



Chill Water Systems

This development course is available in both virtual and in-person, instructor-led formats, it is a two-day chill water systems course that will develop your team how to keep them running efficiently, whether it keeps people or equipment cool.

Description:

Team members will learn about components used in chilled water systems, uses and applications of chilled water systems among many other things. This workshop is perfect for anyone looking to increase their knowledge about chillers, cooling towers and other chilled water systems.

Course Outline:

Day One – Topic

Day One examines the basics of chilled water systems including chillers and cooling towers. We'll do an overview and review heat theories, so team members understand why things happen.

Water Systems Overview

1. Introduction
2. Component tasks
3. System design
4. Controls
5. Codes and standards

Heat Transfer Theory

1. Properties of matter: solid, liquid, vapor
2. Laws of Thermodynamics
3. Heat transfer theory:
 - a. Conduction
 - b. Convection



- c. Radiation
- d. Evaporation
- 4. Principles of heat and temperature measurement
- 5. British thermal unit, specific heat
- 6. Sensible heat latent heat, superheat
- 7. Gas laws
- 8. Atmospheric pressure, vacuum
- 9. Pressure/temperature and pressure/volume relationships

Compression Refrigeration Cycle

Refrigeration cycle, change of state of refrigerant

Heat transfer within the refrigeration cycle

Follow-the-heat

Day Two - Topics

Day Two introduces advanced topics such as refrigerants and equipment components, heat rejection systems and principles of heat movement.

Refrigerants

- 1. Refrigerant composition, including new blends
- 2. Refrigerant oils
- 3. Refrigerant handling: recovery, recycling, reclamation

Equipment Components

- 1. Compressors: reciprocating, scroll, screw, rotary, centrifugal
- 2. Evaporators: tube-in-shell, tube-in-tube, coil-in-shell
- 3. Condensers: water-cooled, air-cooled, evaporative
- 4. Metering devices:
- 5. Thermostatic expansion valve
- 6. Electronic expansion valve
- 7. High and low side floats



8. Auxiliary refrigeration equipment

Heat Rejection Systems

1. Cooling towers
2. Evaporative coolers and condensers, heat exchangers
3. Cooling tower operation and maintenance
4. Water chemistry for open and closed re-circulating systems
5. Glycol systems and fluids

Psychrometrics

1. Principles of air movement
2. Wet-bulb and dry-bulb temperatures
3. Relative humidity and dew point temperatures
4. Psychrometric chart exercises