



COURSE OVERVIEW IE0119

Fiscal Metering

Course Title

Fiscal Metering

Course Date/Venue

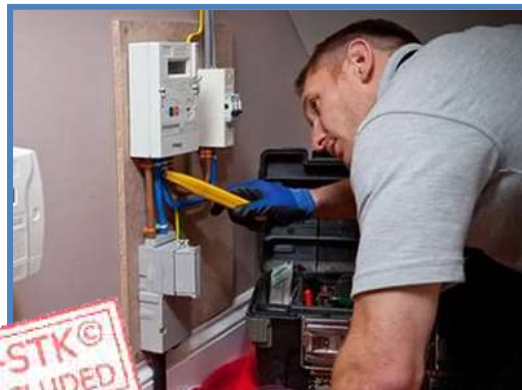
November 09-13, 2025/Zafran Meeting Room, The Tower Plaza Hotel, Dubai, UAE

Course Reference

IE0119

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art fiscal and custody transfer metering simulators.



This course is designed to provide participants a detailed and up-to-date knowledge on fiscal and allocation metering. It covers the standard devices required for the metering system, types of sales contracts, international applied standards, CT practices, functions fiscal metering system, mutual performance expectations, OIML requirements for accuracy and proving and validation issues of fiscal and custody transfer.



The course will also discuss the loss control and lease automatic custody transfer (LACT); the importance of representative fuel samples; applied accuracy terminology; control chart tool for performance monitoring and verification; fluid dynamics as the basics of flow measurements that may influence the accuracy of any flow measuring device; the parameters influencing the flow pattern; API gravity measurement and oil classification; the cavitation and flashing; the phenomena of choked flow; gas compressibility and the principles of gas chromatography.



At the completion of the course, participants will be able to employ heating value measuring methods; moisture and HC dew-point measurements; interpret standard measurement recommendations; describe flow metering that are applied based on other principles; illustrate fiscal gas metering station design; and employ flow calibration, metering prover systems, multiphase flow and water cut measurements.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on custody and allocation metering
- Discuss the standard devices required for the metering system, types of sales contracts, international applied standards, CT practices, functions fiscal metering system, mutual performance expectations, OIML requirements for accuracy and proving and validation issues of fiscal and custody transfer
- Explain the loss control and lease automatic custody transfer (LACT) and the importance of representative fuel samples
- Define applied accuracy terminology and apply control chart tool for performance monitoring and verification
- Describe fluid dynamics as the basics of flow measurements that may influence the accuracy of any flow measuring device
- Identify the parameters influencing the flow pattern like viscosity, density, Reynolds number and Bernouli's theorem describing the energy balances in a flowing fluid
- Discuss API gravity measurement and oil classification as well as the cavitation and flashing, the phenomena of choked flow and gas compressibility
- Explain the principles of gas chromatography covering the basic principles to the quantitation methods of the analysis results
- Employ heating value measuring methods as well as moisture and HC dew-point measurements
- Interpret standard measurement recommendations that includes OIML best practices and requirements for fiscal metering and operation, OIML accuracy meter classification and permissible error and API MPMS
- Describe flow metering that are applied based on other principles and discuss the standardized gas flow metering standards
- Illustrate fiscal gas metering station design and employ flow calibration, metering prover systems, multiphase flow and water cut measurements

Exclusive Smart Training Kit - H-STK®



*Participants of this course will receive the exclusive "Haward Smart Training Kit" (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of custody and allocation metering for those in charge of custody transfer, measurements and metering of oil, gas and petroleum products at marine terminals, loading arms, oil depots, tank farms or bulk storage. This includes engineers and other technical staff.



Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations:

-  British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

-  The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.



Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Dr. Alaa Abdel Kerim, PhD, MSc, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **35 years** of extensive experience in the **Power, Petrochemical, Refinery, Oil and Gas** industries. He specializes in **Flow Measurement Devices, Flowmeter Technologies, Flowmeter Accuracy & Performance, Flowmeter Calibration, Fiscal & Custody Transfer, Fluid Dynamics, Gas Chromatography, and Heating Value Measuring Methods, Solve Typical Flow Measurements Problems, Meters**

Calibration, Installation & Inspection, Liquid & Gas Flowmetering & Meter Calibration, Control Valve, Flowmetering & Custody Transfer, Water Meter Calibration, SCADA Systems, PLC Hardware & Software, PLC Systems Design, Installation and Maintenance, PLC Programming, Lab Programming on Siemens SIMATIC & WinCC, Data Communications, SCADA System Hardware, DCS, PLC, HMI, Automation System, Process Control & Instrumentation, Hydrocarbon, Level & Flow Measurements, Analytical Instrumentation, Find Control Elements, Control Loop Operation, Data Acquisition & Transmission, Electronics Technology, Power Systems Control, Power Systems Security, Power Transmissions, Power Generation, Electrical Substations and MV/LV Electrical System.

