

# Oilfield Services Measurement Solutions

Superior flow and density measurement

Best-in-class measurement



# “How can I streamline my operations for efficiency without compromising environmental, safety and quality performance?”

As an oilfield services operations manager, you continuously look for ways to improve your bottom line to deliver the quality of service that your clients demand. In today's fast-paced market, personnel shortages, changing environmental expectations, and fierce competition all challenge your current business model.

Accurate, reliable and maintenance-free measurement instrumentation is a vital cog in your fleet, providing the basis for identifying safety concerns in the operation, tracking product usage, and freeing maintenance personnel to focus on critical path systems.

## What if you could ...

### Make pinpoint accurate measurements of flow and density to deliver quality service to your customer

- ✓ Achieve repeatable, accurate results every time with Emerson's Micro Motion Coriolis flow and density meters and Rosemount Magnetic flowmeters
- ✓ Maintain accuracy through a broader range of flow rates with a single meter
- ✓ Have confidence in your measurements and stay in compliance with health, environment and safety requirements via Smart Meter Verification with in-situ, non-disruptable scheduled verifications

### Improve safety and environmental performance on location with early identification of process deviations

- ✓ Identify influx or lost circulation in drilling applications with Micro Motion Coriolis meters for improved reaction time in well control situations
- ✓ Maintain density in cementing and drilling mud applications for improved well integrity
- ✓ Track water usage for regulatory compliance and ensure data with Smart Meter Verification

### Reduce personnel required to maintain and repair measurement systems

- ✓ Reduce maintenance even in corrosive or sand-laden environments with Micro Motion Coriolis meters and Rosemount Magnetic meters with no moving parts
- ✓ Consistent performance even as fluid properties change
- ✓ Save time with easy-to-use interface for field operations

**MEASUREMENT PRECISION**  
for oilfield services applications



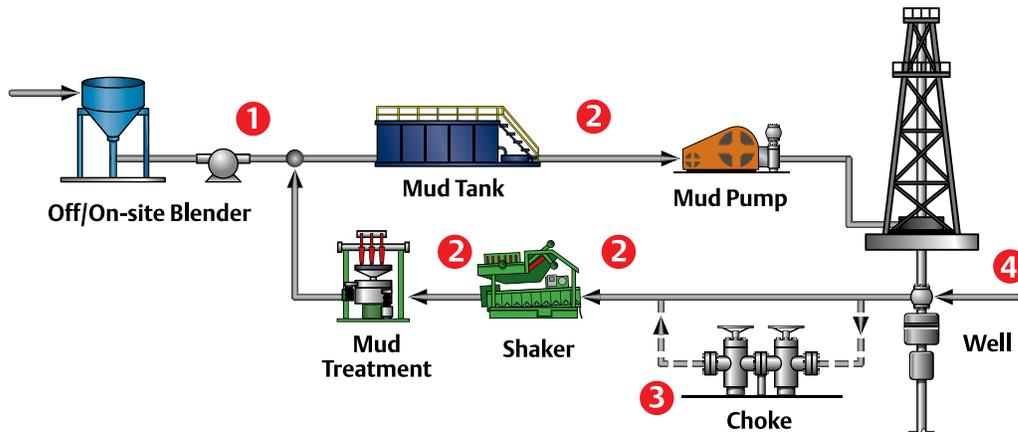


## Drilling Applications

### Identify Well Control Events and Monitor Mud Density

Maintain well control through continuous monitoring of mud density and returns flow

- Identify influx or lost circulation accurately on surface for immediate remedial action
- Improve hydraulic control of the well with direct and continuous mud density measurement both in and out of the well
- Measure water-based, oil-based or synthetic oil-based muds with Micro Motion Coriolis
- Mix drilling mud accurately on-the-fly with density measurements on recirculation loop



1. On-the-Fly / Batch Mixing
2. Enhanced Fluid Monitoring
3. Managed Pressure Drilling
4. Cuttings Re-Injection

## Cementing Applications

### Monitor Cement Density and Flow

Determine cement density on the fly without nuclear source

- Monitor cement density and flow rate for improved quality and blending
- Eliminate complex logistics, licensing, training, safety and disposal issues with non-nuclear design
- Troubleshoot mixing issues easily with advanced diagnostics

