Advanced flow measurement solutions for critical applications
“... there is no future without the past ...”

It is the first line written as introduction for this “Automation Instrumentation Summit” and it is also a perfect starting point for my presentation, with a short view on flow technologies born years ago but developed until today and now ready for future challenging applications.
Company year of constitution: 1993
Headquarted in Carate Brianza (MB)
Exclusive distributor & service center

Flow meters
Level meters
Process analysis
Dust monitors
Services

www.italcontrol.it
Ital Control Meters srl

- Level
  - Microwave
  - Float and magnetic
  - Radar & ultrasonic
Ital Control Meters srl

Analysis

- Refractometer & sound speed
- Resonance viscometer
- FTIR multi gas analyser
- UV oil spill detector

Gasmet

FLEXIM

SOFRASER

Laser Diagnostic Instruments

UV oil spill detector
Emission dust monitor and analyser with QAL1 certification
“... there is no future without the past ...”

Example of technologies ready for future challenging applications:

- Clamp-on ultrasonic flowmeter from FLEXIM
- Thermal mass flowmeter from KURZ
- Coriolis mass flowmeter from RHEONIK
Time of Flight ultrasonic flow meter, measuring principle:

1. The first signal traverses the pipe in the direction of the flow
2. The second signal traverses the pipe against the direction of the flow
3. The result is the transit time difference
Clamp-on from FLEXIM

Standard features of Clamp-on:

• Installation without process stop, no production downtime
• Cost effective for large pipes, high pressure or challenging fluids
• Very low maintenance – no wear

Special features of Flexim:

• Measure for liquid, slurry and gas
• Paired transducers, no zeroing needs
• Excellent very low flow capability
• Permanent coupling: “fit & forget”
• Up to 1000 measure cycle per second
• Advanced digital signal processing
• Temperature compensated transducers
• Each transducers pair is wet calibrated
Clamp-on from FLEXIM

SIL2 approval by Exida as per IEC 61508 achieved in February 2015

- Covering full system from transducers to current output of transmitter
  - no primary element with undetectable failure possibility (i.e. abrasion of orifice plates)

- Proof test for SIS maintenance possible without process stop with portable flowmeter

- Full range of transducers and transmitters:
  - ATEX zone 2 / FM Div II
  - ATEX zone 1
Pipe diameter range – liquids:

from DN 6 to DN 6500

Pipe diameter range – gases:

from DN 16 to DN 1600

no upper pressure limit!
Clamp-on from FLEXIM

Temperature range liquids

Standard / High Temperature Transducers

-160°C 0°C 200°C

Extended temperature range with WavelInjector

-40°C 400°C >500°C
Clamp-on from FLEXIM

Application example

Vacuum tower residue:

• Pipe size DN400
• Temperature 357°C
• G transducers (0.2 MHz)
Clamp-on from FLEXIM

**Application example**

**Cocker unit feed:**

- Pipe size DN100 and 200
- Temperature 380°C
- K transducers (0,5 MHz)
Clamp-on from FLEXIM

Application example

Natural gas storage:

• Pipe size DN100 to DN400
• Variable press and temp
• Liquid fraction up to 5% vol
Clamp-on from FLEXIM

All you have seen is also available with a fully portable unit: model G608

G608 is a powerful device, available with ATEX zone 2 certificate able to be used also with ATEX zone 1 transducer for measure of both gas and liquids.

Only one unit with almost ...

NO LIMITS !
CT (Constant Temperature) thermal mass flow meter, measuring principle:

• One RTD measures the process temperature and a second RTD is heated to 40°C higher

• As gas flows by it pulls heat away from the heated sensor skin, the electronics increase current flow to maintain a constant 40°C differential

• The current flow (power delivered to the heated sensor) directly relates to the gas mass flow rate
Main feature of a thermal mass flow meter:

- Direct mass flow measurement without extra sensors and calculation
- Wide measure dynamics starting from zero flow (CT technique)
- Can be used also below ambient pressure with negligible pressure drop
- Fast reaction time (CT technique) suitable for process control loop
- High temperature version up to 500°C with high accuracy VTM feature

ATEX for Ex area installation
SIL 1 for safety application
QAL1 for emission monitoring
Gas flow measurement with variable gas composition

In a flare gas measurement, often the gas composition to flare is variable, KURZ 454FTB is suitable with manual or automatic capability to adapt at different gas mixture.
Thermal from KURZ

In 2014 KURZ developed and patented an exclusive technique that allows the use of a thermal sensor for measurement of wet gas.

454-WGF (Wet Gas Flow) uses the Leidenfrost effect and a specific high temperature technique to grant stable and accurate flow measure in condensing gas environment, impossible for other thermal flowmeters.
**Application example**

Combustion air:

- Primary air control
- Big rectangular duct
- Multipoint system
Thermal from KURZ

Application example

Stack emission:

• Suitable also for low flow
• All stacks size
• CEMS acc QAL1
Application example

Flare gas measure:

- Multiple calibration
- Wide rangeability
- ATEX zone 1 certificate
Coriolis from RHEONIK

Measuring principle:

• Typically a couple of pipes are excited in vibration and two position sensors measure this vibration.

• At no flow through pipes the vibration measured by position sensors is symmetrical so with no phase shift.

• At flow condition there is a shift in phase of the position sensor signals, the phase shift is directly proportional to mass flow.

• Rheonik design is different from others due to torsion vibration with a guide system instead of standard flexion vibration.
Main feature of a Coriolis mass flow meter:

• Direct mass flow measurement independent from fluid type and condition

• Very high performances in terms of accuracy and rangeability

• Fully bidirectional measurement capability

• Fast response time, suitable for process control and batch

• One instrument measure: mass flow, temperature, density

• Typically suitable for custody transfer applications
Coriolis from RHEONIK

- **Pickup Coils**: Provide tube vibration signals to the transmitter
- **Measurement Tubes**: Where the measurement takes place
- **Mass Bars**: Provide stability and support to the measurement tube oscillation
- **Drive Coils**: Provide power to maintain oscillations at constant amplitude
- **Torsion Rods**: Help energize and guide oscillation
- **In/Out Section**: Decouples measurement tubes from process line stress and misalignment
Coriolis from RHEONIK

RHEONIK design specific features:

• Measure from a “drip” to a “torrent”
• Suitable for extreme pressure: up to 1500 bar
• Extreme temperature design -196...+395°C
• Special materials are available for wetted parts
• MID with accuracy 0,1% for custody transfer
• ATEX sensors and converters for Ex area installation
Application example

Chemical injection:

• Pressure resistance over 1.000 bar

• Very high accuracy also at extreme low flow

• Rugged sensor to withstand pump pulsation

• Full stainless steel version + ATEX for off-shore
Coriolis from RHEONIK

Application example: RHM100 measure on crude oil transfer line
Coriolis from RHEONIK

Metering station RHM160 (12” sensor) with master meter MID
Thanks for your attention!

Any questions?