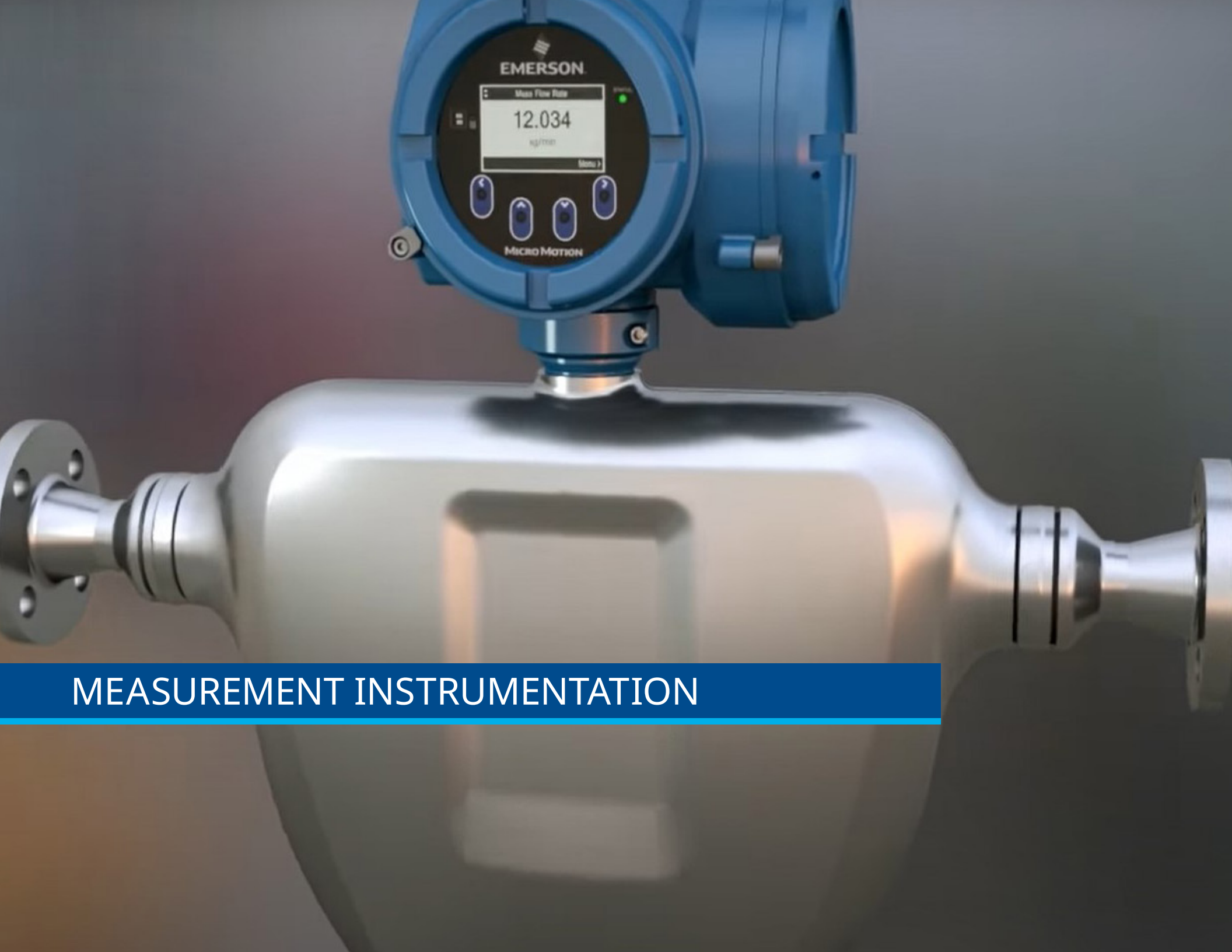




MEASUREMENT INSTRUMENTATION

Measurement Solutions Classroom

In these challenging times when the priority for training your staff can be lost compared to other critical requirements onsite – we have a flexible solution to fit all your different needs, calendars and budgets. From virtual trainings that allow your engineers to access from site or home to sending them to attend the customized training courses in our state-of-the-art training facility be assured that we have you covered.

KEY FEATURES

- State-of-the-art audio/visual technology with fixed mobile cameras & microphones for all virtual training requirements
- Demos to cover all training needs across our entire product portfolio
- Analyzer training center with live gases for both face-to-face and virtual trainings
- Mobile Training skid with full Control System, Flow Loops, Instrumentation and Tank Controls

COURSES OFFERINGS AVAILABLE

- IACET compliant Emerson Standard Courses
- Courses that fall under Fundamentals of Instrumentation, Analytical Instrumentation, Pressure, Temperature, Level Measurement, Flow Measurement, Density Measurement & Rosemount Measurement
- Competency Development Programs

OPPORTUNITIES:

- ✓ Flexible to your needs, timescale and budgets
- ✓ Globally certified expert instructors available to conduct trainings
- ✓ Customize training by job function



Roxar's objectives are to help oil and gas operators **increase oil and gas recovery from their reservoirs, reduce uncertainty and make improved field management decisions.**

The need for training is more critical than ever to achieve and maintain cost-effective operations. Roxar supports all the delivered instrumentation with a range of highly practical training programs.

COURSE ROX007

Roxar - Acoustic Sand Monitor

CEUs : 0.7

Overview

The Roxar Sand Monitor is a non-intrusive acoustic sand monitoring system that identifies in real-time sand production in any water, oil, gas or multiphase flow lines for onshore and offshore locations. This 1-day training course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision-making. The course is available in two versions: SAM Server and Fieldwatch, depending on the system software that your installation is using to operate the instrumentation.

Topics

Introduction to Sand Metering

- Causes of Sand Production
- Why Do we Need Sand Detection System?
- Roxar Sand and Pig Detection System
- System Enclosure, History; Challenge, Integration with Other Products

Measurement Technology

- How Do We Measure - Sand Interface
- Sand Rate Calculation - Sand Detector
- Product Optimization

Operations

- Software and General Set-Up;
- System Overview
- Configure Sensor Parameters
- Process Data Interface: Flow Rate Input,
- Velocity Input, Choke Input, Well Test
- Data Interface
- Alarm Settings Interface, Data Logging
- Basic Interpretation: Basic Noise Estimation,
- Sand Production Estimation
- Adv. Interpretation: Velocity in Signal Interpretation
- Flow Regime Consideration

Maintenance

- Detector Installation: Locations on Pipe,
- Temperature Considerations; - Wiring
- Communication Digital Output, Analogue Output, Volt Free Contact, Lamp Output
- Calibration: Factory Calibration, Background Noise Calibration, Automatic Background Noise Curve (ABA), Sand Noise Calibration
- Sand Transport Capability Indicator
- Sand Mass Correction (L)
- Choke Calibration
- Filtering Settings: Alpha and Beta Filtering of Raw Data, K-Factor
- Preventative Maintenance: Visual Inspection and Routine Testing
- Calibration Adjustment: Background Noise Calibration (Zero Calibration)
- Sand Calibration, Hardware Maintenance: Checking Sensor Connections, Re-installing or Replacing the Detector

CORROSION AND EROSION MONITORING

COURSE ROX008

Roxar - CorrLog - Intrusive Corrosion Monitoring System

CEUs : 0.7

Overview

Our intrusive corrosion monitor 1-day training course will provide your personnel with the knowledge of the Roxar intrusive corrosion monitoring system, providing understanding of the different system infrastructures, components and measurement principles. The course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision-making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics

Introduction to Corrosion Monitoring

- Overview of Corrosion Issues
- Why Corrosion Monitoring?
-

Corrosion Control and Process Optimization

Integrity Management and Safety

- Basic Principles for Selecting Locations for Corrosion Monitoring
- Overview of the Roxar Intrusive Corrosion Monitoring System

Weight Loss Coupons, Electrical Resistance Probes, Linear Polarization Probes, Galvanic Probes

Mechanical Accessories

- Instrumentation
- System Software
- Integrated Flow Assurance Monitoring Systems

Measurement Principles

- Weight Loss Coupons
- Electrical Resistance Probes
- Linear Polarization Probes
- Galvanic Probes

Software Operations

- Verification of the Software
- Configuration and Installation Architecture
- Instrument Specific Parameters
- Raw Data Verification
- Engineer Values

Data Handling and Presentation

Data Interpretation

Reporting

- Exporting Data

Maintenance

- Battery Replacement (Offline Systems Only)
- System Health Check

Replacing Interface Cards



**COURSE RX009****Roxar - SandLog Intrusive Sand Monitoring System**

CEUs : 0.7

Overview

Our intrusive sand monitor 1-day training course will provide your personnel with the knowledge of the Roxar Sand Monitoring System, providing understanding of the different system infrastructures components and measurement principles. The course focuses on teaching the participants what valid and non-valid data is; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision making. The course is available in two versions: MultiTrend & Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics**Introduction to Intrusive Sand Metering**

- Overview of Sand/Erosion Issues
- Basic Principles for Selection Locations for Sand/ Erosion Monitoring
- Erosion Control Integrity & Safety
- Optimizing Flow Rates & Production
- Overview of the Roxar Intrusive Sand/ Erosion Monitoring System

Mechanical Accessories**Sand Erosion Probes****Combined Sand Erosion & Corrosion Probe**

- Electrical Resistance Probes
- Instrumentation
- System Software
- Integrated Flow Assurance Monitoring
- Systems

Measurement Principles

- Electrical Resistance Probes

Sand Erosion Measurements**Correlations with Sand Production Combined Sand Erosion and Corrosion Probe Software Operations**

- Verification of the Software
- Configuration & Installation Architecture
- Instrument Specific Parameters
- Raw Data Verification
- Engineer Values

Data Handling and Presentation**Data Interpretation Reporting**

- Exporting Data

Maintenance

- Battery Replacement (Offline Systems Only)
- System Health Check
- Replacing Interface Cards

CORROSION AND EROSION MONITORING

COURSE ROX010

Roxar - FSM

CEUs : 1.4

Overview

Corrosion is a major cost in the oil and gas as well as other industries, and frequently being the reason for accidents and unplanned interruptions in production plans. Corrosion monitoring is thus important for verification of the assets integrity. Roxar's FSM (Field Signature Method) system is a non-intrusive system for monitoring internal corrosion in pipes, pipelines or vessels directly in the pipe wall. Our Non- Intrusive Corrosion Monitor 2-day training course will provide your personnel with the knowledge of the Roxar non-intrusive corrosion monitoring system, understanding of the different system infrastructures, components and measurement principles. The course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order

to provide input to integrity managers to enable better decision making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics**Introduction**

- Overview of Corrosion Issues
- Why Corrosion Monitoring?

