



PROFESSIONAL TRAINING COURSE

Course No. 1530

Industrial Refrigeration Systems Training Course

HVAC, REFRIGERATION & BUILDING SERVICES
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom

QUEST TRAINING COMPANY

quest-training.com



Course Overview

The Industrial Refrigeration Systems Training Course provides a comprehensive professional learning experience focused on the engineering principles, operation, maintenance, troubleshooting, and performance optimization of industrial refrigeration systems. The course examines the complete refrigeration cycle and the interaction between compressors, condensers, evaporators, expansion devices, refrigerant circuits, controls, pumps, and auxiliary equipment. It is designed to develop the practical technical capabilities required to manage complex refrigeration systems in demanding industrial environments.

Industrial refrigeration systems are critical to the operational continuity of many sectors, including food processing, cold storage, manufacturing, petrochemicals, process industries, and large industrial facilities. Reliable refrigeration performance directly influences temperature control, production stability, equipment reliability, energy consumption, and maintenance requirements. This course enables participants to understand how system design, operating conditions, maintenance practices, and equipment performance interact to influence overall refrigeration efficiency and reliability.

The program combines engineering concepts with practical operational and maintenance considerations. Participants examine refrigeration system configurations, compressor technologies, heat transfer equipment, refrigerant flow, system controls, operating pressures and temperatures, superheat, subcooling, and performance indicators. Particular attention is given to identifying abnormal operating conditions and applying structured troubleshooting methods to determine the underlying causes of refrigeration system problems.

The Industrial Refrigeration Systems Training Course also emphasizes preventive and predictive maintenance, energy efficiency, equipment condition monitoring, and reliability improvement. Participants will develop practical approaches for evaluating existing systems, identifying performance gaps, prioritizing maintenance activities, and recommending appropriate operational or technical improvements. The course is therefore relevant to organizations seeking stronger engineering, maintenance, facilities, and operations capabilities in industrial refrigeration management.

Objectives

- Analyze the operating principles of industrial refrigeration systems and establish the relationship between cooling load, system configuration, equipment capacity, and operating conditions during the course.
- Evaluate different industrial refrigeration cycles and system configurations and determine their suitability for specific industrial applications.
- Assess the performance of compressors, condensers, evaporators, expansion devices, pumps, and associated refrigeration equipment using relevant operating indicators.
- Apply systematic methods for monitoring refrigerant pressure, temperature, superheat, subcooling, and other critical operating parameters.
- Analyze common refrigeration system failures and determine potential mechanical, electrical, operational, and control-related causes.
- Develop preventive, predictive, and condition-based maintenance approaches that support equipment reliability and reduce unplanned downtime.
- Evaluate energy performance and identify practical opportunities to improve the efficiency of industrial refrigeration systems.
- Apply appropriate procedures for inspection, commissioning, operational monitoring, and performance verification of industrial refrigeration equipment.
- Assess the interaction between refrigeration equipment, pumps, controls, heat rejection systems, and auxiliary components within integrated industrial facilities.
- Design structured troubleshooting approaches for reduced cooling capacity, excessive energy consumption, abnormal pressures, temperature instability, and repeated equipment failures.
- Strengthen maintenance planning by establishing equipment criticality, inspection priorities, performance indicators, and condition assessment criteria.
- Develop a practical improvement plan for enhancing the reliability, energy efficiency, and operational performance of an industrial refrigeration system.

Who Should Attend

The Industrial Refrigeration Systems Training Course is designed for engineers, technicians, supervisors, and professionals responsible for the design, operation, maintenance, inspection, and performance management of industrial refrigeration systems. It is particularly suitable for refrigeration and HVAC engineers, mechanical engineers, maintenance engineers, facilities engineers, energy engineers, refrigeration technicians, mechanical maintenance technicians,

operations supervisors, maintenance supervisors, and engineering services personnel.

The course is also suitable for engineering managers, maintenance managers, facilities managers, operations managers, energy managers, technical supervisors, reliability professionals, asset management specialists, and personnel responsible for industrial equipment performance. It is particularly relevant to professionals working in manufacturing plants, food processing facilities, cold storage operations, industrial production sites, petrochemical facilities, process industries, and other organizations where reliable temperature control and continuous cooling are essential.

