COURSE OVERVIEW IE0370
Gas Measurement and Flow Metering Station

Course Title
Gas Measurement and Flow Metering Station

Course Date/Venue
Session 1: April 06-10, 2025/Boardroom 1,
Elite Byblos Hotel Al Barsha,
Sheikh Zayed Road, Dubai, UAE
Session 2: September 08-12, 2025/Fujairah
Meeting Room, Grand Millennium
Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
IE0370

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 simulators.

This course is designed to provide participants with a detailed and up-to-date overview of gas measurement and flowmetering. It covers the need for accurate fiscal measurement; the aspects of natural gas measurement and provides a clear presentation of the measurement principles; and the state-of-the-art technology and its applications in the real world.

Further, the course will discuss the various flow metering technologies including the types, features and functions of ultrasonic flowmeters; and the measurement considerations for ultrasonic flow metering and flow conditioners.

During this interactive course, participants will learn the operational issues of ultrasonic flow metering for gas application; the sizing and selection of ultrasonic flowmeters; the calibration procedures; the energy management system; the scope of field communications; the typical applications of ultrasonic flow metering; and the industry standards applicable for gas measurement and flowmetering.

Course Objectives

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

- Apply and gain an in-depth knowledge on metering and custody transfer
- Monitor and control a metering and custody transfer system recording all measurements and parameters
- Change orifice plate in Daniel orifice flow meter following standard operating procedure (SOP)
- Monitor ultrasonic flow meter operation and record all measurements
- Determine if meter prover loop unit is accurate in regards to cargo transfer
- Perform oil cargo calculation and corrections and gauging of cargo tanks following SOP
- Explain the selection criteria for a meter for custody transfer of hydrocarbon product
- Verify that cargo product specification is within required tolerances
- Prepare documentation for transfer of hydrocarbon products following regulatory procedures
- Compare the various flow metering technologies and know the types, features and functions of ultrasonic flowmeters
- Review the measurement considerations for ultrasonic flow metering and become familiar with flow conditioners
- Explain the operational issues of ultrasonic flow metering for gas application
- Discuss the sizing and selection of ultrasonic flowmeters and carry-out calibration procedures
- Familiarize with energy management system and know the scope of field communications
- Explain the typical applications of ultrasonic flow metering and be able to determine the industry standards applicable for it

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 metering and custody transfer for senior controllers and plant operations supervisors, engineers who are responsible for the design and operation of gas metering stations and field technical staff who have operations and maintenance management responsibilities.

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.

Course Accreditations

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**. 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:

Mr. Taiseer Ali, MSc, BSc, is a **Senior Electrical & Telecommunications Engineer** with over **30 years** of extensive experience **Power & Water Utilities** and Other **Energy Sectors.** His expertise includes **Electrical Substation & Design**, **Electrical Safety**, **Power System** Equipment, **Power System Protection and Relaying**, **Power Distribution**, **HV/LV Equipment**, **High Voltage Electrical Safety**, **LV & HV Electrical System**, **HV Equipments Inspection & Maintenance**, **HV Switchgear Operation & Maintenance**, **LV Distribution Switchgear & Equipment**, **Lock & Tag Out**, **Circuit Breakers & Switchgears**, Portable **Cables**, **Transformers**, Gas Insulated Substations (**GIS**), **HV Substation Inspection & Reporting**, **HV Cable Design**, **HV Electrical System Commissioning**, **HV Equipments Inspection & Maintenance**, Electrical Signal Analysis (**ESA**), **Electrical Equipment Circuits**, **Wiring & Testing**, **Electronic Circuits**, Electrostatic Discharge (**ESD**), **Metering Pump Selection**, Operation, Maintenance & Troubleshooting, **Ultrasonic Flowmetering** for Liquid Application, Li**quid & Gas Flowmetering & Meter Calibration**, **Water Meter Calibration**, PD **Meter Calibration** , Distributed Control System (**DCS**) Applications & Troubleshooting, **SCADA & Industrial Communication**, Process Logic Controller (**PLC**), **Load Flow** Calculation, **Cable** Installation, **Transformer** Maintenance, **Electrical** Safety, **Electrical** Drawing, **Power Generation & Transmission**, **Power Distribution & Network**, **Protection Relays**, **Electrical** Troubleshooting, **Earthing**, **Bonding**, **Lightning & Surge Protection**, **UPS & Battery**, **Instrumentation & Control**, **Process Control & Instrumentation**, **Industrial Communication**, **Flow** Measurement, **Level** Measurement, **Temperature & Vibration** Measurement, **Measurement** Instrumentation, **Pressure** Measurement, **Analytical** Instrumentation, **Calibration & Testing** Procedures, Final Control Elements, **Control Loops** Operation, **Control Panels**, **Power Generation**, **Power Transformers**, **Uninterruptible Power Systems** (**UPS**), **Battery Chargers**, **AC** & **DC Transmission**, **Distribution Network**, **Grid Input Assessment**, Load Flow, Short Circuit, Smart Grid, Grounding, **Electrical Equipment**, **Electrical Motors** & **Drives**, Power System Harmonics, **Electrical Substation Design**, **Power Cable Testing & Fault Location**, **Circuit Breakers & Switchgears**, Electrical Distribution Design, Installation & Commissioning and **HVDC Transmission** & **Control**, Advanced Networking, Datron Maintenance, Cisco Internet, Data Base Access, Advanced Computer, AutoCAD, Standard Radio Devices, Advanced Calibration, Repair and Maintenance of VHF Portable Role, Combat Vehicle Reconnaissance 76mm and Target Engagement Using Simulaser.

