

COURSE OVERVIEW FE0018-4D
Thermal Insulation for the Mechanical Systems

Course Title

Thermal Insulation for the Mechanical Systems

Course Date/Venue

Session 1: August 19-22, 2024/Club B Meeting Room, Ramada Plaza by Wyndham Istanbul City Center, Istanbul, Turkey
 Session 2: November 04-07, 2024/ Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE



Course Reference

FE0018

Course Duration/Credits

Four days/2.4 CEUs/24 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 up-to-date overview of Thermal Insulation for the Mechanical Systems of a Refinery and Process Plant. It covers the importance of thermal insulation in industrial applications including the materials and their properties; the types of insulation materials, thermal conductivity and insulation performance factors; the considerations for temperature range, fire resistance, moisture resistance, and chemical compatibility; the material selection criteria, insulation cladding and protective finishes; and the insulated piping systems, insulation thickness and requirements.



Further, the course will also discuss the insulation for pressure vessels and tanks; thermal insulation requirements for different types of vessels; the insulation thickness calculations based on temperature differentials and operating condition; the insulation installation methods for vessels and tanks; the insulation cladding design and corrosion protection measures; the insulation requirements for heat exchangers and boilers; the insulation selection criteria based on operating temperatures and heat transfer rates; the insulation for different types of heat exchangers; the insulation considerations for boiler components; and the insulation installation and maintenance practices for heat exchangers and boilers.

During this interactive course, participants will learn the insulation requirements for HVAC ductwork and air handling systems; the insulation for acoustic control, vibration damping, piping and equipment in hazardous areas; the insulation testing procedures and methods; the insulation density, thickness verification, moisture and water vapor barrier testing; the quality assurance and inspection of installed insulation systems; the maintenance practices for insulation systems; the inspection and monitoring of insulation for damage, degradation, and moisture ingress; the repair and replacement methods for damaged insulation; the insulation retrofitting and upgrade strategies.; and the maintenance planning and documentation for insulation systems.

Course Objectives

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

- Apply and gain an in-depth knowledge on thermal insulation for the mechanical systems of a refinery and process plant
- Discuss the importance of thermal in industrial applications including materials and their properties
- Explain the role of insulation in energy conservation and process efficiency as well as insulation standards and regulations
- Recognize the types of insulation materials, thermal conductivity and insulation performance factors
- Discuss considerations for temperature range, fire resistance, moisture resistance and chemical compatibility
- Identify insulation material selection criteria for different applications, insulation cladding and protective finishes
- Recognize insulated piping systems, insulation thickness for energy conservation and process control and insulation requirements for different types of piping
- Carryout insulation installation techniques and best practices as well as inspection and quality control of insulated piping systems
- Determine insulation considerations for pressure vessels and tanks and thermal insulation requirements for different types of vessels, insulation requirements for heat exchangers, boilers, HVAC ductwork and air handling systems
- Apply insulation thickness calculations based on temperature differentials and operating conditions and insulation installation methods for vessels and tanks
- Illustrate insulation cladding design and corrosion protection measures and insulation selection criteria based on operating temperatures and heat transfer rates
- Employ insulation for different types of heat exchangers, insulation considerations for boiler components and insulation installation and maintenance practices
- Carryout thermal insulation for ductwork in different environments and insulation materials and methods for reducing heat gain/loss and condensation
- Apply noise reduction, vibration control and insulation installation techniques for ductwork and air handling systems

- Install insulation for cryogenic systems and low-temperature applications, fireproofing, fire insulation, acoustic control, vibration damping and piping and equipment in hazardous areas
- Employ insulation testing procedures, methods and thermal performance testing and measurement techniques
- Apply insulation density, thickness verification, moisture and water vapor barrier testing, quality assurance and inspection of installed insulation systems
- Implement maintenance practices for insulation systems, inspect and monitor as well as insulation for damage, degradation and moisture ingress
- Carryout repair and replace methods for damaged insulation, insulation retrofitting and upgrade strategies including maintenance planning and documentation for insulation systems

Who Should Attend

This course provides an overview of all significant aspects and considerations of thermal insulation for the mechanical systems of a refinery and process plant for mechanical engineers, process engineers, inspection engineers, operators and technicians, maintenance, business development, quality assurance (QA), quality control (QC), project oversight, safety, inspections, estimating, management, product development, mechanical insulation system design and specification development.

