

# Instrumentation for the Water and Wastewater industry



**Application Solutions**

**ROSEMOUNT**<sup>®</sup>

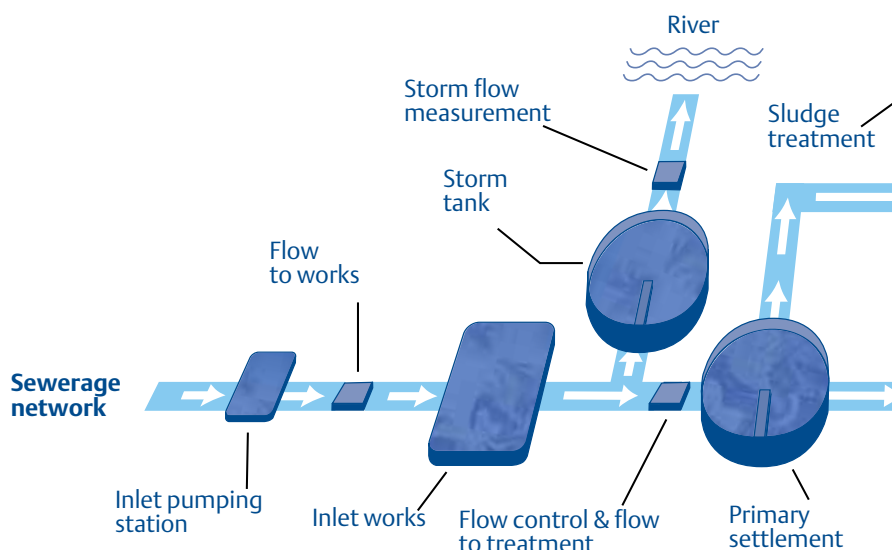
  
**EMERSON**<sup>™</sup>  
Process Management

# Best in class instrumentation for waste water treatment

Today's instrument engineer doesn't have the time to study specifications and suppliers to find the solution to specific application requirements.

With Emerson, we have the complete product portfolio for water industry applications, along with the expertise of our instrument consultants who understand your process and the issues that you face.

Emerson has been providing reliable measurement and control products to the water and wastewater treatment industry for over 50 years. Our instrument consultants can help you with the selection process and provide the support, advice and fast response that you need.



## INLET WORKS

### Inlet pumping station

3100 Ultrasonic level, 9700 hydrostatic pressure transmitters with 3491 programmable pump controllers for automated control of up to 4 pumps  
2051 Pressure transmitter for pumping main pressure

### Inlet flow measurement

8700 Electromagnetic flowmeters for full pipes, 8714i Calibration Verification™ and diagnostics  
3100 Ultrasonic transmitter and 3493 flow controller for open channel flow

### Automatic screen control

3100 Ultrasonic level transmitters and 3492 differential level controllers for automatic control of screen rake system

## PRIMARY TREATMENT

### Sludge blanket monitoring

MSL600 Continuous sludge interface level measurement and/or 433 fixed sludge alarm level sensors for primary settling tanks

