Haward Technology Middle East

COURSE OVERVIEW ME0275
Pressure Vessels and Heat Exchangers Design in accordance with ASME VIII and TEMA (Level 2)

Course Title
Pressure Vessels and Heat Exchangers Design in accordance with ASME VIII and TEMA (Level 2)

Course Date/Venue
Session 1: March 29-April 02, 2026/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE and Online Virtual Training
Session 2: September 13-17, 2026/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE and Online Virtual Training

H-STK© INCLUDED

Course Reference
ME0275

3.0 CEUs (30 PDHs) AWARD

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Pressure Vessels and Heat Exchangers Design in accordance with ASME VIII and TEMA. It covers the pressure vessel types and applications including the structure and scope of ASME Section VIII; the design conditions and allowables, shell thickness calculations and head design; the mechanical design reporting, nozzle types and arrangement and nozzle reinforcement calculations; the external loads on nozzles and flange selection and analysis; the support skirts, legs, saddles and lugs, openings and attachments; and the heat exchanger overview and classifications.

During this interactive course, participants will learn the thermal design fundamentals, shell and tube mechanical design, TEMA construction types, pressure drop and flow arrangement; the TEMA inspection, maintenance and failure modes, pressure vessel fabrication process and welding methods for vessels; the welding qualifications and post weld heat treatment (PWHT), non-destructive examination (NDE/NDT) and hydrostatic and pneumatic testing; the ASME compliance and documentation and design optimization techniques; and the integration with piping systems, internal components and process performance.

Course Objectives

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

- Apply and gain an in-depth knowledge on pressure vessels and heat exchangers design in accordance with ASME VIII and TEMA
- Discuss pressure vessel types and applications including the structure and scope of ASME Section VIII
- Identify design conditions and allowables, shell thickness calculations and head design
- Apply mechanical design reporting, nozzle types and arrangement and nozzle reinforcement calculations
- Recognize external loads on nozzles and carryout flange selection and analysis
- Identify support skirts, legs, saddles and lugs, openings and attachments and heat exchanger overview and classifications
- Illustrate thermal design fundamentals, shell and tube mechanical design, TEMA construction types and pressure drop and flow arrangement
- Apply TEMA inspection, maintenance and failure modes, pressure vessel fabrication process and welding methods for vessels
- Review welding qualifications and carryout post weld heat treatment (PWHT), non-destructive examination (NDE/NDT) and hydrostatic and pneumatic testing
- Discuss ASME compliance and documentation and apply design optimization techniques, integration with piping systems and internal components and process performance

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 pressure vessels and heat exchangers design in accordance with ASME VIII and TEMA for those who are involved in the design, fabrication and testing of pressure vessels and for engineers who want to know more or move to this very interesting engineering area. Further, engineers involved in maintenance, repair and flaw evaluation of pressure vessels will also have a need for this course.

Course Fee

F2F Classroom: 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.

Online Virtual: US$ 2,750 per Delegate + **VAT**.

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.

Virtual Training (If Applicable)

If this course is delivered online as a Virtual Training, the following limitations will be applicable:-

Certificates	Only soft copy certificates will be issued to participants through Haward's Portal. This includes Wallet Card Certificates if applicable
Training Materials	Only soft copy Training Materials (PDF format) will be issued to participant through the Virtual Training Platform
Training Methodology	80% of the program will be theory and 20% will be practical sessions, exercises, case studies, simulators or videos
Training Program	The training will be for 4 hours per day starting at 0930 and ending at 1330
H-STK Smart Training Kit	Not Applicable
Hands-on Practical Workshops	Not Applicable
Site Visit	Not Applicable
Simulators	Only software simulators will be used in the virtual courses. Hardware simulators are not applicable and will not be used in Virtual Training

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

Haward's certificates are accredited by the following international accreditation organizations:

- BAC British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

- ACCREDITED IACET PROVIDER 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. Manuel Dalas MSc, BSc, is a **Senior Mechanical & Maintenance Engineer** with over **25 years** of industrial experience in **Oil**, **Gas**, **Refinery**, **Petrochemical**, **Power** and **Nuclear** industries. His wide expertise includes **Gas Turbines & Compressors** Troubleshooting, **Gas Turbines** Performance, Maintenance & Testing, **Gas Turbine Performance** and Optimization, **Gas Turbine Control** Systems, **Advanced Gas Turbine**, **Gas Turbine Design** and **Analysis**, **Air Compressor** & **Gas Turbines** Selection and Design, **Material Cataloguing**, **Maintenance Planning & Scheduling**, Reliability Centered Maintenance (**RCM**), **Reliability Maintenance**, **Condition Based Maintenance & Condition Monitoring**, **Asset & Risk** Management, **Vibration Condition Monitoring & Diagnostics** of Machines, **Vibration & Predictive** Maintenance, Reliability Improvement & Vibration Analysis for Rotating Machinery, Effective Maintenance **Shutdown & Turnaround** Management, **Engineering Codes & Standards**, **Rotating Equipment** Maintenance, **Mechanical** Troubleshooting, **Static Mechanical Equipment** Maintenance, **Machinery** Failure Analysis, **Machinery Diagnostics & Root Cause Failure** Analysis, **Plant Reliability & Maintenance** Strategies, **Boiler** Operation & Water Treatment, **Pumps** Maintenance & Troubleshooting, **Fans**, **Blowers & Compressors**, **Process Control Valves**, Piping Systems & Process Equipment, Advanced **Valve** Technology, **Pressure Vessel** Design & Analysis, **Steam & Gas Turbine**, **High Pressure Boiler** Operation, **FRP Pipe** Maintenance & Repair, **Centrifugal & Positive Displacement Pump** Technology Troubleshooting & Maintenance, **Rotating Machinery** Best Practices, **PD Compressor & Gas Engine** Operation & Troubleshooting, **Hydraulic Tools & Fitting**, **Process Piping** Design, Construction & **Mechanical Integrity**, **Stack & Noise** Monitoring, **HVAC & Refrigeration** Systems, BPV Code, Section VIII, Division 2, **Facility Planning & Energy** Management, Hoist - Remote & Basic **Rigging & Slinging**, **Mobile Equipment** Operation & Inspection, **Heat Exchanger**, **Safety Relief Valve**, **PRV & POPRV/PORV**, **Bearing & Lubrication**, **Voith Coupling** Overhaul, **Pump & Valve** Technology, **Lubrication** Inspection, **Process Plant** Optimization, Rehabilitation, Revamping & Debottlenecking, Engineering Problem Solving and **Process Plant** Performance & Efficiency. Currently, he is the **Technical Consultant** of the **Association of Local Authorities of Greater Thessaloniki** where he is in charge of the mechanical engineering services for piping, pressure vessels fabrications and ironwork.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager**, **Project Engineer**, **Safety Engineer**, **Deputy Officer**, **Instructor**, **Construction Manager**, **Construction Engineer**, **Consultant Engineer** and **Mechanical Engineer** for numerous multi-billion companies including the **Biological Recycling Unit** and the **Department of Supplies** of **Greece**, **Alpha Bank Group**, **EMKE S.A**, **ASTE LLC** and **Polytechnic College of Evosmos**.

Mr. Dalas has a **Master's** degree in **Energy System** from the **International Hellenic University, School of Science & Technology** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University of Greece** along with a **Diploma** in **Management & Production Engineering** from the **Technical University of Crete**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), a **Certified Project Manager Professional** (**PMI-PMP**), a **Certified Instructor/Trainer**, a **Certified Energy Auditor** for **Buildings**, **Heating & Climate Systems**, a **Member** of the **Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness**. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop 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	***Overview of Pressure Vessel Types & Applications*** *Types: Horizontal, Vertical, Spheres, Reactors • Typical Process Applications • Internal vs External Pressure Vessels • Vessel Classification & Service Categories*
0930 – 0945	*Break*
0945 – 1030	***ASME Section VIII – Structure & Scope*** *Division 1, 2, 3 Differences • Responsibilities of Manufacturer, Designer & Inspector • Mandatory & Non-Mandatory Appendices • Relationship to Other ASME Codes*
1030 – 1130	***Design Conditions & Allowables*** *Design Pressure and Design Temperature • Coincident Conditions • Allowable Stresses • Corrosion Allowance and Joint Efficiency*
1130 – 1215	***Shell Thickness Calculations (Div.1)*** *Cylindrical Shell Under Internal Pressure • Longitudinal vs Circumferential Stress • Thickness Formula and Code Equations • Practical Example*
1215 – 1230	*Break*
1230 – 1330	***Head Design (Torispherical, Ellipsoidal, Hemispherical)*** *Head Types and Applications • Thickness Formulas for Each Head Type • Knuckle and Crown Radius Rules • Formed vs Flat Heads*
1330 – 1420	***Basics of Mechanical Design Reporting*** *Design Assumptions • Calculation Report Structure • Design Verification • Documentation Practices*
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	***Nozzle Types & Arrangement*** *Radial and Reinforced Nozzles • Manways and Inspection Openings • Instrument and Safety Nozzles • Positioning Logic and Hazards*
0830 – 0930	***Nozzle Reinforcement Calculations*** *Area Replacement Method • Reinforcement Zones • Use of Reinforcement Pads • Integrally Reinforced Nozzles*
0930 – 0945	*Break*
0945 – 1100	***External Loads on Nozzles*** *Pipe Loads Transfer (Force & Moment) • Wind, Thermal and Seismic Loads • WRC 107/537 Overview • Local Shell Stress Analysis*
1100 – 1215	***Flange Selection & Analysis*** *ASME B16.5 & B16.47 • Gasket Types and Selection • Bolt Stress Requirements • Pressure-Temperature Ratings*