During his career life, Dr. Alaa has been practically and academically involved in different **Power System** and **Instrumentation international companies** and **Universities** as a **Senior Professor & Consultant, Instrumentation Engineer** and **Electrical Engineer**. His recent practical applications experience includes the design, supply, installation, operation of full **DCS, SCADA, PLC, HMI Automation System** for **Sumid Line Petroleum, Siemens USA, AREVA USA** to name a few. His experience also includes electrical coordination, protection level adjustments and electrical testing.

Dr. Alaa has a **PhD** degree in **Electrical Engineering** from the **Technical University of Gdansk, Poland** and has **Master** and **Bachelor** degrees in **Electrical Machine & Power Engineering** from **Cairo University** and **Helwan University**, respectively. Further, he is a **Certified Instructor/Trainer** and delivered numerous trainings and workshops worldwide.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.



Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Fee

US\$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 09th of November 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to Fiscal & Custody Transfer (CT) Metering Standard Devices Required for the Metering System • Type of Sales Contracts • International Applied Standards • CT Practices • Functions Fiscal Metering System • Mutual Performance Expectations • OIML Requirements for Accuracy & Proving & Validation Issues
0930 – 0945	Break
0945 – 1100	Loss Control & Lease Automatic Custody Transfer (LACT) Understand the Aim of Loss Control • The Importance of Representative Fuel Samples & Lease Automatic Custody Transfer
1100 – 1230	Applied Accuracy Terminology Accuracy • Precision • Standard Deviation & Variance • Repeatability, Variability • Probability • STD • Systematic Error • Control Chart Tool for Performance Monitoring & Verification
1230 – 1245	Break
1245 – 1420	Fluid Dynamics Basics of Flow Measurements that May Influence the Accuracy of Any Flow Measuring Device • Parameters Influencing the Flow Pattern like Viscosity, Density, Reynolds Number & Bernoulli's Theorem Describing the Energy Balances in a Flowing Fluid • Standard API Gravity Measurement & Oil Classification
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One

Day 2: Monday, 10th of November 2025

0730 – 0930	Fluid Dynamics (cont'd) Stability of the Flow Pattern is of Paramount Importance, Special Attention is Paid to the Types of Possible Disturbances like Swirl Flow & The Methods to Prevent it by Application of Flow Straighteners & Conditions • Cavitation & Flashing • The Phenomena of Choked Flow & Gas Compressibility
0930 – 0945	Break
0945 – 1100	Principles of Gas Chromatography Process Gas Chromatography is Applied for the Required Analysis of a Fluid Composition as Part of the Flow Metering • Basic Principles to the Quantitation Methods of the Analysis Results



1100 - 1230	Heating Value Measuring Methods <i>Pros & Cons of the Different Methods to Determine the Heating Value of a Gas like Calorific Value Measurements & The GC Method using the "Du Long" Equation</i>
1230 - 1245	Break
1245 - 1420	Moisture & HC Dew-Point Measurements <i>Principles of Moisture Analysis • The Effects & Risks like Hydrate Forming by the Combination of Water (WDP) & Hydrocarbon Dew Point (HCDP) in Natural Gas</i>
1420 - 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	Lunch & End of Day Two

Day 3: Tuesday, 11th of November 2025

0730 - 0930	Standard Measurement Recommendations <i>OIML Recommended Best Practices & Requirements for Fiscal Metering & Operation • OIML Accuracy Meter Classification & Permissible Error • API MPMS • Practical Case Example</i>
0930 - 0945	Break
0945 - 1100	Flow Metering Using ΔP <i>Advantages & Disadvantages Compared to Other Flow Measuring Principles • Flow Devices like Venturi, Nozzle & Their Particular Applications • What is the Actual Effect of the Measurement Rangeability, Turn-Down Ratio in Relation to the Measurement Accuracy?</i>
1100 - 1230	Flow Metering that are Applied Based on Other Principles <i>What Issues Need to be Considered Before Selection of Any Type of Flow Meter for the Measurement Volumetric, Mass & Totalized Flow ?</i>
1230 - 1245	Break
1245 - 1420	Flow Metering that are Applied Based on Other Principles (cont'd) <i>What are the Other Measuring Principles, their Significant Advantages & Disadvantages, Interferences & 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 & Vortex?</i>
1420 - 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	Lunch & End of Day Three

