

## COURSE OVERVIEW ME0007 Vapor Recovery Unit System

### Course Title

Vapor Recovery Unit System

### Course Date/Venue

June 28-July 02, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

### Course Reference

ME0007

### Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

### Course Description



***This practical and highly-interactive course includes real-life case studies and exercises 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 an up-to-date overview of vapor recovery engineering. It covers the vapor control systems and how equipment works; the hydro-carbon vapor adsorption-absorption process with dry vacuum pump, absorber tanks, piping, venting systems and condensate collection; the liquid ring VRU systems, vacuum booster blower and equipment failure patterns; the various approaches to machinery troubleshooting, troubleshooting faults and applying corrective action; and the product loading pumps, dry vacuum pump, rich absorbent return pump and liquid ring vacuum pump.



During this interactive course, participants will learn the seal fluid cooler, separator, packing, mechanical seals and seal support systems; the mechanical seal failure analysis, troubleshooting, maintenance and repair as well as bearing care and maintenance; the couplings and alignment, electrical components and operation and instrumentation of VRU's; and the continuous emission monitoring system and vapor watch-enhanced maintenance package records system and preventive maintenance for lubrication.

## Course Objectives

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

- Apply systematic techniques on the operation, maintenance and troubleshooting of vapor recovery unit (VRU) system
- Discuss vapor control systems and how equipment works
- Determine hydro-carbon vapor adsorption-absorption process with dry vacuum pump as well as absorber tanks, piping, venting systems and condensate collection
- Recognize liquid ring VRU systems, vacuum booster blower and equipment failure patterns
- Carryout various approaches to machinery troubleshooting, troubleshooting faults and applying corrective action
- Identify product loading pumps, dry vacuum pump, rich absorbent return pump and liquid ring vacuum pump
- Explain seal fluid cooler, separator, packing, mechanical seals and seal support systems
- Employ mechanical seal failure analysis, troubleshooting, maintenance and repair as well as bearing care and maintenance
- Describe couplings and alignment, electrical components and operation and instrumentation of VRU's
- Apply continuous emission monitoring system and vapor watch-enhanced maintenance package records system as well as preventive maintenance for lubrication

## 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 vapor recovery unit system for engineers, operators, regulatory personnel and other technical staff who deal with vapor recovery or vapor combustion equipment for petroleum distribution facilities in their daily operation.

## 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)

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

This course will be conducted by the following instructor. However, we have the right to change the course instructor prior to the course date and inform participants accordingly:



**Mr. Karl Thanasis**, PEng, MSc, MBA, BSc, is **Senior Mechanical & Maintenance Engineer** with over **45 years** of extensive industrial experience. His wide expertise includes **Compressors Maintenance & Troubleshooting**, **Screw Compressor MK/WRV Operation Maintenance & Troubleshooting**, **Piping & Pipeline, Maintenance, Repair, Shutdown, Turnaround & Outages, Maintenance & Reliability Management, Mechanical Maintenance Planning, Scheduling & Work Control, Advanced Techniques in Maintenance Management, Predictive & Preventive Maintenance, Maintenance & Operation Cost Reduction Techniques, Reliability Centered Maintenance (RCM), Machinery Failure Analysis, Rotating Equipment Reliability Optimization & Continuous Improvement, Material Cataloguing, Mechanical & Rotating Equipment Troubleshooting & Maintenance, Root Cause Analysis & Reliability Improvement, Condition Monitoring, Root Cause Failure Analysis (RCFA), Steam Generation, Steam Turbines, Power Generator Plants, Gas Turbines, Combined Cycle Plants, Boilers, Process Fired Heaters, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, Heat Exchangers, Heat Transfer, Coolers, Power Plant Performance, Efficiency & Optimization, Storage Tank Design & Fabrication, Thermal Power Plant Management, Boiler & Steam System Management, Pump Operation & Maintenance, Chiller & Chiller Plant Design & Installation, Pressure Vessel, Safety Relief Valve Sizing & Selection, Valve Disassembling & Repair, Pressure Relief Devices (PSV), Hydraulic & Pneumatic Maintenance, Advanced Valve Technology, Pressure Vessel Design & Fabrication, Pumps, Turbo-Generator, Turbine Shaft Alignment, Lubrication, Mechanical Seals, Packing, Blowers, Bearing Installation, Couplings, Clutches and Gears. Further, he is also versed in **Wastewater Treatment Technology, Networking System, Water Network Design, Industrial Water Treatment in Refineries & Petrochemical Plants, Piping System, Water Movement, Water Filtering, Mud Pumping, Sludge Treatment and Drying, Aerobic Process of Water Treatment that includes Aeration, Sedimentation and Chlorination Tanks. His strong background also includes Design and Sizing of all Waste Water Treatment Plant Associated Equipment such as Sludge Pumps, Filters, Metering Pumps, Aerators and Sludge Decanters.****

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager, Plant Manager, Area Manager - Equipment Construction, Construction Superintendent, Project Engineer and Design Engineer**. His duties covered **Plant Preliminary Design, Plant Operation, Write-up of Capital Proposal, Investment Approval, Bid Evaluation, Technical Contract Write-up, Construction and Sub-contractor Follow up, Lab Analysis, Sludge Drying and Management of Sludge Odor and Removal**. He has worked in various companies worldwide in the **USA, Germany, England and Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA and Greece** and has a **Master's and Bachelor's degree in Mechanical Engineering with Honours** from the **Purdue University and SIU in USA** respectively as well as an **MBA** from the **University of Phoenix in USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management (ILM)** a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

