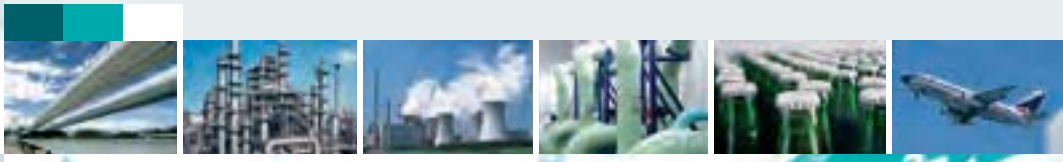
FLEXIM

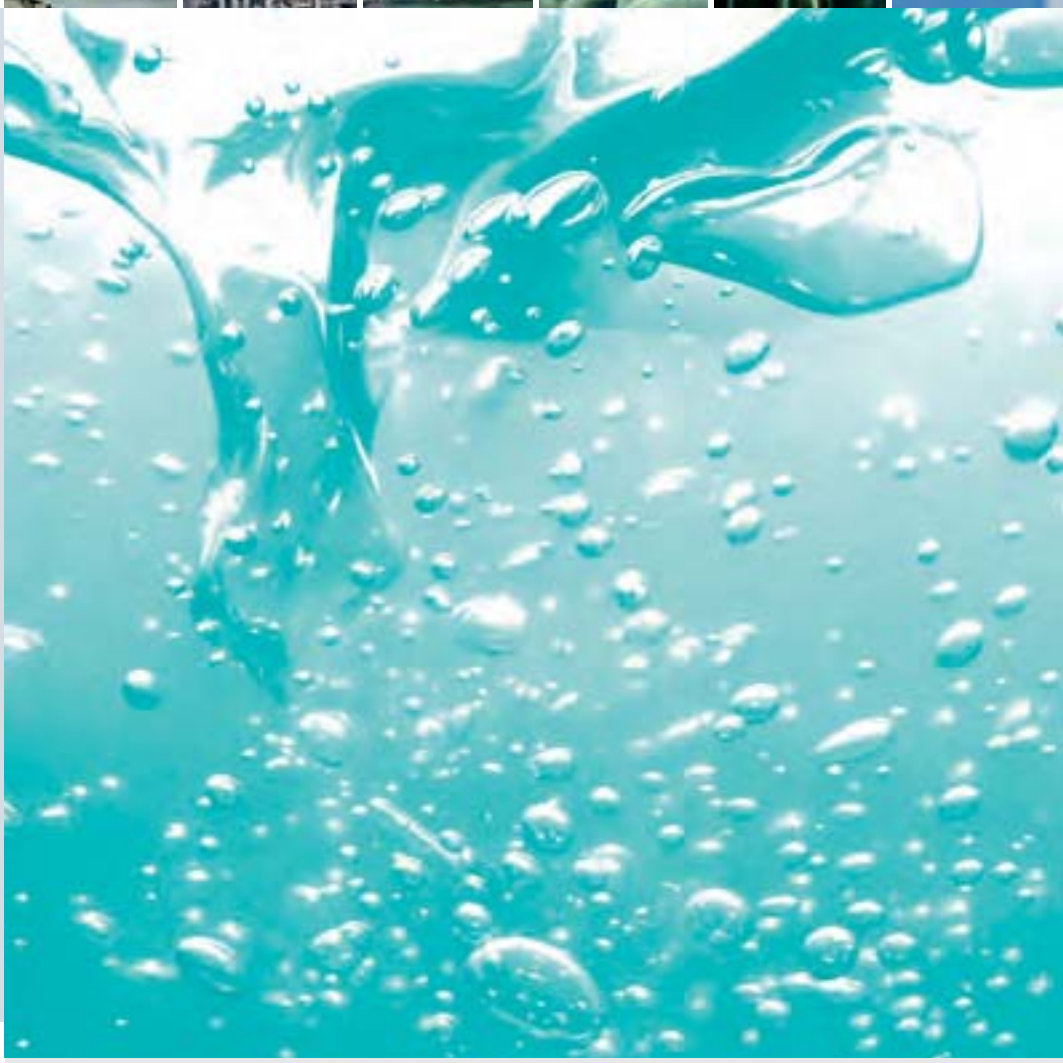
FLUXUS®

Non-Invasive Liquid Flow Measurement



- Chemical Industry
- Petrochemical Industry
- Oil Exploration
- Pharmaceutical Industry
- Semiconductor Industry
- Food and Beverage Industry
- Water and Wastewater Industry
- Power Generation
- District Energy

Measure from outside what's flowing inside



FLUXUS® is ...

