

COURSE OVERVIEW IE0738 Field Measurement Devices

<u>Course Title</u> 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

(30 PDHs)

Course Reference

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-theart 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.



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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



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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.



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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: -

A CEL

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 gualified 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.

*** BAC

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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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 Process Control Instrumentation & Automation, Instrumentation, Analvzer 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, Effective Communication Skills and Total Quality Supervisory Leadership, 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.



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<u>Course Program</u> 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:

Dav 1

Day I		
0730 - 0800	Registration & Coffee	
0800 - 0815	Welcome & Introduction	
0815 - 0830	PRE-TEST	
0830 - 0930	<i>Introduction to Instrumentation & Process Control</i> Definition • Process Measurements • Process Control & Process Characteristics • Theoretical Concepts of Physical Systems • Electrical, Liquid, Thermal	
0930 - 0945	Break	
0945 – 1030	<i>Overview of Pressure, Levels, Temperatures & Flows</i> 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	<i>Electrical, Electronic & Pneumatics</i> <i>Types of Equipment</i>	
1420 – 1430	Recap	
1430	Lunch & End of Day One	

Day 2

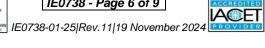
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	Types of Level Measurement
0730 - 0830	Two Methods Used to Measure Level; Direct or Mechanical Method \mathcal{E}
	Indirect or Inferential Methods • Definition • Gauge Glass Level
	Measurement • Electrical & Electronic Level Sensor • Remote Display Level
	Indicator • Level Engineering Units
	Types of Level Measurement (cont'd)
	Dipsticks • Differential Pressure DP, Pressure-Measuring Devices
	(Hydrostatic Systems) • Buoyancy Buoyancy Tape Systems: Level
0830 - 0930	Indicators Classified Based on Buoyancy • Ultrasonic Level Gauge• Radar
	(Microwave) Sensors • Capacitance Devices • Tank Gauging • Bypass Level
	Gauge
0930 - 0945	Break
	Purpose of Level Measurement
0945 - 1015	How Level Measurement Transmitters Work • Characteristics of Level
	Measurement Elements
	Ammonia Storage Level Measurement (Enraf System)
	Theory & Operations, Control System Involved & its Philosophy, Various
1015 1100	Aspects of Maintenance, Trouble Shootings & Problem Solving • Case
1015 - 1100	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



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1245 – 1320	Ammonia ProductionGas Scrubber Level • Ammonia Separator Level Measurement & Point LevelDetection • Heat Recovery Boiler Level Measurement & Point LevelDetection • 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

Dav 3

Day 3	
	Reactor, Stripper Level & Separator Measurement (Level
	Measurement Bottom HP Stripper & HP Reactor)
	Theory & Operations, Control System Involved & its Philosophy, Various
0730 - 0930	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
	Magnetic Float Level Measurement
	Magnetic Float Level Switch Working Animation • Magnetic Float Level
0945 - 1100	Transmitter Working Principle Side Mounting Magnetostrictive Level
	Transmitter Working Principle • Magnetic Float Level Switch Installation
	Techniques
	Float Level Measurement
1100 – 1230	Float Switch Working Principle • Float Level Switch Working Principle
	Animation • Float Level Switch Working Principle
1230 - 1245	Break
	Displacer Level Measurement
	Displacer Level Transmitter Dry Calibration with Weights • Displacer Level
1245 – 1420	Switch Working Principle • Displacer (Buoyancy) Level Transmitter
1243 - 1420	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

Dav 4

Day 4	
0730 - 0930	Steam Turbine Condenser Level Measurement & Its Philosophy &
0750 - 0950	Instrument Controls
0930 - 0945	Break
	Boiler & Stream Drum Level Measurement Fundamental Strategy
0945 - 1100	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
	Optimizing Strategy for Boiler Drum Level Control
1245 – 1420	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
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Day	5
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0730 - 0830	Control System Involved for the Level Measurement
0830 - 0930	<i>New Innovations & Standards for the Level Measurements</i> <i>The Innovation in Interface Measurement</i>
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 LevelMeasurement InstrumentSteam Drum Level Measurement Technique, Theory and Operations,Control System Involved & its Philosophy, Various Aspects of Maintenance,Trouble Shootings & Problem Solving • Case Study (Level MeasurementChallenges in Boilers & Steam Drum) • Solving the Seven Most CommonTank 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.

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Course Coordinator

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