COURSE OVERVIEW ME0773
Humidity Control in Buildings (Tips & Traps, Real World Problems & Solutions), Air-to-Air Heat Recovery Fundamentals & Applications and Variable Refrigerant Flow Systems: Design & Applications

Course Title
Humidity Control in Buildings (Tips & Traps, Real World Problems & Solutions), Air-to-Air Heat Recovery Fundamentals & Applications and Variable Refrigerant Flow Systems: Design & Applications

Course Date/Venue
November 10-14, 2024/Ras Al Khaimah Meeting Room, The Tower Plaza Hotel, Dubai, UAE

Course Reference
ME0773

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 is designed to provide participants with a detailed and up-to-date overview of Humidity Control in Buildings (Tips & Traps, Real World Problems and Solutions), Air-to-Air Heat Recovery Fundamentals and Applications and Variable Refrigerant Flow Systems. It covers the fundamentals of relative humidity and its role in building environments; the effects of humidity on building materials and the impact of moisture on structural materials, furnishings and health; and the humidity control strategies and how humidity influences indoor air quality (IAQ) and comfort levels in buildings.

Further, the course will also discuss the proper tools and methods for accurate measurement of humidity in buildings; and the advanced humidity control strategies using dehumidification systems and passive methods for optimal control; the HVAC system integration for humidity control and techniques for managing humidity in hot, humid or arid environments; avoiding frequent mistakes and issues in design and application; the practical approaches for resolving humidity problems in buildings; the principles of air-to-air heat recovery and the types of heat recovery systems; how heat recovery systems improve energy efficiency and comfort; and the key factors to consider when designing heat recovery systems for buildings.

During this interactive course, participants will learn the best practices for maintenance and performance of heat recovery systems; the variable refrigerant flow (VRF) systems; planning and designing VRF systems for commercial and residential building; how VRF systems contribute to energy savings and sustainability; managing cooling and heating demands using VRF controls; combining VRF with HVAC, humidity control and ventilation systems; the advanced design techniques for humidity control and VRF systems; the common issues in VRF and heat recovery systems; troubleshooting typical problems in installation, operation and maintenance; maximizing energy efficiency in heat recovery and VRF system operations; and implementing VRF and humidity control systems in older buildings.

Course Objectives

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

- Apply and gain an in-depth knowledge on humidity control in buildings (tips & traps, real world problems and solutions), air-to-air heat recovery fundamentals and applications and variable refrigerant flow systems
- Discuss the fundamentals of relative humidity and its role in building environments
- Identify the effects of humidity on building materials and the impact of moisture on structural materials, furnishings and health
- Carryout humidity control strategies and discuss how humidity influences indoor air quality (IAQ) and comfort levels in buildings
- Apply proper tools and methods for accurate measurement of humidity in buildings
- Carryout advanced humidity control strategies using dehumidification systems and passive methods for optimal control
- Apply HVAC system integration for humidity control and techniques for managing humidity in hot, humid or arid environments
- Avoid frequent mistakes and issues in design and application and apply practical approaches for resolving humidity problems in buildings
- Discuss the principles of air-to-air heat recovery and the types of heat recovery systems
- Explain how heat recovery systems improve energy efficiency and comfort
- Recognize the key factors to consider when designing heat recovery systems for buildings

- Implement best practices for maintenance and performance of heat recovery systems
- Recognize variable refrigerant flow (VRF) systems as well as plan and design VRF systems for commercial and residential building
- Discuss how VRF systems contribute to energy savings and sustainability
- Manage cooling and heating demands using VRF controls as well as combine VRF with HVAC, humidity control and ventilation systems
- Apply advanced design techniques for humidity control and VRF systems
- Identify the common issues in VRF and heat recovery systems as well as troubleshoot typical problems in installation, operation and maintenance
- Maximize energy efficiency in heat recovery and VRF system operations as well as implementing VRF and humidity control systems in older buildings

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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of humidity control in buildings (tips & traps, real world problems and solutions), air-to-air heat recovery fundamentals and applications and variable refrigerant flow systems for HVAC engineers and technicians, building services engineers, architects and building designers, facilities managers, energy consultants, contractors and builders, building code officials and inspectors and other technical staff.

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:-

- 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.

- 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.

