



COURSE OVERVIEW IE0126
Pressure Measurement, Repair and Calibration

Course Title

Pressure Measurement, Repair and Calibration

Course Date/Venue

Session 1: July 07-11, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: December 14-18, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



Course Reference

IE0126



Course Duration/Credits

Three days/3.0 CEUs/30 PDHs

Course Description

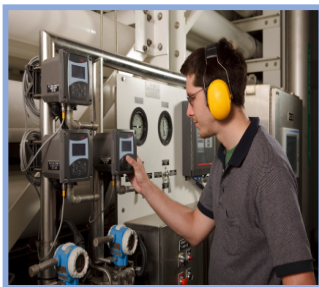


This hands-on, highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art flow measurement simulators.

Field instruments or measurement devices can be characterized in several different ways. In regard to the measured value, some are continuous and some are discrete. In regard to time, some are continuous and some are sampled. In regard to their relationship to the process, some are in-line, some are on-line, and some are off-line.



The steady-state characteristics of a measurement device often determine its suitability for a given purpose. This includes its measurement range, its accuracy, its repeatability, the resolution of the measured value, and its turndown ratio. Measurement uncertainty is receiving increasingly more attention and will probably receive even more in the future.



Instrument Calibration must be carried out to maintain and verify instrument accuracy. Test and Calibration instruments are used for various instruments which measure typically Flow, Level, Pressure and Temperature. They are also used for setting up final elements such as control valves. Test and Calibration instruments are usually available in portable versions for site calibration or bench versions for the workshop.



Calibration is the process of configuring an instrument to provide a result for a sample within an acceptable range. Eliminating or minimizing factors that cause inaccurate measurements is a fundamental aspect of instrumentation design.

This course is designed to give an overview of the general principles of calibration for various field instruments used for flow, level, pressure or temperature measurement. It provides an up-to-date calibration methods available across a variety of locations and applications and is designed to outline all the basic principles which can be applied to high accuracy calibrations in laboratory and field applications. The course also addresses less accurate calibrations or 'verifications' in difficult situations.

The course covers the calibration and monitoring of field instruments; the various types of process variables; all standard instruments measurements and test equipment; bench calibration for different type of process variables instrumentations; calibrating different type of process variables instrumentations; standard instrument measurement and test equipment; the applicable standards to instrument calibration; the instrument performance, electrical measurements and the 4-20 mA standard; the digital system fundamentals and typical applications and the bench calibration for pressure instruments, level instruments, temperature instruments and flow instruments.

Course Objectives

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

- Apply and gain systematic techniques and methodologies on test calibration and maintenance of flow-level pressure and temp
- Calibrate and monitor field instruments used to measure and control various types of process variables e.g. flow, level, pressure and temperature
- Get familiar with all standard instruments measurements and test equipment
- Perform bench calibration for different type of process variables instrumentations at the workshop
- Perform calibration for different type of process variables instrumentations on site
- Carryout standard instrument measurement and test equipment
- Discuss applicable standards to instrument calibration
- Review instrument performance, electrical measurements and the 4-20 mA standard
- Identify the digital system fundamentals and typical applications
- Perform bench calibration for pressure instruments, level instruments, temperature instruments and flow instruments

Who Should Attend

This course is intended for instrument maintenance technicians who are in charge of calibrating various field instruments.

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: -

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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.

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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.

Accommodation

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



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. John Vorster, MSc, BTech, is a Senior Instrumentation & Control Engineer with over 20 years of industrial experience within the Oil, Gas, Process, Refinery, Power and Nuclear industries. His wide expertise includes Testing, Calibration & Maintenance of Flow, Level, Pressure & Temperature; Flow Measurement & Custody Measurement, Flow Computer, Turbine Flowmeters, Ultrasonic Flowmeter, Positive Displacement Flowmeter, Coriolis Flowmeter, Flow Rate Corrections, Pressure Flow Transmitters, Pressure Methods, Flow Nozzles, Orifice Plates, Venturi Tubes, Pitot Tubes, Process Control Design & Plant Modelling, Instrumentation, Automation, Process Control Instrumentation, Analyzer Measurement Systems, Pressure Management, Selection & Sizing of all Instrumentation, SIL Criteria, Calibration & Configuration of Installed Instrumentation, PLC & DCS, Bearing Replacement and Control Valves. Further, he is also well-versed in HAZOP, LOPA Studies, Radiation Protection, Hazardous Substances, Hazardous Area Classification, Nuclear Devices Maintenance, Loop Drawings, Loop Calculations, Engineering Drawings, Shutdown Maintenance & Planning, Asset Management, Six Sigma, Energy Management & Measurements, Project Management, Strategic Resource Planning, Budget Preparation, ISO 9001, ISO 14000 and ISO 18000 standards. He is currently the Instrumentation Analyzer & Engineer of Sasolburg wherein he is in-charge of the design and monitoring of the analyzer measurement systems.

