# COURSE OVERVIEW IE0338
# Inspection, Maintenance & Calibration Program of Terminal Flowmetering Station

**Course Title**
Inspection, Maintenance & Calibration Program of Terminal Flowmetering Station


**Course Date/Venue**
January 19-23, 2025/Safir Meeting Room, Divan Istanbul, Turkey

3.0 CEUs (30 PDHs) AWARD

**Course Reference**
IE0338

**Course Duration/Credits**
Five days/3.0 CEUs/30 PDHs

**Course Objectives**

***This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.***

This course is designed to provide participants with a detailed and up-to-date overview of Inspection, Maintenance & Calibration Program of Terminal Flowmetering Station. It covers the role, principles and custody transfer of flow measurement in the industry; the different types of flowmeters and the industry standards, legal frameworks and regulatory requirements in the oil and gas sector; the importance of safety and establishing protocols for inspection and maintenance; and the routine inspection techniques for flowmeters, instruments and ultrasonic flowmeters.

Further, the course will also discuss the Coriolis flowmeters and its design, principle, installation and troubleshooting; the effective strategies for maintenance planning and schedules; the predictive and preventative maintenance for optimal performance; the common flowmeter problems and the importance of accurate documentation, record keeping in maintenance and calibration; the importance and basics of calibration; and the master meter, volumetric and gravimetric methods in proving systems.

During this interactive course, participants will learn the calibration and traceability in compliance with international standards; the field calibration techniques and measurement accuracy; the QA/QC in flow measurement and calibration, the legal and financial implications of custody transfer; the design and operating custody transfer systems; the techniques for accurate sampling and product analysis; the principles and methods for hydrocarbon allocation; and the management of data for transparency and accountability.

## Course Objectives

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

- Apply and gain an in-depth knowledge on inspection, maintenance and calibration program of terminal flowmetering station
- Discuss the role, principles and custody transfer of flow measurement in the industry
- Enumerate the different types of flowmeters and recognize the industry standards, legal frameworks and regulatory requirements in the oil and gas sector
- Identify the importance of safety and establishing protocols for inspection and maintenance
- Carryout routine inspection techniques for flowmeters and instruments and discuss ultrasonic flowmeters and Coriolis flowmeters covering its design, principle, installation and troubleshooting
- Develop effective strategies for maintenance planning and schedules
- Differentiate predictive and preventative maintenance by comparing its approaches for optimal performance
- Identify and resolve common flowmeter problems and recognize the importance of accurate documentation and record keeping in maintenance and calibration
- Explain the importance and basics of calibration and employ the master meter, volumetric and gravimetric methods in proving systems
- Apply calibration standards and traceability through ensuring compliance with international standards
- Recognize field calibration techniques as well as improve measurement accuracy
- Implement QA/QC in flow measurement and calibration as well as evaluate the legal and financial implications of custody transfer
- Design and operate custody transfer systems and apply the techniques for accurate sampling and product analysis
- Discuss the principles and methods for hydrocarbon allocation and manage data for transparency and accountability

## 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 course conveniently saved in a **Tablet PC**.*

## Who Should Attend

This course provides an overview of all significant aspects and considerations of inspection, maintenance and calibration of terminal flowmetering station for instrumentation and control engineers, mechanical engineers, facility managers, maintenance technicians, calibration technicians, quality assurance and control personnel and those who are involved in the oil and gas and petrochemical industry where accurate measurement of fluid flow is critical.

## 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

Certificates are accredited by the following international accreditation organizations:

- 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.

- 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.

