COURSE OVERVIEW IE0738
Field Measurement Devices

Course Title
Field Measurement Devices

Course Date/Venue
Session 1: January 26-30, 2025/Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA
Session 2: November 16-20, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
IE0738

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 field measurement devices (level measurement). It covers the instrumentation and process control; the pressure, levels, temperatures and flows measurement; the process control and loops; the instrument symbols of PID; the various types of level measurement; the types of level measurement installed in the fertilizer plant; the ammonia production and urea production; and the urea reactor and stripper level measurement.

During this interactive course, participants will learn the magnetic float level measurement, float level measurement and displacer level measurement; the steam turbine condenser level measurement; the boiler and stream drum level measurement fundamental strategy; the significance of various types of level measurement of process control; optimizing strategy for boiler drum level control; new innovations and standards for the level measurements; the relevant international instruments standards for the level measurement; and troubleshooting and maintenance involve in each types of level measurement instrument.

Course Objectives

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

- Apply and gain a comprehensive knowledge on field measurement devices (level measurement)
- Discuss instrumentation and process control including its definition, process measurements, process control and process characteristics and theoretical concepts of physical systems, electrical, liquid and thermal
- Identify pressure, levels, temperatures and flows covering control valve, evaluation and control
- Recognize process control and loops including block diagrams and process controller
- Interpret instrument symbols of PID including types of electrical, electronic and pneumatics equipment
- Identify the various types of level measurement covering the two methods used to measure level
- Discuss the purpose of level measurement, how level measurement transmitters work and the characteristics of level measurement elements
- Recognize the type of level measurement installed in the fertilizer plant
- Describe ammonia production and urea production
- Explain urea reactor and stripper level measurement that include level measurement bottom HP stripper and HP reactor
- Carryout theory and operations, control system involved and its philosophy, various aspects of maintenance, trouble shootings and problem solving
- Employ magnetic float level measurement, float level measurement and displacer level measurement
- Explain steam turbine condenser level measurement and its philosophy and instrument controls
- Carryout boiler and stream drum level measurement fundamental strategy
- Identify significance of various types of level measurement of process control
- Carryout ammonia storage level measurement (Enraf system) covering theory and operations, control system involved and its philosophy, various aspects of maintenance, troubleshooting and problem solving
- Discuss Honeywell Enraf SmartRadar flexline precision tank gauging system call 54 and Honeywell Enraff SmartRadar 970 series for storage tank measurements
- Optimize strategy for boiler drum level control and recognize control system involved for the level measurement
- Apply new innovations and standards for the level measurements
- Review the relevant international instruments standards for the level measurement
- Troubleshoot and maintain involve in each type of level measurement instrument
- Apply steam drum level measurement technique and discuss its theory and operations, control system involved and its philosophy, various aspects of maintenance, trouble shootings and problem solving
- Carryout level measurement challenges in boilers and steam drum case study as well as solve the seven most common tank gauging problems

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 a basic overview of all significant aspects and considerations of field measurement devices (level measurement) for instrument engineers, supervisors and technicians.