### Automatic desludging

MSM400 Sludge density monitor for automatic desludge control

### Sludge density measurement

MSM400 Sludge density measurement directly in tank or in-line pipe measurement

### Sludge thickening

MSL600 Continuous sludge interface level measurement for sludge thickeners

### Sludge holding tanks

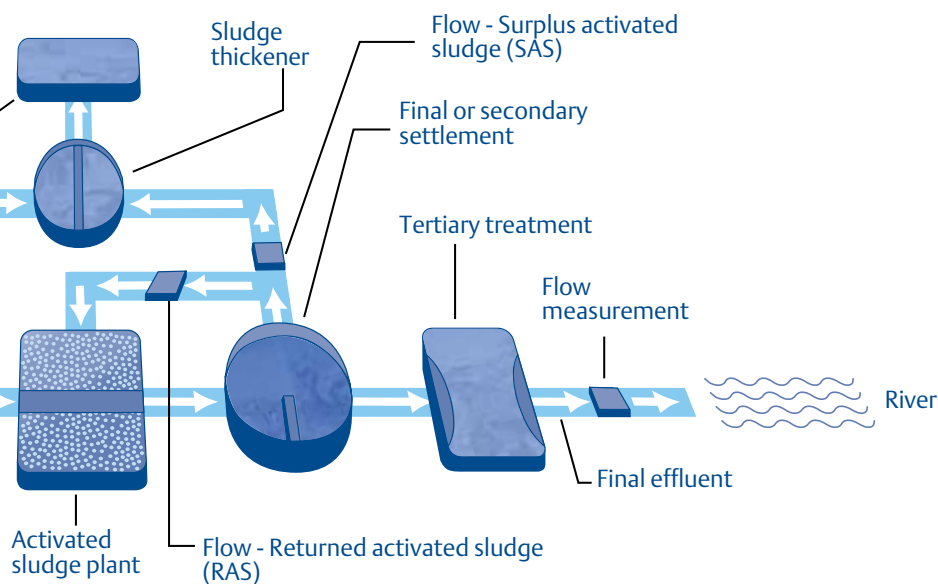
5400 Non-contacting radar level  
5300/3300 Guided wave radar for lime dosing level  
3100 Ultrasonic level for open tanks  
9700 Hydrostatic pressure transmitters  
2051 Pressure transmitter with 1199 diaphragm seals for DP level measurement  
3491 Controllers for level measurement and control

