Chilled Water Plant Design
Detailed Topic Agenda

Live Session #1: October 6, 2020 (Tuesday)
Please Note: All times shown are Central Daylight Time (CDT)
Additional short breaks will be included.

12:00 Welcome and Introductions
12:30 Determining the Need for Chilled Water & Load Determination
   • Many choices in system type
   • Comparison of system types
   • Advantages of chilled water system
   • Advantages of central plant
   • Chilled water options
   • Load definition and evaluation

1:45 Break
2:00 Chiller Basics (continues during Live Session #2)
   • Chiller types
   • Compressors; evaporators; condensers; drive types
   • Refrigerant cycle
   • Starter types; constant and variable speed
   • Chiller efficiency
   • Chilled and condenser water flow rates
   • Heat recovery chillers
   • Refrigerants

4:00 Adjourn Session #1

Live Session #2: October 8, 2020 (Thursday)
Please Note: All times shown are Central Daylight Time (CDT)
Additional short breaks will be included.

12:00 Chiller Basics continued
1:15 Break
1:30 Related Chiller Topics
   • Steam turbine drives
   • Factory and field erected units
   • Industrial and commercial design
   • Absorption and adsorption chillers
   • Chiller prime movers
2:15 Pump Basics  
• Hydraulics  
• Centrifugal pump fundamentals and configurations  
• System curves  
• Pump curves  
• Pump and system curve interaction

2:45 Pumping Schemes  
• Condenser water pumping schemes  
• Chilled water pumping schemes

3:15 Class Problem Workshop

4:00 Adjourn Session #2

Live Session #3: October 12, 2020 (Monday)  
Please Note: All times shown are Central Daylight Time (CDT)  
Additional short breaks will be included.

12:00 Cooling Tower Basics (until 2:20)  
• Principles of operation  
• Components  
• Selection parameters  
• Tower types  
• Heat transfer surfaces  
• Capacity control  
• Water losses  
• Water quality

1:00 Break

1:15 Cooling Tower Basics continued

2:20 Break

2:30 More Cooling Tower Design Issues  
• Noise issues  
• Other factors influencing performance  
• Location; wind direction  
• Free cooling  
• Make-up water requirements  
• Free cooling systems  
• Cold weather operation

3:40 Class Problem Review

4:00 Adjourn Session #3
Live Session #4: October 14, 2020 (Wednesday)
Please Note: All times shown are Central Daylight Time (CDT)
Additional short breaks will be included.
12:00 Thermal Energy Storage
  • Chilled water
  • Density-depressed chilled water
  • Ice harvesting
  • Ice on coil; encapsulated ice; ice slurries
12:45 System Design Issues
  • Delta temperature
  • Supply and return temperatures
  • Effects of supply temps and delta T
  • Other chiller issues
1:15 Break
1:30 System Design Issues continued
2:15 Plant Siting Issues
  • Building construction
  • Aesthetics
  • Utility Infrastructure
  • Noise Issues
  • Modular Plants
  • Central Plant General Arrangements
  • Phasing
3:30 Class Problem Workshop
4:00 Adjourn Session #4

Live Session #5: October 16, 2020 (Friday)
Please Note: All times shown are Central Daylight Time (CDT)
Additional short breaks will be included.
12:00 Class Problem Review
12:30 Distribution Systems (until 2:30)
  • Configuration options
  • Sizing
  • Hydraulic modeling & gradient
  • Installation options: direct buried, shallow trenches, tunnels
  • End users (buildings, etc.)
    – direct connected
    – indirect heat exchangers
    – interface options
1:30 Break
1:45 Distribution Systems continued
2:30 Controls
• Control valve fundamentals
• Pressure independent control valves
• Control schemes and optimization

3:00  Break

3:15  Code and Certification Issues
• Code requirements
• Machine room design
• Energy efficiency
• LEED

3:30  Costs
• Capital costs
• Operation costs

4:00  Course Adjourns