Corrosion Control and Process Optimization**Integrity Management and Safety**

- Basic Principles for Selecting Locations for Corrosion Monitoring
- Overview of the Roxar FSM System
- Mechanical Components

Buried System

- Instrumentation
- System Software
- System Infrastructure
- Integrated Flow Assurance Monitoring Systems

Measurement Principles

- Field Signature Method

Software Operations

- Verification of the Software Configuration and Installation Architecture
- Instrument Specific Parameters
- Raw Data Verification
- Signature
- Engineering Values

Data Handling and Presentation**Data Interpretation****Reporting**

- Exporting Data

Maintenance

- Battery Replacement (EX Version)
- System Health Checks

COURSE ROX011

Roxar - Hydraulic Retrieval & Access Fitting System

CEUs : 0.7

Overview

The objective of this course is to give the participant an overview of the Hydraulic Retrieval & Access Fitting System. The focus of this 1-day course is to bring awareness of working safely and efficiently with the tool and safe work practices. It will explain the design and operations of the tool and the fitting, and is recommended for anyone who will work with retrieval operations using our hydraulic retrieval system. Physical demonstrations with retrievers, service valves and retractors on non-pressurized stands may be arranged by special request.

Topics**Introduction**

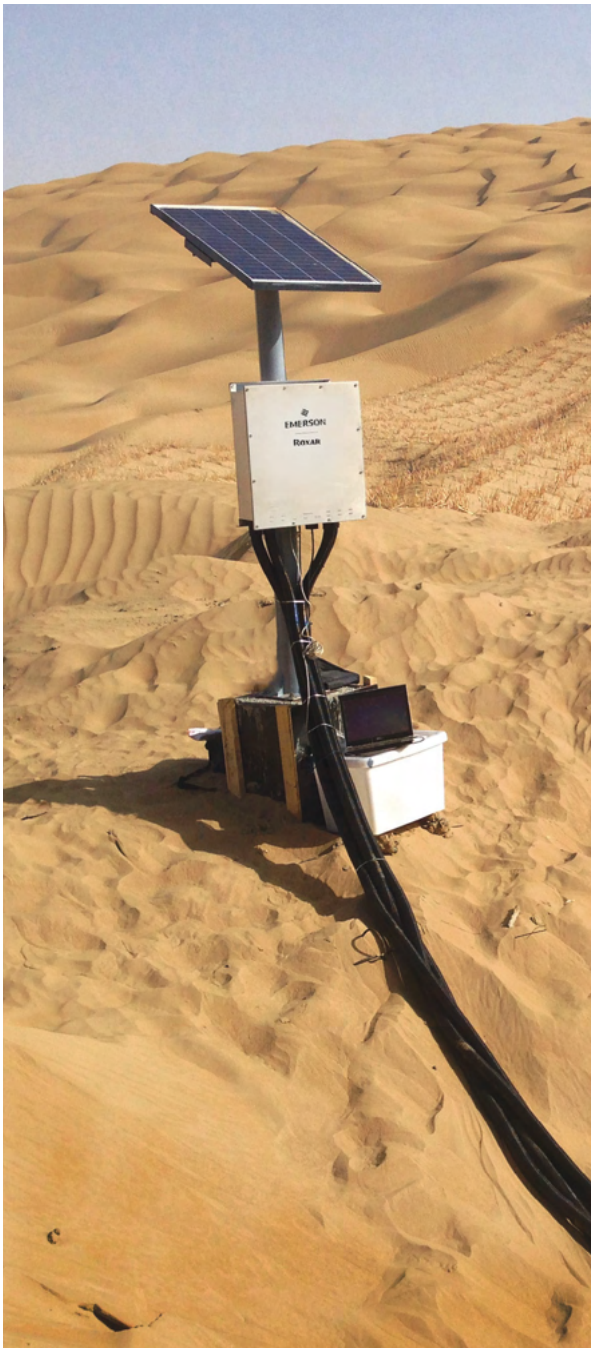
- The Hydraulic Access Fitting and its Components
- The Hydraulic Tool Retrieval and its Components
- Different Variations of the Tool (PED/Non-PED)

Theoretical Operation

- Videos
- Theoretical Run through the Operation
- Understanding How the Tool Works
- Safe Operation of the Tool
- Troubleshooting and Maintenance

Practical Operation

- Practical Troubleshooting
- Focus on Getting Comfortable using the Tool
- Repeated Operations
- Maintenance After Use
- Practical Exam

**COURSE ROX001****Roxar - Multiphase Meter 1900VI**

CEUs : 2.1

Overview

The Roxar topside Multiphase meter measures accurately the flow rates of oil, gas and water without separation, mixing or moving parts. Field experience shows long term stability, high accuracy and very good repeatability. The objective of the 3-days Roxar MPFM 1900VI course is to provide the participant with an understanding of the multi phase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set-up and configuration; calibration data, reference fluid parameter set-up and operation of the meter. The course will cover interpretation and correlation of MPFM parameters versus influences of process conditions.

Topics**Introduction to Multiphase**

- Metering of Oil & Gas Production
- Purpose of the Roxar Multiphase Meter
- Multiphase Flow and Terminology
- Roxar Multiphase Sensors and Electronics

Measurement Technology

- Overview of the Measurement System
- Measurement Principles used in Roxar MPFM 1900VI
- Determination of Flow Rates
- Velocity Measurements: Pressure,
- Temperature & Volume
- Verification of the Measurements - which Factors have Vital Importance for Design and Process Calculation

Operations

Overview of Roxar MPFM 1900VI

Operation System

- Service Console Software Installation and Main Screen Presentations
- Communication Set-Up
- Calibration and Reference Fluid Parameter Set-Up
- Purpose of the Service Console Program (SCP)
- Interpretation of the SCP screen Diagnostics
- SCP Screen Alarm Indication, Configuration of the Multiphase Meter
- Practical Information on How to Access and Save Parameter Files;
- Practical Information on How to Log and Retrieve Data; Well Test Options

Maintenance

- Test Equipment and Recommended Spare Parts
- Main Checks and Intervals
- Radiological survey (Topside)
- Reference Fluid Density Parameter Set-Up
- Reference Permittivity and Conductivity
- Temperature, Pressure and Differential
- Pressure Function Check
- Capacitance Unit Function Check
- Inductive Unit Function Check
- Densitometer Unit Function Check

Roxar - Multiphase Meter 2600

CEUs : 1.4

Overview

The Roxar Zector technology provides accurate and real-time characterization of flow patterns. The voxel-based signal processing and electrode geometry provides information, including multiple flow velocity data and near wall measurements. The objective of the Roxar MPFM2600 2-days course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set up and configuration; calibration data, reference fluid parameter set up and operation of the meter. The course will cover interpretation and correlation of MPFM parameters versus influences of process conditions. Understanding the data is the key in order to make the right decisions for reservoir management.

Topics

Introduction to Multiphase Metering

- Single Phase Metering/ Multiphase Metering
- Flow Regimes
- Roxar's Experience in Multiphase Metering
- Roxar MPFM2600
- Mechanical Design

Mechanical Specifications

- Installation and Commissioning Instructions
- Measurement Technology
- Overview of the Measurement System
- The Principle of Operation (Phase Fraction Measurement, the Gamma Densitometer, Velocity Measurement, PVT Tables, Phase Slip, Static Properties)

Software Operations

- Overview of Roxar MPFM Operation System
- Installation and Start Up of the Service Console
- Software Operations: Practical Information on How to Access and Save Parameter Files, Logging and Retrieving data, Well Test Options

Maintenance

- Overview of the Mechanical System
- Maintenance
- Gamma System
- Electrical System
- Calibration
- Replacement of Parts

PVT

- What is PVTx
- Fluid Analysis: Sampling, Compositional Data
- Tempest PVTx
- Import Tables
- Parameter Save and Download; Diagnostics;
- Troubleshooting



ROXAR METERING

COURSE ROX003

Roxar - Subsea Multiphase Meter

CEUs : 1.4

Overview

The Roxar subsea Multiphase meter provides flow rates for oil, gas and water; vital information for managing reservoirs and processes. The objective of the Roxar SMPFM 2-days course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The objective of the Roxar Subsea Multiphase Meter course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set up and configuration; calibration data, reference fluid parameter set up and operation of the meter. The course will cover interpretation and correlation of SMPFM parameters versus influences of process conditions. Understanding the data is the key to make the right decisions for reservoir management.

Topics**Introduction to Multiphase Metering**

- Single Phase Metering/Multiphase Metering
- Flow Regimes
- Roxar's Experience in Multiphase Metering
- Roxar SMPFM
- Well Testing, Monitoring and Allocation

Mechanical Specifications

- Roxar SMPFM Components
- Versions of the Meter

Measurement Technology

- Overview of the Measurement System
- The Principle of Operation (Phase Fraction Measurement, the Gamma Densitometer, Velocity Measurement, PVT Tables, Phase Slip, Static Properties)

Software Operations

- Overview of Roxar SMPFM operation system
- Installation and Start-Up of the Service Console
- Software Operations: Practical Information on How to Access and Save Parameter Files, Logging and Retrieving Data, Well Test Options
- Well Test
- Creating Diagnostic Files
- Setting Up Fluid Parameters

Maintenance

- Gamma System
- Electrical System
- Calibration
- Software Updates
- Sensor Geometry

PVT

- What is PVTx
- Fluid Analysis: Sampling, Compositional Data
- Tempest PVTx
- Import Tables



ROXAR METERING

COURSE ROX006

Roxar - Subsea Watercut Meter

CEUs : 0.7

Overview

The Roxar Watercut meter measures water in oil (0% to 100%) and is used in process control on test separators, fiscal metering, on- and offloading, export metering, desalting in refineries, two phase flow metering. The Roxar Watercut meter uses a unique and patented microwave resonance technology to measure the permittivity of an oil/water mixture with an extremely high level of accuracy and sensitivity. The aim of this 1-day course is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run the instrument on their own, including delivering on-site quality reliable data, do normal routine maintenance, fault finding and troubleshooting.

Topics**Introduction to Water Cut Metering and Technology**

- Why Measure Water Cut?
- Water Cut Metering Challenges
- Water Cut Metering Requirements
- Technology for Water Cut Measurement

Operations

- Connecting to the Meter
- Software Operations: Entering the Meter, Configuration Measurement
- Inline Calibration of the Meter
- Measurement Uncertainty
- Practical Exercises on Meter Electronics

Measurement Technology

- How Do We Measure Water Cut Installation
- Microwave Signal Path
- Entrapment of Microwaves in a Pipe
- Microwave Resonance
- Permittivity of Oil and Water
- Water Continuous and Oil Continuous Phase
- The Tables of Water Cut Made from the First Meter
- The Production of the Meters to Fit the Model of the First Meter
- The Production Sequence in a Meter Measurement Uncertainty and Initial Explanation

Maintenance

- Overview of Recommended Maintenance
- Turning Diagnostics and Logging of Hyper Terminal
- Taking a 50dB Plot of Microwave Electronics
- Common Error Messages
- Sending Diagnostic Data to Roxar for Analysis and Filing
- Download New Code for a Meter
- Erasing Battery Backed RAM in a Meter
- Troubleshooting the Temperature Transmitter Practical Exercises



COURSE ROX004**Roxar - Wetgas Meter**

CEUs : 0.7

Overview

The Roxar Wetgas Meter is a unique instrument allowing accurate measurement of hydrocarbon flow rates and water production, with a very compact mechanical solution. The aim of this 1-day training is to provide the participants with in-depth knowledge of instrument operation, which enables participants to take full advantage of the meter in real applications. Course participants will be taught the intricacies of the meter and measurement technology, understanding of the data and the measurement principles will allow better decision making when it comes to reservoir management and optimizing the production process.