Training Methodology

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Workshops & Work Presentations
- 30% Case Studies & Practical Exercises
- 20% Software, Simulators & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

Istanbul	US\$ 5,000 per Delegate + VAT . This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	US\$ 4,500 per Delegate + VAT . This rate includes H-STK [®] (Howard 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.

Course 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 **2.4 CEUs** (Continuing Education Units) or **24 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 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. Dimitry Rovas, CEng, MSc, PMI-PMP, SMRP-CMRP is a **Senior Mechanical & Maintenance Engineer** with extensive industrial experience in **Oil, Gas, Power and Utilities** industries. His expertise includes **Thermal Insulation, Insulation Standards & Regulations, Insulation Materials & Selection, Piping System Insulation, Insulation Installation Techniques, Insulation Inspection & Quality Control, Insulation Thickness Calculation, Insulation & Corrosion Protection, Heat Exchanger & Boiler Insulation, Tanks & Vessels Insulation, Pipeline & Piping Insulation, Insulation Testing & Quality Assurance, Insulation Maintenance & Repair, Insulation Retrofitting, Impulse Tube**

Installation & Inspection, Parker Compression Fittings, Pipes & Fittings, PSV Inspection, Boiler Operation, Maintenance & Inspection, Root Cause Failure Analysis, Tank Design & Engineering, Tank Shell, Tanks & Tank Farms, Vacuum Tanks, Gas Turbine Operating & Maintenance, Diesel Engine, Engine Cycles, Governors & Maintenance, Crankshafts & Maintenance, Lubrication System Troubleshooting & Maintenance, Engines/Drivers, Motor Failure Analysis & Testing, Motor Predictive Maintenance, Engine Construction & Maintenance, HP Fuel Pumps & Maintenance, Fired Equipment Maintenance, Combustion Techniques, Process Heaters, Glass Reinforced Epoxy (GRE), Glass Reinforced Pipes (GRP), Glass Reinforced Vent (GRV), Mechanical Pipe Fittings, Flange Joint Assembly, Adhesive Bond Lamination, Butt Jointing, Joint & Spool Production, Isometric Drawings, Flange Assembly Method, Fabrication & Jointing, Jointing & Spool Fabrication, CAESAR, Pipe Stress Analysis, Pipe Cuttings, Flange Bolt Tightening Sequence, Hydro Testing, Pump Technology, Fundamentals of Pumps, Pump Selection & Installation, Centrifugal Pumps & Troubleshooting, Reciprocating & Centrifugal Compressors, Screw Compressor, Compressor Control & Protection, Gas & Steam Turbines, Turbine Operations, Gas Turbine Technology, Valves, Process Control Valves, Bearings & Lubrication, Advanced Machinery Dynamics, Rubber Compounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber Manufacturing Systems, Heat Transfer, Vulcanization Methods, Process Plant Shutdown & Turnaround, Professional Maintenance Planner, Advanced Maintenance Management, Maintenance Optimization & Best Practices, Maintenance Auditing & Benchmarking, Material Cataloguing, Reliability Management, Rotating Equipment, Energy Conservation, Energy Loss Management in Electricity Distribution Systems, Energy Saving, Thermal Power Plant Management, Thermal Power Plant Operation & Maintenance, Heat Transfer, Machine Design, Fluid Mechanics, Heating & Cooling Systems, Heat Insulation Systems, Heat Exchanger & Cooling Towers, Mechanical Erection, Heavy Rotating Equipment, Material Unloading & Storage, Commissioning & Start-Up. Further, he is also well-versed in MS project & AutoCAD, EPC Power Plant, Power Generation, Combined Cycle Powerplant, Leadership & Mentoring, Project Management, Strategic Planning/Analysis, Construction Management, Team Formation, Relationship Building, Communication, Reporting and Six Sigma. He is currently the **Project Manager wherein he is managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.**