FLUXUS® measures flow non-invasively using ultrasonic technology. Clamp-on ultrasonic transducers are simply clamped onto the outside of the pipe and never come into contact with the liquid. Pipe work is not necessary.

Non-invasive clamp-on technology provides maximum flexibility and the sophisticated electronics of FLUXUS® ensure the highest possible reliability. The measuring system, consisting of the transducer and VARIOFIX transducer system, can be optimally adjusted to suit individual requirements.

The FLUXUS® flowmeter series comprises a broad variety of transmitters and transducers: from basic models for standard applications up to robust measuring solutions for offshore use or for hazardous metering locations.

Our Tradition is Innovation

Ever since its inception, FLEXIM has been among the pioneers an innovator in the field of ultrasonic flow measurement. Each FLUXUS® embodies the wealth of expertise and application experience of our engineers.

FLEXIM rises to meet the challenge where others have already failed. Put FLEXIM's experience and expertise to work for you. Submit your application to us and we will find the solution!

Intelligent Signal Processing

FLUXUS® instruments feature an exceptionally robust dual-µP technology core together with the latest digital signal processing. They produce stable and reliable results even under the most difficult application conditions. FLUXUS' measurement algorithm automatically adapts to the varying application conditions. Its very high measurement rate of 1000 measurements per second allows for a real time statistical analysis. All this makes the FLUXUS® unsurpassed in performance and one of the most capable ultrasonic flow meter available on the market today.

Flexible.

From 6 mm tubing to 6.5 m penstocks

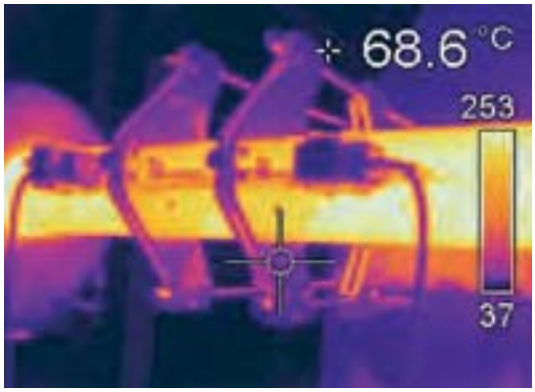
FLEXIM's non-invasive ultrasonic technology suits an unmatched range of applications. FLUXUS® offers reliable measurement on the smallest of pipes (e.g. 6 mm tubing in paint finishing systems) as well as very large pipes (e.g. large penstock measurements in hydroelectric plants).

Up to 400°C

Standard transducers may be used at temperatures up to 130°C, the temperature range of the high temp versions extends up to 200°C. The patented WaveInjector® system extends the measurement range of FLEXIM's standard transducers from cryogenic temperatures up to 400°C

For nearly every liquid and pipe material

Measurement is possible on just about every liquid medium and pipe material, regardless of the conductivity. Steel, iron or plastic pipes; sludge, sand, acids or tar: FLUXUS® is up to the task challenge!



... even in hazard area locations

Transducers and transmitters are available in ATEX and FM certified versions.

Non-invasive.

The advantages of non-invasive measurement are obvious: because ultrasonic transducer systems are simply attached to the outside of the pipe, measuring equipment is not subjected to wear and tear by the media and does not cause any pressure loss. Measurements at maximum operating pressures can be carried out easily with no additional costs added. No pipe work is required when setting up the measuring point and, as a result, operation is not interrupted.

100% plant availability

- Simple attachment of the VARIOFIX transducer system to the outside of the pipe
- Installation is possible during normal ongoing operation without machine downtime

100% resistant to media

- No contact with media, therefore no chemical attack
- No need to use expensive special materials

100% wear-free

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

100% leak-proof

- No additional risk of leakage caused by the measuring equipment

100% pressure-resistant

- No pressure limit
- Effortless measurement even at maximum operating pressures
- No extra charge for high pressure ranges
- Zero point and measurement reading are not affected by static pressure changes

100% secure

- No blockage of small bores or impulse piping
- No influence of pulsations, vibrations, speed peaks, swirling or cross flows

100% robust

- Resistant to pressure surges or solids in the medium

100% economical

- No pressure loss, thus low operating costs
- Cost-effective installation
- Installation without welding or other mechanical work on the pipe
- No extra charge for large nominal widths

100% progressive

- Precise, hysteresis-free, bi-directional flow measurement with high measurement dynamics
- Long-term stable, drift-free measurement results
- High measuring rate
- Short response time
- Measurement of even minute flows

User-Friendly.