Topics**Introduction to Wetgas**

- Introduction
- Wet Gas
- Why Measure Water?
- Multiphase Flow
- Flow Conditions
- Ranges and Specifications
- Installation Examples

Mechanical Specifications

- Material Overview
- Design Standards
- WGM Components
- Cathodic Protection and HISC
- Insulation and Coating
- Testing

Measurement Technology

- Overview of the Measurement System
- The Principle of Operation
- Direct Measurement and Required Inputs
- Fraction Calculations
- Formation Water Detection
- Calculation Modes
- Redundancy

Operations and Maintenance

- Pre-Commissioning Phases
- Commissioning and Start Up
- Communication
- Roxar WGM Console
- Meter Operation
- Alarms and Warnings
- Calibration (Describe All Alternatives)
- Maintenance

COURSE ROX005**Roxar - Subsea Wetgas Meter**

CEUs : 0.7

Overview

The Roxar Subsea Wetgas meter is a unique instrument allowing accurate measurement of hydrocarbon flow rates and water production with a very compact mechanical solution. The aim of this 1-day training is to provide the participants with in-depth knowledge of instrument operations which enable participants to take full advantage of the meter in real applications. Course participants will be taught the intricacies of the meter and measurement technology, understanding of the data and the measurement principles will allow better decision making when it comes to reservoir management and optimizing the production process.

Topics**Introduction to Wetgas**

- Introduction
- Wet Gas
- Why Measure Water?
- Multiphase Flow
- Flow Conditions
- Ranges and Specifications
- Installation Examples

Mechanical Specifications

- Material Overview
- Design Standards
- SWGM Components
- Cathodic Protection and HISC
- Insulation and Coating
- Testing

Measurement Technology

- Overview of the Measurement System
- The Principle of Operation
- Direct Measurement and Required Inputs
- Fraction Calculations
- Formation Water Detection
- Calculation Modes
- Redundancy

Operations and Maintenance

- Pre-commissioning Phases
- Commissioning and Start Up
- Communication
- Roxar SWGM Console
- Meter Operation
- Alarms and Warnings
- Calibration (Describe All Alternatives)
- Maintenance

Introduction to Tempest ENABLE

CEUs: 2.1

Overview

Tempest ENABLE provides mathematical support to reservoir engineers in their use of reservoir simulation software. This support allows engineers to complete tasks like history matching much more quickly than using the simulator on its own, and provides a more rigorous approach to predicting future reservoir performance or optimizing field development. In this introductory course, students learn how to perform history matching and prediction uncertainty using Tempest ENABLE in conjunction with the reservoir simulator. The course normally uses the Tempest MORE simulator, but can also be run with Eclipse and some proprietary simulators, as per demand.

Duration

3-days

Topics

Intended for

Reservoir engineers with background knowledge or hands-on experience in reservoir simulation technology

Overview & Project setup

- Overview of ENABLE
- Setting up an ENABLE project
- Setting up and importing the deck
- Setting up modifiers
- Scoping runs
- ENABLE theory 1: Statistical approach and its impact
- Setting up and importing history

History Matching

- Selecting history match points
- Using the stochastic estimator
- Refinement runs
- ENABLE theory 2: Refinement runs
- Analyzing results and managing plots
- Qualities & tolerances
- Automation macros
- Import & export

Prediction & Optimization

- Analyzing qualities & modifiers
- Results calculator
- Confidence Intervals
- Multiple scenarios
- User functions
- Using ENABLE for Appraisal and optimization



RMS for Reservoir Geologist Specializing in Property Modeling

CEUs: 3.5

Overview

The complete geological 3D modeling workflow is covered, from data I/O to volumetrics. Facies modeling and petrophysical modeling are covered to an advanced level, making the course particularly relevant to those geologists who will focus on this part of the characterization workflow.

Duration

5-days

Intended for

Reservoir geologists. No previous RMS experience required.

Topics

Orientation

- Project panel and data layout
- Visualization - multi-viewer, map views
- 3D views, correlation views
- Creating cross sections
- Printing & plotting
- Setting up workflows
- Project units

Structural Modeling

- Data loading horizons, wells, well picks and isochores
- QC & cross check of horizon & well data
- Fault surface creation and truncation
- Fault QC tools
- Creating the horizon model
- Data filtering and updating the horizon model
- Adjusting the structural model to zone logs
- 3D grid - creating, visualizing and QC

Facies Modeling - Basic

- Blocked wells - creation & visualization
- QC of blocked wells using statistics, well log editor and data analysis
- Object based facies modeling
- Pixel based facies modeling
- Combining facies techniques

Facies Modeling - Advanced (fluvial, shoreface & delta and turbidite environments will be modeled)

- Using proportions and variograms to influence lateral distribution
- Creating and editing a body log
- Generating a facies log from well data
- Correlating channels in 3D space
- Modeling crevasses
- Using vertical proportion curves
- Using seismic data to distribute facies
- Creating average facies maps
- Working with progradational/ retrogradational systems
 - Progradational direction, stacking angles, facies interfingering & curved boundaries
- Using 'backbone' objects to influence facies body shapes and direction in a turbidite environment
- Using sedseis

Petrophysical Property Modeling

- Interpolation of well data - basic and conditioned to facies
- Stochastic petrophysical property modeling - basic distribution
- Water saturation - using trends and variable contacts
- Volumetrics

COURSE KBA-01114-Y9F5Y4

Intro to 3D Geological Modeling in RMS CEUs: 2.1**Overview**

Geologists are taken through the full 3D static modeling workflow to enable new users to return to their office and confidently build a model from data I/O to volumetrics.

Duration

3-days

Intended for

Reservoir Geologists. No prior RMS training required

Topic**Orientation**

- Project panel and data layout
- Visualization - multi-viewer, map views,
- 3D views, correlation views
- Creating cross sections
- Printing & plotting
- Setting up workflows
- Project units

Structural Modeling

- Data loading horizons, wells, well picks and isochores
- QC & cross check of horizon & well data
- Fault surface creation and truncation
- Fault QC tools
- Creating the horizon model
- Data filtering and updating the horizon model
- Adjusting the structural model to zone logs
- 3D grid - creating, visualizing and QC

Facies Modeling

- Blocked wells - creation & visualization
- QC of blocked wells using statistics, well log editor and data analysis
- Object based facies modeling
- Pixel based facies modeling
- Combining facies techniques

Petrophysical Property Modeling

- Interpolation of well data - basic and conditioned to facies
- Stochastic petrophysical property modeling - basic distribution
- Water saturation - using trends and variable contacts
- Volumetrics
- Model updating

COURSE KBA-01120-P5Y0P0

Advanced Property Modeling in RMS CEUs: 2.1**Overview**

Building on the facies & petrophysical property modeling material covered in the basic geological modeling course, this advanced module focuses on detailed 3D modeling in a variety of sedimentary environments, to give the necessary skills with which to tackle any environment with a best practice approach.

Duration

3-days

Intended for

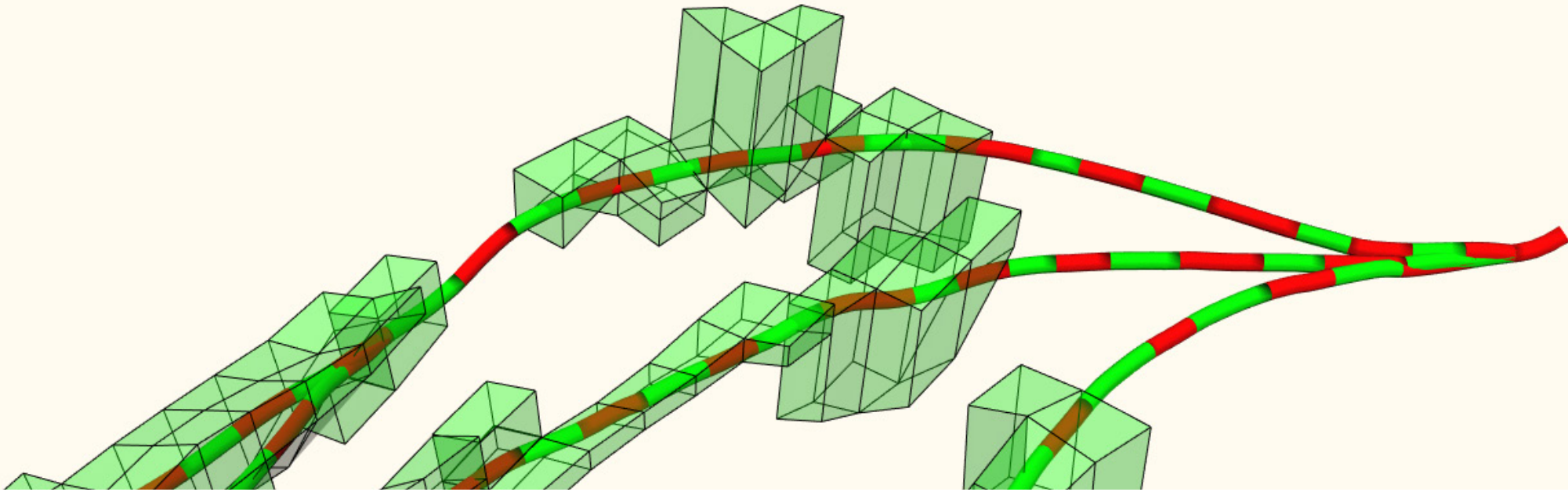
Reservoir geologists who have completed an introductory course or have RMS experience

Topics**Facies Modeling, advanced (fluvial, shoreface & delta and turbidite environments will be modeled.)**

- Using proportions and variograms to influence lateral distribution
- Creating and editing a body log
- Generating a facies log from well data
- Correlating channels in 3D space
- Modeling crevasses
- Using vertical proportion curves
- Using seismic data to distribute facies
- Creating average facies maps
- Working with progradational/ Retrogradational systems - Progradational direction, stacking angles, facies interfingering & curved boundaries
- Using 'backbone' objects to influence facies body shapes and direction in a turbidite environment
- Using sedseis

Petrophysical Property Modeling

- Interpolation of well data - basic and conditioned to facies
- Stochastic petrophysical property modeling - basic distribution
- Water saturation - using trends and variable contacts
- Volumetrics
- Model updating



COURSE KBA-01213-Y3W9G6

Model Driven Interpretation in RMS

CEUs: 1.4

Overview

A new module in RMS 2013, Model Driven Interpretation provides a fresh, unique approach to interpretation of any geophysical surveys and data, including 2D & 3D seismic, attributes & inversion models. Centered on the concept of the Agile Model, interpreted surfaces are generated using RMS's proprietary structural modeling algorithms, which imparts geological consistency from the outset, and enables complex structures to be created very easily. The integrated workflow flows from data right through to structural modeling. Interpreters and modelers can also capture the geophysical uncertainty during the interpretation process, and this uncertainty can be carried through the full structural modeling workflow to explore different configurations matching the interpretation, as well as uncertainty maps to help determine areas that might need further work.