During his career life, Mr. Taiseer has gained his expertise and thorough practical experience through handling challenging positions such as being the **Head of the Command Control & Communication Department**, **Head of the Academic and Technical Branch**, **Chief of the Frequency Branch**, **Commander**, **Electrical Engineer**, **Spectrum Management Engineer**, **Safety Engineer**, **Engineering Manager**, **Electrical Engineering Head**, **Quality Control Department Head**, **Engineering Supervisor** and **Lecturer/Instructor** for various companies and universities such as the Yarmouk University, C3 Directorate, JAF C3 Communication Workshops, Jordan Armed Forces Joint Officer and Military Communication College and multi-national companies and institutes.

Mr. Taiseer has a **Master's** degree in **Industrial Engineering/Engineering Management** and a **Bachelor's** degree in **Electrical/Communication Engineering**. Further, he is a **Certified Instructor/Trainer** and delivered various trainings internally in his previous companies.

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.

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.

Accommodation

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

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

0730 – 0800	*Registration, Coffee, Welcome & Introduction*
0800 – 0815	***PRE-TEST***
0815 - 0830	***Review of Course*** *Objectives of Course ● Timetables*
0900 – 1000	***Introduction*** *General ● The Market ● The Measurement of Gas ● The Future*
1000 – 1015	*Break*
1015 – 1100	***Natural Gas Fundamentals*** *General ● Types of Natural Gas ● Natural Gas Thermodynamics ● Isentropic Flow ● Compressibility*
1100 – 1230	***Practical Examples*** *Calculation of Velocities ● Volumetric Flow ● Mass Flow ● Accuracy Considerations*
1230 – 1420	***Natural Gas Processes*** *General ● Overview ● Gas Processing ● Liquefaction*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0900	***Comparison of Technologies*** *D.P. Transmitter ● Venturi Tubes ● Vortex Meter ● Turbine Meter ● Coriolis Meter ● Summary*
0900 – 1000	***Video Presentation*** *Coriolis Mass Flowmeter*
1000 – 1015	*Break*
1015 – 1045	***Ultrasonic Flowmeters – Basic Principles*** *Introduction ● General ● Transit Time ● Doppler ● Beam Configuration ● Clamp-On Type ● Insertion Type*
1045 – 1115	***Video Presentation*** *3 Beam Ultrasonic Flowmeter*
1115 – 1230	***Ultrasonic Flowmeters – General*** *Preview ● History ● Product Overview*
1230– 1420	***Ultrasonic Flowmeters – Main Types*** *Elster – Instromet ● Emerson – Daniel ● Panametrics – Sentinel ● Sick – Maihack ● Krohne ● FMC – Smith Meters ● Typical Specification ● Future Trends*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 1000	***Measurement Considerations*** *Preview ● Basic Requirements ● Response ● Uncertainty ● Instrument Specification ● Accuracy Specifications*
1000 – 1015	*Break*
1015 – 1100	***Flow Conditioners*** *General ● Fully Developed Pipeline Flow ● Test Results ● Types of Flow Conditioners*
1100 – 1230	***Operational Issues*** *Introduction ● Contamination ● Control Valve Noise*
1230 – 1420	***Operational Issues (cont'd)*** *Signal Quality ● On-Line Monitoring*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 1000	***Sizing & Selection*** *General ● Sizing Notes ● Practical Example ● Selection Guidelines ● Typical Specification ● Summary*
1000 – 1015	*Break*
1015 – 1100	***Calibration*** *Introduction ● Calibration Systems ● Dry Calibration ● Calibration Requirements ● Practical Exercise*
1100 – 1200	***Meter Proving*** *Interactive Video Presentation*
1230 – 1300	***Energy Management*** *Introduction ● Speed of Sound Considerations ● Energy Management System ● Questions & Answers ● Summary*

