COURSE OVERVIEW IE0115
Advancement in Process Measurement

Course Title
Advancement in Process Measurement

Course Date/Venue
Session 1: June 23-27, 2025/Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: November 10-14, 2025/Ajman Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
IE0115

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.

The course is designed to provide delegates with a detailed and up-to-date overview of Advancement in Process Measurement. It covers the importance and key objectives of process measurement and the role of measurement in process optimization; the measurement units and standards, SI units and their relevance, calibration standards and traceability, impact of international standards (ISO, ASTM, etc.) and importance of unit consistency; the measurement accuracy and precision and techniques for minimizing errors; the types of sensors, working principles of transducers, sensor selection criteria for various processes and challenges in sensor integration; and the signal conditioning, processing, signal amplification and filtering, analog-to-digital conversion techniques and noise reduction methods.

Further, the course will also discuss the process control systems, flow measurement techniques, temperature measurement, pressure measurement and level measurement; the chemical composition analysis, measurement in dynamic environments, data acquisition systems, data storage and security and data visualization; the descriptive statistics for process data and regression analysis for measurement trends; and the hypothesis testing in process improvement and statistical process control techniques.

During the interactive course, participants will learn the role of predictive modelling in process optimization and machine learning techniques for process prediction; the benefits and limitations of wireless systems, network protocols for wireless sensors, power management in wireless sensors and applications in remote and hazardous locations; the principles of fiber optic sensing, types of fiber optic sensors, advantages over traditional sensors and industrial application of fiber optics; the machine vision systems, 3D scanning and imaging, AI and machine learning in measurement and augmented reality (AR) and virtual reality (VR); the role of measurement in energy optimization, monitoring emission and environmental compliance and water and waste management through measurement; and the smart factories and automation, ethical and legal considerations and future trends in process measurement.

Course Objectives

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

- Apply and gain an in-depth knowledge on the advancement in process measurement
- Discuss the importance and key objectives of process measurement including the role of measurement in process optimization
- Identify measurement units and standards covering SI units and their relevance, calibration standards and traceability, impact of international standards (ISO, ASTM, etc.) and importance of unit consistency
- Apply measurement accuracy and precision and techniques for minimizing errors as well as discuss the types of sensors, working principles of transducers, sensor selection criteria for various processes and challenges in sensor integration
- Illustrate signal conditioning and processing covering signal amplification and filtering, analog-to-digital conversion techniques and noise reduction methods
- Recognize process control systems and apply flow measurement techniques, temperature measurement, pressure measurement and level measurement
- Carryout chemical composition analysis, measurement in dynamic environments, data acquisition systems, data storage and security and data visualization
- Apply descriptive statistics for process data, regression analysis for measurement trends, hypothesis testing in process improvement and statistical process control techniques
- Discuss the role of predictive modelling in process optimization and apply machine learning techniques for process prediction
- Identify the benefits and limitations of wireless systems, network protocols for wireless sensors, power management in wireless sensors and applications in remote and hazardous locations
- Explain the principles of fiber optic sensing, types of fiber optic sensors, advantages over traditional sensors and industrial application of fiber optics
- Recognize machine vision systems, 3D scanning and imaging, AI and machine learning in measurement and augmented reality (AR) and virtual reality (VR)
- Define the role of measurement in energy optimization, monitor emission and environmental compliance and apply water and waste management through measurement
- Discuss smart factories and automation, ethical and legal considerations and future trends in process measurement

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 advancement in process measurement for industry professionals, technical experts, academic and research professionals, regulatory and compliance officers, product developers, innovators, business leaders, decision-makers, consultants and trainers.

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.

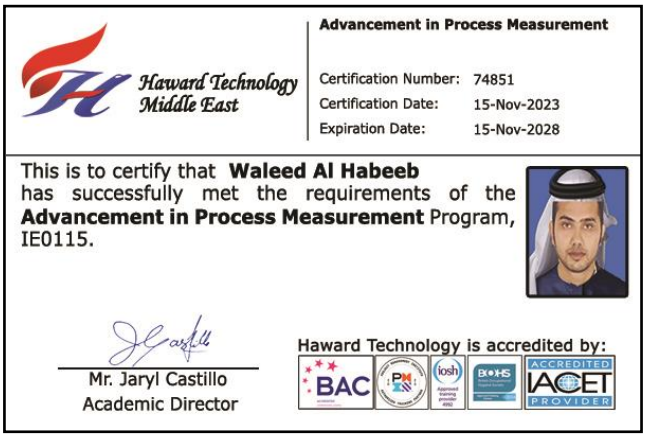
Course Certificate(s)

(1) Internationally recognized Competency Certificates and Plastic Wallet Cards will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Certificates are valid for 5 years.