## Managed Pressure Drilling

Drill through challenging gradient windows with the help of Coriolis flow measurement

- Identify well control events immediately on surface
- Measure water-based, oil-based or synthetic oil-based muds with Micro Motion Coriolis
- Differentiate between lost circulation events and pump failures by comparing pump strokes with flow out



# Stimulation Applications

## Clean and Dirty Fluid Volumes

Monitor the clean and dirty fluid rates during stimulation treatments

- Measure with high accuracy across a range of rates, from matrix stimulation rates to unconventional frac rates, with Rosemount Magnetic flowmeters
- Ensure accurate measurement of highly abrasive proppant-laden fracturing fluid with Rosemount High Signal Magnetic flowmeters
- Reduce field replacement time and cost with grooved coupling process connections



## Liquid Additive Injection

Accurately meter liquid additives, monitor chemical quality

- Measure liquid additives with pinpoint accuracy in a drainable meter
- Measure conductive and non-conductive fluids and slurries with Micro Motion Coriolis meters
- Install Micro Motion Coriolis meter anywhere without flow conditioning or straight pipe run requirements



# Environmental

## Water Management

Monitor water usage for regulatory compliance

- Track and report total flows for regulatory compliance and ensure data with Smart Meter Verification
- Monitor for water quality via density measurement

## Dual fuel combustion monitoring

Improve fuel efficiency and reduce emissions from engines

- Ensure reliable and accurate measurement of compressed or light gases
- Manage fuel-to-gas ratios based on fuel composition to yield maximum combustion efficiency
- Track quantity of fuel loaded and consumed for regulatory reporting

# Micro Motion® and Rosemount® Flow and Density Meters



## Micro Motion® ELITE® Coriolis Flow and Density Meters

Flow range	0.01 to 120,000 lb/min (0.35 – 3,266,000 kg/hr)
Liquid mass flow accuracy	±0.05% or ±0.1%
Liquid volume flow accuracy	±0.05% or ±0.1%
Gas flow accuracy	±0.25% or ±0.35%
Liquid density accuracy	±0.2 kg/m <sup>3</sup> , ±0.5 kg/m <sup>3</sup> or ±2.0 kg/m <sup>3</sup>
Nominal line size	1/12" to 16" (2 to 400 mm)



## Micro Motion® F-Series Coriolis Flow and Density Meters

Flow range	6.5 to 10,000 lb/min (180 to 272,000 kg/hr)
Liquid mass flow accuracy	±0.10%, ±0.15% or ±0.20%
Liquid volume flow accuracy	±0.15% or ±0.30%
Gas flow accuracy	±0.50%
Liquid density accuracy	±0.5 kg/m <sup>3</sup> , ±1.0 kg/m <sup>3</sup> or ±2.0 kg/m <sup>3</sup>
Nominal line sizes	¼" to 4" (6 to 100 mm)



## Micro Motion® T-Series Coriolis Meters

Flow range	2.5 to 3200 lb/min (68 - 87,000 kg/hr)
Liquid volume flow accuracy	±0.25%
Gas flow accuracy	±0.50%
Liquid density accuracy	±0.002 g/cm <sup>3</sup> (±2.0 kg/m <sup>3</sup> )
Nominal line size	¼" to 2" (6 to 50 mm)



## Micro Motion® Specific Gravity Meter

Specific gravity accuracy	Up to ±0.1% of reading
Specific gravity range	0-3



## Micro Motion® Fork Density Meter

Density accuracy	±0.1 kg/m <sup>3</sup> (±0.001 g/cc)
Density range	0-3000 kg/m <sup>3</sup> (0-3 g/cc)



## Rosemount® 8700 Magnetic Flowmeter

Liquid flow accuracy	±0.15%
Nominal line size	0.15" to 48"

See product data sheets for complete technical specifications



EMERSON WORLD-LEADING  
FLOW AND DENSITY  
technology

SETS THE STANDARD FOR  
RELIABLE, REPEATABLE,  
HIGH PERFORMANCE  
MEASUREMENT



Emerson's Micro Motion and Rosemount devices are known globally in over 85 countries for quality, reliability, application expertise, and support not available elsewhere.

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