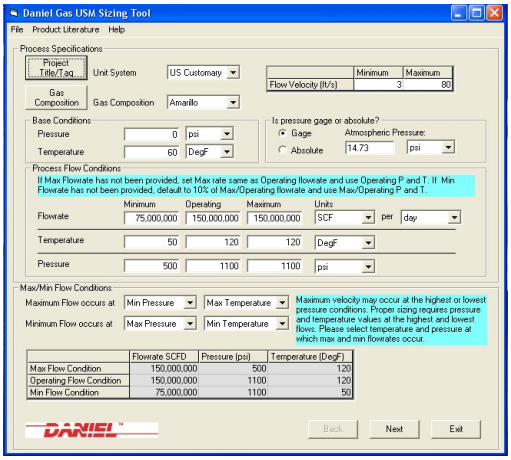
1300 – 1330	***Field Communications*** *Analogue Signals ● Digital Communications ● Fieldbus Technologies ● Future Trends*
1330 - 1420	***Video Presentation*** *HART Communication*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

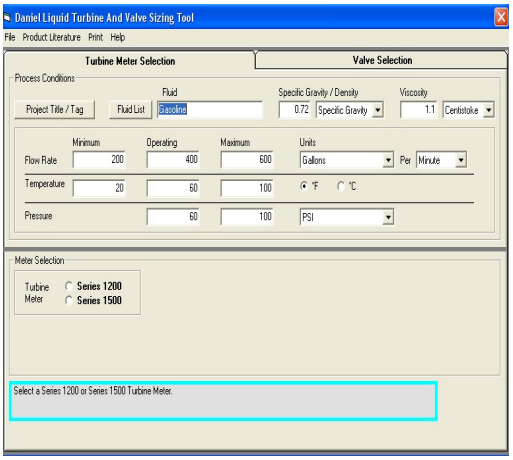
0730 – 1000	***Typical Applications*** *Process Gas & Flare Gas ● Custody Transfer of Natural Gas ● Custody Transfer Master Station ● Gas Distribution Pipeline ● Pipeline Leak Detection ● SCADA System*
1000 – 1015	*Break*
1015 – 1230	***Industry Standards*** *ISO 15970-2008 ● ISO 15971-2008 ● 15403-1-2006 ● AGA 9*
1230 – 1345	***Case Study: The Development of a 12 Beam Ultrasonic Gas Flowmeter*** *Introduction ● Fouling ● Meter Design ● Swirl Elimination ● Measurement Accuracy ● Conclusions*
1345 - 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 - 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

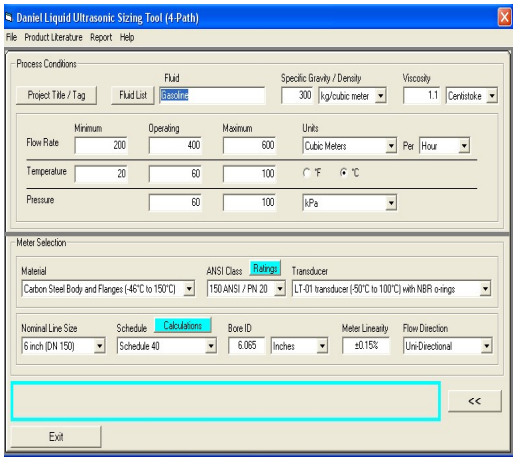
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art "Gas Ultrasonic Meter Sizing Tool", "Liquid Turbine Meter and Control Valve Sizing Tool", "Liquid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



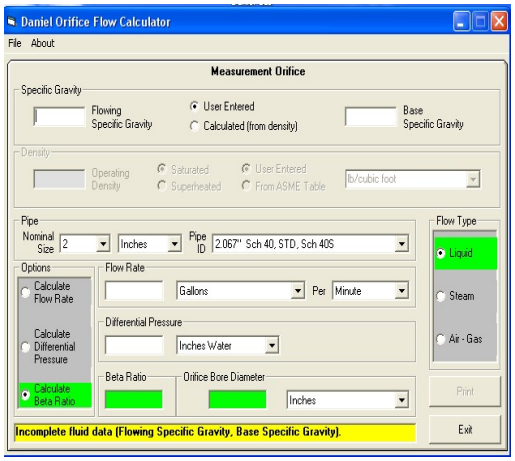
Gas Ultrasonic Meter (USM) Sizing Tool Software



Liquid Turbine Meter and Control Valve Sizing Tool Software



Liquid Ultrasonic Meter Sizing Tool Software



Orifice Flow Calculator Software

Course Coordinator

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