### Sludge transfer

8700 Electromagnetic flowmeters for full pipes, 8714i Calibration Verification and diagnostics

### Sludge digester

5400 Non-contacting radar level



## BIOLOGICAL TREATMENT

### Aeration flow monitoring

485 Annubar® averaging pitot tubes

405 Compact orifice plates

2051 Differential pressure transmitters for volume and mass flow of air to aeration lanes

## SECONDARY TREATMENT

### Final settlement blanket monitoring

MSL600 Continuous sludge interface level

433 Fixed sludge interface level for final and secondary settlement tanks

### Dissolved air flotation (DAF)

2051 Pressure transmitters for air pressure measurement

## TERTIARY TREATMENT

### Level measurement

3100 Ultrasonic level transmitter

9700 Hydrostatic pressure transmitters

3491 Controllers for level measurement and control

### Sand filter backwash control

2051 Differential pressure transmitters for head loss across filters

### Backwash solids detection

433 Ultrasonic interface level sensors and controllers

### Final effluent discharge monitoring

3100 Ultrasonic level transmitter and 3493 flow controller

8700 Electromagnetic flowmeters for full pipes, 8714i Calibration Verification diagnostic

2051 Pressure transmitter for pump discharge monitoring

### Chemical treatment

3100 Ultrasonic level

5400 Non-contacting radar level

2051 Pressure transmitter with diaphragm seal for tank level

3491 Controllers for level measurement and control



MSL600 Sludge blanket level



5400 Sludge holding tank



3107 Open channel flow



3100 and 3300 on effluent sump

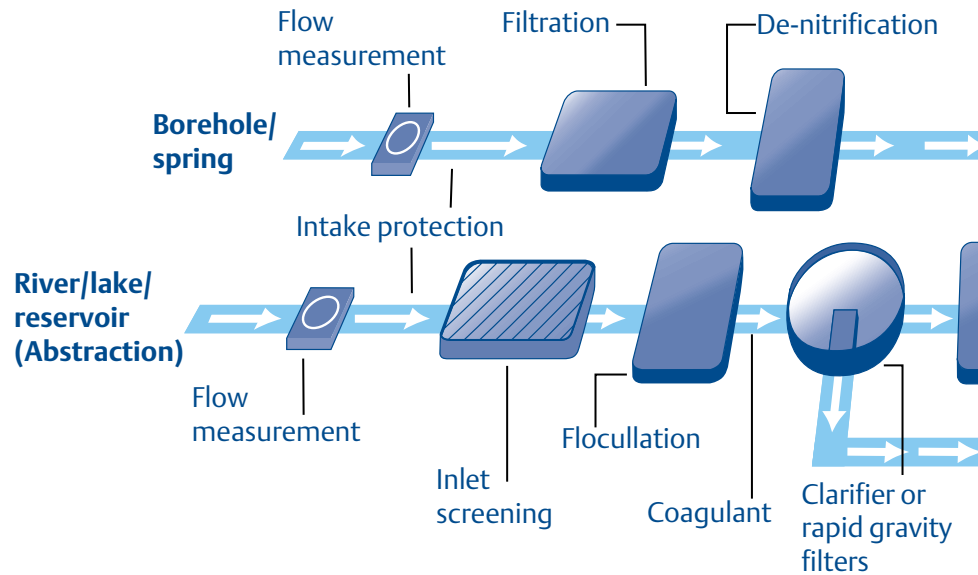


485 Annubar air flow to aeration



433S Sludge interface level

# Best in class instrumentation for clean water treatment



## ABSTRACTION AND BOREHOLE

### Flow measurement: open channel and closed pipe

3100 Ultrasonic transmitter and 3493 open channel flow controller  
8700 Electromagnetic flowmeters for full pipes, 8714i Calibration Verification diagnostic

## INLET MONITORING and SCREENING

### Level measurement

3100 Ultrasonic level  
9700 Hydrostatic pressure transmitters  
3491 Controllers for level measurement and control

### Flow measurement

8700 Electromagnetic flowmeters for full pipes

## FILTRATION

### Level measurement

3100 Ultrasonic level transmitters  
9700 Hydrostatic pressure transmitters  
3491 Controllers for level measurement and control

### Filter backwash control

2051 Differential pressure transmitters for measuring head loss across filters

### Backwash solids detection

433 Ultrasonic interface level sensors and controllers

### Flow to filters and backwash flow

8700 Electromagnetic flowmeters for full pipes

## GAC PLANT

### GAC interface level

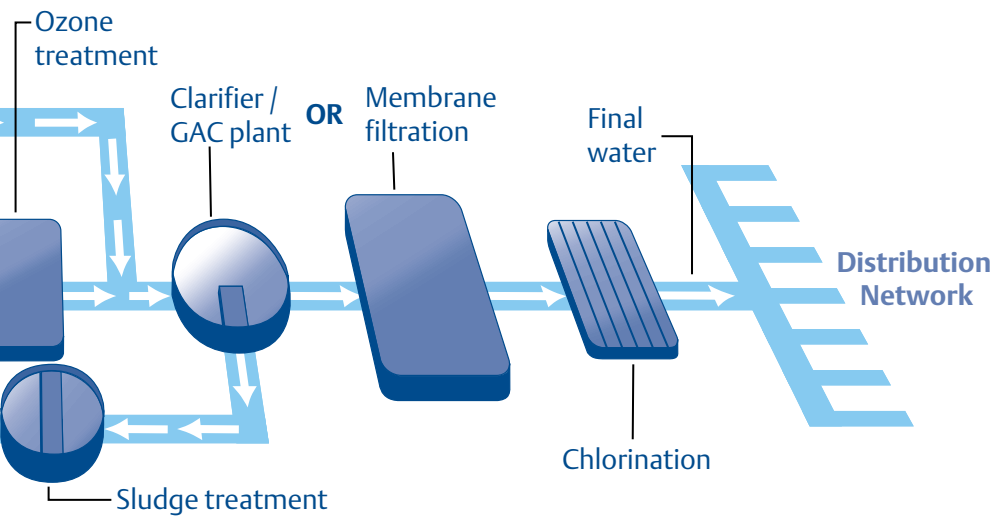
MSL600 Continuous interface level  
433 Fixed alarm interface level sensors

### Level measurement

3100 Ultrasonic level transmitters  
9700 Hydrostatic pressure transmitters  
3491 Controllers for level measurement and control

### Backwash solids detection

MSL600 Continuous interface level, and 433 fixed alarm interface level sensors



## CHEMICAL TREATMENT

### Level measurement

- 3100 Ultrasonic level transmitter
- 2051 Pressure transmitter with diaphragm seal
- 3491 Controllers for level measurement and control

## CLARIFIER

### Sludge blanket monitoring

- MSL600 Continuous sludge interface level, and 433 fixed alarm sludge interface level