During his career life, Mr. Vorster has gained his practical and field experience through his various significant positions and dedication as the **Project Manager, Trainer, Senior Instrumentation Engineer, Instrumentation Engineer, Green Belt Project Leader, Instrumentation Technologist, Senior Instrumentation/Electrical Artisan, Instrumentation Artisan and Apprentice Instrumentation** for numerous international companies including **Sasolburg, DOW Chemical Company, Safripol and Iscor.**

Mr. Vorster has a **Master** degree in **Engineering Development & Management**, as well as a **Bachelor of Technology** degree and a **National Diploma in Electrical Engineering** from the **North West University** and **Vaal University of Technology** respectively. Further, he is a **Certified Instructor/Trainer, a Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)**, an **Appointed Radiation Protection Officer** and a **Qualified Instrument Mechanician**. Moreover, he is an active member of **Project Management Institution (PMI)** and **South African Institute of Measure and Control (SAIMC)** and has delivered numerous courses, workshops, conferences and seminars internationally.





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® (Howard 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

0730 - 0800	Registration & Coffee
0800 - 0815	Welcome & Introduction
0815 - 0830	PRE-TEST
0830 - 0930	Standard Instrument Measurement & Test Equipment Flow Instruments • Level Instruments • Pressure Instruments • Temperature Instruments • On-line instruments • Off-line Instruments
0930 - 0945	Break
0945 - 1130	Applicable Standards to Instrument Calibration Why Standards? • What Standards? • Quality
1130 - 1230	Applicable Standards to Instrument Calibration (cont'd) ISO 9000 • ISO 17025
1230 - 1245	Break
1245 - 1330	Instrument Performance Accuracy • Repeatability • Linearity • Hysteresis • Performance
1330 - 1420	Instrument Performance (cont'd) Specifications • Errors • Zero & Span • Basic Control Concepts
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

0730 - 0830	Review of Electrical Measurements Typical Multi-Meter • Voltage measurement
0830 - 0930	Review of Electrical Measurements (cont'd) Current measurement • Resistance measurement





0930 - 0945	Break
0945 - 1130	The 4-20 mA Standard Live Zero • Current Loop • Standards
1130 - 1230	The 4-20 mA Standard (cont'd) The 2-Wire Transmitter • Load Effect • Intrinsic safety
1230 - 1245	Break
1245 - 1330	Digital System Fundamentals Numbering Systems • Code Numbers
1330 - 1420	Digital System Fundamentals (cont'd) Binary Logic • Ladder Logic • Applications
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 Two

Day 3

0730 - 0830	Typical Applications Flowmeter • Radar Level
0830 - 0930	Typical Applications (cont'd) Split Signal Control • Cascade Control (Computer Simulation)
0930 - 0945	Break
0945 - 1130	Perform Bench Calibration at the Workshop and On-site Definition • Standards • ISO 9000
1130 - 1230	Perform Bench Calibration at the Workshop and On-site (cont'd) ISO 17025
1230 - 1245	Break
1245 - 1330	Pressure & Level Instruments: Bench Calibration at the Workshop and On-site Dead Weight Tester • Portable Calibrators • Pressure Transmitters • Differential Pressure Transmitters
1330 - 1420	Pressure & Level Instruments: Bench Calibration at the Workshop and On-site (cont'd) Ultrasonic & Radar • Blanking distances • Laser Measurement
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 Two

Day 4

0730 - 0830	Temperature Instrument: Bench Calibration at the Workshop and on-site Oil Baths • Thermocouple Construction • Thermocouple Types
0830 - 0930	Temperature Instrument: Bench Calibration at the Workshop and on-site (cont'd) Thermocouple Tables • MV Meter
0930 - 0945	Break
0945 - 1130	Temperature Instrument: Bench Calibration at the Workshop and on-site (cont'd) RTD Construction • RTD Types • Wheatstone Bridge





