COURSE OVERVIEW PE0205
Extraction System Design

Course Title
Extraction System Design

Course Date/Venue
Session 1: April 14-18, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: September 14-18, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

3.0 CEUs (30 PDHs) AWARD

H-STK© INCLUDED

Course Reference
PE0205

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

Course Date/Venue

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 participants with a detailed and up-to-date overview of Refrigeration in Gas Conditioning and NGL Extraction Facilities. It covers the basic concepts, thermodynamic principles and cycles of refrigeration; the role and importance of refrigeration in gas conditioning and NGL extraction; the types and components of refrigeration systems including the refrigerant selection criteria; addressing safety risks and environmental impacts of refrigeration systems; the criteria and methodologies for designing refrigeration systems; the thermodynamic analysis of refrigeration cycles, heat exchanger design in refrigeration and process simulation and modeling; the material selection and equipment sizing; and the operational best practices for refrigeration systems.

During this interactive course, participants will learn the techniques and tools for monitoring refrigeration systems; troubleshooting common issues and the preventive and predictive maintenance practices; the methods to enhance performance and efficiency; the innovative refrigeration methods in gas conditioning; the energy efficiency in refrigeration systems, incorporating sustainable energy sources and addressing ecological concerns and refrigerant management; the future trends in refrigeration technology and customizing refrigeration solutions; the economic analysis of refrigeration systems in gas processing; the risk management and regulatory compliance; and the future directions and innovations in refrigeration.

Course Objectives

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

- Apply and gain an in-depth knowledge on refrigeration in gas conditioning and NGL extraction facilities
- Discuss the basic concepts, thermodynamic principles and cycles of refrigeration as well as the role and importance of refrigeration in gas conditioning and NGL extraction
- Identify the types and components of refrigeration systems including the refrigerant selection criteria
- Address safety risks and environmental impacts of refrigeration systems as well as the criteria and methodologies for designing refrigeration systems
- Illustrate the thermodynamic analysis of refrigeration cycles, heat exchanger design in refrigeration and process simulation and modeling
- Apply material selection and equipment sizing and the operational best practices for refrigeration systems
- Carryout techniques and tools for monitoring refrigeration systems, troubleshot common issues and apply preventive and predictive maintenance practices
- Employ methods to enhance performance and efficiency and explore innovative refrigeration methods in gas conditioning
- Recognize energy efficiency in refrigeration systems, incorporate sustainable energy sources and address ecological concerns and refrigerant management
- Discuss the future trends in refrigeration technology, customize refrigeration solutions and apply the economic analysis of refrigeration systems in gas processing
- Apply risk management and regulatory compliance and explain future directions and innovations in refrigeration

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 refrigeration in gas conditioning and NGL extraction facilities for process engineers, plant operators, technical managers, maintenance technicians, regulatory, compliance professionals and other technical staff.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course 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.

- 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. Karl Thanasis, PEng, MSc, MBA, BSc, is a **Senior Engineer** with over **30 years** of practical experience within the **Oil**, **Gas**, **Refinery** and **Petrochemical** industries. His wide expertise includes **Process Plant** Optimization Technology & Continuous Improvement, **Process Engineering Calculations**, **Process Plant** Start Up & Commissioning, Applied **Process Engineering** Elements**, Coke Cooler**, **Process Plant** Start-up & Commissioning, **Process Plant** Troubleshooting, **Operations Abnormalities & Plant Upset**, **Process Equipment** Applications & Troubleshooting, **Process Plant Performance & Efficiency**, **Gas Sweetening & Sulphur Recovery**, **Distillation-Column** Control & Troubleshooting, **Oil Movement & Troubleshooting**, **Process Plant Operations & Control**, **Process Equipment** Operation, **Fired Heaters & Air Coolers** Maintenance, **Heat Exchangers**, **Pumps & Compressors**, **Crude Desalter**, **Pressure Vessels & Valves**, **Steam Trapping & Control**, **Pumps & Valve** Maintenance & Troubleshooting, **Turbomachinery**, **Mechanical Alignment**, **Rotating Equipments**, **Diesel Generators**, **Lubrication** Technology, **Bearing**, **Predictive & Preventive** Maintenance, **Root Cause Analysis**, **Boilers**, **Oil Field** Operation, **Production** Operation, Plant Operation & Commissioning, **Crude Oil De Salting** Process, **Gas Conditioning**, **NGL Recovery & NGL Fractionation**, **Flare** System, **Storage Tanks**, **Oil Recovery** System and **Chemical Injection**.

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** and **Bachelor** degrees 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**) and a **Certified Instructor/Trainer**.