Senior managers and decision makers can also benefit from the program when they are involved in evaluating refrigeration system performance, maintenance strategies, equipment replacement, modernization projects, energy efficiency initiatives, or operational improvement programs. The course provides them with a practical technical perspective for supporting maintenance investment decisions and improving the reliability and lifecycle performance of industrial refrigeration assets.

Learning Outcomes

- Explain the operating principles of major industrial refrigeration systems and distinguish between different refrigeration cycle configurations.
- Identify the functions, operating characteristics, and performance requirements of compressors, condensers, evaporators, expansion devices, receivers, pumps, valves, and control components.
- Interpret key refrigeration pressure and temperature measurements to evaluate the operating condition of industrial refrigeration equipment.
- Assess superheat and subcooling conditions and relate abnormal readings to potential refrigeration system performance problems.
- Evaluate compressor performance and recognize operating symptoms associated with excessive loading, inadequate lubrication, abnormal pressures, overheating, and reduced efficiency.
- Diagnose common problems affecting condensers, evaporators, refrigerant circuits, expansion devices, and associated mechanical equipment.
- Apply structured troubleshooting techniques to investigate reduced cooling capacity, unstable temperatures, high energy consumption, abnormal pressures, and recurring equipment failures.
- Develop preventive and predictive maintenance activities based on equipment criticality, operating conditions, manufacturer recommendations, and observed system performance.

- Evaluate refrigeration energy consumption and identify operational and maintenance opportunities for improving system efficiency.
- Apply effective inspection and condition-monitoring practices to support reliable operation and early identification of developing faults.
- Assess the performance of integrated industrial refrigeration systems and identify relationships between equipment, controls, auxiliary systems, and operating conditions.
- Prepare a practical refrigeration system performance and maintenance improvement plan based on identified operational and technical gaps.

Course Outline

DAY 01

Industrial Refrigeration Fundamentals and System Configuration

- Fundamentals of industrial refrigeration and its role in industrial processes
- Thermodynamic principles and refrigeration cycle fundamentals
- Types and configurations of industrial refrigeration systems
- Refrigerant circuits and functions of major system components

PRACTICAL APPLICATION

Identify major system components and trace the refrigeration cycle through an industrial installation

DAY 02

Compressors, Condensers, and Heat Rejection Systems

- Industrial compressor types, operating principles, and selection considerations
- Reciprocating, screw, and centrifugal compressors and their industrial applications
- Compressor capacity control, lubrication, operating limits, and performance monitoring
- Condenser types, heat rejection principles, and factors affecting condenser efficiency

DAY 02 — CONTINUED

PRACTICAL APPLICATION

Evaluate compressor and condenser performance using pressure, temperature, capacity, and operating indicators

DAY 03**Evaporators, Expansion Systems, and Refrigeration Controls**

- Evaporator types, heat transfer principles, and industrial applications
- Expansion valves, metering devices, and refrigerant flow control
- Superheat, subcooling, pressure relationships, and system stability
- Refrigeration controls, sensors, actuators, alarms, interlocks, and protective devices

PRACTICAL APPLICATION

Diagnose abnormal evaporator and expansion system conditions using operating parameters

DAY 04**Industrial Refrigeration Operation, Maintenance, and Troubleshooting**

- Operating procedures and performance monitoring for industrial refrigeration systems
- Preventive, predictive, and condition-based maintenance strategies
- Inspection of compressors, heat exchangers, pumps, valves, piping, controls, and auxiliary equipment
- Troubleshooting mechanical, electrical, refrigeration circuit, and control-related problems

PRACTICAL APPLICATION

Conduct structured fault diagnosis for reduced cooling capacity, high energy consumption, abnormal pressures, and temperature instability

DAY 05

Energy Efficiency, Reliability, and Performance Improvement

- Energy efficiency principles for industrial refrigeration systems
- Refrigeration system performance assessment and efficiency improvement opportunities
- Equipment reliability, criticality assessment, and maintenance prioritization
- System optimization, modernization considerations, and lifecycle performance improvement

FINAL WORKSHOP, ACTION PLAN, OR IMPLEMENTATION EXERCISE

Develop an industrial refrigeration system performance, reliability, and maintenance improvement plan

Register or Request More Information

Course page: <https://quest-training.com/courses/industrial-refrigeration-systems-training-course>

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