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 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. Mustafa Fadel is a **Senior Mechanical Engineer** with over **25 years** of industrial experience within the **Power & Water Utilities** and other **Energy Sectors**. His specialization widely covers **District Cooling**: **Plant**: **Design**, **Operation & Maintenance HVAC System**, **HVAC** Equipment Terminology, **HVAC System Block Load Calculation**, **HVAC System** Development of Drawings, **Air Distribution** System, Basic **Chiller Water System Design & Selection**, **Pump** Design & Selection, **Rotating & Static Equipment**, **Cooling Tower Design**, **Boiler** Design & Selection, Energy Management & Value Engineering for Mechanical System, Mechanical Ventilation, Smoke Ventilation, Staircase Pressurization, System Design & Development of Drawings, Data Center Design, **Precision AC Equipment Selection**, **Refrigeration Systems**, **Air Cooler Design**, **Chillers**, **Mass** & **Heat Transfer**, **Electromechanical**, **Rotating & Static Equipment** including **Heat Exchangers**, **Piping & Pipeline**, **Pressure Vessels**, **Valves**, **Tanks Turbines**, **Compressors**, **Motors**, **Pumps**, **Evaporators**, **Condensers**, **Blowers** and **Fans**, **Maintenance Planning & Scheduling**, **Root Cause Failure Analysis**, **Performance Calculations**, **Reliability Maintenance** and **Corrective** & **Preventive Maintenance**. Further, he is also well-versed in **HSE Management**, **KPI's**, **CMMS** and **AutoCAD** as well as in various international standards such as the **ASHRAE**, **API**, **ASTM**, **ASME**, **AMCA**, **NFPA** and **SMACNA**. Currently, he is the **HVAC&R Specialist** in **SEGAS LNG Plant** wherein he is responsible for the implementation, construction and maintenance strategy for industrial HVAC&R equipment.

During his career life, Mr. Fadel has gained his practical and field experience through his various significant positions and dedication as the **Section Head**, **Project Manager**, **HVAC System Consultant Engineer**, **Mechanical Engineer**, **HVAC&R Instructor** and **Senior Technical Consultant** for international companies and universities like the **Foster Wheeler**, **Technip**-Italy, Borner Company, Union FENOSA Gas, Asphalt Bitumen, King Khalid University, Alexandria Petroleum Company, FAWAZ Company, Marium Corporation and many more.

Mr. Fadel has a **Bachelor** degree in **Power Mechanical 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 American Society of Heating Refrigetaring and Air Conditioning Engineers (**ASHRAE**), **USA**. He has further delivered and participated numerous engineering and inspection projects, trainings, courses, seminars and conferences globally.

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: ***Sunday, 10th of November 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Fundamentals of Humidity in Indoor Environments*** *Understanding Relative Humidity and its Role in Building Environments*
0900 – 0930	***Effects of Humidity on Building Materials*** *Impact of Moisture on Structural Materials, Furnishings and Health*
0930 – 0945	*Break*
0945 – 1100	***Humidity Control Strategies*** *Basic Principles for Controlling Humidity in Various Climate Zones*
1100 – 1230	***Indoor Air Quality (IAQ) & Humidity*** *How Humidity Influences IAQ and Comfort Levels in Buildings*
1230 – 1245	*Break*
1245 – 1330	***Common Problems in Humidity Control*** *Identifying Real-World Challenges in Commercial and Residential Buildings*
1330 – 1420	***Humidity Measurement Techniques*** *Tools and Methods for Accurate Measurement of Humidity in Buildings*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Monday, 11th of November 2024***

0730 – 0830	***Advanced Humidity Control Strategies*** *Using Dehumidification Systems and Passive Methods for Optimal Control*
0830 – 0930	***HVAC System Integration for Humidity Control*** *How HVAC Systems can Assist or Hinder Proper Humidity Control*
0930 – 0945	*Break*
0945 – 1100	***Humidity Control in Extreme Conditions*** *Techniques for Managing Humidity in Hot, Humid or Arid Environments*
1100 – 1230	***Common Traps in Humidity Control*** *Avoiding Frequent Mistakes and Issues in Design and Application*
1230 – 1245	*Break*
1245 – 1330	***Real-World Case Studies of Humidity Failures*** *Analysis of Building Environments with Poor Humidity Control*
1330 – 1420	***Solutions for Common Humidity Issues*** *Practical Approaches for Resolving Humidity Problems in Buildings*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Tuesday, 12th of November 2024***

0730 – 0830	***Principles of Air-to-Air Heat Recovery*** *Introduction to Heat Recovery Systems and Their Significance in Energy Savings*
0830 – 0930	***Types of Heat Recovery Systems*** *Overview of Rotary, Plate and Run-Around Coil Heat Exchangers*
0930 – 0945	*Break*

0945 – 1100	***Applications in Building Environments*** *How Heat Recovery Systems Improve Energy Efficiency and Comfort*
1100 – 1230	***Design Considerations for Air-to-Air Heat Recovery*** *Key Factors to Consider When Designing Heat Recovery Systems for Buildings*
1230 – 1245	*Break*
1245 – 1330	***Maintenance & Performance of Heat Recovery Systems*** *Best Practices for Maintaining Optimal Performance*
1330 – 1420	***Case Studies on Heat Recovery Systems*** *Real-World Examples of Successful Heat Recovery Applications*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: Wednesday, 13th of November 2024