Duration

2-days

Intended for

Geophysicists, geologists & RMS modelers

Topic

- Students are guided through a full interpretation workflow, from data import to the structural model, and learn about inherent data uncertainties and how to evaluate uncertainty in the interpretation context.
- Import & visualize SEG-Y data
- Interpretation concepts and techniques - create a new interpretation
- Measuring uncertainty during interpretation
- Geo-entities : connecting the interpretation to reservoir geology
- Velocity modeling and depth conversion
- Build a structural model from the interpretation
- Refining an existing interpretation
- Well ties
- Fault uncertainty (quick overview)

Reservoir Simulation using Tempest MORE and Tempest PVTx

CEUs: 3.5

Overview

The course is designed for reservoir engineers looking to create and run EOS compositional simulation models using Tempest. A thorough overview of this highly visual, easy to use & comprehensive suite is given, with practical examples used throughout on both black oil and compositional simulation technology.

Duration

5-days

Intended for

Reservoir Engineers

Topic

Participants with a reservoir engineering background are guided through the workflow required to create EOS compositional simulation models in Tempest MORE, perform compositional simulation runs and analyze results. After an initial overview of Tempest functionalities, a step by step approach is used to prepare EOS compositional simulation datasets, perform runs and view the simulation results. Through interactive EOS modeling the participants will learn how to use Tempest-PVTx to build the fluid data needed for EOS compositional simulation. The created fluid data files will be imported to Tempest-MORE for simulation. Exercises for both Tempest-PVTx and compositional simulation with Tempest- MORE are provided and on completing the course, engineers will be confident in generating and running compositional simulation models on their own data.

Black oil simulation

- Introduction to the Tempest suite and an overview of Tempest VIEW pre & post processing
- Visualizing and editing the input model
- Setting up a simulation using the simulation wizard
- Viewing simulation output
- DAT file & grid coarsening
- Fluid file. Set up of simulation models: black oil, dry gas, wet gas & retrograde gas, compositional, polymer, thermal and coal bed methane
- Relative permeability file
- GRID file
- INT file
- Recurrent file

EOS simulation

- Highlight similarities and differences between Black Oil and EOS Compositional simulation in Tempest
- Set up EOS simulation cases using the Tempest MORE Simulation Wizard
- Tempest Data Explorer for pre-processing
- Run a simulation and perform post processing on results
- Generate/review/run various EOS simulation cases

PVTx

- Use Tempest PVTx to interactively create reservoir fluid models
- Hydrocarbon composition and fluid properties
- Perform fluid characterization and phase behavior
- Laboratory techniques and model PVT experiments used in petroleum engineering and process applications
- Equation of State (EoS)
- Flash calculations
- Regression
- Export reservoir fluid models from Tempest
- PVTx into simulators

Reservoir Simulation using Tempest

Overview

The course is designed for reservoir engineers looking to create and run simulation models using Tempest. A thorough overview of this highly visual, easy to use & comprehensive software is given, with practical examples used throughout.

Duration

3-days

Intended for

Reservoir engineers

FLOW & DENSITY MEASUREMENT



COURSE D4520

Hydrocarbon Liquid Flow Measurement Systems Operation and Maintenance

CEUs: 2.1

Overview

This 3-days course provides students with a detailed understanding of the principles of measurement for Hydrocarbon Liquids. Consideration of the correct Primary measuring device, its installation, operation, and secondary instrumentation requirements will be explained. The instructor will reference applicable standards, used for design, and to optimize system performance. This includes system calibrations, meter-proving practices and maintenance. Full supporting literature will be made available to students.

Prerequisites

A basic knowledge of flow measurement is required.

Topics

- Background to Liquid Flow Measurement
- Commercial and Legal Requirements
- Principles of Current Liquid Flow
- Measurement Techniques
- Secondary instrumentation, including Liquid Samplers
- Meter Operation, Calibration and Meter Proving Operations
- Maintenance Procedures
- Reporting and Book Keeping

COURSE D4510

Hydrocarbon Gas Flow Measurement Systems Operation and Maintenance

CEUs: 1.4

Overview

This 2-days course provides students with a detailed understanding of the principles of measurement for Hydrocarbon Gases. Consideration of the correct Primary measuring device, its installation, operation and secondary instrumentation requirements will be explained. The instructor will reference applicable standards, used to design the system to optimize performance. This includes system calibrations and device maintenance. Full supporting literature will be made available to students.

Prerequisites

A basic knowledge of flow measurement is required.

Topics

- Background to Gas Flow Measurement
- Commercial and Legal Requirements
- Principles of Current Gas Flow Measurement Techniques
- Secondary Instrumentation, including Gas Quality Analyzers
- System Design Standards Used
- Meter Operation, Calibration and Master Metering Operations
- Maintenance Procedures
- Reporting and Book Keeping

FLOW & DENSITY MEASUREMENT

COURSE D4230/D4280

Operation and Maintenance of Gas/Liquid Ultrasonic Meters

CEUs: 1.4

Overview

This 2-days course prepares students to install, operate and maintain multipath ultrasonic flow meters. In addition to classroom instruction, the training course includes hands-on experience using the flow meter, simulator and diagnostic software.

Topics

- Basics of Sound Waves
- How Ultrasonic Flow Meters Work and their Advantages over other Meters
- The Performance Characteristics of Transit Time Ultrasonic Flow meters
- System Components and Mark III Electronics, including the Central Processing Unit (CPU) Board and the Option Board Meter Mechanics
- Removal and installation of Transducer Assemblies
- Volumetric and Mass Ultrasonic Gas Flow Measurement
- Meter Installation Considerations
- Inform the instructor if working on Liquid Meter

COURSE D4100

Introduction to Model 500 and 700 Gas Chromatographs

CEUs: 2.1

Overview

This 3-days course provides students with a basic understanding of how a gas chromatograph works, emphasizing chromatograph fundamentals and basic theory. The only prerequisites are basic computer skills and DMS provides an experienced on-site instructor as well as all necessary equipment and handouts for the course.

Topics

- Basic Chromatography Principles and Their Application to Gas Measurement
- Basic Chemistry, Flow Configuration and Carrier and Calibration Gas Systems
- Basic Sample Systems
- Basic Chromatograph Hardware
- Times Events, Retention Times, Response Factors
- Calculations & Control Parameter
- Using Chromatograms to Identify Problems
- Identifying Gas Components
- Calibrating a Gas Chromatograph
- Operation of MON Software

COURSE D4510

Hydrocarbon Gas Flow Measurement Systems Operation and Maintenance

CEUs: 1.4

Overview

This 2-days course covers the operation, installation and maintenance of the Compact Prover.

Prerequisites

Basic knowledge of flow measurement.

Topics

- Theory of Operation: Double Chronometry and Specifications
- Overview of the Parts Which Make up the Compact Prover such as Actuator Assembly, Pneumatic Spring Chamber, Piston and Poppet, Optical Switches, Hydraulic Motor and Pump, and Solenoid Valve
- Installation: Prover and Meter Location, Nitrogen Spring Plenum Setting, and Power requirements
- Troubleshooting and Repair of: safety Barriers, Seal and O-ring Replacement, Detector Switches, Interface Board, Hydraulic and Nitrogen System, and Spare Parts
- Overview of Calibration: Seal Leak Test, Upstream and Downstream calibration and Waterdraw Data Sheet
- Overview of Prover Electronics:
- Programming, Input and data Modes Using Software/Local Display, Circuit Module Description and Diagnostics
- Proving Operations: Direct Proving and Master Meter Proving
- Prover Maintenance

FLOW & DENSITY MEASUREMENT

COURSE D4260/D4262

Operation and Maintenance of S600/S600+ Flow Computers

CEUs: 1.4

Overview

This 2-days course provides students with an appreciation of the operation, design, capabilities and configuration of the S600/ S600+ flow computer. This hands-on course deals with file transfer and machine recovery as part of the maintenance scope. The instructor will make use of the latest configuration software. Full supporting literature will be made available to all students.

Prerequisites

Basic knowledge of flow measurement.

Topics

- Introduction to the S600/S600+
- Board Removal and Layout
- Keypad Access and Security
- Menu Navigation
- Data/Mode Changing
- Alarm Handling and Configuration Configuring and Generating Reports Application Specific Functions
- Cold/Warm Starting Modes
- File Back-Up and Download
- Using the configuration Software

COURSE D4530

Understanding Metering Systems: Applications, Operations and Maintenance

CEUs: 1.4

Overview

This 2-days course is an introduction to high accuracy fluid flow measurement systems. The instructor will explain the practical application of gas and liquid flow meters and secondary instrumentation as well as the liquid sampling and gas analysis techniques for measuring product quality. Good practice for System operation and maintenance will also be discussed. Supporting literature will be supplied to students.

Prerequisites

A background in process control or process instrumentation is required.

Topics

- Background to High Accuracy Fluid Flow Measurement
- Custody Transfer, Fiscal and Allocation Metering
- Commercial Agreements and Legal Requirements
- Flow Measurement Methods
- Qualitative Measurement
- Reference Standards Employed
- Flow and Energy calculations
- System Maintenance
- Good Metering Practices

COURSE D4540

DanPac Measurement and Control System Introduction to Operation and Maintenance

CEUs: 1.4

Overview

This 2-days generic course provides students with an operational introduction to the Danpac Measurement & Control System. The instructor will explain the metering system architecture, its function and administration. As well as showing how to navigate the operator interface, the course covers basic troubleshooting. The instructor will also explain the features and benefits of the control options available within DanPac. Students will receive supporting literature.

Topics

- Introduction to the DanPac System Architecture
- Operator Interface Graphics and Controls
- Access and Security
- Communication and Interface to System Field Components Reporting and Alarm Functions
- Simple Diagnostics and Troubleshooting

*More detailed training for a specific project application is also available and will be quoted on request.

Prerequisites

A background in flow measurement is required.

COURSE 2380

Micro Motion Coriolis Comprehensive Training Class

CEUs: 1.4

Overview

This 2-days class is modeled after the 2352 factory course. It consists of a blend of lectures and extensive hands-on exercises that cover the installation, configuration and calibration of the Micro Motion metering system. Students will learn the Series 1000/2000 transmitters using either ProLink® III, AMS Device Manager, HC475 or L.O.I. Students will perform a master reset, configure the Series 1000/2000, perform a flow calibration and solve troubleshooting problems. Based on student need, we will cover one or all of the following topics: RFT9739, 9739MVD transmitter, T-Series, R-Series, or Series 3000 platform. Onsite classes can be customized to cover the customer's installed base, preferred configuration tools and application questions. This course also includes an introduction to Micro Motion's new 5700 transmitter.