**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. Sydney Thoresson**, PE, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **40 years** of extensive experience within the **Petrochemical**, **Utilities**, **Oil**, **Gas** and **Power** industries. His specialization highly evolves in **Process Control Instrumentation**, **Process Instrumentation & Control**, **Process Control**, **Instrumentation**, Troubleshooting & Problem Solving, Instrumentation Engineering, Process Control (**PCI**) & Safeguarding, **Instrument Calibration & Maintenance**, **Instrumented Safety Systems**, **Liquid & Gas Flowmetering**, **Custody Measurement**, **Ultrasonic Flowmetering**, **Loss Control**, **Gas Measurement**, **Flowmetering & Custody Measurement**, **Multiphase Flowmetering**, **Measurement and Control**, **Mass Measuring System Batching** (**Philips**),High Integrity Protection Systems (**HIPS**), Process Controller, **Control Loop & Valve Tuning**, **Compressor Control & Protection**, **Control Systems**, Programmable Logic Controllers (**PLC**), **SCADA System**, **PLC & SCADA** - Automation & Process Control, **PLC & SCADA** Systems Application, Technical **DCS/SCADA**, **PLC-SIMATIC S7 300/400**: Configuration, Programming and Troubleshooting, **PLC, Telemetry and SCADA** Technologies, Cyber Security of Industrial Control System (**PLC, DCS, SCADA & IED**), Basics of **Instrumentation Control System, DCS**, **Distributed Control System** - Operations & Techniques, Distributed Control System (**DCS**) Principles, Applications, Selection & Troubleshooting, Distributed Control Systems (**DCS**) especially in **Honeywell DCS**, **H&B DCS**, **Modicon, Siemens**, **Telemecanique**, **Wonderware** and **Adrioit,** Safety Instrumented Systems (**SIS**), Safety Integrity Level (**SIL**), Emergency Shutdown (**ESD**), **Emergency Shutdown** System, Variable Frequency Drive (**VFD**), **Process Control & Safeguarding**, **Field Instrumentation**, **Instrumented Protective Devices** Maintenance & Testing, Instrumented Protective Function (**IPF**), **Refining & Rotating Equipment**, **Equipment Operations**, **Short Circuit Calculation**, **Voltage Drop Calculation**, **Lighting Calculation**, **Hazardous Area Classification**, **Intrinsic Safety**, Arc Furnace Automation-Ferro Alloys, Walking Beam Furnace, Blast Furnace, Billet Casting Station, Cement Kiln Automation, Factory Automation and Quality Assurance Accreditation (**ISO 9000** and **Standard BS 5750**). Further, he is also well-versed in **Electrical Safety**, **Electrical Hazards Assessment**, **Electrical Equipment**, **Personal Protective Equipment**, Log-Out & Tag-Out (**LOTO**), **ALARP & LOPA** Methods, Confined Workspaces, Power **Quality**, Power **Network**, Power **Distribution**, **Distribution Systems**, **UPS** & **Battery System**, **Earthing & Grounding**, Power **Generation**, **Protective Systems**, **Electrical Generators**, **Power** & **Distribution Transformers**, **Electrical Motors**, **Switchgears**, **Transformers**, **AC** & **DC Drives**, **Variable Speed Drives** & **Generators** and **Generator Protection**. He is currently the **Projects Manager** wherein he manages projects in the field of electrical and automation engineering and in-charge of various process hazard analysis, fault task analysis, FMEA and HAZOP study.

During Mr. Thoresson's career life, he has gained his thorough and practical experience through various challenging positions and dedication as the **Contracts & Projects Manager**, **Managing Director**, **Technical Director**, **Divisional Manager**, **Plant Automation Engineer**, **Senior Consulting Engineer**, **Senior Systems Engineer**, **Consulting Engineer**, **Service Engineer** and **Section Leader** from several international companies such as **Philips**, **FEDMIS**, **AEG**, **DAVY International**, **BOSCH**, **Billiton** and **Endress/Hauser**.

Mr. Thoresson is a **Registered Professional Engineering Technologist** and has a **Bachelor's** degree in **Electrical & Electronics Engineering** and a **National Diploma** in **Radio Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and an active member of the International Society of Automation (**ISA**) and the Society for Automation, Instrumentation, Measurement and Control (**SAIMC**). He has further delivered numerous trainings, courses, seminars, conferences and workshops worldwide.