### Clarifier level

- 3100 Ultrasonic level transmitters
- 9700 Hydrostatic pressure transmitters
- 3491 Controllers for level measurement and control

## SLUDGE TREATMENT (Waste)

### Sludge blanket monitoring

- MSL600 Continuous sludge interface level, and 433 fixed sludge interface level

### Automatic desludging

- MSM400 Sludge density monitor for initiation of automatic desludge control

### Sludge density measurement

- MSM400 Sludge density measurement for in-tank or in-line pipe measurement

### Sludge holding tanks

- 5400 Non-contacting radar level
- 5300/3300 Guided wave radar for lime dosing level
- 3100 Ultrasonic level transmitters
- 9700 Hydrostatic pressure transmitters
- 3491 Controllers for level measurement and control in closed and open tanks

## DISTRIBUTION NETWORK

### Network pressure

- 2051 Pressure transmitter for pump discharge and network pressure

### Network flow

- 3051S Differential pressure for DP flow fiscal metering
- 8700 Electromagnetic flowmeters for full pipes, 8714i Calibration Verification diagnostic
- 485 Annubar averaging pitot tubes
- 405 Compact orifice plates



2051 Sludge pump pressure



3100 Contact tank level



3108 High accuracy flow over weir



3300 Reservoir level



3107 Pumping station level

# Instrumentation for water industry applications



## 3100 Series Ultrasonic Level Transmitters

Transmitters for level measurement, wetwell, sump pump control and open channel flow measurement.

- Reference accuracy  $\pm 0.25\%$ , measuring range up to 40ft (12m)
- FM, CSA, ATEX, IECEX Hazardous area approval, HART® digital communication
- 2 Wire 24V dc loop powered
- Measures liquid height, distance to liquid, volume or flow in open channels
- Automatic temperature compensation



## 3490 Series Universal Controllers

Wall and panel mounting control units for any 4-20mA or HART compatible transmitter.

- Five fully field programmable relays
- Programme wizards to assist configuration and set-up for level, pump control and flow
- Pre-configured flow curves for weirs and flumes in accordance with ISO / BS standards
- 4-20 mA output, 5 x SPDT relay contacts on controllers
- FM, CSA, ATEX, IECEX Hazardous area approval, HART digital communication
- Data logging of up to 7000 events plus totalized flow



## Rosemount Radar Level Transmitters

Direct level measurement, virtually unaffected by process conditions.

- Repeatability:  $\pm 0.04"$  ( $\pm 1\text{mm}$ )
- 4-20mA output with digital HART communication
- IS or explosion proof FM, CSA, IECEX, ATEX

## 5400 Series Non-contacting radar

Pulsed, free propagating radar for level measurement in liquids

- Wide range of antennas and mounting connections.
- Measuring range up to 98ft (30m)
- Reference accuracy:

Model 5401:  $\pm 0.4"$  ( $\pm 10\text{mm}$ ) - Model 5402:  $\pm 0.12"$  ( $\pm 3\text{mm}$ )

## 3300 and 5300 Series Guided wave radar

Top mounted, level and interface measurement for liquids or solids.

- Wide variety of probe styles and mounting connections
- Measuring range up to 164ft (50m)
- Reference accuracy:

3300:  $\pm 0.2"$  ( $\pm 5\text{mm}$ ), 5300:  $\pm 0.12"$  ( $\pm 3\text{mm}$ )



## 2100 Series Vibrating Fork Level Switches

Level switches using vibrating fork technology for level alarm and control applications

- 4-20mA output with digital HART communications
- IS or explosion-proof FM, CSA, IECEX, ATEX
- WirelessHART™ options
- Extended length to 10ft (3m) available
- Stainless steel wetside with ECTFE/PFA coating option for corrosive applications
- 24-264V dc or ac powered with relay or solid state output



## MSL600 Ultrasonic Continuous Sludge Blanket Level Measurement

For continuous monitoring of sludge blanket interface in primary and secondary settlement tanks and clarifiers and sludge thickeners.