**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, 28<sup>th</sup> of June 2026**

0730 – 0800	<i>Registration &amp; Coffee</i>
0800 – 0815	<i>Welcome &amp; Introduction</i>
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Introduction</b> <i>Overview of Vapor Control Systems • Understanding How Equipment Works</i>
0930 – 0945	<i>Break</i>
0945 – 1030	<b>Hydro-Carbon Vapour Adsorption-Absorption Process with Dry Vacuum Pump</b>
1030 – 1130	<b>Absorber Tanks-Piping- Venting Systems</b>
1130 – 1230	<b>Condensate Collection</b>
1230 – 1245	<i>Break</i>
1245 – 1420	<b>Liquid Ring VRU Systems</b> <i>Adsorption – Absorption Process with Liquid Ring Pump</i>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day One</i>

**Day 2: Monday, 29<sup>th</sup> of June 2026**

0730 – 0930	<b>Vacuum Booster Blower Overview</b> <i>Rotors • Balancing • Rotor Dynamics • Impellers • Casings • Troubleshooting &amp; Preventive Maintenance for Compressors • Bearings • Seals: Labyrinths, Oil Seals &amp; Self Acting Gas Seals • Couplings • Controls</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Equipment Failure Patterns</b> <i>Materials Selection • Types of Corrosion • Bath-Tub Curve • Actual Equipment Failure Patterns • Actions to Minimize Failure Effect</i>
1100 – 1200	<b>Basic Approaches to Machinery Troubleshooting</b> <i>Examples from Recent Failure Incidents Attributed to Design Defects • Processing &amp; Manufacturing Deficiencies</i>
1200 – 1230	<b>Case Studies</b>
1230 – 1245	<i>Break</i>



1245 – 1315	<b>Troubleshooting Faults &amp; Applying Corrective Action</b> Equipment Performance Monitoring • Vibration Analysis • Fast Fault Finding
1315 – 1400	<b>Product Loading Pumps Overview</b> Centrifugal Pump Theory • Operating Characteristics • Centrifugal • Pump Operation • Cavitation & NPSH
1400 – 1420	<b>Dry Vacuum Pump</b>
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Two

**Day 3: Tuesday, 30<sup>th</sup> of June 2026**

0730 – 0930	<b>Rich Absorbent Return Pump</b>
0930 – 0945	Break
0945 – 1030	<b>Liquid Ring Vacuum Pump</b>
1030 – 1100	<b>Seal Fluid Cooler</b>
1100 – 1130	<b>Seperator</b>
1130 – 1230	<b>Packing &amp; Mechanical Seals</b> Compression Packing • Molded (Automatic) Packing • Basic Principles of Mechanical Seals • Face Materials • Secondary Seal Materials • Single Mechanical Seals • Single Mechanical Seal • Flushing Plans
1230 – 1245	Break
1245 – 1420	<b>Seal Support Systems</b> Dual Sealing Systems & Flushing Plans • API 682 Reference Guide • Gas Barrier Seal Technology for Pumps • Support Systems for Dry Gas (Self Acting) Compressor Seals • Mechanical Seal Selection Strategies
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4: Wednesday, 01<sup>st</sup> of July 2026**

0730 – 0930	<b>Mechanical Seal Failure Analysis &amp; Troubleshooting</b> Failure Analysis • Mechanical Seal Troubleshooting • Determining Leakage Rates • Ascertaining Seal Stability
0930 – 0945	Break
0945 – 1100	<b>Mechanical Seal Maintenance &amp; Repair</b> Bellows Seal Repair • Cartridge Seal Installation & Management • Seal Face Care
1100 – 1230	<b>Bearing Care &amp; Maintenance</b> Basic Bearing Concepts • Bearing Classifications • Bearing Care & Maintenance • Lubrication Management Break
1230 – 1245	Break
1245 – 1315	<b>Couplings &amp; Alignment</b> Purpose of Couplings • Types of Couplings • Alignment Methods • Foundation & Grouting Guidelines
1315 – 1400	<b>Electrical Components &amp; Operation</b>
1400 – 1420	<b>Instrumentation of VRUs</b>
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Four



**Day 5: Thursday, 02<sup>nd</sup> of July 2026**

0730 – 0830	<b>Continuous Emission Monitoring System</b>
0830 – 0930	<b>Vapor Watch-enhanced Maintenance Package Records System Data</b> Pressures, Temperatures, Flows & other Vapor Control Parameters & can be Configured to Output Useful Reports on System Performance.
0930 – 0945	Break
0945 – 1100	<b>Preventive Maintenance-Lubrication</b> Comparative Viscosity • Classifications
1100 – 1230	<b>Preventive Maintenance-Lubrication (cont'd)</b> Cost of Poor Lubrication • Fundamentals-Oil & Grease • Storage & Handling Methods
1230 – 1245	Break
1245 – 1345	<b>Preventive Maintenance</b> General Philosophy • Equipment Sparing Factor & Maintenance Approach
1345 – 1400	<b>Course Conclusion</b>
1400 - 1415	<b>POST-TEST</b>
1415 – 1430	Presentation of Course Certificates
1430	Lunch & End of Course

**Practical Sessions**

This practical and highly-interactive course includes real-life case studies and exercises:-



**Course Coordinator**

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