

## COURSE OVERVIEW IE0273 Continuous Process Control Loops

**Course Title**

Continuous Process Control Loops

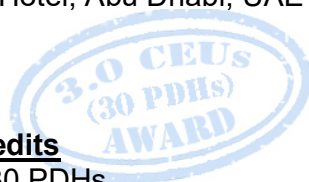
**Course Date/Venue**

Session 1: February 23-27, 2025/Boardroom  
1, Elite Byblos Hotel Al Barsha,  
Sheikh Zayed Road, Dubai, UAE  
Session 2: August 25-29, 2025/Fujairah  
Meeting Room, Grand Millennium  
Al Wahda Hotel, Abu Dhabi, UAE



**Course Reference**

IE0273



**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 an introduction to process control to engineers and other technical staff. It teaches the base fundamentals, as well as open and closed loop tuning methods. The course is developed with field tuning in mind, not control design.



The course will discuss the control fundamentals and terminology including the principles, control loop as well as the various types and right selection of control valve and describes the process control methods and characteristics of control valve.



It illustrates the different tuning rules available and explains the fundamentals of control systems, proper tuning of PID controllers, the concepts and application of feed forward control, auto tuning and new developments and troubleshooting tuning.

The various types of control valves, actuators and valve selection will also be discussed during the course.

**Course Objectives**

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

- Apply and gain a basic knowledge on continuous process control loops
- Discuss the control fundamentals and terminology including the principles, control loop as well as the various types and right selection of control valve
- Describe the process control methods and characteristics of control valve
- Illustrate the different tuning rules available and explain the fundamentals of control systems
- Demonstrate the proper tuning of PID controllers and the concepts and application of feed forward control
- Identify auto tuning and new developments and employ good practices and troubleshooting tuning
- Discuss the various types of control valves, actuators and valve selection

**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 process controller, control loop & valve tuning for engineers and other technical staff who are willing to learn more about single loop controllers, PID and tuning. The course explains the essence of feedback control without going in-depth into math.

**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 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: -

- 
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.

**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 Adroit, 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/Hausser**.

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\$ 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.

**Accommodation**

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

**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	<i>Registration &amp; Coffee</i>
0800 – 0815	<i>Welcome &amp; Introduction</i>
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Control Fundamentals</b> <i>Terminology • Principles of Control • Basic Control Loop</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Control Fundamentals (cont'd)</b> <i>Advanced Control Loop • Control Algorithm • Control System</i>
1100 – 1215	<b>Control Valve Types</b> <i>Butterfly • Eccentric • Rotary Plug • Ball • Plug • Linear Valves • Globe • Cage • Double Port</i>
1215 – 1230	<i>Break</i>
1230 – 1420	<b>Control Valve Types (cont'd)</b> <i>How to Select the Right Valve?</i>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day One</i>

**Day 2**

0730 – 0930	<b>Process Control Methods</b> <i>Open Loop • Process Behaviour • Time Lags • Selection of Type of Controller • Proportional</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Process Control Methods (cont'd)</b> <i>Integral • Derivative • Feedback • Cascade • Ratio • Feed Forward</i>
1100 – 1215	<b>Control Valve Characteristics</b> <i>Selection of Flow Characteristics • Sizing Steps • Classification</i>
1215 – 1230	<i>Break</i>
1230 – 1420	<b>Control Valve</b> <i>Cavitation • Flashing • Noise</i>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Two</i>



**Day 3**

0730 – 0930	<b>Different Tuning Rules Available</b> Overshoot • Lambda Tuning • Trial Tuning
0930 – 0945	Break
0945 – 1100	<b>Different Tuning Rules Available</b> Cohen Coon Tuning • Process Controlability • Suggestions & Rules of Thumb
1100 – 1215	<b>Fundamentals of Control Systems</b> On-Off Control • Cascade • Ratio • FF • FB
1215 – 1230	Break
1230 – 1420	<b>Fundamentals of Control Systems (cont'd)</b> Prop. Band • Integral • Derivative • Direct/Reverse
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4**

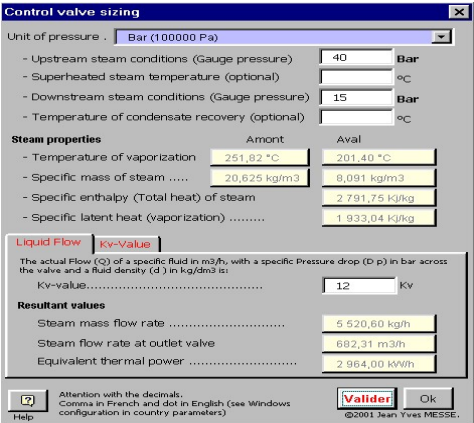
0730 – 0930	<b>Tuning of PID Controllers</b> Open Loop • Ziegler Nichols
0930 – 0945	Break
0945 – 1100	<b>Tuning of PID Controllers (cont'd)</b> Continuing Cycling Method • Response Lags • Closed Loop Control
1100 – 1215	<b>VIDEO Presentation</b> Control Tuning
1215 – 1230	Break
1230 – 1420	<b>Concepts &amp; Application of Feed Forward Control</b>
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Four

**Day**

0730 – 0930	<b>Auto Tuning &amp; New Developments</b>
0930 – 0945	Break
0945 – 1100	<b>Good Practices &amp; Troubleshooting Tuning</b>
1100 – 1215	<b>Good Practices &amp; Troubleshooting Tuning (cont'd)</b>
1215 – 1230	Break
1230 – 1345	<b>Types of Control Valves, Actuators &amp; Valve Selection</b>
1345 – 1400	<b>Course Conclusion</b>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

### Simulator (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 simulators “Valve Sizing Software”, “Valve Software 3.0”, “Valvestar 7.2 Software” and “PRV<sup>2</sup>SIZE Software”.