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 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. Attalla Ersan, PEng, MSc, BSc, is a **Senior Engineer** with over **35 years** of extensive experience within the **Oil & Gas**, **Hydrocarbon** and **Petrochemical** industries. His expertise widely covers the areas of **Process Analyzer & Analytic Instrumentation**, **Process Control**, Instrumentation, Troubleshooting & Problem Solving, **Process Plant** Operations, **Process Plant** Startup & Operating Procedure, **Control Room** Emergency Response, **SIL Criteria**, Calibration & Configuration of Installed Instrumentation, **PLC & DCS**, **Bearing** Replacement, **Control Valves**, **Emergency Response** Planning, **Boiler & Steam** System Management, **Process Control** Design & Plant Modelling, **Process** Instrumentation & Automation, **Process Control** Instrumentation, **Analyzer Measurement** Systems, **Pressure** Management and Selection & Sizing of all Instrumentation. Further, he is also well-versed in **Permit to Work** System, **Power Transformers**, **Power System** Analysis, **Power Supply** Substations, **Electric Power System** Operation, Fundamentals of **Power System Equipment**, **Power System Stability**, **Power System Harmonics** Analysis, Mitigation & Solution Strategies, **Power System**, Generation & Distribution, **AC & DC Motors**, **Substations, Switchgears & Distribution**, **Electro-mechanical Protection Relays**, Engineering Drawings, Industrial **Power System Coordination**, Distributed Control System (**DCS**), **Honeywell TDS 3000 DCS**, **Liquid** and **Gas Flowmetering**, **Meter** Calibration, Hazard and Operability (**HAZOP**) Study, Process Hazards Analysis (**PHA**), **HAZOP** Facilitation, **Loss Prevention**, Consequence Analysis Application, **Gas Detectors** Operation, **Accident/Incident Investigation** (**Why Tree Method**), **Occupational Exposure** Assessment, **Fire Fighting & First Aid**, **Environmental** Management and Basic **Safety** Awareness. Project Management, Human Resources Consultancy, Manpower Planning, Job Design & Evaluation, Recruitment, Training & Development and Leadership, Creative Problem-Solving Skills, Work Ethic, Job Analysis Evaluation, Training & Development Needs, Bidding & Tendering, Technical Report Writing, Supervisory Leadership, Effective Communication Skills and Total Quality Management (TQM). He is currently the **CEO** of **Ersan Petrokimya Teknoloji Company Limited** wherein he is responsible for the design and operation of Biogas Process Plants.

During his career life, Mr. Ersan has gained his practical and field experience through his various significant positions and dedication as the **Policy**, **Organization & Manpower Development Head**, **Training & Development**, **Head**, **Ethylene Plant – Pyrolysis Furnace Engineer**, **Production Engineer**, Process Training Coordinator, Ethylene Plant Shift Supervisor, Ethylene Plant Panel & Fit Operator, Process Training & Development Coordinator, **Technical Consultant**, and **Instructor/Trainer** for Qatar Vinyl Company Limited and Qatar Petroleum Company (QAPCO).

Mr. Ersan is a **Registered Professional Engineer** and has a **Master's degree** of **Education** in **Educational Training & Leadership** and a **Bachelor's degree** of **Petrochemical Engineering**. Further, he is a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, workshops, conferences and seminars internationally.

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	***Introduction to Instrumentation & Process Control*** *Definition • Process Measurements • Process Control & Process Characteristics • Theoretical Concepts of Physical Systems • Electrical, Liquid, Thermal*
0930 – 0945	*Break*
0945 – 1030	***Overview of Pressure, Levels, Temperatures & Flows*** *Control Valves • Evaluation & Control • Examples of Drawings*
1030 – 1130	***Process Control & loops*** *Definition • Block Diagrams • Process Controller*
1130 – 1245	*Break*
1245 – 1320	***Understanding of PID*** *Instrument Symbols*
1320 – 1420	***Electrical, Electronic & Pneumatics*** *Types of Equipment*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Types of Level Measurement*** *Two Methods Used to Measure Level; Direct or Mechanical Method & Indirect or Inferential Methods • Definition • Gauge Glass Level Measurement • Electrical & Electronic Level Sensor • Remote Display Level Indicator • Level Engineering Units*
0830 – 0930	***Types of Level Measurement (cont'd)*** *Dipsticks • Differential Pressure DP, Pressure-Measuring Devices (Hydrostatic Systems) • Buoyancy Buoyancy Tape Systems: Level Indicators Classified Based on Buoyancy • Ultrasonic Level Gauge• Radar (Microwave) Sensors • Capacitance Devices • Tank Gauging • Bypass Level Gauge*
0930 – 0945	*Break*
0945 – 1015	***Purpose of Level Measurement*** *How Level Measurement Transmitters Work • Characteristics of Level Measurement Elements*
1015 - 1100	***Ammonia Storage Level Measurement (Enraf System)*** *Theory & Operations, Control System Involved & its Philosophy, Various Aspects of Maintenance, Trouble Shootings & Problem Solving • Case Study (Honeywell Enraf SmartRadar Flexline Precision Tank Gauging System Call 54 & Honeywell Enraf SmartRadar 970 Series for Storage Tank Measurements*
1100 – 1230	***Types of Level Measurement Installed in the Fertilizer Plant***
1230 – 1245	*Break*