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 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	***Fundamentals of Refrigeration**: Basic Concepts, Thermodynamic Principles & Cycles*
0900 - 0930	***Gas Conditioning & NGL Extraction**: The Role & Importance of Refrigeration in these Processes*
0930 – 0945	*Break*
0945 – 1100	***Types of Refrigeration Systems**: Various Refrigeration Systems Used in the Industry*
1100 – 1200	***Components of Refrigeration Systems**: Compressors, Condensers, Evaporators, Expansion Devices*
1200 – 1215	*Break*
1215 – 1330	***Refrigerant Selection Criteria**: Factors Influencing the Choice of Refrigerants in Gas Processing*
1330 - 1420	***Safety & Environmental Considerations**: Addressing Safety Risks & Environmental Impacts of Refrigeration Systems*
1420 – 1430	***Recap***
1430	*End of Day One*

Day 2

0730 – 0830	***Design Principles of Refrigeration Systems**: Criteria & Methodologies for Designing Refrigeration Systems in Gas Processing*
0830 - 0930	***Thermodynamic Analysis of Refrigeration Cycles**: Detailed Study of Different Refrigeration Cycles Used in Gas Conditioning*
0930 – 0945	*Break*
0945 – 1100	***Heat Exchanger Design in Refrigeration**: Role & Design of Heat Exchangers in Refrigeration Systems*
1100 – 1200	***Process Simulation & Modeling**: Using Software Tools for Designing & Optimizing Refrigeration Systems*
1200 – 1215	*Break*
1215 – 1330	***Material Selection & Equipment Sizing**: Best Practices for Material Selection & Sizing of Refrigeration System Components*
1330 - 1420	***Case Studies**: Real-World Design Challenges & Solutions in Refrigeration Systems*
1420 - 1430	***Recap***
1430	*End of Day Two*

Day

0730 – 0830	***Operational Best Practices for Refrigeration Systems**: Guidelines for Efficient & Safe Operation*
0830 - 0930	***Performance Monitoring & Control**: Techniques & Tools for Monitoring Refrigeration Systems*
0930 – 0945	*Break*
0945 – 1100	***Troubleshooting Common Issues**: Identifying & Solving Operational Problems in Refrigeration Systems*
1100 – 1200	***Maintenance Strategies for Refrigeration Equipment**: Preventive & Predictive Maintenance Practices*
1200 – 1215	*Break*
1215 – 1330	***Refrigeration System Optimization**: Methods to Enhance Performance & Efficiency*
1330 - 1420	***Interactive Workshop**: Practical Session on Operation & Maintenance of Refrigeration Systems*
1420 - 1430	***Recap***
1430	*End of Day Three*

Day 4

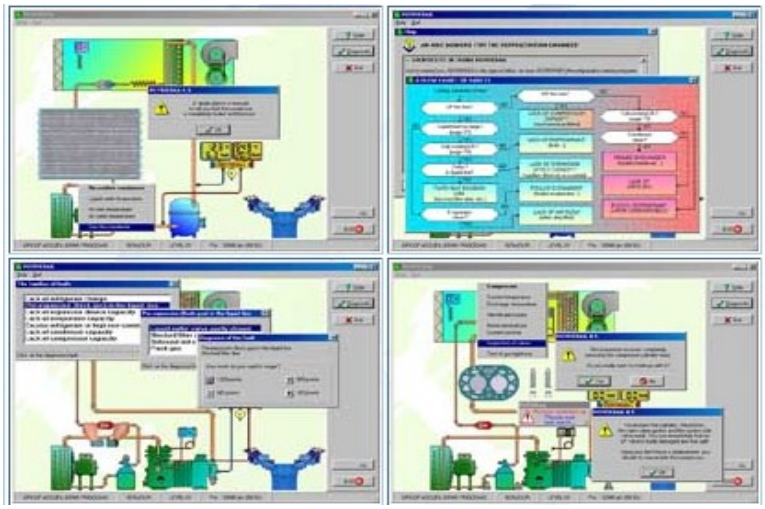
0730 – 0830	***Advanced Refrigeration Technologies**: Exploring Innovative Refrigeration Methods in Gas Conditioning*
0830 - 1930	***Energy Efficiency in Refrigeration Systems**: Strategies to Reduce Energy Consumption*
0930 – 0945	*Break*
0945 – 1100	***Use of Renewable Energy in Refrigeration:** Incorporating Sustainable Energy Sources*
1100 – 1200	***Environmental Impact of Refrigeration**: Addressing Ecological Concerns & Refrigerant Management*
1200 – 1215	*Break*
1215 – 1420	***Future Trends in Refrigeration Technology**: Upcoming Advancements & their Potential Impact*
1420 – 1430	***Recap***
1430	*End of Day Four*

