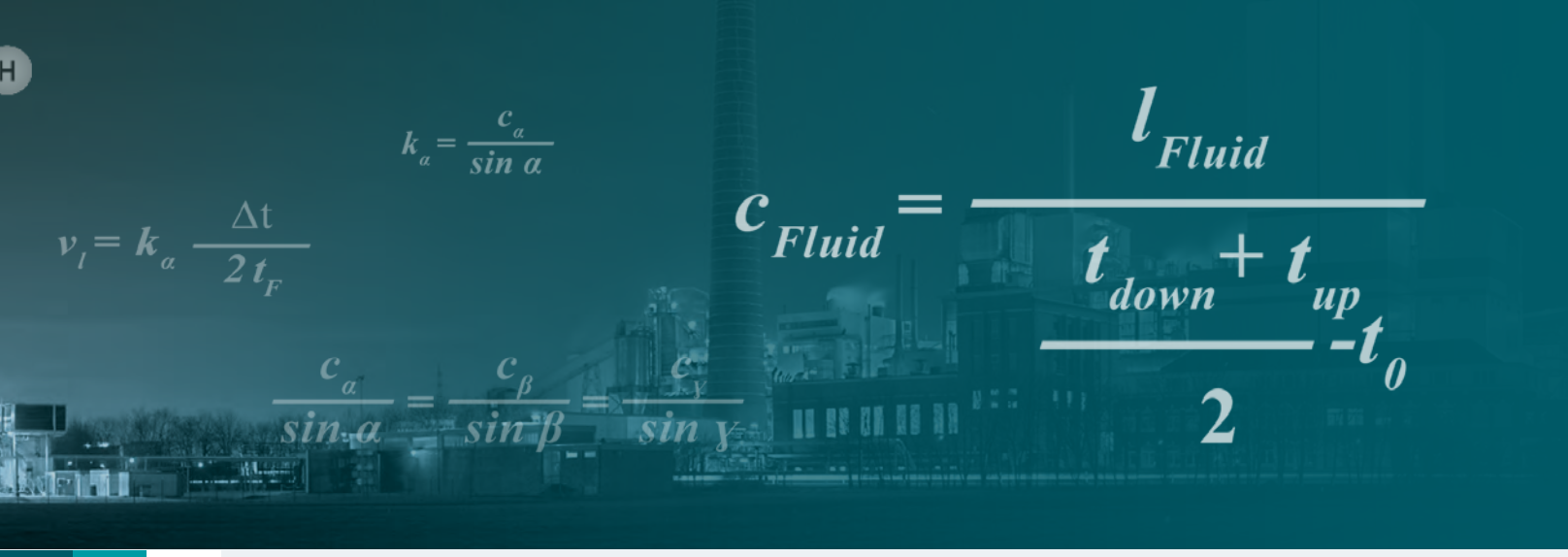
Concentration Measurement of High Purity Sulfuric Acid

One of the largest chemical companies in the world, residing in Germany, produces, among other chemicals, high purity sulfuric. Used as a raw material for many other chemical production processes, continuous concentration measuring during production is crucial to obtain a uniform product quality. What was formerly done offline in the laboratory is now solved by the PIOX® S in real time directly during production while never coming in contact with the fluid.

Simply clamped on to the pipe, the transducers are removed from the highly corrosive medium and thus avoid possible contamination of the product stream.

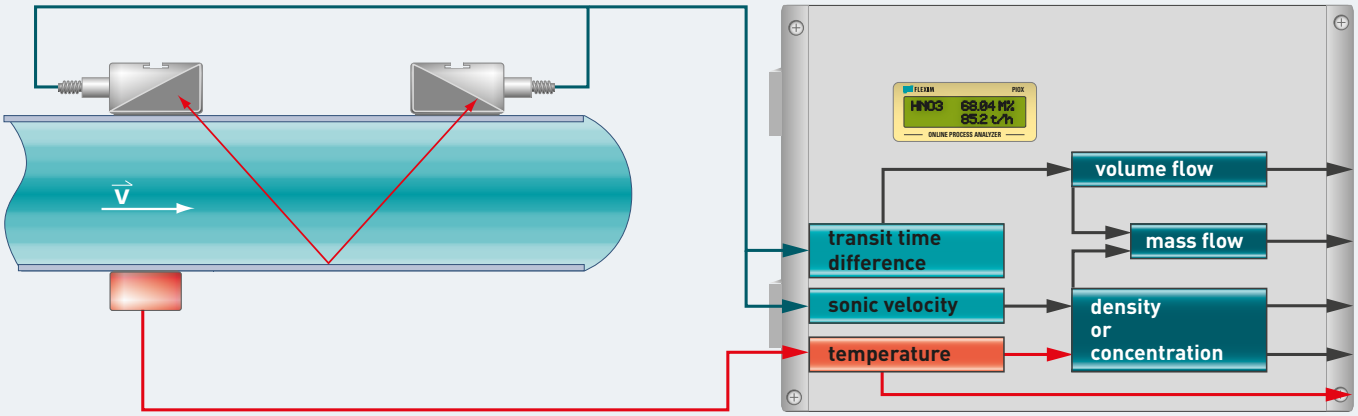
Advantages:

- Highly accurate, even at marginal concentration changes
- Ideal solution under high process temperatures (up to 428 °F) and pressures
- No possibility of contamination of the media



PIOX® S Measurement Principle:

The measurement method of PIOX® S is based upon the ultrasonic transit-time principle.