Day 4: Wednesday, 12th of November 2025

0730 - 0930	Standardized Gas Flow Metering Standards <i>AGA Applied Terms & Factors that are Used in the Different Calculation Equations for the Main Types of Gas Flow Measuring Principles as Indicated in the Applied Standards • What are the Reasons for Application of a Dedicated Flow Computer and What are the Special Functions Like the Standardized Calculations & Additional Functions?</i>
0930 - 0945	Break
0945 - 1100	Fiscal Gas Metering Station Design <i>How is the Recommend Design of a NG Fiscal Metering Station? • Which Facilities are Required & What are Generally Applied Practices for Installation?</i>



1100 - 1230	Flow Calibration <i>What are the Reasons for Flow Meter Calibration & Practical Considerations? • What is the difference Between Calibration & Proving? • What are the Different Types of Flow Meter Calibration Systems?</i>
1230 - 1245	Break
1245 - 1420	Flow Calibration (cont'd) <i>What are the Issues Concerning Testing, Calibration & Presentation of Proving Data? • What Alternative Type of Turbine Meter Calibration is Applied? • What are the Trends & Best Practices?</i>
1420 - 1430	Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i>
1430	Lunch & End of Day Four

Day 5: Thursday, 13th of November 2025

0730 - 0930	Metering Prover Systems <i>What are the Main Types of Prover Systems & Their Specific Reasons of Application • How is the Way of Operation of Tank Provers, Piston Provers, Displacement Types Prover, Bi-Directional Pipe Prover & Ball Prover</i>
0930 - 0945	Break
0945 - 1100	Metering Prover Systems (cont'd) <i>What are the Reasons for Application of a Master Meter System? • What are Important General Prover Issues?</i>
1100 - 1230	Multiphase Flow & Water Cut Measurements <i>Why is MPF Metering Not Suitable as CT / Fiscal Metering? • What are the Three Phase Flow Properties? • What is Meant by "Water-Cut" & How is it Measured?</i>
1230 - 1245	Break
1245 - 1345	Multiphase Flow & Water Cut Measurements (cont'd) <i>What are the Measuring Principles for WC like Absorption Spectroscopy? • What are the Applied Three Phase Metering Techniques? • What is Meant by GVF & WC & What Influences Do They Have on the Performance? • Industrial Types that will be Discussed are the Developed MPF Meters from Roxar, Daniel, Agar, Expro, Haimo, Framo /Schlumberger & Jiskoot</i>
1345 - 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 - 1415	POST-TEST
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course

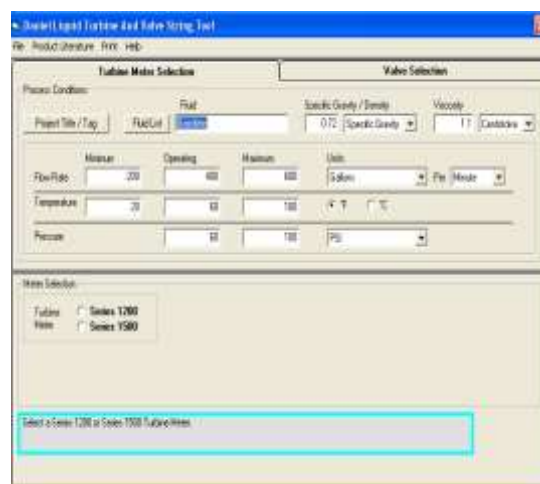


Simulators (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art “Gas Ultrasonic Meter Sizing Tool”, “Liquid Turbine Meter and Control Valve Sizing Tool”, “Liquid Ultrasonic Meter Sizing Tool”, “Orifice Flow Calculator” and FMI_Config_Tool_668 simulators.



Gas Ultrasonic Meter (USM) Sizing Tool Software



Liquid Turbine Meter and Control Valve Sizing Tool Software



Liquid Ultrasonic Meter Sizing Tool Software



Orifice Flow Calculator Software



FMI Config Tool 668 Simulator Software

Course Coordinator

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