



Air Conditioning & Refrigeration Maintenance & Troubleshooting

Duration 5 Days

Introduction

The course covers wide range of information related to Air Conditioning & Refrigeration beside Regulation, Codes, and Standards.

The operation and work safety with AC&R will be covered also.

Who Should Attend

This course is designed for engineers and technicians who are working in the field of Air Conditioning & Refrigeration.

Course objective

Upon completion of this course, students will be able to:

1. Understand the fundamentals of Air Conditioning & Refrigeration
2. Identify components in AC&R systems and know what they do
3. Know the differences, types, and classifications of Refrigerants & Oils
4. Accurately read systems & component measurements
5. Understand air properties and understand how they affect the AC&R system
6. Work safely with AC&R systems
7. Operate an AC&R system from top to bottom
8. Conduct preventative and repair maintenance activities
9. Troubleshoot and service AC&R systems
10. Understand the role of energy conservation & peak operating efficiency
11. Understand regulatory considerations

Course Outline

Fundamentals of Air Conditioning and Refrigeration

- Air Conditioning versus Refrigeration
- Laws of Thermodynamics and Heat Transfer
- Types of Air Conditioning & Refrigeration Systems

Regulation, Codes, and Standards

- New Energy Efficiency Standards (S.E.E.R.)
- EPA Section 608 of the Clean Air Act of 1990 Regulations
- ASHRAE, ASME
- Technician Licensing, Testing and Certification

Compression Refrigeration Cycle

- Basic System Design
- Follow-the-Heat TM

Refrigerants

- CFCs, HCFCs, HFCs, Inorganics
- Zeotropic and Isotropic Refrigerant Mixtures
- Refrigerant Safety
- Working with New Blends Including R-410a Refrigerant
- EPA 608 Significant New Alternative Policy

Refrigerant Oils

- MO, AB, POE, PAG, PAO Oils
- Oil Properties
- Maintaining Oil Quality in Your AC&R System



Major AC&R System Components

- Evaporator
- Compressor
- Condenser

- Metering (Expansion) Device

Auxiliary System Components

- Crankcase Heater
- Suction Accumulator
- Receiver
- Filter-Drier
- Sight Glass with Moisture Indicator
- Oil Separator
- Service Valves
- Muffler
- Refrigerant Controls, and More...

Electrical Control Circuit Fundamentals for AC&R

- Electrical Controls and Components
- Relays and Contactors
- Thermostats

Refrigeration Systems

- Commercial Refrigeration
- Ice Machines
- Other specialty refrigeration systems

System Diagnostics, Servicing & Troubleshooting

- Service Tools and Equipment
- Manifold Gauge Set
- Recovery Machine
- Vacuum Pump
- Micron Gauge
- Leak Detection Equipment
- Recovering Refrigerant
- Charging the AC&R System
- Troubleshooting AC&R System Problems
- Energy Conservation & Peak Operating Efficiency

Air Handling Systems

- Psychrometrics - the Study of Air
- Fans and Filters
- System Maintenance

Heat Pumps and Chillers

- Air, Water, and Ground-Source Heat Pumps
- Heat Pump Operation and Troubleshooting
- Chilled Water System Design and Operation