Recertification is FOC for a Lifetime.

Sample of Certificates

The following are samples of the certificates that will be awarded to course participants:-



(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

Haward Technology Middle East

Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 15-Nov-23

HTME No. 74851

Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
IE0115	Advancement in Process Measurement	November 11-15, 2023	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Jaryl Castillo
Academic Director

Haward Technology has been approved as an Accredited Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2018 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2018 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 Association 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 is accredited by

P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | E-mail: info@haward.org | Website: www.haward.org

Certificate 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. 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, Process **Instrumentation** and Control Techniques, **Instrumentation** for Process Optimization and Control, Process Automation and **Instrumentation** Systems Integration, Troubleshooting in Process Control Systems**,** Process Control & Safeguarding, **Troubleshooting Instrumentation** and Control Systems, GC Processes **Troubleshooting** and Control Systems, Practical **Troubleshooting** and Repair of Electronic Circuits**,** Process Control, **Troubleshooting** & **Problem Solving.** Process Control (**PCI**) & Safeguarding, **Control Loop & Valve Tuning**, **Controller Maintenance** Procedures, High Integrity Protection Systems (**HIPS**), **Instrument Calibration & Maintenance**, **Instrumented Safety Systems**, **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**, **Liquid & Gas Flowmetering**, **Custody Measurement**, **Ultrasonic Flowmetering**, **Loss Control**, **Gas Measurement**, **Flowmetering & Custody Measurement**, **Multiphase Flowmetering**, **Measurement and Control**, **Mass Measuring System Batching** (**Philips**), 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**, **Power Systems Control**, **Power Systems Security**, Power **Electronics**, Electrical **Substations**, **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**, **Electrical & Instrumentation 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 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 – 0900	***Introduction to Process Measurement*** *Definition & Importance of Process Measurement • Historical Evolution of Measurement Techniques • Key Objectives of Process Measurement • Role of Measurement in Process Optimization*
0900 – 0930	***Measurement Units & Standards*** *SI Units & their Relevance • Calibration Standards & Traceability • Impact of International Standards (ISO, ASTM, Etc.) • Importance of Unit Consistency*
0930 – 0945	*Break*
0945 – 1100	***Measurement Accuracy & Precision*** *Defining Accuracy & Precision • Sources of Errors in Measurements • Techniques for Minimizing Errors • Statistical Evaluation of Measurement Data*
1100 – 1230	***Sensors & Transducers*** *Types of Sensors: Mechanical, Electrical, & Optical • Working Principles of Transducers • Sensor Selection Criteria for Various Processes • Challenges in Sensor Integration*
1230 – 1245	*Break*
1245 – 1330	***Signal Conditioning & Processing*** *Signal Amplification & Filtering • Analog-to-Digital Conversion Techniques • Noise Reduction Methods • Role of Data Acquisition Systems*
1330 – 1420	***Basics of Process Control Systems*** *Basics of Control Systems in Process Measurement • Open-Loop versus Closed-Loop Systems • Key Components of Process Control Systems • Overview of Industrial Applications*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Flow Measurement Techniques*** *Differential Pressure Flow Meters • Ultrasonic & Electromagnetic Flow Meters • Thermal Mass Flow Meters • Application Challenges & Case Studies*
0830 – 0930	***Temperature Measurement*** *Contact-Based Methods (Thermocouples, RTDs) • Non-Contact Methods (Infrared Thermometers, Pyrometers) • Calibration of Temperature Sensors • Application in High-Temperature Environments*
0930 – 0945	*Break*
0945– 1100	***Pressure Measurement*** *Types of Pressure Sensors (Gauge, Absolute, Differential) • Strain Gauge Pressure Transducers • High-Accuracy Pressure Measurement Techniques • Pressure Measurement in Hazardous Environments*
1100 – 1230	***Level Measurement*** *Mechanical Methods (Float, Tape) • Ultrasonic & Radar-Based Techniques • Guided Wave Radar Systems • Applications in Storage Tanks & Process Vessels*
1230 – 1245	*Break*
1245 – 1330	***Chemical Composition Analysis***