- Graphical display of sludge blanket
- Self cleaning sonar transducer
- 23ft (7m) Measuring range (tank depth)
- 4-20 mA output, 2 x SPDT relay contacts
- On board data logging with user defined logging intervals



## MSM400 Ultrasonic Sludge Density Measurement

Sludge density measurement for primary and secondary sludge and industrial slurries.

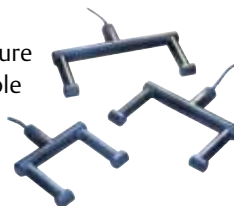
- Sludge density measuring ranges up to 20% solids
- 316SS Tank mounted sensors NEMA type 6P (IP68) rating
- Flanged pipe sections with in-line sensors: 4", 6", 8" (DN100, DN150, DN200) Other sizes on request
- Back lit LCD display on weatherproof wall mounting enclosure
- 4-20 mA output, 2 x SPDT relay output contacts
- Simple calibration using pre-programmed sludge types



## 433 Series Sludge Blanket Level Sensors

Sludge blanket level detection and density measurement for primary and secondary sludge and industrial slurries. Simple sludge level detection using the 433 sensor with either MCU200 or Electrosensor controllers

- 316 Stainless steel tank mounted sensors for blanket level, NEMA type 6P (IP68)
- Flanged pipeline sensors for in-line density, 4", 6" and 8". (100, 150, 200mm) Other sizes on request
- NEMA type 4 (IP65) wall mounting enclosure
- DPDT relay output contacts with adjustable time delays
- Simple configuration and calibration



## 9710 Hydrostatic Level Transmitters

Level measurement for arduous conditions.

- Flush mount ceramic sensor in tough 316SS body
- 2 Wire 24V dc loop powered, 4-20mA output
- Measuring range up to 650ft (200m)
- Low cost installation



## Pressure Transmitters

All models available with flexible Coplanar™ design which helps reduce engineering and installed costs.

### Pressure measurement:

- Reference accuracy  $\pm 0.075\%$  Span (0.065% optional)
- Installed stability = 2 years (5 year optional)
- 100:1 Rangedown

### Differential pressure flow measurement:

- Rosemount 3051S Ultra for flow enables up to 14:1 flow turndown with a single transmitter
- Annubar technology has  $\pm 0.8\%$  of volumetric flow rate accuracy, ideal for large lines due to minimal pressure loss

### Differential pressure level measurement:

- Rosemount Tuned Systems™ optimize performance and lower installed costs
- Multiple direct mount and capillary options to match vessel mounting requirements



## Magnetic Flowmeters

Microprocessor-based SMART instruments using pulsed DC technology providing continuous automatic zeroing to compensate for variations in the process environment.

- All welded construction
- Simple design to enhance reliability
- Available in sizes 0.5 to 72" (12mm to 1.8m)
- Wide selection of wetted materials for compatibility with virtually all conductive fluids
- Advanced diagnostic capabilities, in HART or Fieldbus protocols, reducing commissioning and maintenance time
- NSF approved
- Rosemount 8714i Calibration Verification diagnostic. Allows users to verify calibration without additional equipment
- Verifies both transmitter and flowtube sensor calibration
- No need to remove the meter from the line



# Other water industry products from Emerson include:-



## Rosemount Pressure, Temperature, Flow and Level

The Rosemount product offering includes a complete line of pressure, temperature, flow, level, and safety measurement instrumentation. Throughout the process industries, Rosemount devices are specified more often than any other brand of process instrumentation.



## Rosemount Analytical

Rosemount Analytical offers a comprehensive line of process gas and liquid analyzers, sensors and systems for efficiency, quality, and environmental analysis solutions. Rosemount Analytical instruments and systems will help you maximize performance, productivity and profitability.



## Smart Wireless Networks

Emerson's Smart Wireless networks enable a cost effective solution for measurements that were unattainable previously. The self-organizing network ensures an interoperable, adaptive and flexible approach to wireless. It is secure, robust, infinitely configurable, with data reliability of greater than 99%.



## Instrument and Valve Services

Offering an extensive network of service centers and field service technicians in North America, Emerson's Instrument and Valve Services help build reliability programs to help plants achieve maximum capacity and minimal risk of downtime.

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