

PRACTICAL INDUSTRIAL FLOW MEASUREMENT FOR ENGINEERS AND TECHNICIANS



YOU WILL LEARN HOW TO:

- Describe and compare important existing technologies in flow measurement
- Explain the critical fundamentals of flow measurement
- Specify and design flow measurement systems
- Troubleshoot and install flow instrumentation systems
- Avoid common errors in the installation of flow meters
- Describe and specify emerging technologies

WHO SHOULD ATTEND:

Those in the design, implementation and upgrading of industrial control systems and:

- Instrumentation and control engineers
- Control technicians
- Data systems planners and managers
- Electrical engineers
- Building service designers
- Electricians
- Automation engineers
- Electrical and instrumentation technicians
- Maintenance engineers
- Energy management consultants
- Process engineers
- Power system protection and control engineers



The Workshop

Practical Industrial Flow Measurement is suitable for the engineer, electrician, technician, raftsperson, operator and others who require practical, specialist knowledge for selecting and implementing flow measurement systems.

This workshop is ideal for cross-skill training. The two-day course focuses on typical real-world applications. Close attention is given to special installation considerations and application limitations when selecting and installing different flow instruments.

Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

The Program

DAY ONE

BASIC PROPERTIES OF FLUIDS

- Basic fluid properties
- Non-Newtonian fluids
- Velocity profiles
- Reynolds number
- Flow measurement
- Mass flow rate
- Multi-phase flows

POSITIVE DISPLACEMENT METERS

- Introduction
- Sliding vane
- Oval gear meters
- Lobed impeller
- Oscillating piston
- Nutating disc

INFERENCE METERS

- Turbine meter
- Woltman meter
- Propeller type
- Impeller meters
- Installation recommendations

OSCILLATORY FLOW METERS

- Primary devices
- Sensors
- Application guidelines for vortex flow metering
- Avoiding problems

DIFFERENTIAL PRESSURE METERS

- Basic theory
- Orifice plate
- Tapping points
- Venturi tube meter
- Venturi and flow nozzles
- The Dall tube
- Target meter
- Pitot tube
- Point averaging
- Elbow
- Troubleshooting

DAY TWO

VARIABLE AREA METERS

- Operating principle
- Floats
- Metering tube

ELECTROMAGNETIC FLOWMETERS

- Measuring principle
- Construction
- Conductivity
- Field characterisation
- Measurement in partially filled pipes
- Empty pipe detection
- Field excitation
- The pulsed D.C. field
- Bipolar pulse operation
- Meter sizing

ULTRASONIC FLOWMETERS

- Doppler method
- Transit time meter
- Flow profile
- Frequency difference
- Clamp on instruments
- Velocity of sound measurement
- Factors influencing the velocity of sound
- Beam scattering

- Summary
- Advantages
- Disadvantages
- Application limitations

MASS FLOW MEASUREMENT

- The Coriolis force
- A practical system
- Multiple phase flow
- Density measurement
- Loop arrangements
- Straight through tube
- Application in the food industry
- Applications in the chemical industry
- Summary of Coriolis mass measurement
- Thermal mass meters

OPEN CHANNEL FLOW MEASUREMENT

- The Weir
- The flume
- Level measurement
- Linearisation

SUMMARY, OPEN FORUM AND CLOSING