1215 – 1230	Break
1230 – 1330	***Support Skirts, Legs, Saddles & Lugs*** *Support Type Selection • Local Stress at Supports • Base Plate and Anchor Bolt Design • Stability Checks*
1330 – 1420	***Openings & Attachments*** *Lifting Lugs and Platforms • Internal Baffles & Trays • Heating/Cooling Coils • Stress Concentration Areas*
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	***Heat Exchanger Overview & Classifications*** *Shell & Tube, Plate, Air-Cooled Types • TEMA Classes: R, C, B • Typical Industrial Applications • Selection Criteria*
0830 – 0930	***Thermal Design Fundamentals*** *Heat Transfer Coefficients • Log Mean Temperature Difference (LMTD) • Overall Heat Transfer Coefficient (U) • Fouling Factor Consideration*
0930 – 0945	*Break*
0945 – 1100	***Shell & Tube Mechanical Design*** *Tube Sheet Thickness • Shell Thickness and Diameters • Expansion Joints Requirement • Baffle Design Principles*
1100 – 1215	***TEMA Construction Types*** *Fixed Tubesheet (BEM, AEM) • U-Tube (BEU) • Floating Head (AEU) • Advantages & Limitations*
1215 – 1230	*Break*
1230 – 1330	***Pressure Drop & Flow Arrangement*** *Shell-Side vs Tube-Side Flow • Baffle Spacing Optimization • Tube Layout Patterns • Pressure Drop Control*
1330 – 1420	***TEMA Inspection, Maintenance & Failure Modes*** *Common Exchanger Failures • Tube Leakage and Fouling • Cleaning Methods • Preventive Measures*
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 4

0730 – 0830	***Pressure Vessel Fabrication Process*** *Material Cutting and Forming • Rolling and Bending of Plates • Vessel Assembly Sequence • Dimensional Tolerances*
0830 – 0930	***Welding Methods for Vessels*** *SMAW, GTAW, GMAW, SAW • Weld Joint Design • Back-Gouging and Sequencing • Pre-Heat and Interpass Temperature*

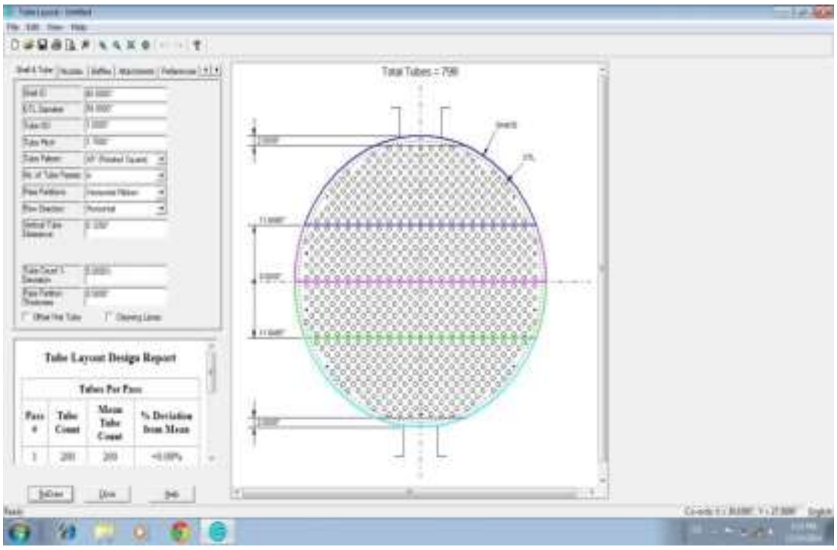
0930 – 0945	Break
0945 – 1100	**Welding Qualifications** WPS, PQR and Welder Qualifications • ASME Section IX Requirements • NDT Witness Requirements • Record Control
1100 – 1215	**Post Weld Heat Treatment (PWHT)** Stress Relief Purpose • Temperature/Time Cycles • Materials Requiring PWHT • Distortion Control
1215 – 1230	Break
1230 – 1330	**Non-Destructive Examination (NDE/NDT)** Radiography (RT) • Ultrasonic (UT) • Magnetic Particle (MT) • Liquid Penetrant (PT)
1330 – 1420	**Hydrostatic & Pneumatic Testing** Test Pressure Calculation • Safety Precautions • Leak Detection Methods • Documentation Requirements
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 Four