“Plug & Play” calibrated transducers

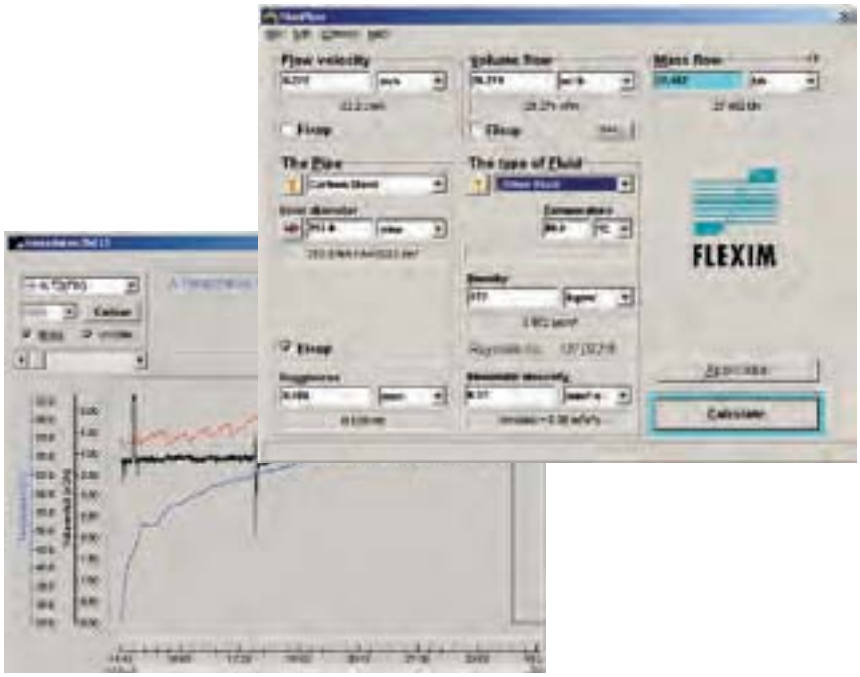
Each pair of transducers undergo a rigorous wet-flow calibration at the factory and is shipped with traceable calibration documentation. All calibration data (including the transducer identification and parameters) is stored in a transducer-resident non-volatile memory. It is automatically transferred to the transmitter upon connection. Consequently, programming errors are eliminated and there is never need for a zero adjustment or calibration.

Guaranteed to be user friendly

No elaborate instructions are required in order to use FLUXUS®'s intuitively structured menus. The pipe and materials parameters are easily found due to the internal liquid media and pipe materials database. The measurement is started with just a few key strokes. Explosionproof instruments can be operated without opening the housing and without requiring any additional programming devices.

A “Straight-Shot” from pipe to PC

FluxData connects FLUXUS® to any PC. This optional software package with graphical user interface takes care of the data exchange between the transmitter and the computer. With FluxData, you can readily transfer your measurement data from the flowmeter to a PC, analyze and visualize the measuring results and manage the data files directly or easily export to an external data management program.





General Technical Data

Measuring principle:	Transit time difference correlation principle
Quantities of measurement:	Volume flow, mass flow, flow velocity, heat flow (only if temperature inputs are installed)
Flow velocity:	(0.01 to 25) m/s
Resolution:	0.025 cm/s
Repeatability:	0.15% of reading ± 0.01 m/s
Accuracy*:	
- with standard calibration:	± 1.6 % of reading ± 0.01 m/s
- with extended calibration (option):	± 1.2 % of reading ± 0.01 m/s
- with field calibration**:	± 0.5 % of reading ± 0.01 m/s
Gaseous and solid content:	< 10%

* for measurement acc. to transit time difference principle, under reference conditions and at v > 0.15 m/s

