

COURSE OVERVIEW ME0509
Advanced Technology in Design, Installation & Maintenance Aspects
of Vapour Absorption Chiller (VAM) Plant

Course Title

Advanced Technology in Design, Installation & Maintenance Aspects of Vapour Absorption Chiller (VAM) Plant

Course Date/Venue

August 30-September 03, 2025/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE

Course Reference

ME0509-3D

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 in the class will be applied using the following practical methods: -

(1) Industrial Facility Visit: Course participants will be taken to an industrial facility where they will practice testing, maintenance and troubleshooting. In case that this course is organized inside client premises (In-House), then client shall provide access to its HVAC and refrigeration workshop for practical sessions.



(2) HVAC Simulator: Participants will use in the class the state-of-the-art HVAC Simulator to practice some of the skills learnt.

This course introduces vapour absorption refrigeration systems and explains the principles of vapour absorption refrigeration system. At the same time, it compares vapour compression refrigeration systems with continuous vapour absorption refrigeration systems. Further, it provides expression for maximum COP of ideal absorption refrigeration system. Properties of ideal and real refrigerant-absorbent mixtures will be discussed during the course.



A thorough description of a single stage vapour absorption refrigeration system with solution heat exchanger is provided. Finally, a discussion over the desirable properties of refrigerant-absorbent pairs for vapour absorption refrigeration systems and the commonly used working fluids will be covered in this course.

Course Objectives

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

- Apply and gain an advanced knowledge on the design, installation and maintenance aspects of vapour absorption chiller (VAM) plants and technology
- Identify the refrigeration machines, determine chilled water supply temperature and establish temperature range
- Configure chillers using one-pump parallel, multi-pump parallel, primary-secondary parallel and variable primary flow parallel configuration
- Carryout chiller design and application and enumerate the elements of chilled water system
- Illustrate chilled water system control and performance
- Recognize cooling thermal energy storage including the economics and available technologies
- Determine special chiller considerations for noise and vibration, electrical service and chiller heat recovery
- Employ proper chiller operation and maintenance including commissioning, maintenance and performance troubleshooting
- Define chiller performance requirements and perform economic evaluation of chiller systems in buying a chiller

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 vapour absorption chiller for those who are involved in the design, installation and maintenance of such equipment and technology. Mechanical & electrical engineers, maintenance managers & supervisors, procurement supervisors & engineers, HVAC maintenance services and HVAC technical staff will definitely benefit from this course.

Accommodation

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

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.

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:

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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.

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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. 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 **Pipe Stress Analysis** using **CAESAR II, CAESAR II Application, Piping Dynamic, Static & Other Special Analysis** using **CAESAR II, Expansion Joints Design & Analysis, Impact Load Analysis, Piping Systems, Piping Codes Used in CAESAR II, RFP Pipe Maintenance & Repair, Relief Valve Analysis, Safety Relief Valve, Tanks & Tank Farms, Seismic Loads, Tank Shell, Tank Failure, Vacuum Tanks, Tank Design & Engineering, Tank Contractions, 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, Gas Turbines & Compressors Troubleshooting, Advanced Valve Technology, Pressure Vessel Design & Analysis, Steam & Gas Turbine, High Pressure Boiler Operation, Centrifugal & Positive Displacement Pump Technology Troubleshooting & Maintenance, Rotating Machinery Best Practices, PD Compressor & Gas Engine Operation & Troubleshooting, Hydraulic Tools & Fitting, Mass & Material Balance, Water Distribution & Pump Station, Tank Farm & Tank Terminal Safety & Integrity Management, 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 & Slings, Mobile Equipment Operation & Inspection, Heat Exchanger, 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, Mechanical Engineer** and **CAESAR II Application Consultant** 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.

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 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: Sunday, 30th of August 2026

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0815	<i>Welcome & Introduction</i>
0815 – 0830	PRE-TEST
0830 – 0930	Refrigeration Machines <i>Vapor Compression Refrigeration • Refrigeration Cycle • Refrigerants Absorption • Refrigeration Absorption • Refrigerants Vapor</i>
0930 – 0945	<i>Break</i>
0945 – 1100	Refrigeration Machines (cont'd) <i>Compression Cycle • Water Chillers • Scroll Compressors • Rotary Screw and Centrifugal Compressors • Electric-Drive Chillers • Engine-Drive Chillers • Condensing Medium • Absorption Chillers Establishing the Temperature Range</i>
1100 – 1215	Refrigeration Machines (cont'd) <i>Lithium Bromide Absorption Chillers • Ammonia Absorption Chillers • Chilled Water for HVAC Applications</i>
1215 – 1230	<i>Break</i>
1230 – 1340	Refrigeration Machines (cont'd) <i>Determining the Chilled Water Supply Temperature • Establishing the Temperature Range</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day One</i>