0730 – 0830	***Basics of Variable Refrigerant Flow (VRF) Systems*** *Basic Principles of VRF Technology and its Advantages over Traditional Systems*
0830 – 0930	***Design Considerations for VRF Systems*** *Planning and Designing VRF Systems for Commercial and Residential Buildings*
0930 – 0945	*Break*
0945 – 1100	***Energy Efficiency of VRF Systems*** *How VRF Systems Contribute to Energy Savings and Sustainability*
1100 – 1230	***Control Strategies in VRF Systems*** *Managing Cooling and Heating Demands Using VRF Controls*
1230 – 1245	*Break*
1245 – 1330	***Integration of VRF with Other Building Systems*** *Combining VRF with HVAC, Humidity Control and Ventilation Systems*
1330 – 1420	***Real-World Applications of VRF Systems*** *Successful Implementations of VRF Technology in Diverse Environments*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

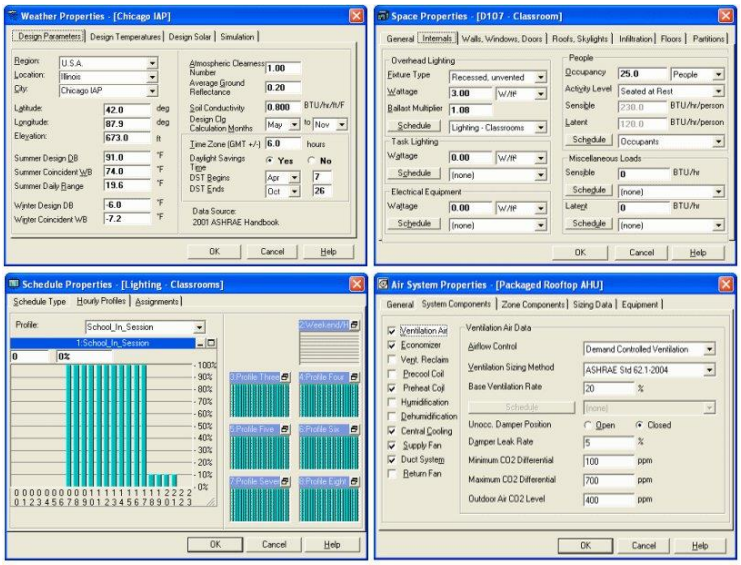
Day 5: Thursday, 14th of November 2024

0730 – 0830	***Advanced Design Techniques for Humidity Control & VRF Systems*** *Leveraging Advanced Tools and Software for Complex Building Designs*
0830 – 0930	***Common Issues in VRF & Heat Recovery Systems*** *Troubleshooting Typical Problems in Installation, Operation and Maintenance*
0930 – 0945	*Break*
0945 – 1100	***Energy Efficiency Optimization Techniques*** *Maximizing Energy Efficiency in Heat Recovery and VRF System Operations*
1100 – 1230	***Retrofit Solutions for Existing Buildings*** *Implementing VRF and Humidity Control Systems in Older Buildings*
1230 – 1245	*Break*
1245 – 1315	***Sustainability & Green Building Standards*** *Incorporating Energy-efficient Systems into LEED and Other Certification Schemes*
1315 – 1345	***Future Trends in HVAC, Humidity Control & VRF Technology*** *Emerging Technologies and Practices for Sustainable Building Management*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

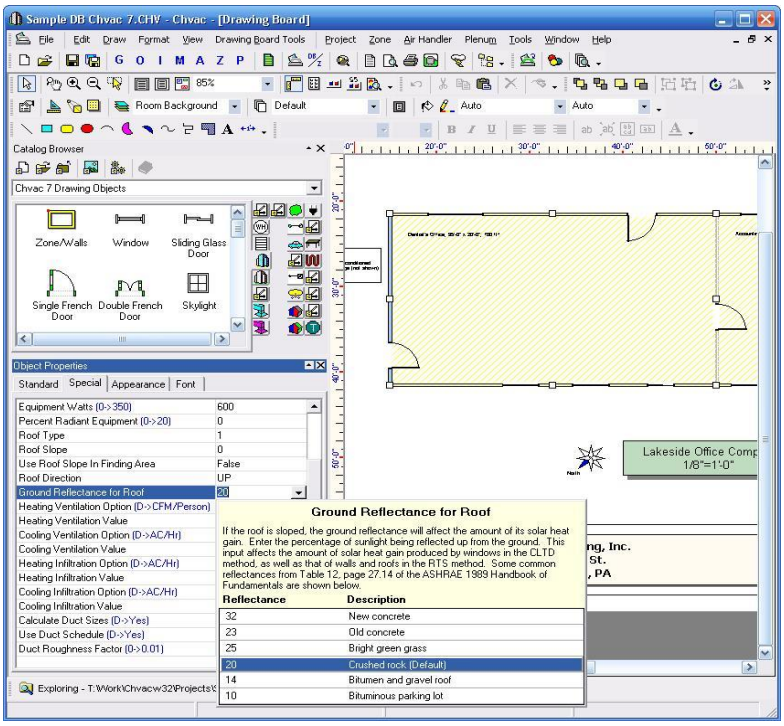
Practical Sessions/Site Visit

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 simulators "Hourly Analysis Program (HAP) Software" and "Elite CHVAC Simulator".



Hourly Analysis Program (HAP) Software



Elite CHVAC Simulator

Course Coordinator

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