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager, Field Engineer, Thermal Insulation Engineer, Mechanical Engineer, Preventive Maintenance Engineer, Senior Thermal Insulation Technician, Researcher, Instructor/Trainer, Telecom Consultant and Consultant** from various companies such as the Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas has a **Master's degree in Energy Production & Management and Mechanical Engineering** from the **National Technical University of Athens (NTUA), Greece**. Further, he is a **Certified Instructor/Trainer, a Certified Maintenance and Reliability Professional (CMRP)** from the Society of Maintenance & Reliability Professionals (SMRP), **Certified Project Management Professional (PMI-PMP), Certified Six Sigma Black Belt, Certified Internal Verifier/Assessor/Trainer** by the Institute of Leadership & Management (ILM), **Certified Construction Projects Contractor, Certified Energy Auditor** and a **Chartered Engineer**. Moreover, he is an active member of **American Society for Quality, Project Management Institute (PMI), Body of Certified Energy Auditors and Technical Chamber of Greece**. He has further received various recognition and awards and delivered numerous trainings, seminars, courses, workshops and conferences internationally.





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	Introduction to Thermal Insulation in Refineries & Process Plants Thermal Insulation and its Importance in Industrial Applications • Thermal Insulation Materials and their Properties • The Role of Insulation in Energy Conservation and Process Efficiency • Insulation Standards and Regulations in Refineries and Process Plants
0900 - 0930	Insulation Materials & Selection Types of Insulation Materials (Fiberglass, Mineral Wool, Cellular Glass, etc.) • Thermal Conductivity and Insulation Performance Factors
0930 - 0945	Break
0945 - 1030	Insulation Materials & Selection (cont'd) Considerations for Temperature Range, Fire Resistance, Moisture Resistance and Chemical Compatibility
1030 - 1230	Insulation Materials & Selection (cont'd) Insulation Material Selection Criteria for Different Applications • Insulation Cladding and Protective Finishes
1230 - 1245	Break
1245 - 1420	Insulation for Piping Systems Insulated Piping Systems • Determining Insulation Thickness for Energy Conservation and Process Control • Insulation Requirements for Different Types of Piping (Process, Steam, Hot Water, Cryogenic, etc.)
1420 - 1430	Recap
1430	Lunch & End of Day One

Day 2

0730 - 0830	Insulation for Piping Systems (cont'd) Insulation Installation Techniques and Best Practices • Inspection and Quality Control of Insulated Piping Systems
0830 - 0930	Insulation for Pressure Vessels & Tanks Insulation Considerations for Pressure Vessels and Tanks • Thermal Insulation Requirements for Different Types of Vessels (Storage Tanks, Reactors, Columns, etc.)
0930 - 0945	Break
0945 - 1100	Insulation for Pressure Vessels & Tanks (cont'd) Insulation Thickness Calculations Based on Temperature Differentials and Operating Conditions • Insulation Installation Methods for Vessels and Tanks • Insulation Cladding Design and Corrosion Protection Measures
1100 - 1230	Insulation for Heat Exchangers & Boilers Insulation Requirements for Heat Exchangers and Boilers • Insulation Selection Criteria Based on Operating Temperatures and Heat Transfer Rates • Insulation for Different Types of Heat Exchangers (Shell and Tube, Plate, Air-Cooled, etc.)





1230 – 1245	Break
1245 – 1420	Insulation for Heat Exchangers & Boilers (cont'd) Insulation Considerations for Boiler Components (Boiler Walls, Steam Drums, Headers, etc.) • Insulation Installation and Maintenance Practices for Heat Exchangers and Boilers
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3

0730 – 0830	Insulation for Ductwork & Air Handling Systems Insulation Requirements for HVAC Ductwork and Air Handling Systems • Thermal Insulation for Ductwork in Different Environments (Ambient, Chilled, Hot, etc.)
0830 – 0930	Insulation for Ductwork & Air Handling Systems (cont'd) Insulation Materials and Methods for Reducing Heat Gain/Loss and Condensation • Considerations for Noise Reduction and Vibration Control • Insulation Installation Techniques for Ductwork and Air Handling Systems
0930 – 0945	Break
0945 – 1100	Insulation for Equipment & Special Applications Insulation Considerations for Equipment and Special Applications (Pumps, Compressors, Turbines, etc.) • Insulation for Cryogenic Systems and Low-Temperature Applications
1100 – 1230	Insulation for Equipment & Special Applications (cont'd) Fireproofing and Fire Insulation Requirements • Insulation for Acoustic Control and Vibration Damping • Insulation for Piping and Equipment in Hazardous Areas
1230 – 1245	Break
1245 – 1420	Insulation Testing & Quality Assurance Insulation Testing Procedures and Methods • Thermal Performance Testing and Measurement Techniques
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4