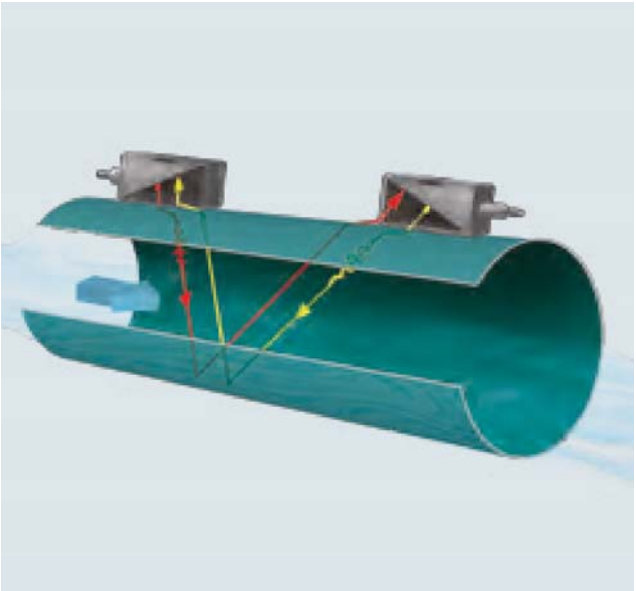
** reference uncertainty < 0.2 %

Measuring principle

The Transit Time Difference Correlation Principle makes use of the fact that the time-of-flight of an ultrasonic signal is affected by the flow velocity of the carrier medium. Like a swimmer working his way across a flowing river, an ultrasonic signal travels slower more slowly upstream than downstream.

Our instruments work according to this transit-time principle: an ultrasonic pulse is sent downstream through the medium, another pulse is sent upstream. By measuring the transit time difference, the average flow velocity can be determined. The volume flow can then be calculated from out of the flow velocity and the pipe parameters.

The acoustic measuring method works without inertia and independent of the flow direction. As a result, FLUXUS® measures bi-directionally with excellent measurement dynamics.



Industry Hardened.

The Transducer System

“Fit for the Purpose“ Construction

All FLEXIM clamp-on transducers are watertight and suitable for use in harsh industrial environments. The robust stainless steel construction and the rugged integrated cables guarantee reliable measurement results over long periods of extensive use. Almost all transducer types are available in explosion-protected and IP68 versions.

Robust transducer mounting fixtures

Be it for the easy and quick mounting of a short-term measurement solution or for a permanent installation, for large pipes or for small tubes: FLEXIM offers you transducer mounting fixtures for the most various applications.