Day 5

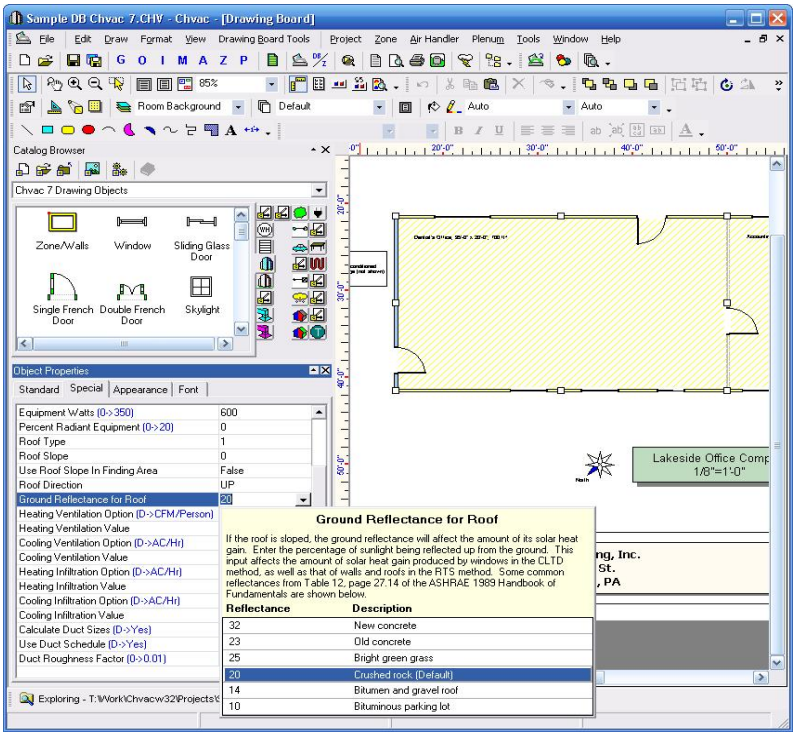
0730 – 0830	***Customizing Refrigeration Solutions**: Adapting Refrigeration Technologies to Meet Specific Needs*
0830 - 0930	***Economic Analysis of Refrigeration Systems in Gas Processing**: Cost Considerations & Budget Management*
0930 – 0945	*Break*
0945 – 1100	***Case Studies**: Analysis of Past Refrigeration Projects & Learning from Experiences*
1100 – 1200	***Risk Management & Regulatory Compliance**: Navigating Risks & Adhering to Industry Regulations*
1200 – 1215	*Break*
1215 – 1345	***Future Directions & Innovations in Refrigeration**: A Look at the Evolving Landscape of Refrigeration Technology*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*End of Course*

Simulators (Hands-on Practical Sessions)

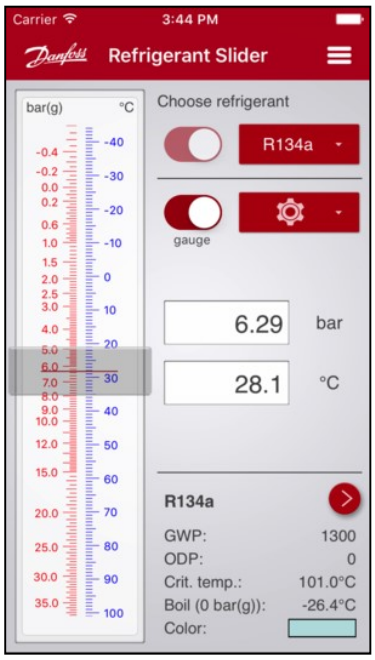
Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using one of our state-of-the-art simulators “KOTZA HVAC Simulator”, “KOTZA HVAC Simulator”, “Danfoss Refrigerant Slider App”, “Danfoss Trouble Shooter App” and “Air Lite Psychrometric Calcs”.



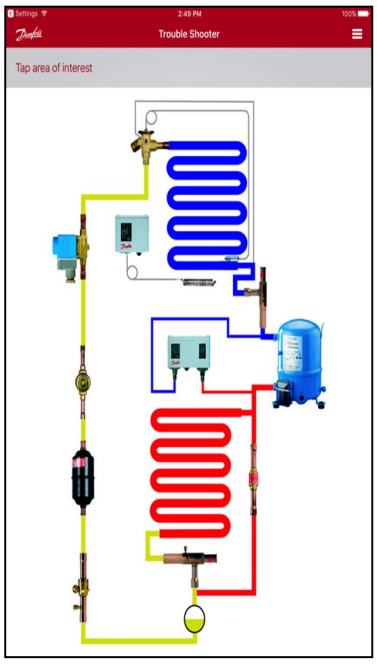
KOTZA HVAC Simulator



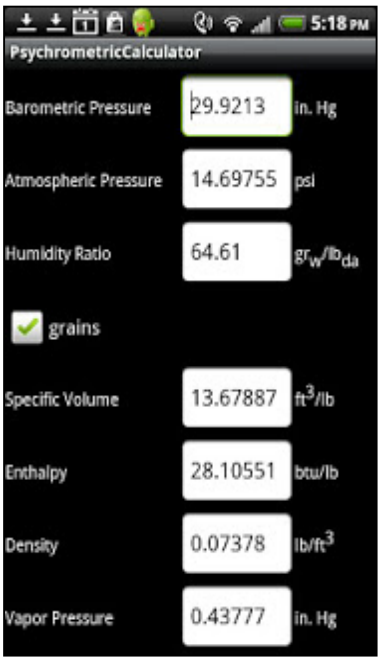
Elite CHVAC Simulator



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