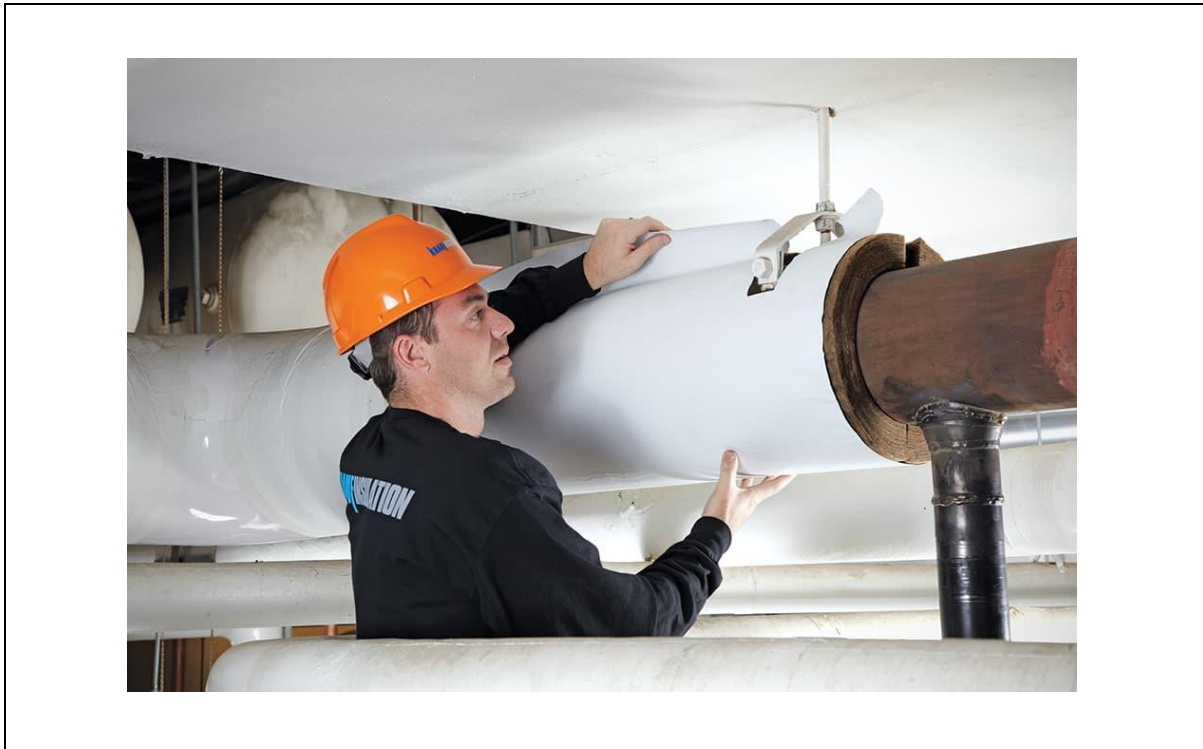
0730 – 0830	Insulation Testing & Quality Assurance (cont'd) Insulation Density and Thickness Verification • Moisture and Water Vapor Barrier Testing • Quality Assurance and Inspection of Installed Insulation Systems
0830 – 0930	Maintenance & Repair of Insulation Systems Maintenance Practices for Insulation Systems • Inspection and Monitoring of Insulation for Damage, Degradation and Moisture Ingress
0930 – 0945	Break
0945 – 1100	Maintenance & Repair of Insulation Systems (cont'd) Repair and Replacement Methods for Damaged Insulation • Insulation Retrofitting and Upgrade Strategies • Maintenance Planning and Documentation for Insulation Systems
1100 – 1230	Case Studies & Practical Exercises Analyzing Real-World Case Studies Related to Thermal Insulation in Refineries and Process Plants • Practical Exercises for Insulation Thickness Calculations, Material Selection and Installation Techniques



1230 – 1245	Break
1245 – 1345	Case Studies & Practical Exercises (cont'd) Group Discussions and Knowledge Sharing • Q&A Session for Clarifications and Further Discussions
1345 – 1400	Course Conclusion
1400 – 1415	POST-TEST
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

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