## Course Fee

**US$ 6,000** 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.

## 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 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, 19th of January 2025***

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| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***Overview of the Oil & Gas Terminal**: Understanding the Role of Flow Measurement & Custody Transfer in the Industry* |
| *0930 – 0945* | *Break* |
| *0945 – 1130* | ***Principles of Flow Measurement**: Introduction to Various Flow Measurement Technologies & their Applications* |
| *1130 - 1230* | ***Types of Flowmeters**: Detailed Exploration of Different Types of Flowmeters Used in the Oil & Gas Sector* |
| *1230 – 1245* | *Break* |
| *1245 – 1320* | ***Standards & Regulatory Requirements**: Overview of Industry Standards, Legal Frameworks & Compliance* |
| *1320 - 1420* | ***Safety Protocols & Procedures**: Importance of Safety & Establishing Protocols for Inspection & Maintenance* |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

***Day 2:*** ***Monday, 20th of January 2025***

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|---|---|
| *0730 – 0830* | ***Basic Inspection Techniques**: Introduction to Routine Inspection Techniques for Flowmeters & Instruments* |
| *0830 – 0930* | ***Ultrasonic Flowmeters**: Understanding Principle, Installation & Troubleshooting* |
| *0930 – 0945* | *Break* |

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|---|---|
| 0945 – 1130 | ***Coriolis Flowmeters**: Detailed Study of Design, Operation & Maintenance* |
| 1130 – 1230 | ***Maintenance Planning**: Developing Effective Maintenance Strategies & Schedules* |
| 1230 – 1245 | *Break* |
| 1245 – 1420 | ***Predictive vs. Preventative Maintenance**: Comparing Maintenance Approaches for Optimal Performance* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Two* |

**Day 3: Tuesday, 21st of January 2025**

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|---|---|
| 0730 – 0830 | ***Troubleshooting Common Issues**: Identifying & Resolving Common Flowmeter Problems* |
| 0830 – 0930 | ***Documentation & Record Keeping**: Importance of Accurate Documentation in Maintenance & Calibration* |
| 0930 – 0945 | *Break* |
| 0945 – 1130 | ***Calibration Principles**: Understanding the Importance & Basics of Calibration* |
| 1130 – 1230 | ***Proving Systems**: In-depth Study of the Master Meter, Volumetric & Gravimetric Methods* |
| 1230 – 1245 | *Break* |
| 1245 – 1420 | ***Calibration Standards & Traceability**: Ensuring Compliance with International Standards* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Three* |

**Day 4: Wednesday, 22nd of January 2025**

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|---|---|
| 0730 – 0830 | ***Field Calibration Techniques**: Hands-on Approaches to In-Situ Calibration* |
| 0830 – 0930 | ***Accuracy & Repeatability**: Understanding & Improving Measurement Accuracy* |
| 0930 – 0945 | *Break* |
| 0945 – 1130 | ***Quality Assurance & Control**: Implementing QA/QC in Flow Measurement & Calibration* |
| 1130 – 1230 | ***Custody Transfer Overview**: Understanding the Legal & Financial Implications* |
| 1230 – 1245 | *Break* |
| 1245 – 1420 | ***Metering Stations & Systems**: Design & Operation of Custody Transfer Systems* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Four* |