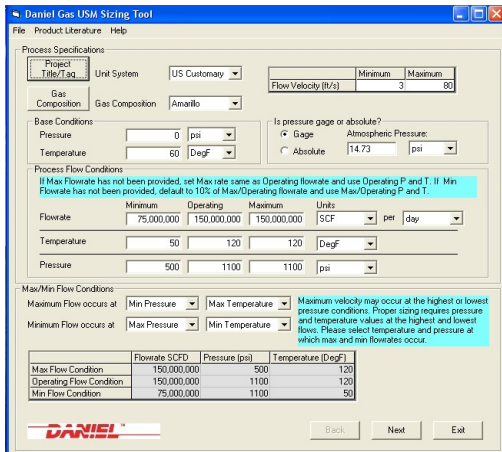
1130 - 1230	Temperature Instrument: Bench Calibration at the Workshop and on-site (cont'd) Pyrometry • Black Box
1230 - 1245	Break
1245 - 1330	Flow Instrument: Bench Calibration at the Workshop and on-site Orifice Plate Tapping Points • Averaging Pilot Tube Sizing
1330 - 1420	Flow Instrument: Bench Calibration at the Workshop and on-site (cont'd) Flow Rigs • Portable Ultrasonic Flowmeters
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 Three

Day 5

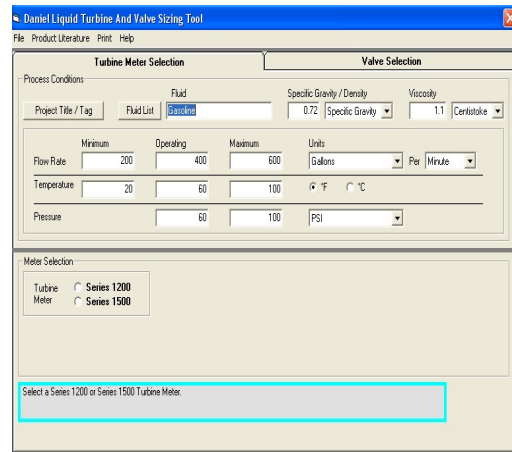
0730 - 0830	Flow Instrument: Bench Calibration at the Workshop and on-site (cont'd) Pulse Measurement • Variable area flowmeters
0830 - 0930	Flow Instrument: Bench Calibration at the Workshop and on-site (cont'd) Vortex Flowmeters • Oval Gear • etc
0930 - 0945	Break
0945 - 1130	Safety Considerations Intrinsic Safety Applications • Explosion-Proof Applications
1130 - 1230	Safety Considerations (cont'd) Area Classifications • Approval Standards
1230 - 1245	Break
1245 - 1345	Safety Considerations (cont'd) Certification • Oxygen Cleaning
1345 - 1400	Review, Wrap-up Session & Course Conclusion
1400 - 1415	POST-TEST
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulators (Hands-on Practical Sessions)

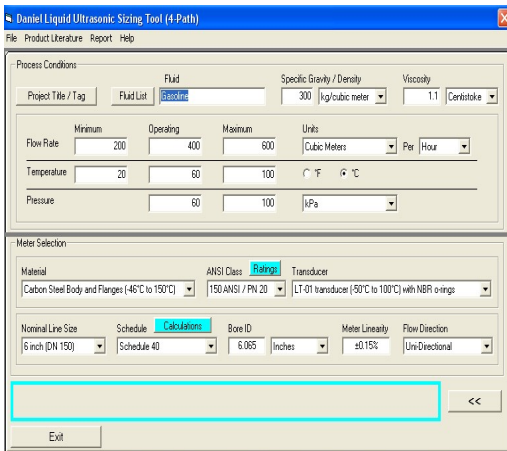
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art “Gas Ultrasonic Meter Sizing Tool”, “Liquid Turbine Meter and Control Valve Sizing Tool”, “Liquid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



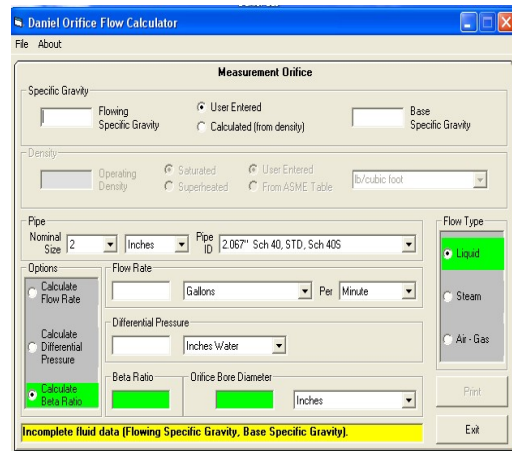
Gas Ultrasonic Meter (USM) Sizing Tool Simulator



Liquid Turbine Meter and Control Valve Sizing Tool Simulator



Liquid Ultrasonic Meter Sizing Tool Simulator



Orifice Flow Calculator Simulator

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org