Two ultrasonic transducers are mounted to the pipe wall, and are alternatingly sending and receiving ultrasonic signals. Measuring the difference in the transit time between the two signals, the flow velocity (v) and the volume flow, based on the pipes inner diameter, are accurately calculated.

Based on the mean value of the ultrasonic signal transit-time, the sonic velocity (c) within the medium is unambiguously determined.

A temperature probe, mounted in clamp-on or inline configuration, transmits the temperature measurement (T).

Based on the measured sonic velocity and temperature, PIOX® S calculates the desired units of measure, such as concentration, density, solid content, yield, as well as user and industry defined values such as Brix and others.

Moreover, by internally combining the values of the volume flow with the measured density of the liquid, the PIOX® S Massflow is able to precisely determine the mass flow rate.

PIOX® S: Concentration and Mass Flow

FLEXIM has a large library of fluids for measuring concentration and mass flow of liquids that continues to grow*:

Fluid	Measurement	Concentration	Temperature
Caprolactam	Concentration	90 - 100 %	70 °C (158 °F) - 130 °C (266 °F)
Ethanol	Concentration	30 - 100 %	10 °C (50 °F) - 70 °C (158 °F)
Ethylene Glycol	Concentration	20 - 55 %	0 °C (32 °F) - 30 °C (86 °F)
Hydrochloric Acid	Concentration, Density & Mass Flow	0 - 15 %	5 °C (41 °F) - 30 °C (86 °F)
Hydrochloric Acid	Concentration, Density & Mass Flow	0 - 5 % > 15 %	5 °C (77 °F) - 100 °C (212 °F) 30 °C (86 °F) - 100 °C (212 °F)
Hydrofluoric Acid	Concentration	40 - 70 %	10 °C (50 °F) - 70 °C (158 °F)
Nitric Acid	Concentration, Density & Mass Flow	50 - 80 % 90 - 100 %	10 °C (50 °F) - 70 °C (158 °F) 10 °C (50 °F) - 50 °C (122 °F)
Oleum	Concentration	0 - 30 % 50 - <100 %	5 °C (41 °F) - 50 °C (122 °F) 5 °C (41 °F) - 50 °C (122 °F)
Phosphoric Acid	Concentration, Density & Mass Flow	25 - 60 %	5 °C (41 °F) - 40 °C (104 °F)
Propylene Glycol	Concentration	0 - 40 %	10 °C (50 °F) - 40 °C (104 °F)
Sodium Chloride	Concentration, Density & Mass Flow	0 - 30 %	10 °C (50 °F) - 70 °C (158 °F)
Sodium Hydroxide	Concentration	0 - 50 %	10 °C (50 °F) - 100 °C (212 °F)
Sugar	Concentration	0 - 90 %	10 °C (50 °F) - 90 °C (194 °F)
Sulfuric Acid	Concentration	80 - 100 %	10 °C (50 °F) - 220 °C (428 °F)
Urea	Concentration	0 - 65 %	10 °C (50 °F) - 70 °C (158 °F)

**Note: Table does not include all fluids in the FLEXIM library. If you do not see your fluid or requirements listed, contact your local FLEXIM representative for verification, or email us at sales@flexim.com*

PIOX® S Standard Delivery Transmitters

FLEXIM PIOX-S TRANSMITTER	US-7407. SCPX	US-7407. MCPX	US-7407. SCPXM	US-7407. MCPXM	US-7407. MCPXMF	US-7407. MCPXMFM
CONCENTRATION & VOLUME FLOW	X	X	X	X		
CONCENTRATION & MASS FLOW					X	X
CHANNEL (QTY.)	1	2	1	2	2	2
ANALOG OUTPUT	2	4	0	0	4	0
MODBUS OUTPUT			X	X		X
BINARY RELAY OUTPUT (QTY.)	3	3	0	0	3	0
ANALOG TEMPERATURE INPUT, 0/4-20 mA (QTY.)	2	2	2	2	2	2
THERMAL RTD INPUT (QTY.)	1	2	1	2	1	1

OPTIONS: FM CL1 / DIV 1 & 2; 12/24 VDC MAINS POWER; HART; BACNET; VDC ANALOG OUTPUTS; PROFIBUS P.A.; PLEASE CONSULT YOUR REPRESENTATIVE FOR OPTIONS AND PRICING

FLEXIM

More than 20 years of experience in clamp-on ultrasonic metering

Clamp-On and Go Technology

Using non-intrusive transducers, and a strap-on RTD temperature sensor, PIOX® S is truly a clamp-on and go affair. All of the additional costs associated with intrusive technologies are avoided. Furthermore, the hazards associated with intrusive metering technologies are eliminated.

PIOX® S Performance Guarantee

We know our applications well, and coupling this with a large installed base, FLEXIM guarantees that your PIOX® S system measures to your required accuracies or you get your money back.

Ready to Get Started?

Feel free to contact FLEXIM or your local Sales Representative to get started with your PIOX® S measuring system.

We look forward to responding to your inquiry!

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