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis Meter Works and the Function of the Key Components
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Configure the Metering System to Measure Flow, Density and Temperature for Various Applications
- Learn a Step by Step Process to Perform
- Basic Troubleshooting of the Most Common Meter and Process Issues

Audience

This class is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion flow and density meter. Typical job functions include, maintenance technicians, instrument technicians and instrumentation engineers.

Prerequisites

Basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing are assumed.

FLOW & DENSITY MEASUREMENT

COURSE 2358

Micro Motion Coriolis Product – Intermediate

CEUs: 0.7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting of Micro Motion sensors with the Series 1000/2000 transmitters and peripherals. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broader range of equipment based on the needs of the attendees.

After completing this training, students will also get unlimited access to the Micro Motion's Online Training (e2353) for a year. This online training cost \$400/license per year if purchased separately.

Prerequisites

A basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed

Topics

- Explain the Fundamentals for how a Micro Motion Coriolis Meter Works and the Function of the Key Components
- Be able to apply the installation best practices for orienting, mounting and wiring the sensor and transmitter
- Configure the Metering System to Measure Available Process Variables from the Device for Their Application
- Learn a Step by Step Process to Perform
- Basic Troubleshooting of the Most Common Meter and Process Issues



FLOW & DENSITY MEASUREMENT

COURSE 2340

Rosemount 8700 Series Magnetic Flowmeter

CEUs: 0.7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Magnetic flowmeter. Typical job functions include: maintenance technicians, instrument technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover how to install, configure and maintain the Rosemount 8700 Series Magnetic Flowmeter Systems composed of the Model 8712 and 8732 transmitters and the 8705 Flanged and 8711 Wafer Sensors. The students will learn the operation and capabilities of Local Operator Interface (LOI), 475 Field Communicator, and/or AMS Device Manager and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

Prerequisites

Knowledge of basic flow fundamentals and instrumentation.

Topics

- Explain the Difference and Capabilities of the Rosemount 8700 Series Magnetic Flowmeters
- Identify Transmitter and Sensor Parts and Explain Functionality
- Explain Faraday's Law and the Principles of Operation of Magnetic Flowmeter System
- Configure and Test Transmitters Using the LOI, Field Communicator or AMS Device Manager or PROLINK III
- Properly Install/Troubleshoot the Rosemount Magnetic Flowmeter System



FLOW & DENSITY MEASUREMENT

Customized Training at a customer's plant is a **convenient, cost-effective means of training four to ten technicians**. Also, offering special technical training tools and materials for self-study.



COURSE 2341

Rosemount 3051S Pressure & 5300 Guided Wave Radar Level Transmitters - 2397

CEUs: 0.7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8800 Series Vortex Flowmeter. Typical job functions include; maintenance technicians, instrument technicians and instrument engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover how to install, configure and maintain the Rosemount 8800 Series Smart Vortex flowmeter systems. The students will learn the operation and capabilities of the Local Operator Interface and HC475 Field Communicator and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

Topics

- Explain the Differences and Capabilities of the Rosemount 8800 Series Vortex Flowmeters
- Explain the von Karman Effect and the Principles of Operation of Vortex Flowmeters.
- Identify Vortex Parts and Explain Functionality Configure and Test Transmitters using Field Communicator or AMS Device Manager
- Properly Install and Troubleshoot the Rosemount 8800 Series Vortex Flowmeter System

**COURSE 2381****Micro Motion ModBus
Digital Communication**

CEUs: 0.7

This course is appropriate for personnel who have any of the following responsibilities: Installing a Micro Motion transmitter on an RS-485 network, configuring, calibrating, operating or troubleshooting a Micro Motion transmitter using ModBus protocol, setting up a Modbus host or PLC to communicate with a Micro Motion transmitter or writing programs that use ModBus protocol to communicate with Micro Motion transmitters.

Overview

This 1-day class consist of a blend of lectures and hands-on exercises. Students will learn the Modbus communication model, including RS-485 network requirements, memory structure, data types, functions, character framing and message framing. Students will use Micro motion's Modbus documentation set and Modbus tool to configure transmitter features, read process data, reset totals, read and acknowledge alarms, analyze diagnostic registers, zero the flowmeter, perform a loop test and manage a batch process. Troubleshooting will also be covered.

Prerequisites

Students should have completed Micro Motion Comprehensive Product Training, Course 2352 or have equivalent knowledge or experience.

Topics

- Explain the Fundamentals for the Modbus Protocol model
- Configure, Commission, Read Process
- Data, View and Analyze Key Diagnostic Registers and Loop Test a Batch Application using a Micro Motion Meter
- Set up a Host System or PLC to Communicate with a Micro Motion Transmitter via Modbus Diagnostics
- Meter Verification Diagnostics

FLOW & DENSITY MEASUREMENT

COURSE 2386

Micro Motion Specific Gravity Meter - Intermediate

CEUs: 0.7

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion 3098 Gas Specific Gravity meter. Typical job functions include; maintenance technicians and instrumentation engineers.

Overview

This 1-day course consists of a blend of lectures and hands-on exercises that cover an overview of the operating principle, key components and applications of a 3098 Micro Motion Gas Specific Gravity meter. The process of commissioning a 3098 is covered including: installation, wiring, configuration and field calibration at initial start-up. Troubleshooting of commonly seen issues is also covered. This course includes hands-on demonstrations.

Prerequisites

None required. However, basic understanding of the fundamentals of the behavior/ properties of gases and gas density measurement are helpful. Basic electricity, analog and frequency signal processing knowledge are also assumed.

Topics

- Explain the Principle of Operation for how a Micro Motion 3098
- Gas Specific Gravity works and the Function of the Key components
- Learn the installation Best Practices for orienting, mounting, piping and wiring the 3098
- Configure the 3098 and perform the required field calibration
- Learn a step by step process to perform basic troubleshooting of the most common issues Customers encountered



MEASUREMENT INSTRUMENTATION

COURSE 2333

Process Measurement Products III (Level)

CEUs: 2.1

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of measurement instrumentation.

Overview

This 3-days course explains how level instruments function and how they are installed and calibrated. It emphasizes installation, proper setup and calibration / verification of level instruments. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- Correctly install Guided Wave Radar
- Transmitters
- Correctly install Non-contacting
- Radar Transmitters
- Properly calibrate Level instruments
- Perform basic troubleshooting

Prerequisites

Some experience in instrument calibration, maintenance , installation and operation would be helpful.

Topics

- DP Level Fundamentals
- Radar Applications
- Radar Instruments
- Radar PC Software
- Field Communicator
- Test Equipment Selection
- Installation
- Configuration
- Calibration / Verification
- Troubleshooting

COURSE 2305

3051 Smart Pressure Transmitter

CEUs: 0.7

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3051 Smart Pressure Transmitter.

Overview

This 1-day course lecture and labs to teach the student how to install, configure, calibrate, and maintain the Rosemount Model 3051 Smart Pressure Transmitter. The Student will also learn the operation of the Model Field Communicator, Students will:

- Explain the differences between Smart & Analog Transmitters
- Identify 3051 parts and functionality
- Explain the principles of operation of the 3051
- Configure, calibrate and test 3051
- Smart Pressure Transmitters using the Field Communicator or AMS
- Properly install/troubleshoot the 3051 Smart Transmitter

Prerequisites

Knowledge of basic pressure fundamentals and pressure instrumentation

Topics

- | | |
|---|-----------------------------------|
| • Smart and Analog Transmitters | • Field Communicator Operation |
| • 3051 Overview and Principles of Operation | • Digital Trims/Calibration |
| • Test Equipment Selection | • Installation and Start-up |
| • Bench Testing the 3051 Smart Transmitter | • Troubleshooting and Maintenance |



MEASUREMENT INSTRUMENTATION

COURSE 2307

3051 Fieldbus Pressure Transmitter

CEUs: 0.7

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3051 Fieldbus Pressure Transmitters.

Overview

This 1-day course uses lectures and labs to maximize the hands-on experience and teach the student how to install and maintain the Rosemount Model 3051 Fieldbus Pressure Transmitter. The Student will also learn the operation of the Field Communicator. Students who complete this course will be able to :

- Identify 3051 parts and functionality
- Explain the principles of operation of the 3051
- Design and build a Fieldbus segment
- Configure test, and calibrate the 3051
- Fieldbus Pressure Transmitter using the field Communicator
- Properly install and troubleshoot the 3051 Fieldbus Transmitter

Prerequisites

Knowledge of basic pressure fundamentals and pressure instrumentation.

Topics

- 3051 Overview and Principles of Operation
- FOUNDATION™ Fieldbus Overview
- Fieldbus Wiring/Segment Design/Function Blocks
- Test Equipment Selection
- Bench Testing 3051 Fieldbus Transmitter
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

COURSE 2308

3051S Smart Pressure Transmitter

CEUs: 0.7

This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting and maintenance of the Rosemount Model 3051S Smart Pressure Transmitter.

Overview

This 1-day course uses lectures and labs to maximize the hands-on experience and teach the student how to install, configure, calibrate, troubleshoot and maintain the Rosemount Model 3051S Smart Pressure Transmitter. The student will also learn the operation of the Model Field Communicator. Students who complete this course will be able to:

- Identify 30501S parts and functionality explain the principle of operation of the 3051S
- Configure and test the 3051S Smart
- Pressure Transmitters using the Field
- Communicator or AMS
- Properly install, configure and test the 3051S Smart Transmitter

Prerequisites

Knowledge of basic pressure fundamentals and pressure instrumentation

Topics

- 3051S Overview/Principles of Operation
- 3051S Installation & Options
- Test Equipment Selection
- Configure & Test the 3051S Advance Features:
 - » Alarm & Saturation Levels,
 - » Alarm Direction, Write Protection,
 - » Process Alerts, Scaled Variable
- Digital Trims/Calibration
- Troubleshooting and Maintenance

MEASUREMENT INSTRUMENTATION

COURSE 2309

Rosemount DP Level & Electronic Remote Sensor (ERS) System

CEUs: 0.7

Description

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, calibrate, maintain, and troubleshoot DP Level Transmitters and the Rosemount 3051S ERS System.

Topics

- How remote seals work
- Understanding Remote Seals components
- Diaphragm Seals Most Common
- Understanding Capillary Connections
- Understanding the different fill fluids
- Understanding Remote Seal performance
- Remote Seal Performance Calculation using Instrument Toolkit
- Installing/Mounting DP Level Transmitters
- Ranging/Scaling DP Level Transmitters
- ERS Technology
- ERS Overview and Principles of Operation
- ERS / DP Level Installation
- ERS Wiring
- ERS Configuration with AMS Device Manager and the Field Communicator
- ERS Module Assignments
- ERS Scaled Variable
- Bench Testing the ERS System
- ERS Zero Trims and Calibration
- Troubleshooting and Maintenance

Prerequisites:

Knowledge of basic Pressure, and DP Level fundamentals & instrumentation.