1245 – 1320	***Ammonia Production*** *Gas Scrubber Level • Ammonia Separator Level Measurement & Point Level Detection • Heat Recovery Boiler Level Measurement & Point Level Detection • Ammonia Tank Level Measurement & Point Level Detection*
1320 – 1420	***Urea Production*** *Stripper Level Measurement • Pool Condenser Level Measurement • Urea Reactor Level Measurement & Point Level Detection*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Reactor, Stripper Level & Separator Measurement (Level Measurement Bottom HP Stripper & HP Reactor)*** *Theory & Operations, Control System Involved & its Philosophy, Various Aspects of Maintenance, Troubleshootings & Problem Solving • Case Study (Radar Level Measurements in Corrosion Sensitive Areas Stamicarbon and VEGA Radar Level Measurements in Corrosive Sensitive, Safurex VEGA Radar Instruments (Horn Type, Rod Type))*
0930 – 0945	*Break*
0945 – 1100	***Magnetic Float Level Measurement*** *Magnetic Float Level Switch Working Animation • Magnetic Float Level Transmitter Working Principle Side Mounting Magnetostrictive Level Transmitter Working Principle • Magnetic Float Level Switch Installation Techniques*
1100 – 1230	***Float Level Measurement*** *Float Switch Working Principle • Float Level Switch Working Principle Animation • Float Level Switch Working Principle*
1230 – 1245	*Break*
1245 – 1420	***Displacer Level Measurement*** *Displacer Level Transmitter Dry Calibration with Weights • Displacer Level Switch Working Principle • Displacer (Buoyancy) Level Transmitter Principle, Limitations, Design • Installation & Calibration • Displacer Level Measurement Calculations • Displacer Level Transmitter Working Principle • Displacer Interface Level Measurement*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

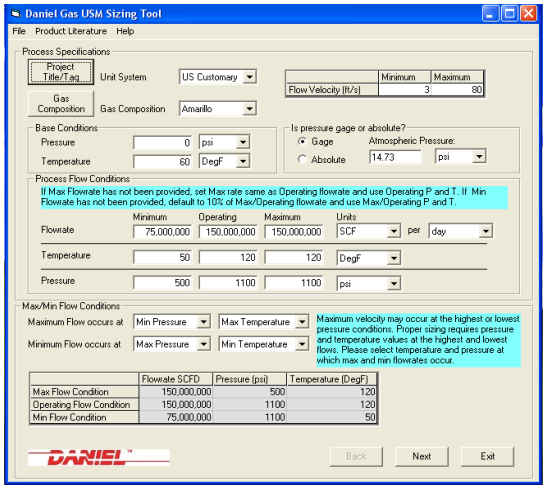
0730 – 0930	***Steam Turbine Condenser Level Measurement & Its Philosophy & Instrument Controls***
0930 – 0945	*Break*
0945 – 1100	***Boiler & Stream Drum Level Measurement Fundamental Strategy*** *Preventing Turbine Water Damage: Sources of Water Induction* *Boiler Drum's Water Level Control*
1100 – 1230	***Significance of Various Types of Level Measurement of Process Control***
1230 – 1245	*Break*
1245 – 1420	***Optimizing Strategy for Boiler Drum Level Control*** *Shrink & Swell • Drum Level Measurement • Understanding Response Dynamics • Types of Level Control Systems • Tuning the Control Loop • Handling Disturbances*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