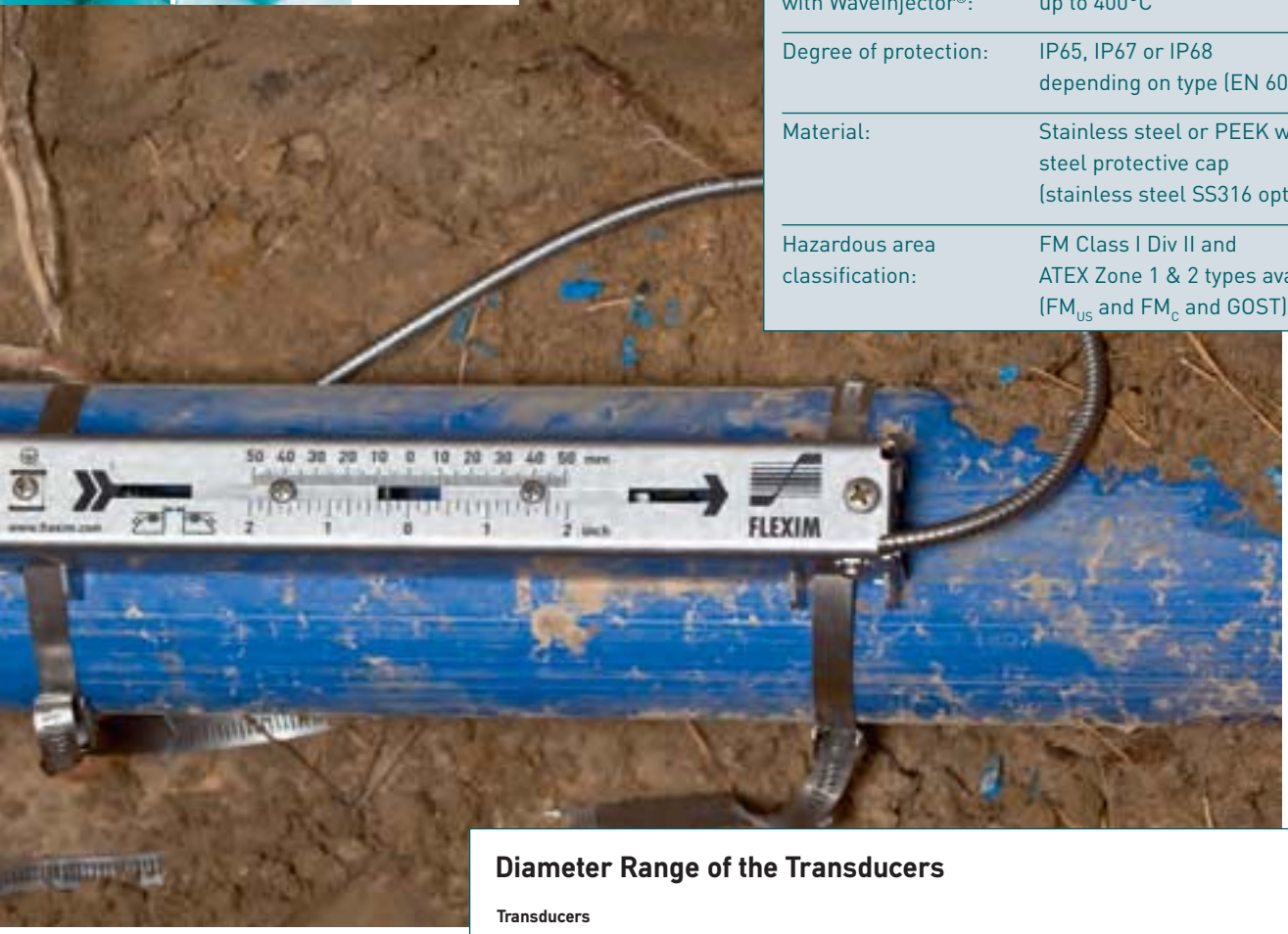
VARIOFIX transducer systems provide a strong hold. Even in the event of strong temperature fluctuations, they provide continuous, stable contact pressure between the transducers and the pipe thereby ensuring optimum irradiation of measuring signals into the medium.

There are two versions of the VARIOFIX transducer system: VARIOFIX L and VARIOFIX C. Both are made of stainless steel and are therefore corrosion-resistant and durable. The transducer distance can be set easily and precisely. Maintenance requirements are reduced considerably due to the permanent contact with coupling pads.

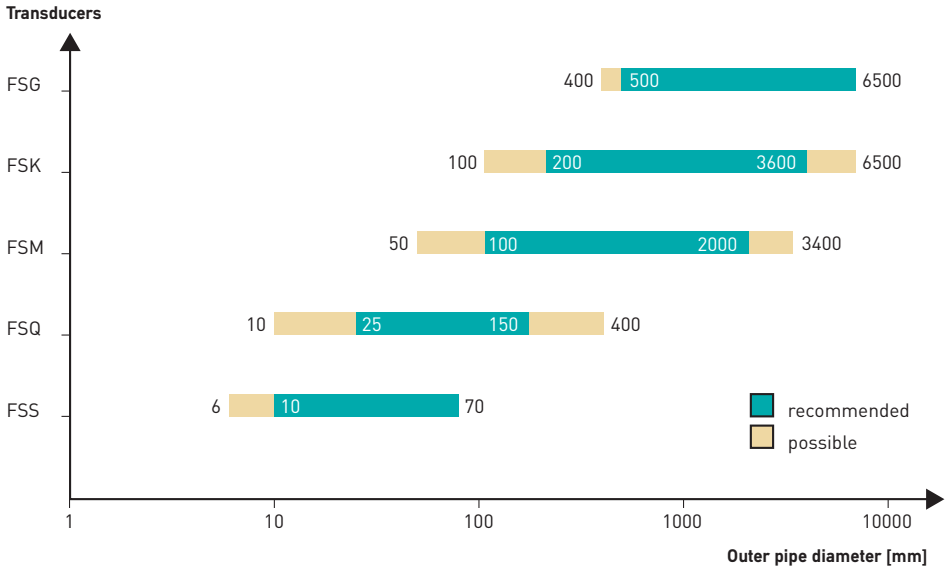
VARIOFIX L is the standard transducer mounting fixture and VARIOFIX C provides optimum protection even in the harshest conditions: beneath the stainless steel cover, the measuring point is permanently protected against external influences, wind and weather as well as mechanical damage.