Objectives

Students who complete this course will:

- Know the common DP Level Applications
- Understand Remote Seal Components
- Understanding Remote Seal performance
- Know How to perform DP Level Installation and Ranging
- Identify ERS transmitter parts and explain their functionality
- Identify 3051S ERS Hi & Lo Sensors
- Explain the principles of operation of the ERS System
- Configure and test the ERS system use AMS Device Manager and the Field Communicator
- Perform Zero Trims and Calibrate the ERS Sensors
- Properly install & troubleshoot the 3051S ERS System

Audience

This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting and maintenance of DP Level Transmitters and the Rosemount 3051S Electronic Remote Sensors (ERS) System.

COURSE 2310

Rosemount 3051S MultiVariable Mass Flow Transmitter

CEUs: 0.7

Description

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, calibrate and maintain the Rosemount Model 3051SMV HART Mass Flow Transmitter.

Topics

- DP Flow Fundamentals
- Overview and Principles of Operation
- Test Equipment Selection
- Temperature Sensor Wiring
- Bench Testing the Smart Transmitters
- 3051SMV Engineering Assistant Software
- Operation of the Field Communicator and AMS Device Manager
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance
- Note: This product is also included in course 2327 and 2329.

Objectives

Students who complete this course will:

- Identify transmitter parts and explain their functionality
- Explain the principles of operation of the transmitter
- Configure and test using the Field Communicator, AMS Device Manager, and the 3051SMV Engineering Assistant software
- Configure the compensated flow parameters using the 3051SMV Engineering Assistant Software - properly install & troubleshoot the 3051SMV transmitter

Audience

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 3051S MultiVariable Transmitter.

Prerequisites

Knowledge of basic Pressure, and DP Flow fundamentals and instrumentation.

MEASUREMENT INSTRUMENTATION

COURSE 2321

3144P Temperature Transmitters

CEUs: 0.7

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3144P Smart Temperature Transmitters.

Overview

This 1-day course uses lecture and labs to teach the students how to install, configure, calibrate and maintain the Rosemount Model 3144P Smart Temperature Transmitters. The Student will also learn the operation of the field Communicator. Students who complete this course will:

- Identify 3144P parts and explain their functionality
- Explain the principles of operation of the 3144P
- Configure, calibrate and test 3144P
- Smart Temperature Transmitter using the Field Communicator or AMS
- Properly install and troubleshoot the 3144P Smart Transmitter

Prerequisites

Knowledge of basic temperature fundamentals and temperature instrumentation

Topics

- 3144P Overview and Principles of Operation
- Test Equipment Selection Sensor
- Selection and Wiring
- Bench Testing the 3144P Smart Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- 3144P Dual Sensor Setup and Configuration
- Installation and Start-up
- Troubleshooting and Maintenance

The vast amounts of information generated by these devices **make possible lower automation costs, improved plant performance, faster troubleshooting, fewer unscheduled lower maintenance costs.**

COURSE 2324

3144P Fieldbus Temperature Transmitters

CEUs: 0.7

This 1-day course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3144P Fieldbus Temperature Transmitters. The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- Identify 3144P parts and explain their functionality
- Explain principles of operation of the 3144P
- Design and build a Fieldbus segment
- Configure, calibrate and test 3144P
- Fieldbus Temperature transmitter using Field Communicator
- Properly install and troubleshoot the 3144P Fieldbus Transmitters

Prerequisites

Knowledge of basic temperature fundamentals and temperature instrumentation

Topics

- | | |
|---|---|
| <ul style="list-style-type: none"> • 3144P Overview and Principles of Operation • FOUNDATION™ FieldBus Overview • Fieldbus Wiring • Fieldbus Segment Design • Fieldbus Function Blocks • Test Equipment Selection | <ul style="list-style-type: none"> • Sensor Selection and Wiring • Bench Testing 3144P FieldBus Transmitters • Field Communicator Operation • Digital Trims/Calibration • Installation and Start-up • Troubleshooting and Maintenance |
|---|---|

MEASUREMENT INSTRUMENTATION

COURSE 2336

5400 Series HART Radar Level Transmitter

CEUs: 1.4

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5400 HART Radar Level Transmitter.

Overview

This 2-days course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 5400 Radar Transmitters. Students who complete this course will be able to:

- Explain the principle of operation of the 5400 Radar
- Identify 5400 Radar parts and explain their functionality
- Properly install and wire the 5400 Radar
- Configure and test the 5400 Radar to work in different applications
- Properly troubleshoot the 5400 Radar
- Transmitter and the installation using Radar Master Software

Prerequisites

Knowledge of basic level fundamentals and instrumentation

Topics

- 5400 Overview and Principles Operation
- Installation of the 5400 Radar
- Wiring 5400 Radar
- Configuration of 5400 Radar
- Bench testing the 5400 Radar
- Field Communicator Operation
- AMS Devise Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling Using Radar Master Software

NOTE: 5400 HART Radar Level transmitter is also included in the 3-days Level course # 2333

Rosemount sponsors more than **two-dozen courses** covering product **installation, configuration, calibration and maintenance.**

COURSE 2337

5300 High Performance Guided Wave Radar HART Level Transmitter

CEUs: 1.4

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5300 High Performance Guided Wave Radar (GWR) Series HART Radar Level Transmitter.

Overview

This 2-days course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 5300 High Performance GWR Transmitter. Students who complete this course will be able to :

- Explain the principles of operation of the 5300 GWR
- Identify 5300 GWR parts and explain their functionality
- Understand the available probe option and when each should be used
- Properly install and wire the 5300 GWR
- Understand how to setup the 5300 GWR in work in application
- Properly troubleshoot the 5300 GWR
- Transmitter and installation using Radar Master Software

Prerequisites

Knowledge of basic level fundamentals and instrumentation

Topics

- 5300 Overview and Principles of Operation
- Installation of the 5300 GWR
- Wiring the 5300 GWR
- Field Communicator Operation
- AMS Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling Using Radar Master Software

MEASUREMENT INSTRUMENTATION

COURSE 2326

**Process Measurement Products I
(Pressure and Temperature)**

CEUs: 2.8

This course is designed for technicians, engineers and plant personnel who need to know installation, calibration, maintenance, and troubleshooting of measurement instrumentation.

Overview

This 4-day course explains how pressure and temperature instruments function and how they are installed and calibrated. It emphasizes installation, proper setup and calibration of Analog and Smart Pressure and Transmitters. The course uses lectures and labs to teach the students. Those who complete this course will be able to:

- Correctly perform installation and setup procedures
- Properly Configure Pressure and Temperature Transmitters.
- Properly Calibrate Pressure and Temperature Transmitters.
- Perform basic troubleshooting

Prerequisites

Some experience in instrument calibration, maintenance, installation and operation would be helpful.

Topics

- Basic 4-20 mA Loop Setup
- Pressure sensors
- Temperature Sensors
- Analogue Transmitters
- Smart Transmitters
- AMS Device Manager
- Hart and Field Communicator
- Test Equipment Selection
- Installation and Configuration
- Calibration / Verification
- Troubleshooting

COURSE 2327

**Process Measurement
Products II (DP Flow)**

CEUs: 1.4

This course is designed for technicians, engineers and plant personnel who need to know installation, calibration, maintenance and troubleshooting of DP Flow measurement instrumentation.

Overview

This 2-day course explains how DP Flow functions and how they are installed and calibrated. It emphasizes installation, proper setup and calibration of DP Flow Instruments. The course uses lectures and labs to teach the students. Those who complete this course will be able to:

- Correctly install, configure and calibrate the DP Flow instruments.
- Perform DP Flow troubleshooting

Prerequisites

Some experience in instrument calibration, maintenance, installation and operation would be helpful.

Topics

- Basic DP Flow Fundamentals
- DP Flow sizing Calculations
- Multi-variable Flow Transmitters
- AMS Device Manager with Engineering Snap-on Assistant
- Field Communicator
- Test Equipment Selection
- Installation and Configuration
- Calibration / Verification
- Troubleshooting

MEASUREMENT INSTRUMENTATION

COURSE 2370

Fieldbus Measurement Instruments

CEUs: 2.1

This course is intended for technicians, engineers responsible, calibrating and troubleshooting FOUNDATION Fieldbus measurement instruments.

Overview

This 3-days course covers the integration of Foundation Fieldbus compliant measurement devices using the communicator, FF Modem and AMD device manager and other hosts. Those who complete this course will be able to:

- Install, Configure and Calibrate & Troubleshooting Rosemount Fieldbus Devices, including pressure Transmitter, Temperature Transmitter and Radar level transmitters.

Prerequisites

Some experience in instrument calibration, maintenance, installation and operation would be helpful.

Topics

- Foundation Fieldbus Overview
- Fieldbus Wiring / Segment design function Blocks
- Field Communicator Operation
- AMD Device Manager Operation
- Theory of operation, Installation, Configuration and Troubleshooting of the following:
 - » 3051 C & 3051S Pressure Transmitters
 - » 3144 & 644 Temperature Transmitters
 - » GWR level Transmitters



COURSE 2328

848 Fieldbus Temperature Transmitter

CEUs: 0.7

This 1-day course use lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 848T Fieldbus Temperature Transmitters.

Overview

The Student will also learn the operation of the Field Communication. Students who complete this course will be able to:

- Explain the principles of operation of the 848T
- Configure, calibrate, and test the 848T
- Fieldbus temperature transmitter using the Field Communicator
- Design and build a fieldbus segment
- Properly install and troubleshoot the 848T Fieldbus Transmitter

Prerequisites

Knowledge of basic temperature fundamentals and temperature instrumentation

Topics:

- 848T Overview and Principles of Operation
- FOUNDATION™ Fieldbus Overview
- Fieldbus wiring
- Fieldbus Segment Design
- Fieldbus Function Blocks (including the MAI and ISEL Blocks)
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing the 848T Fieldbus Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

COURSE 2329

Rosemount Pressure, Temperature & MultiVariable Flow Transmitters

CEUs: 1.4

Description

This 2-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate, troubleshoot, and maintain the Rosemount 3051, 3144P, and 3051SMV Transmitters.

Prerequisites

Students should have experience with process instrumentation and measurements.

Topics

- Field Communicator Operation
- 3051 Pressure Transmitter Installation, Configuration, Calibration and Troubleshooting
- 3144P Temperature Transmitter Installation, Configuration, Calibration and Troubleshooting
- 3051SMV MultiVariable DP Flow Transmitter Installation, Configuration, Calibration and Troubleshooting

Note: Students must attend both days. Reference course, 2305, 2321 and 2308MV for further details.

**COURSE 2332****3300 Guided Wave Radar Level Transmitter**

CEUs: 1.4

This course is for those individuals responsible for the installation/maintenance of the Rosemount Model 3300 Series Guided Wave Radar (GWR) Level & interface transmitters

Overview

This 2-days course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, calibrate, troubleshoot and maintain the Rosemount Model 3300 GWR Level & Interface Transmitters. Students who complete this course will be able to:

- Explain the principle of operation of the 3300 GWR
- Identity 3300 parts and explain their functionality
- Understand the available probe option and when each should be used
- Properly install the 3300 GWR
- Configure and test the 3300 GWR
- Properly troubleshoot the 3300 GWR transmitter using RCT software

Prerequisites

Knowledge of basic level and interface fundamentals and instrumentation.

