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# 1 Training Catalogue

## 1.1 General Oil and Gas Metering:

This highly interactive 3-days training will bring together Engineers from multiple discipline background but mainly Metering Engineers and Managers. Join this unique event and dive into industry insights with help and guidance of well recognized and respected trainer. The training will be focused on delivering highly relevant content to Oil Gas industry professionals. Proposed Maximum seats per session: 6 Persons

Who should attend:

- Metering Engineers
- Production Operations Engineers
- Process Engineers
- Finance Staff
- HCA Engineers
- Commercial/Contract Staff
- Gas Processing / Technology Specialist
- Field & Plant Operations Personnel
- Facilities Engineers
- Project Engineers
- Field Engineers
- Maintenance Engineers & Supervisors

Take Away From The 3-Day Training:

All delegates will receive course documentation for use during the program  
Trouble-shooting examples on Metering from the trainer's experience  
Open discussions to engage and share between each other  
Interactive learning approach.

## DAY 1

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8:30 **Registration & Welcome Coffee**

8:55 **Welcome and Opening remarks from the masterclass leader**

9:00 **Session 1**

### **Introduction to Fiscal and CT Metering**

- Learn about the Standard devices required for the metering system, the type of Sales Contracts, International applied Standards, CT practices, Functions fiscal metering system, Mutual Performance expectations, OIML requirements for accuracy and proving and validation issues

10:30 **Morning Coffee & Networking**

11:00 **Session 2**

### **Applied Accuracy Terminology**

- Terms like Accuracy, Precision, Standard Deviation & Variance will be explained by clear examples to be able to correctly apply these indispensable terms like repeatability, variability, probability, STD, Systematic Error
- Control Chart tool for Performance monitoring and verification

12:30 **Luncheon**

13:30 **Session 3**

### **Fluid Dynamics**

- Fluid dynamics are the basics of flow measurements that may influence the accuracy of any flow measuring device
- Parameters influencing the flow pattern like viscosity, Density, Reynolds number and Bernoulli's theorem describing the energy balances in a flowing fluid
- Next to the latter also standard API Gravity
- Measurement and Oil Classification will be discussed

15:00 **Afternoon Coffee & Networking**

15:30 **Session 4**

- Case Studies
- Q&A Session

16:30 **Review of Day 1**

## DAY 2

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8:30 **Welcome Coffee**

9:00 **Session 5**

### **Continuation- Fluid Dynamics**

- Since the stability of the Flow Pattern is of paramount importance special attention is paid to the types of possible disturbances to it like e.g. swirl flow and the methods to prevent it by application of flow straighteners and conditioners
- Other important issues will be discussed like cavitation and flashing, the phenomena of choked flow and gas compressibility

10:30 **Morning Coffee & Networking**

11:00 **Session 6**

### **Flow Metering using $\Delta P$**

- Since the  $\Delta P$  types of flow measurements are still widely applied this subject will be comprehensively discussed including its advantages and disadvantages compared to other flow measuring principles
- The latter includes flow devices like Venturi, Nozzle and their particular applications
- What is the actual effect of the Measurement Rangeability, Turn-Down Ratio in relation to the measurement accuracy?

12:30 **Luncheon**

13:30 **Session 7**

### **Standard Measurement/ Recommendations**

- Introduction to the OIML recommended best practices and requirements for fiscal metering and operation
- OIML accuracy meter classification and permissible errors
- API MPMS Chapter 5.8
- Practical Case Example

15:00 **Afternoon Coffee & Networking**

15:30 **Session 8**

### **Flow Metering that are applied based on other principles**

- What issues need to be considered before selection of any type of flow meter for the measurement Volumetric, Mass and Totalized Flow?
- What are the other measuring principles, their significant advantages and disadvantages, interferences and typical applications for accurate flow measurements like PD meters, the Turbine flow meters, Transit time type Ultra Sonic flow-meters, Coriolis Mass Flow measurement, Thermal Mass flow, Electro Magnetic and Vortex?

## DAY 3

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8:30 **Welcome Coffee**

9:00 **Session 9**  
**Principals of Gas Chromatography**

- Process Gas Chromatography is applied for the required analysis of a fluid composition as part of the flow metering, this subject will be discussed from the basic principles to the quantitation methods of the analysis results

10:30 **Morning Coffee & Networking**

11:00 **Session 10**  
**Fiscal Gas Metering Station Design**

- How is the recommend design of a NG fiscal metering station, which facilities are required and what are generally applied practices for installation?

12:30 **Luncheon**

13:30 **Session 11**  
**Flow Calibration**

- What are the reasons for Flow Meter calibration and practical considerations?
- What is the difference between Calibration and Proving?
- What are the different types of flow meter calibration systems?
- What are the issues concerning testing, calibration and presentation of proving data?
- What alternative type of Turbine meter calibration is applied?
- What are the trends and best practices?

15:15 **Afternoon Coffee & Networking**

15:30 **Session 12**

**Metering Provers Systems**

- What are the main types of Prover systems and their specific reasons of application
- How is the way of operation of Tank provers, Piston provers, Displacement types prover, Bidirectional Pipe prover and Ball Prover
- What are the reasons for application of a Master Meter system?
- What are important general prover issues?

16:30 **Closing remarks from the training leader**

**END OF THE TRAINING COURSE**