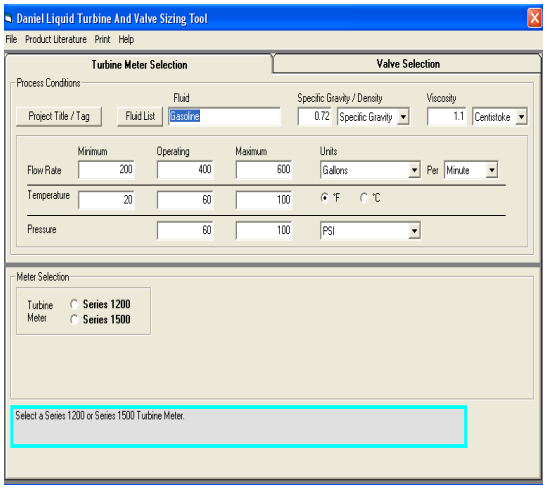
0730 – 0830	***Control System Involved for the Level Measurement***
0830 – 0930	***New Innovations & Standards for the Level Measurements*** *The Innovation in Interface Measurement*
0930 – 0945	*Break*
0945 – 1230	***The Relevant International Instruments Standards for the Level Measurement***
1230 – 1245	*Break*
1245 – 1345	***Troubleshooting & Maintenance Involve in each Type of Level Measurement Instrument*** *Steam Drum Level Measurement Technique, Theory and Operations, Control System Involved & its Philosophy, Various Aspects of Maintenance, Trouble Shootings & Problem Solving • Case Study (Level Measurement Challenges in Boilers & Steam Drum) • Solving the Seven Most Common Tank Gauging Problems*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

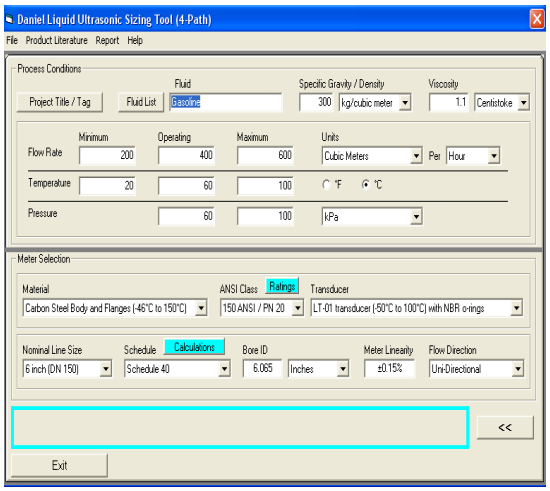
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art "Gas Ultrasonic Meter Sizing Tool", "Liquid Turbine Meter and Control Valve Sizing Tool", "Liquid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



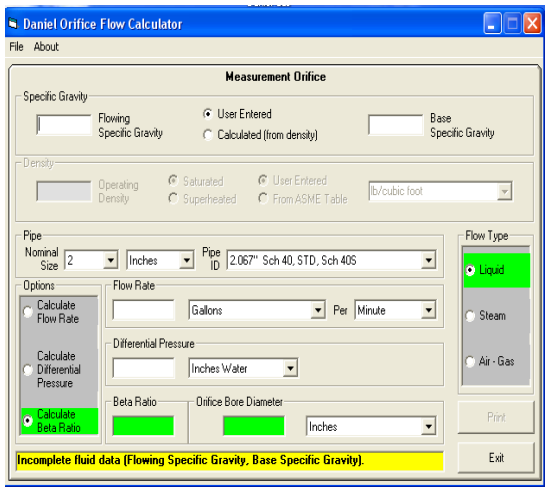
Gas Ultrasonic Meter (USM) Sizing Tool Simulator



Liquid Turbine Meter and Control Valve Sizing Tool Simulator



Liquid Ultrasonic Meter Sizing Tool Simulator



Orifice Flow Calculator Simulator

Course Coordinator

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