Topics

- 3300 Overview/principles of Operation
- Installation of the 3300 GWR
- Configuration of the 3300 GWR
- Bench Testing the 3300 GWR
- Field communicator Operation
- Calibration, Verification and adjustments
- Troubleshooting and maintenance
- Troubleshooting and Reading Tank
- Graphs using RCT Software

MEASUREMENT INSTRUMENTATION

COURSE 2375

Wireless Self Organizing Network

CEUs: 1.4

This course is intended for technicians, engineers and other plant personnel who need to know how to design, install, setup, configure, maintain and troubleshoot Wireless Self Organizing Networks and their Components.

Overview

This 2-days course explains how Self Organizing Wireless Networks function and how they are installed, setup, configured and integrated. It emphasizes planning, proper installation and startup, configuration, maintenance and integration.

The course uses lectures and labs to maximize the hands-on experience and teach the students. Students who complete this course will:

- Correctly install and setup the Wireless Gateway
- Properly install and configure Wireless Transmitters
- Properly integrate Host interfaces to the Wireless Gateway

Prerequisites

Some experience in network and Host integration would be helpful

Topics

- How Self organizing networks function
- Self Organizing networks best practices
- Network components
- Installation and setup
- Network parameters
- Wireless transmitters installation configuration, maintenance and calibration THUM installation wiring and configuring
- Using AMS Device manager with the wireless gateway
- Configuring wireless devices with AMS device manager
- Modbus serial integration
- Modbus TCP integration
- OPC integration
- Advance features



MEASUREMENT INSTRUMENTATION

COURSE 2395

Rosemount 3300 & 5300 Guided Wave Radar Level Transmitters

CEUs: 0.7

Description

This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount 3300 & 5300 Series HART Radar Level Transmitters.

Overview

Students who complete this course will be able to:

- Explain the principles of operation of the 3300/5300 GWR
- Identify 3300/5300 GWR parts and explain their functionality
- Understand available probe options and when each should be used
- Properly install and wire the 3300/5300 GWR
- Configure and test the 3300/5300 GWR
- Understand how to setup the 3300/5300 GWR to work in different applications
- Properly troubleshoot the 3300 & 5300 GWR and the Installation using Radar Master software

Prerequisites

Knowledge of basic level and interface fundamentals and instrumentation.



COURSE 2396

Rosemount Guided Wave & Non-Contacting Radar Level Transmitters

CEUs: 0.7

Description

This course is designed for those individuals responsible for the installation, configuration, calibration/verification and maintenance of the Rosemount 5408 Non-Contacting & 5300 Guided Wave Radar (GWR) HART Level Transmitter.

Overview

This 1-day course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount 5408 & 5300 Series HART Radar Level Transmitters

Topics

- 5408 & 5300 Overview and Principles of Operation
- Installation of the 5408 & 5300 Radar
- Configuration of the 5408 & 5300 Radar
- Radar Master Software Operation
- Instrument Inspector Software Operation
- Calibration, Verification and Adjustments
- Troubleshooting and Maintenance
- Tank & Application/Probe Troubleshooting and Echo Handling Using Radar Master Software

Objectives

Students who complete this course will be able to:

- explain the principles of operation of the 5408 & 5300 radar
- identify 5408 & 5300 parts and explain their functionality
- properly install and wire the 5408 & 5300 Radar
- configure and test the 5408 & 5300 Radar
- properly troubleshoot the 5408 & 5300 Radar transmitter and installation using Radar Master software
-

Prerequisites

Knowledge of basic level and interface fundamentals and instrumentation.

ANALYTICAL INSTRUMENTATION

COURSE 2200

General pH, Conductivity, and ORP Theory CEUs: 0.7**Overview**

This 1-day course provides a solid theoretical background in pH, conductivity and ORP measurements. Students will:

- Understand how much measurement is made
- Recognize installation/ application problems
- Learn configuration/ calibrate procedures
- How to implement a maintenance program Troubleshooting problems using diagnostics

Topics

- What is pH/Conductivity/ORP
- How pH/Conductivity /ORP Measurements are Made
- Physical Process Properties and How They Affect On-Line Measurements
- Proper Calibration Techniques
- Cleaning and Maintenance of a Sensor
- How to Decipher Diagnostics Readouts
- pH/Conductivity Sensor Overview
- pH/Conductivity/ORP Analyzer

COURSE 2201

Amperometric Measurement Theory: Chlorine, Dissolved Oxygen & Ozone CEUs: 0.7**Overview**

This 1-day course provides insight into the complicated amperometric measurements of Chlorine, Dissolved Oxygen and Ozone. Students will learn the concepts of how amperometric sensor work and how to calibrate each type of measurement.

Student will:

- Differentiate the various species of chlorine
 - Implement a proper maintenance program
- Use diagnostics to troubleshoot problems

Topics

- Amperometric Measurement Theory
- Chlorine/Dissolved Oxygen/ Ozone
- Calibration Produces for Each Meas.
- Maintenance & Troubleshooting Tips

COURSE 2202/2202V

Rosemount Analytical Two-Wire Instrumentation Models Xmt and 5081 Transmitters CEUs: 0.2**Overview**

This 2-hour class cover features, benefits and operation if any Rosemount Analytical's Model 5081 or Model Xmt two wire transmitters. Each Transmitters family can measure pH, ORP, Contacting, Dissolved Oxygen and Ozone. Both Transmitters have advanced diagnostics capabilities and can

communicate via HART or Foundation Fieldbus communication protocols. This class is free when performed in conjunction with either course 2200 "General pH, Conductivity, ORP theory", Course 2201 "Amperometric Measurement Theory".

Topics

- Installation and Application Problems
- Configuration of Outputs (HART only)
- Use Diagnostic Features (if Applicable)
- Sensor Calibration
- Troubleshooting

COURSE 2800

Rosemount Liquid Analysis General pH, Conductivity, and ORP Theory CEUs: 1.4**Description**

This 2-day course combines lectures with bench-top labs and uses the interactive plant for scenario based training. Target students are individuals responsible for the installation, configuration, calibration and maintenance of Rosemount Analytical pH, Conductivity, and ORP sensors and analyzers. Students shall apply classroom knowledge directly to the interactive plant scenario labs. Be ready to learn in a "real world" plant environment.

ANALYTICAL INSTRUMENTATION



COURSE 2110

Rosemount MLT Process Gas Analyzers

CEUs: 2.1

Description

This 3-day course is a classroom training where students learn principles and practical operation of MLT analyzers. Through hands-on training, the student will learn on how to install, maintain, and troubleshoot the MLT analyzer. Using MLT Analyzer demo units students will:

- Understand the Photometric measurement principles such as the theory of Infrared and Ultraviolet Spectrometry, Paramagnetic and Thermal Conductivity
- Learn the signal processing of the electronic boards.
- Learn the test procedure for troubleshooting and diagnostics

Topics

- Introduction to the function of Physical parts
- Function of Electronic boards
- Test points and procedure
- Mechanical Assembly / Disassembly
- Programming of software parameters
- Calibration setup manual (Auto calibration when available) Analog outputs, and Digital Inputs / Outputs
- Save / Load configuration functionality
- Spare parts

Prerequisites

Basic Knowledge of PGA Analyzers would be helpful

COURSE 2170

Rosemount X-Stream Process Gas Analyzers

CEUs: 2.1

Description

This 3-day course is a classroom training where students learn principles and practical operation of XE analyzers. Through hands-on training, the student will learn on how to install, maintain, and troubleshoot the XE analyzer. Using XE Analyzer demo units students will:

- Understand the Photometric measurement principles such as the theory of Infrared and Ultraviolet Spectrometry, Paramagnetic and Thermal Conductivity
- Learn the signal processing of the electronic boards.
- Learn the test procedure for troubleshooting and diagnostics

Topics

- Introduction to the function of Physical parts
- Function of Electronic boards
- Test points and procedure
- Mechanical Assembly / Disassembly
- Programming of software parameters
- Calibration setup manual (Auto calibration when available) Analog outputs, and Digital Inputs / Outputs and Modbus setup
- Save / Load configuration functionality
- Spare parts
- Troubleshooting Procedure

Prerequisites

Basic Knowledge of PGA Analyzers would be helpful

COURSE FG 2100**Basic Course for Flame & Gas Detectors**

CEUs: 1.4

Overview

This is a 2-day basic course about Flame and Gas Detectors.

Topics**Flame Detection**

- Introduction to Flame detection principals
- Types of flame detection and its applications
- Ultra Violet (UV), Infra Red (IR) and UV/IR
- Installing – Where to locate and aim the detector
- Causes of false alarms from Flame Detection and ideas to minimize the alarms
- Preventive Maintenance

Gas Detection - Flammable and Toxic Gas

- Introduction to Gas detection principals
- Gas Detector Transmitters – Millennium Transmitters – M2B and 21
- Types of Gas detectors available in the market and its Operating principals: Cat Bead, Electro chemical and Metal Oxide Semiconductor
- Installing – Where to site and locate the gas detectors
- Causes of false alarms and how to minimize it
- Preventive Maintenance

Smoke/Oil Mist Detector (EExd model)

- Introduction to Airborne Particle Monitor (APM)
- Applications using APM
- Installing the APM – Where to site and locate the detector
- Causes of false alarms and how to minimize it
- Preventive Maintenance

Ultrasonic Gas Leak Detector

- Introduction to Ultrasonic Gas Leak Detector (UGLD)
- Applications using UGLD
- Site Mapping of Background Noise
- Installing the UGLD – Where to site and locate the detector
- Causes of false alarms and how to minimize it
- Preventive Maintenance

Notes

- Course duration is 2-days
- Minimum 5 students per class
- Maximum 10 students per class
- Additional students will be charged extra

COURSE R4105**Rosemount 700XA & 1500XA Gas Chromatographs - Introduction**

CEUs: 2.1

Description

This 3-day course gives students a basic understanding of how the Rosemount 700XA and 1500XA gas chromatographs work, emphasizing chromatograph fundamentals and basic theory.

Topics

- Reviewing Chromatography Principles
- Understanding Chemistry, Flow Configuration, and Gas Systems
- Reviewing Sample Systems
- Working with Chromatograph Hardware
- Setting Timed Events, Retention Times, and Response Factors
- Understanding Data Calculations
- Reading Chromatograms
- Calibrating a Gas Chromatograph

Note:

Classes typically start at 8AM CST on Tuesday and end at 5PM CST on Thursday to accommodate travel

COURSE 2154**Rosemount OCX8800 Oxygen & Combustibles Transmitter**

CEUs: 0.7

Description

This 1-day course covers combustion measurement principles and the theory of operation for oxygen analyzers in general and the installation, operation, calibration and maintenance of the Rosemount OCX8800 Analyzers.