**Day 5: Thursday, 23rd of January 2025**

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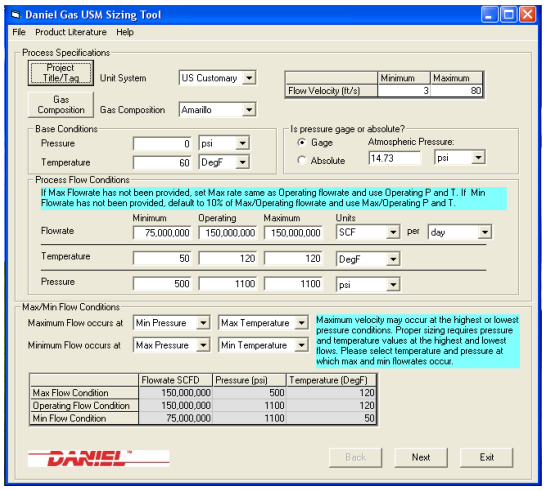
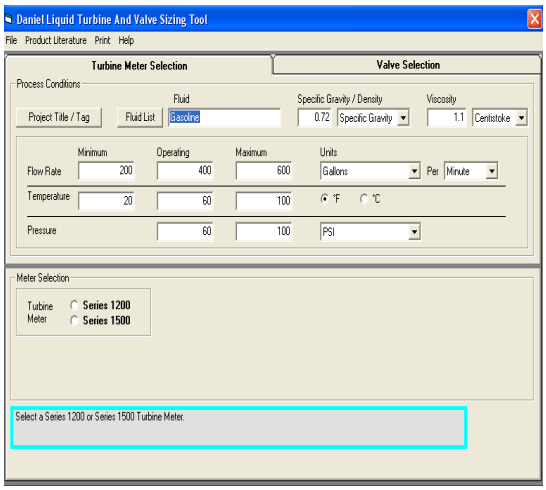
| 0700 – 0830 | ***Sampling & Analysis**: Techniques for Accurate Sampling & Product Analysis* |
| 0830 – 0930 | ***Allocation Measurement**: Principles & Methods for Hydrocarbon Allocation* |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Data Management**: Managing Data for Transparency & Accountability* |
| 1100 - 1230 | ***Auditing & Compliance**: Preparing for & Handling Audits in Custody Transfer* |
| 1230 – 1245 | *Break* |
| 1245 - 1345 | ***Case Studies**: Real-World Examples of Complex Issues & Solutions in Flow Measurement* |
| 1345 – 1400 | ***Course Conclusion*** |
| 1400 – 1415 | ***POST TEST*** |
| 1415 – 1430 | *Presentation of Course Certificates* |
| 1430 | *Lunch & End of Course* |

## Simulators (Hands-on Practical Sessions)

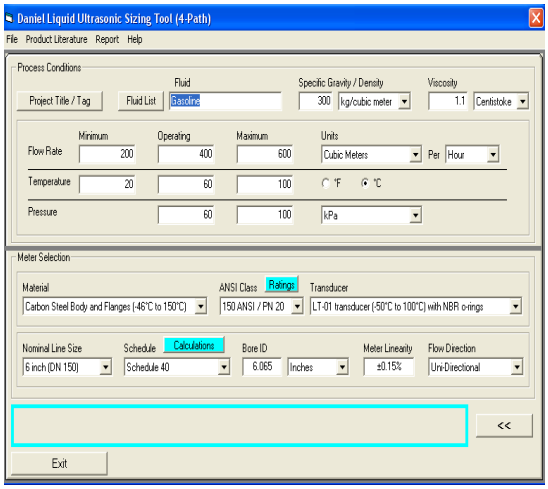
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our "Gas Ultrasonic Meter Sizing Tool", "Liquid Turbine Meter and Control Valve Sizing Tool", "Liquid Ultrasonic Meter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



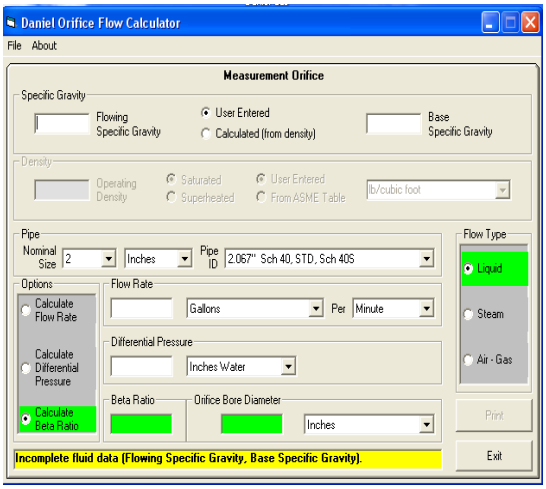

**Gas Ultrasonic Meter (USM) Sizing Tool Simulator**




**Liquid Turbine Meter and Control Valve Sizing Tool Simulator**




**Liquid Ultrasonic Meter Sizing Tool Simulator**




**Orifice Flow Calculator Simulator**

## Course Coordinator

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