Day 2: Monday, 31st of August 2026

0730 – 0930	Chiller Configurations <i>The Single-Chiller System • Multichiller Systems • One-Pump Parallel Configuration Multiple-Pump Parallel</i>
0930 – 0945	Break
0945 – 1100	Chiller Configurations (cont'd) <i>Primary-Secondary Parallel Configuration</i>
1100 – 1215	Chiller Configurations (cont'd) <i>Variable Primary Flow Parallel Configuration • System Peak Cooling Load and Load Profile • Selecting Water Chillers • Basic Chiller Requirements</i>
1215 – 1230	Break
1230 – 1420	Chiller Configurations (cont'd) <i>Part Load Efficiency Load versus Capacity • Atmospheric Impacts • Mixed Energy Source • Chiller Systems</i>
1420 – 1430	Recap <i>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</i>
1430	Lunch & End of Day Two

Day 3: Tuesday, 01st of September 2026

0730 – 0930	Chiller Design & Application, Chilled Water System Elements <i>Chiller Placement and Installation • Chilled Water Piping • Piping Materials and Insulation Requirements</i>
0930 – 0945	Break
0945 – 1100	Chiller Design & Application, Chilled Water System Elements (cont'd) <i>Water Expansion and Air Removal • Water Treatment • Pump Selection and Piping • Pump Basics • Pump Head and Horsepower • Variable Flow Pumping</i>
1100 – 1215	Chilled Water System Control & Performance <i>Start-Up Control • Capacity Control • Refrigerant Flow Control • Sequencing Multiple Chillers</i>
1215 – 1230	Break
1230 – 1320	Chilled Water System Control & Performance (cont'd) <i>Optimizing Chilled Water Supply Temperature • Variable Flow Pumping Control</i>
1420 – 1430	Recap <i>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</i>
1430	Lunch & End of Day Three

Day 4: Wednesday, 02nd of September 2026

0730 – 0930	Cooling Thermal Energy Storage <i>Economics of Thermal Energy Storage • Available Technologies • Chilled Water Storage Systems • Ice Storage • Phase Change Materials Storage Systems • Application of TES</i>
0930 – 0945	Break
0945 – 1100	Special Chiller Considerations <i>Noise and Vibration • Electrical Service • Chiller Heat Recovery •</i>



1100 – 1215	Chiller Operation & Maintenance Chiller Commissioning • Chiller Maintenance • Chiller Performance Troubleshooting
1215 – 1230	Break
1230 – 1420	Chiller Operation & Maintenance (cont'd) Selection or Design Problems • Installation Problems • Refrigerant Management Program
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: Thursday, 03rd of September 2026

0730 – 0830	Buying a Chiller Defining Chiller Performance Requirements • Economic Evaluation of Chiller Systems
0930 – 0945	Break
0945 – 1100	Buying a Chiller (cont'd) First Costs • Annual Recurring Costs
1100 – 1215	Buying a Chiller (cont'd) Nonrecurring Repair and Replacement Costs
1215 – 1230	Break
1230 – 1345	Buying a Chiller (cont'd) Total Owning and Operating Cost Comparison • Procurement Specification
1330 – 1345	Course Conclusion Using this Course Overview, the Instructor(s) will Brief Participants about Topics that were Covered During the Course
1345 – 1415	POST-TEST
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

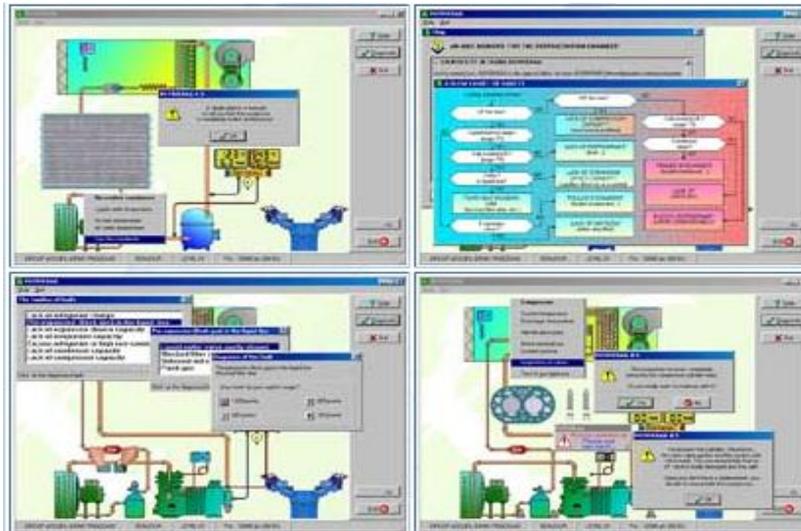
Practical Sessions/Site Visit

Site visit will be organized during the course for delegates to practice the theory learnt:-