Topics

- Combustion Requirements
- Methods of Oxygen Analysis
- Combustion Efficiency
- Zirconia (Zr)₂ Oxygen Analysis
- Theory of Operation
- Oxygen Analyzer
- COe Analyzer
- Hart Communications

Objectives

Theory of operation, combustion requirements, methods of oxygen analysis, typical uses of oxygen analysis, combustion efficiency, zirconia (ZrO₂) oxygen analysis, COe analyzer: installation, hardware overview, maintenance, and troubleshooting.

ANALYTICAL INSTRUMENTATION

COURSE R4100

Introduction to Model 500 and 700 Gas Chromatographs

CEUs: 2.1

Overview

This 3-day course provides students with a basic understanding of how a gas chromatograph works, emphasizing chromatograph fundamentals and basic theory.

Topics

- Reviewing Basic Chromatography Principles
- Understanding Chemistry, Flow Configuration and Gas Systems
- Understanding Basic Sample Systems
- Working with Chromatograph Hardware
- Setting Timed Events, Retention Times and Response Factors
- Understanding Data Calculations
- Identifying Problems Using Chromatograms

COURSE 2153

Rosemount Oxygen Flue Gas & 6888A Analyzers

CEUs: 0.7

Overview

This 1-day course covers combustion measurement principles and the theory of operation of oxygen analyzers. The class will discuss the installation, operation, calibration and maintenance of the Rosemount 6888A Oxygen Analyzers.

Topics

- | | |
|---|---|
| <ul style="list-style-type: none"> • Combustion Requirements • Methods of Oxygen Analysis • Combustion Efficiency • Zirconia (ZrO₂) Oxygen Analysis • Theory of Operation | <ul style="list-style-type: none"> • Oxygen Analyzer <ul style="list-style-type: none"> » Installation » Hardware » Maintenance » Troubleshooting » HART Communication |
|---|---|

With a wide selection of sensors, analyzers, gas chromatographs and other measurement and analysis technologies, Rosemount Analytical helps customers streamline process performance with innovative improvements that **increase throughput, minimize energy usage, maximize asset life** and take advantage of continuous online diagnostics for amazing results.



ANALYTICAL INSTRUMENTATION

COURSE 2204/2204V

Rosemount Analytical Four-Wire Instrumentation Models 54e, 1055, 1056 or 1057

CEUs: 0.2

Overview

This 2-hour class covers features, benefits and operation of any Rosemount Analytical Model 54e, 1055, 1056 or 1057. Each analyzer family can measure pH, ORP, contacting conductivity, toroidal conductivity, chlorine, dissolved oxygen and ozone. The Model 1056 can also measure turbidity in drinking water and flow from a pulse sensor, and display any 4-20mA signal input. Each instrument has its own available features, and menu tree which will be covered in great detail.

Topics

- Installation and Application Problems
- Configuration of Outputs/ Alarms (If Applicable)
- Programming of Automated Cleaning
- Systems (DO, pH)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration
- Troubleshooting

Available on Request or at
Customer Site

COURSE 2205/2205V

Customer Specific Measurement Theory

CEUs: 0.2

Overview

This 2-hour class covers features, benefits and operation of any Rosemount Analytical Model 54e, 1055, 1056 or 1057. Each analyzer family can measure pH, ORP, contacting conductivity, toroidal conductivity, chlorine, dissolved oxygen and ozone. The Model 1056 can also measure turbidity in drinking water and flow from a pulse sensor, and display any 4-20mA signal input. Each instrument has its own available features, and menu tree which will be covered in great detail.

Topics

- Installation and Application Problems
- Configuration of Outputs / Alarms (If Applicable)
- Programming of Automated Cleaning
- Systems (DO, pH)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration
- Troubleshooting

Available on Request at Customer Site

ANALYTICAL INSTRUMENTATION

COURSE R4210

Operation and Maintenance of Model 500 Gas Chromatographs

CEUs: 2.8

Overview

This 4-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a Model 500 gas chromatograph.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge

Topics

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration
- Techniques and Post-Analysis Calculations
- Using the Chromatograph to identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation -Gas Chromatograph
- Troubleshooting the 2350A Controller
- Configuring the 2350A Controller User Directory Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

COURSE R4212

Operation and Maintenance of Model 700 Gas Chromatographs

CEUs: 2.8

Overview

This 4-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a Model 500 gas chromatograph.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge

Topics

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration
- Techniques and Post-Analysis Calculations
- Using the Chromatograph to identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation -Gas Chromatograph
- Troubleshooting the 2350A Controller
- Configuring the 2350A Controller User Directory Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

ANALYTICAL INSTRUMENTATION

COURSE R4311

Rosemount 500 Process Gas Chromatograph - Advanced

CEUs: 3.5

Overview

This 5-day course is most valuable to those with three years of chromatography experience, or those who have completed the introductory 'Operation and Maintenance of Gas Chromatographs' course. Participants will develop an advanced understanding of gas chromatograph operation, troubleshooting, and maintenance. Training becomes customized when students present application information. Given that data, the experienced instructor will look closely at specific applications and offer participants insight.

Topics

- Understanding Chromatograph Flow Configurations
- Overhauling Valves
- Reviewing Thermal Conductivity, Flame Ionization, and Flame Photometric Detectors
- Understanding Sample/Carrier/Calibration Gas Systems
- Working with and troubleshooting the Rosemount Analytical 2350A Controller
- Installing and Using MON Software for Integration and Calibration
- Setting Timed Events, Retention Times, and Response Factor Calculations
- Understanding Startup Procedures
- Setting Valve Timing and Flows with Different Flow Configurations
- Checking for Proper Separation and Analyzing Gas Chromatographs
- Verifying Proper Operation of the Gas Chromatograph
- Troubleshooting the Chromatograph and 2350A Controller
- Configuring Reporting Details and Control Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

Prerequisites

Students attending this course must have completed either of these Operations & Maintenance courses: R4210, R4212, or have 3 years of advanced chromatography experience. Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel

COURSE R4315

Rosemount 700XA & 1500XA Process Gas Chromatographs - Advanced

CEUs: 3.5

Overview

This 5-day course equips students with a full understanding of many advanced techniques used in process gas chromatography. An experienced instructor and focused material enable students to troubleshoot a variety of field issues for the Rosemount 700XA & 1500XA GC. Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel

Topics

- Setting Valve Timing
- Hardware Troubleshooting
- Mixture Adjustments for FID
- Mixture Adjustment for FPD
- Verifying proper operation of the Gas Chromatograph
- Overview of Model 1500XA
- Liquid Sample Injection
- Review of Sample System Techniques
- Calibration and Accuracy Checks
- Recovery of GC After Analysis Interruption
- GC Start-up After Overhaul
- Communicating to other devices
- Understanding flow settings for various flow configurations
- Understanding when to overhaul valves

Prerequisites

Students attending this course must have completed either of Operations & Maintenance course R4213/R4214 or have 3 years of advanced chromatography experience.

COURSE R4170

Rosemount 370XA Gas Chromatograph - Intermediate

CEUs: 2.1

Overview

This 3-day training is a level 1 course and includes theory, Operations & Maintenance practices for the Rosemount 370XA Gas Chromatograph. Module overview, hardware and software overview as well as basic troubleshooting skills.

Prerequisites

E4070 Introduction to the Model 370XA. Classes typically start at 8AM CST on Tuesday and end at 5PM CST on Thursday to accommodate travel.

Topics

- Chromatographic Theory
- Detector Theory
- Understanding Chromatograms
- Startup Procedures
- Natural Gas Sample Handling
- Using 370XA Software Assistants
- Cal-Saver™
- Running Auto Valve Timing
- Module Initializations
- Calibrations, Validation & Routine Maintenance (Valve Rebuilding)
- Troubleshooting the module
- 370XA Hardware
- MON2020 Software

ANALYTICAL INSTRUMENTATION

COURSE R4213

**Operation and Maintenance
of 700XA Gas Chromatographs**

CEUs: 2.8

Overview

This 4-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a 700XA gas chromatograph.

Prerequisites

'Introduction to Gas Chromatographs' course or equivalent knowledge

Topics

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration
- Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation - Gas Chromatograph
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations



TANK GAUGING

COURSE RTG 101

Tank Gauging Technical Product Training

CEUs: 3.5

This 5-day course covers the products range supplied by Rosemount tank Gauging. This course is suitable for project and maintenance engineers, and persons that are responsible for maintaining the tank gauging system at site.

Overview

This provides good coverage for Tank Gauging products supplied by Rosemount. It gives a general understanding on how to install, startup, commission and maintain a tank gauging system. It also helps the trainee to understand how he can optimize and maximize the benefits of using Rosemount Tank Gauging systems.

Training courses are based on classroom instructions backed up with laboratory work to deliver the trainees with a well-balanced knowledge in an integrated manner.

Prerequisites

- Instrumentation background and basic understanding of level measurement techniques in tanks
- Radar Technology Basics
- Installation of 3900 series/ 5900 Series
- REX/ Raptor hardware and software
- FCU/ FBM functionality
- MTT/ GFD functionality (Raptor)
- Tanks Master WINOpi & Winsetop
- Redundancy
- Lab works (installation, configuration, operation and troubleshooting)

Note:

Customer to specify whether they want REX Tank gauging training or RAPTOR tank Gauging training.

COURSE RTG 102

Tank Master Training

CEUs: 2.1

Tank Master is a 3-days course covering the Maintenance and inventory management software that communicates to the tank Gauging system. Tank Master is certified by OIML for inventory calculation as per API standards. This course helps the user to fully understand the Tank Master software and all its functionalities. It is suitable for individuals that are responsible for administrating and maintaining the tank Master software.

Overview

The course goal is to provide comprehensive knowledge about tank Master Software and its capabilities. It starts by demonstrating the different tools in Tank master and how it can be utilized, and then it continues to demonstrate that advanced capabilities of Tank Master when it comes to connecting to devices and host systems. The course also demonstrates troubleshooting and problem solving techniques in Tank Master. Training courses are based on classroom instructions backed up with laboratory work to deliver the trainees with a well-balanced knowledge in an integrated manner.

Prerequisites

Product training, or fair knowledge in Tank Gauging systems supplied by Rosemount.

Topics

- Inventory Calculation
- WinOpi tools
- Host Communication
- Driver and Communication
- Custom Views
- Redundancy
- Tankmaster.net
- Hybrid/ HTG
- Trouble Shooting

COURSE RTG CUSTOM

Onsite/Offsite Customized Tank Gauging Training

Rosemount Tank Gauging Middle East can provide variety of onsite and offsite courses to meet customer needs.

Overview

Customized courses are normally designed to fit the products available at customer site. The instructor takes a backup from the existing setup at site and designs the training material around it. The material to be covered in the training is customized as per customer requirement and the background of the trainees.

Possible trainings are:

- 1 – ITG maintenance course
- 2 – ITG operation course
- 3 – Wireless Course
- 4 – Tank Master Course

Prerequisites

Basic knowledge about level measurement in tanks.