General Technical Data of the Transducers

Operating temperature, standard transducers:	-40°C to +130°C
Operating temperature, high temperature transducers:	-30°C to +200°C
Operating temperature with WaveInjector®:	up to 400°C
Degree of protection:	IP65, IP67 or IP68 depending on type (EN 60529)
Material:	Stainless steel or PEEK with stainless steel protective cap (stainless steel SS316 optional)
Hazardous area classification:	FM Class I Div II and ATEX Zone 1 & 2 types available (FM_{US} and FM_{C} and GOST)



Diameter Range of the Transducers



One for All.

FLUXUS® F601

Unmatched in performance, this flexible and easy to use instrument is ideal in support of service and maintenance activities. It can also be used for the control or even for the temporary replacement of permanently installed meters.

The wide pipe diameter range of each transducer type is one of its greatest assets: two pairs of transducers are sufficient to cover the most common pipe diameter range.

In addition, the optional thermal energy measurement capability makes it is possible to carry out an uncomplicated analysis of thermal energy usage in any facility. The collected data can be used to perform a complete energy balance assessment or to assist process monitoring and optimization.

Applications

General

- Service and maintenance
- Replacement of defective devices
- Support of commissioning process and installation
- Performance and efficiency measurement
  - Evaluation and assessments
  - Capacity measurement of pumps
  - Monitoring of regulating valves
- Energy efficiency audits

Food and beverage industry

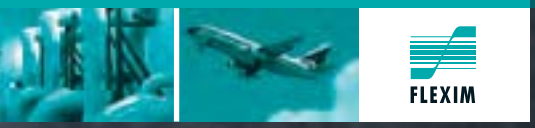
- CIP and SIP optimization
- Consumption optimization

Chemical industry

- Portable flow controls at start-up and/or inspection of facilities
- Helpful tool for facility optimization
- Flow measurement of heat transfer media

Water supply / wastewater services

- Leakage control
- Treatment dosage control
- Flow control in water supply networks



F601: The Portable All-Round Meter

Operating temperature:	-10°C to +60°C
Flow channels:	2
Degree of protection:	Electronic unit: IP65 acc. to EN 60529 Transport case: IP67 acc. to EN 60529
Battery:	Li-Ion, 7.2 V/4.5 Ah, > 14 hours operating time
Inputs and outputs:	
Standard:	Outputs: 2 x current, 2 x binary
Energy:	Inputs: 2 x Pt 100/1000; Outputs: 2 x current, 2 x binary
Double Energy:	Inputs: 4 x Pt 100/1000; Outputs: 2 x current, 2 x binary
Multifunctional:	Inputs: 2 x Pt 100/1000, 2 x current; Outputs: 4 x current, 2 x binary

Refrigeration and air conditioning systems

- Measurement of inlet and outlet flow for service work and maintenance
- Pump preventative maintenance and checks
- Optimization of energy efficiency
- Detection of fouling processes in heat exchangers

Power supply

- Short-term replacement of heat counters with medium contact in case of failures

Facility management

- Optimization of heating and air conditioning systems in large building complexes
- Pump control

Aeronautical industry

- Monitoring of hydraulic and cooling systems of airplanes

Permanently installed, freely configurable.

FLUXUS® ADM 7X07

FLUXUS® ADM 7X07 is designed for permanent installation. With one or two flow channels and versatile electrical inputs and outputs, it can be optimally configured for your measuring application. A variety of process parameters can be measured and handled.

Due to its robust, metal field housing, the ADM 7407 is suitable for outdoor use. Although technically identical, FLUXUS® ADM 7907 is designed for permanent installation in 19“ rack systems.