	Spectroscopic Techniques (UV-Vis, IR, Raman) • Chromatography Systems (GC, HPLC) • Gas Analyzers & Mass Spectrometry • Real-Time Monitoring of Chemical Processes
1330 – 1420	***Measurement in Dynamic Environments*** *Challenges in Measuring Fast-Changing Processes • Adaptive Measurement Systems • Real-Time Data Acquisition • Use of AI in Dynamic Process Measurements*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0900	***Data Acquisition Systems*** *Architecture of Modern Data Acquisition Systems • Types of Data Acquisition Hardware • Communication Protocols (Ethernet, Modbus, Etc.) • Cloud-Based Data Acquisition Systems*
0900 – 0930	***Data Storage & Security*** *Centralized versus Distributed Storage • Importance of Data Encryption • Backup Strategies for Process Data • Regulatory Compliance in Data Storage*
0930 – 0945	*Break*
0945 – 1100	***Data Visualization*** *Role of Dashboards in Process Monitoring • Graphical Representation of Measurement Data • Software Tools for Data Visualization • Customization of Dashboards for Specific Industries*
1100 – 1230	***Statistical Analysis in Measurement*** *Descriptive Statistics for Process Data • Regression Analysis for Measurement Trends • Hypothesis Testing in Process Improvement • Statistical Process Control Techniques*
1230 – 1245	*Break*
1245 – 1330	***Predictive Analytics*** *Role of Predictive Modeling in Process Optimization • Machine Learning Techniques for Process Prediction • Case Studies of Predictive Analytics in Industries • Challenges in Predictive Model Deployment*
1330 – 1420	***Industrial Internet of Things (IIoT)*** *Role of IIoT in Modern Process Measurement • Integration of Smart Sensors & Devices • Data Collection through IIoT Platforms • Real-Time Monitoring Using IIoT*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Wireless Sensor Networks*** *Benefits & Limitations of Wireless Systems • Network Protocols for Wireless Sensors • Power Management in Wireless Sensors • Applications in Remote & Hazardous Locations*
0830 - 0930	***Fiber Optic Sensors*** *Principles of Fiber Optic Sensing • Types of Fiber Optic Sensors (Temperature, Pressure, Etc.) • Advantages Over Traditional Sensors • Industrial Applications of Fiber Optics*
0930 – 0945	*Break*

0945 – 1030	***Machine Vision Systems***

	Basics of Image Processing in Measurements • Applications in Quality Control & Inspection • Integration with Robotic Systems • Case Studies in Automated Measurements
1030 – 1130	***3D Scanning & Imaging*** *Techniques for 3D Measurements • Applications in Manufacturing & Assembly • Role in Reverse Engineering • Limitations of 3D Scanning Technologies*
1130 – 1230	***AI & Machine Learning in Measurement*** *Role of AI in Process Optimization • Machine Learning Algorithms for Data Interpretation • Challenges in AI Integration • Success Stories in AI-Driven Measurement*
1230 – 1245	*Break*
1245 – 1420	***Augmented Reality (AR) & Virtual Reality (VR)*** *Role of AR & VR in Process Visualization • Training Applications in Measurement Systems • Remote Monitoring Using AR Interfaces • Future Trends in AR/VR for Process Measurement*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5

0730 – 0830	***Case Studies in Process Measurement*** *Examples from Oil & Gas Industries • Applications in Pharmaceutical Production • Innovations in Food & Beverage Industries • Lessons from Automotive & Aerospace Sectors*
0830 – 0930	***Sustainability & Process Measurement*** *Role of Measurement in Energy Optimization • Monitoring Emissions & Environmental Compliance • Water & Waste Management Through Measurement • Sustainability-Driven Innovations*
0930 – 0945	*Break*
0945 – 1030	***Smart Factories & Automation*** *Integration of Measurement in Industry 4.0 • Role of Process Measurement in Smart Manufacturing • Use of Autonomous Systems for Process Control • Challenges in Transitioning to Smart Factories*
1030 - 1130	***Ethical & Legal Considerations*** *Ethical Concerns in Process Data Collection • Regulatory Frameworks for Process Measurement • Intellectual Property in Measurement Innovations • Addressing Privacy Issues*
1130 – 1215	***Hands-On Workshop*** *Real-World Problem-Solving Scenarios • Practical Application of Measurement Techniques • Collaborative Group Exercises • Feedback & Learning Outcomes*
1215 – 1230	*Break*
1230 – 1300	***Future Trends in Process Measurement*** *Advancements in Nanotechnology-Based Sensors • Quantum Technologies in Measurement • Long-Term Trends in Automation & AI • Preparing for Future Challenges & Opportunities*
1300 – 1315	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1315 – 1415	***COMPETENCY EXAM***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

Hands-on practical sessions will be organized throughout the course duration using our state-of-the-art simulators "Allen Bradley SLC 500", "Siemens S7-200", "AB Micrologix 1000 (Digital or Analog)", "AB SLC5/03", "AB WS5610 PLC", "Gas Ultrasonic Meter Sizing Tool", "Liquid Turbine Meter and Control Valve Sizing Tool", "Liquid Ultrasonic Meter Sizing Tool" and "Orifice Flow Calculator".