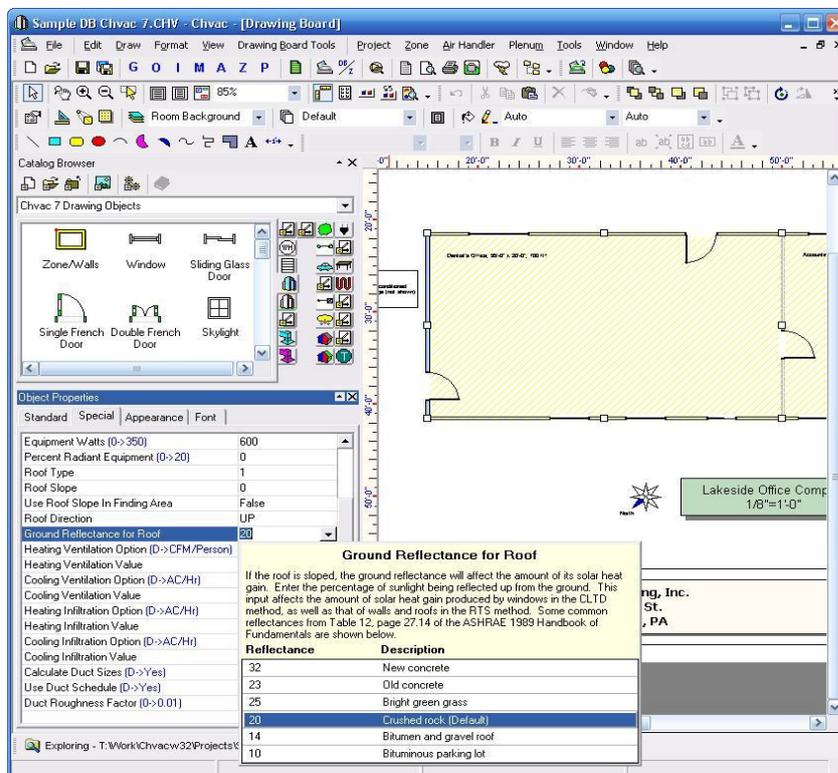


Simulator (Hands-on Practical Sessions)

Practical session 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 “KOTZA HVAC Simulator”, “Elite CHVAC Simulator”, “Danfoss Refrigerant Slider App”, “Danfoss Trouble Shooter App” and ” Air Lite Psychrometric Calcs”.



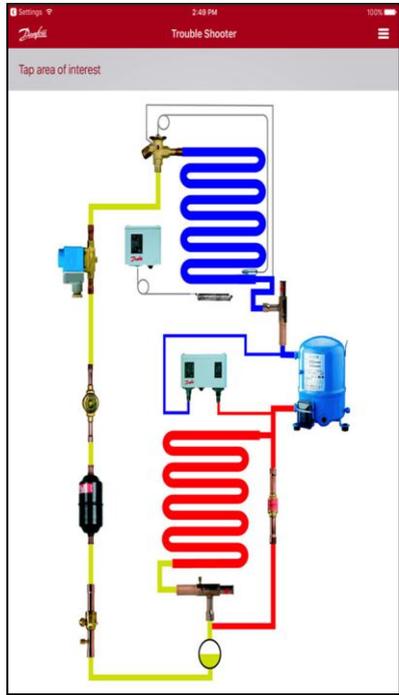
KOTZA HVAC Simulator



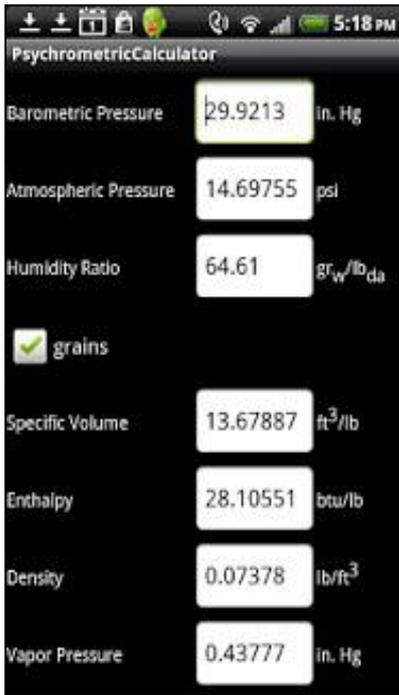
Elite CHVAC Simulator



Danfoss Refrigerant Slider App



Danfoss Trouble Shooter App



Air Lite Psychrometric Calcs

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org