Applications

Chemical industry

- Measurement of
  - corrosive or toxic media, for example in the chlorine chemistry
  - non-conductive media
  - highly viscous media
  - media containing fibers or solid particles
  - long-chained polymers
  - highly concentrated sulfuric acid
- Measurement of heat transfer media such as water/glycol (250°C) and thermal oils
- Measuring on PVC or FRP pipes and tubes

Petrochemical industry

- Measurement of basic materials as well as intermediate and final products
- Measuring at high temperatures, for example tar, bitumen, quench liquids

Power plants

- Measurements in the cooling water, boiler feed water, condensate and heat circuits

Oil and Gas

- Measurement of all hydrocarbon liquids
- Measurement on high pressure systems
- Measurement of bitumen
- Measuring of injection media
- Flow measurement of water for injection

ADM 7407 / ADM 7907: The Multi-Function Meters

Operating temperature:	-10°C to +60°C
Flow channels:	1 or 2
Degree of protection:	ADM 7407: IP65 (EN 60529) ADM 7907: IP20 (EN 60529)
Hazardous Area Classification:	ADM 7407: FM Class I Div II / ATEX Zone 2 optional
Outputs:	A variety of combinations are available from the following: current (0/4 mA ... 20 mA), voltage, frequency, pulse, alarm
Inputs:	Maximum 4. Available are: Temperature (Pt 100/1000 4-wire), current, voltage
Interfaces:	HART, ModBus and RS485

Pharmaceutical and semiconductor industry

- Non-invasive measurement of ultra pure fluids, even in PVC, PFA and glass pipes

Food and beverage industry

- Hygienic contact-free measurement of liquids
- Thermal energy measurement in the energy supply of central boilers and sanitizing machines

Water and waste water industry

- Flow measurement on large diameter pipes (influent, effluent, sludges)
- Consumption and distribution measurements
- Measurement on underground or underwater pipes
- Chemical flows (small pipe and low flows)

Mechanical engineering and plant engineering

- Leak detection on hydraulic systems
- Measurement of cooling lubricant
- Monitoring of heat and cooling circuits and of pumps

Aeronautical industry

- Flow measurement of hydraulic fluid
- Monitoring hydraulic systems of airplanes
- Monitoring cooling lines of airplanes

Experts for Hazardous Areas.

FLUXUS® ADM 8027 / ADM 8127

FLUXUS® ADM 8027 is ATEX certified for stationary use in explosion hazard areas. Its connection compartment and its electronics compartment are hermetically sealed. It can be operated without opening the enclosure and without any additional devices.

The all-stainless-steel and seawater-resistant FLUXUS® ADM 8127 is also ATEX-certified and thus ideally suited for offshore applications.

Applications

Petrochemical industry

- Measurement of basic materials as well as intermediate and final products
- Measuring of crude oil during sampling for quality analysis
- Measurement at high temperatures, e.g.
  - Sump measurement
  - Overflash measurement
  - Measurement of heavy gasoil (HGO)/heavy vacuum gasoil (HVGO)
  - Measurement at cracker feeders
  - Monitoring the flow of heat transfer oil

Chemical industry

- Flow measurement in explosion hazard areas
- Measurement of preliminary products in the production of polyurethane

Oil extraction

- Flow measurement of injection media, for example methanol
- Flow measurement of injected water
- Measurement of the feeding process into sand separators for process management
- Flow measurement of condensate
- Measurement on high pressure systems

ADM 8027 / ADM 8127: The Explosion-Proof Experts

Operating temperature:	ADM 8027: -20°C to +60°C; ADM 8127: -20°C to +50°C
Flow channels:	1 or 2
Protection degree:	IP66 (EN 60529)
Hazardous area classification:	ATEX zone 1 and 2; ATEX mining certification optional
Outputs:	1 or 2 current outputs, 1-4 binary outputs Also available: 1 or 2 binary outputs (relay), 1 binary output (OC) and 3 binary outputs (OC) Option: Intrinsically safe outputs
Interfaces:	HART, ModBus und RS485

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Natural gas extraction and processing

- Measuring of injection media (monoethylamine, triethylene glycol, etc...)
- Measurement of reservoir

FLEXIM

A short portrait

For 20 years, FLEXIM has been an active leader in many areas of process instrumentation in both national and international markets. In addition to non-invasive flow measurement, FLEXIM specializes in innovative online process analysis using ultrasonic technology and refractometry.

Year after year, FLEXIM continues its substantial investment in research and development in order to maintain and further improve its position as an industry leader. In addition, FLEXIM maintains a close contact to its customers. Innovative and reliable products meeting exactly the needs of the customer are the result.

Competent and professional associates in our sales offices and regional headquarters in Europe, North America, Asia and all over the world ensure the worldwide distribution of FLEXIM's proven technology and guarantee you qualified service.

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