**Control valve sizing**

Unit of pressure : Bar (100000 Pa)

- Upstream steam conditions (Gauge pressure) : 40 Bar
- Superheated steam temperature (optional) : °C
- Downstream steam conditions (Gauge pressure) : 15 Bar
- Temperature of condensate recovery (optional) : °C

**Steam properties**

	Amount	Aval
Temperature of vaporization	251,62 °C	201,40 °C
Specific mass of steam	20,625 kg/m <sup>3</sup>	8,091 kg/m <sup>3</sup>
Specific enthalpy (Total heat) of steam	2 791,75 kJ/kg	
Specific latent heat (vaporization)	1 933,04 kJ/kg	

**Liquid Flow**    **Kv-Value**

The actual Flow (Q) of a specific fluid in m<sup>3</sup>/h, with a specific Pressure drop (D p) in bar across the valve and a fluid density (d) in kg/dm<sup>3</sup> is:

Kv-value : 12 Kv

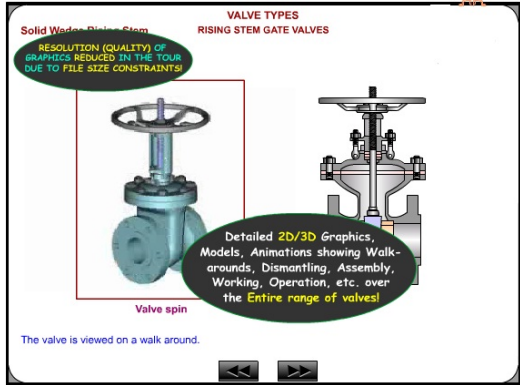
**Resultant values**

Steam mass flow rate	5 520,60 kg/h
Steam flow rate at outlet valve	682,31 m <sup>3</sup> /h
Equivalent thermal power	2 964,00 kW/h

Attention with the decimals.  
Comma in French and dot in English (see Windows configuration in country parameters)

Validater    Ok

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**VALVE TYPES**

Solid Water Diaphragm Stem

RESOLUTION (QUALITY) OF GRAPHICS REDUCED IN THE TOUR DUE TO FILE SIZE CONSTRAINTS

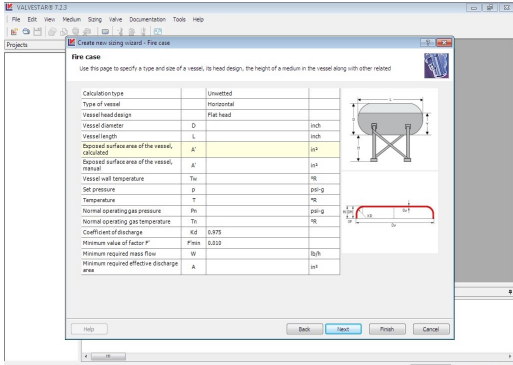
Detailed 2D/3D Graphics, Models, Animations showing Walk-arounds, Dismantling, Assembly, Working, Operation, etc. over the Entire range of valves!

Valve spin

The valve is viewed on a walk around.

**Valve Sizing Software**

**Valve Software 3.0**



**VALVESTAR 7.2**

File Edit View Medium Song Valve Documentation Tools Help

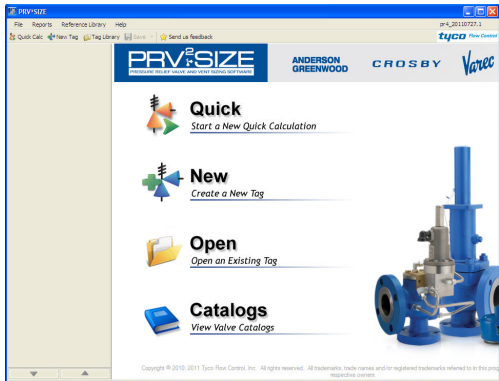
Projects

**How case**

Use this page to specify a type and size of a vessel, its head design, the height of a medium in the vessel along with other related

Calculation type	Unshotted
Type of vessel	Horizontal
Vessel head design	Flat head
Vessel diameter	D
Vessel height	H
Exposed surface area of the vessel, closed	A <sub>c</sub>
Exposed surface area of the vessel, closed	A <sub>c</sub>
Vessel wall temperature	T <sub>w</sub>
Temperature	T
Set pressure	P
Normal operating pressure	P <sub>n</sub>
Normal operating gas temperature	T <sub>n</sub>
Coefficient of discharge	K <sub>d</sub> 0,875
Minimum value of factor F	F <sub>min</sub> 0,810
Minimum required mass flow	W
Minimum required effective discharge area	A

Back    Next    Print    Cancel



**PRV<sup>2</sup>SIZE**

Anderson Greenwood Crosby Veeva

Quick  
Start a New Quick Calculation

New  
Create a New Tag

Open  
Open an Existing Tag

Catalogs  
View Valve Catalogs

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**Valvestar 7.2 Software**

**PRV<sup>2</sup>SIZE Software**

### Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: [mari1@haward.org](mailto:mari1@haward.org)