Allen Bradley SLC 500 Simulator

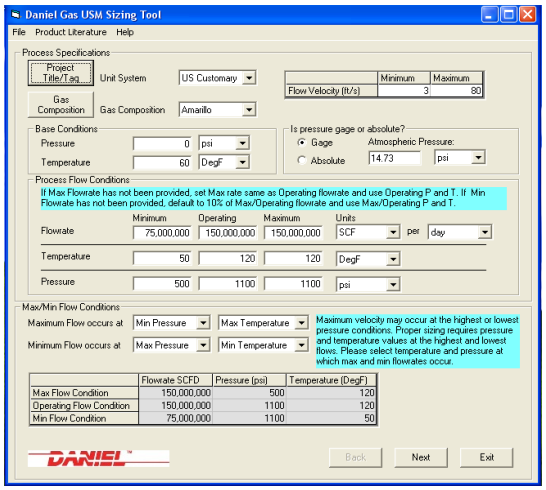
Siemens S7-200 Simulator

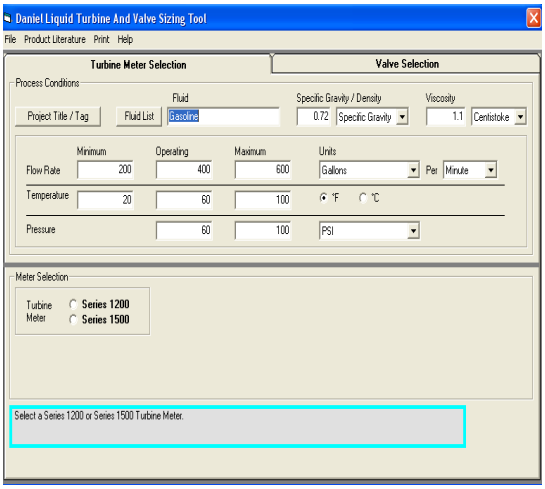
Allen Bradley Micrologix 1000 Simulator (Digital)

Allen Bradley Micrologix 1000 Simulator (Analog)

Allen Bradley SLC 5/03

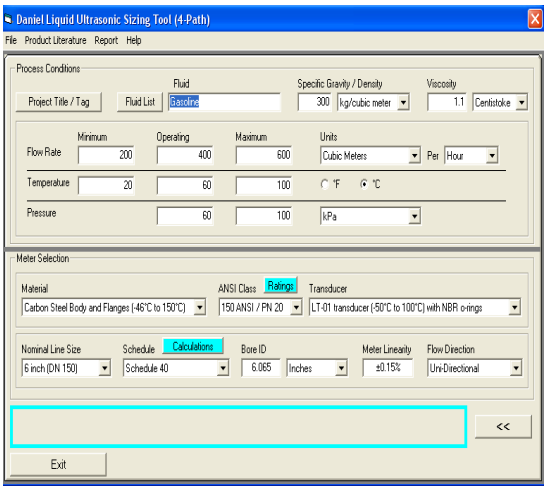
Allen Bradley WS5610 PLC Simulator PLC5

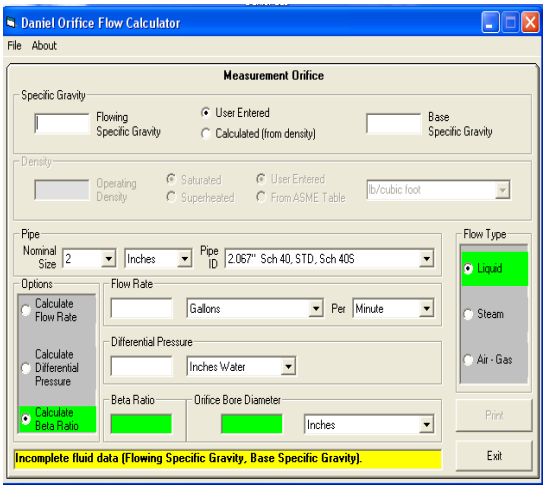




Gas Ultrasonic Meter (USM) Sizing Tool Software

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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