



Air Conditioning and Refrigeration for MTA Technicians

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This course covers the design, construction, operation, and maintenance associated with air conditioning and refrigeration units, with a review of environmental concerns associated with commonly used refrigerants, as well as the recent restrictions placed upon the handling and disposal of these refrigerants by the EPA in accordance with the Clean Air Act. This course is designed for all maintenance personnel involved in the upkeep and repair of air condition units as part of their daily routine.

I. Fundamentals of Refrigeration

- Overview of Refrigeration Development
- AC & R Terminology
- Heat, Cold, Heat Transfer
- Measurements
- Units of Heat, BTUs
- Change of State
- Link to Food Industry
- Safety

II. Refrigeration Tools and Materials

- Common Tools
- Piping and Tubing
- Instruments and Gauges
- Measuring Tools

III. Basic Refrigeration Systems

- Controlled Expansion Systems
- Ice Makers
- Compression Systems w/Expansion Valves
- Defrost Systems

IV. Compression Systems

- Laws of Refrigeration
- Compression Cycle
- Components

V. Electromagnetic Fundamentals

- AC & R Circuit Fundamentals
- Electrical Motors
- Motor Circuits
- Hermetic System Motors
- Motor Protection
- Fan Motors
- Servicing Electrical Motors
- Motor Testing

VI. Electrical Circuits and Controls

- Wiring Diagrams
- Ladder Diagrams
- Control Systems
- Refrigeration and Freezer Controls
- Pressure Sensing Controls
- Motor Safety Controls
- Automatic Defrost Controls
- Remote Temperature Sensing Elements

VII. Refrigerants

- Characteristics
- Types
- Properties
- Moisture Effects
- Oil Effects
- Leak Detection
- Performance
- Storage

VIII. Small Hermetic Systems

- Instruments Tools and Supplies
- Troubleshooting Refrigeration Units
- Diagnosing Component Problems
- Evacuating Systems With a Vacuum Pump

IX. Commercial Systems

- Mechanical Cycle
- Motor Controls
- Commercial Evaporators
- Refrigerant Controls
- Valves, Pressure Regulating
- Electrical Heater Defrost Systems

X. Servicing and Installing Commercial

Systems

- Electrical Connections
- Starting a System
- Servicing Condensing Units
- Locating Troubles

XI. Fundamentals of Air Conditioning

- Physical Properties of Air
- Humidity
- Climate
- Air Movement

XII. Control Systems

- Control Mechanisms
- Thermostats
- Electronic Thermostats
- Controllers
- Primary Controls
- Sequential Operating Controls
- Limit Controls

XIII. Servicing and Troubleshooting

- Troubleshooting Techniques
- Troubleshooting Procedures
- Troubleshooting Charts