Day 5

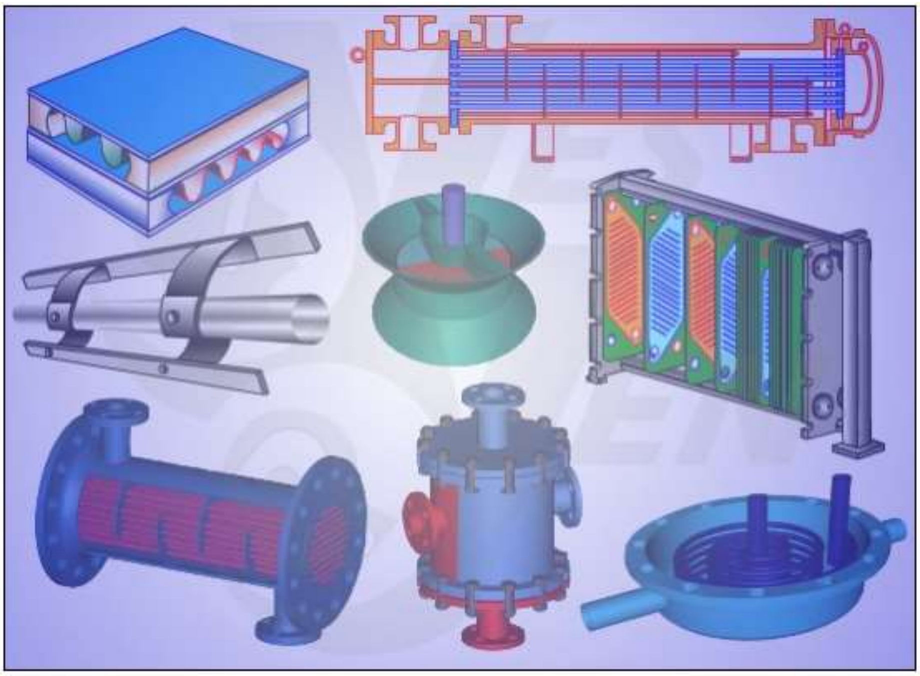
0730 – 0830	**ASME Compliance & Documentation** Data Reports (U-Stamp Requirements) • Design Calculations Package • Inspection and Test Records • Final Dossier Preparation
0830 – 0930	**Failure Analysis & Case Studies** Over-Pressure and Rupture Cases • Thermal Fatigue Examples • Nozzle Failure Analysis • Lessons Learned
0930 – 0945	Break
0945 – 1100	**Design Optimization Techniques** Weight and Cost Minimization • Material Efficiency • Standardization of Components • Modular Design Concept
1100 – 1215	**Integration with Piping Systems** Stress Transfer from Piping to Nozzles • Flexibility Allowances • Expansion Compensation • Piping Support Positioning
1215 – 1230	Break
1230 – 1300	**Internal Components & Process Performance** Distributors & Collectors • Baffles and Trays • Using Modeling Results • Performance Evaluation
1300 - 1345	**Capstone Design** Mini Project: Design a Pressure Vessel + Exchanger • Apply ASME VIII & TEMA Rules • Perform Thickness & Nozzle Checks • Present Design Reasoning
1345 – 1400	**Course Conclusion** Using this Course Overview, the Instructor(s) will Brief Participants about t Topics that were Covered During the Course
1400 – 1415	**POST-TEST**
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

Simulator (Hands-on Practical Sessions)

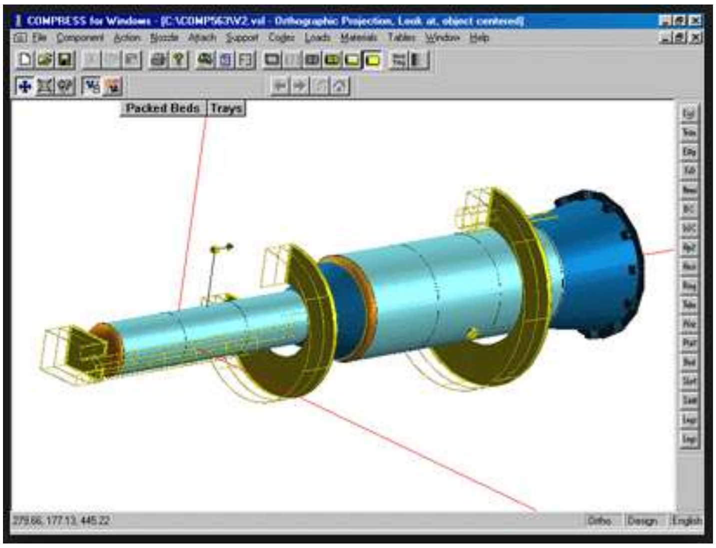
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the simulator “Heat Exchanger Tube Layout”, “Heat Exchangers CBT” and “COMPRESS” simulator.



Heat Exchanger Tube Layout Simulator



Heat Exchangers CBT



COMPRESS Simulator

Course Coordinator

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