APPA Institute for Facilities Management

Energy & Utilities

Cooling Distribution (317)

Mark St. Onge, EFP

Purpose of Today's Presentation

To provide a broad understanding of chilled water distribution systems

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Agenda

Introduction to and examination of chilled water distribution systems and associated components

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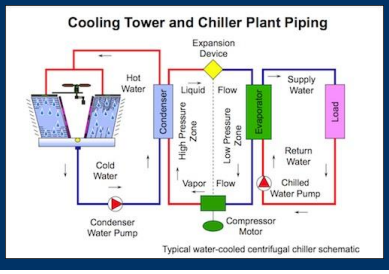
Chilled Water System



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Chilled Water Distribution System

Components

- Pumps
- Pipes
- Expansion Tanks
- Heat Exchangers
- Controls
- Metering

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Chilled Water Distribution System

Designs

- Primary Loop
- Secondary Loop
- Tertiary Loop

- Two Pipe / Four Pipe Systems

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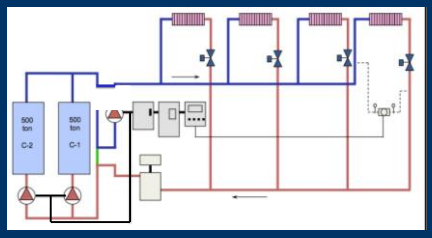
Primary Loop



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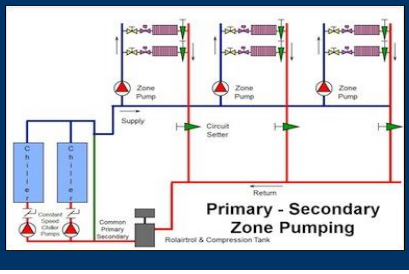
Secondary Loop



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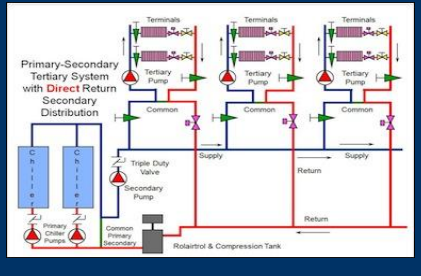
Tertiary Loop



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Plant Configuration

Why Primary / Secondary / Tertiary Pumping?

Save Pumps, Save Dollars, Save Energy
Go To: Variable Flow Direct Primary

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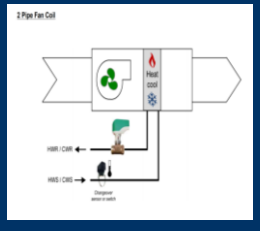
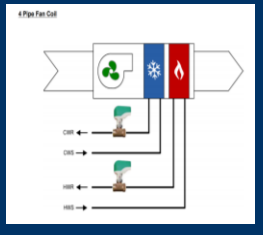
Two Pipe & Four Pipe Systems





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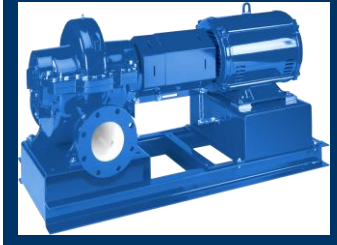
Pumps



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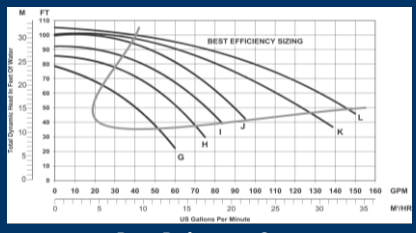
Pump Performance



Pump Performance Curve

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Piping System

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Piping System
Flexible Connectors

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Cross Connections

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Piping System Expansion Tanks

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Piping System Insulation

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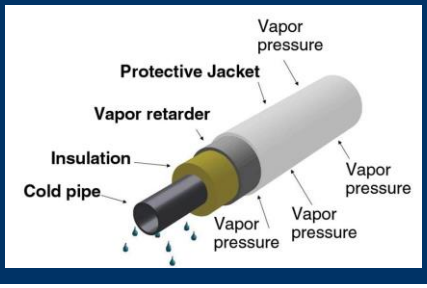
Insulation



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Water Treatment

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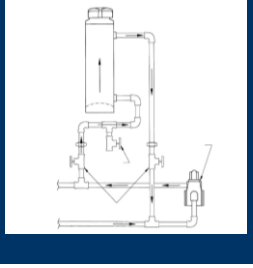
By-Pass (chemical) Feeder



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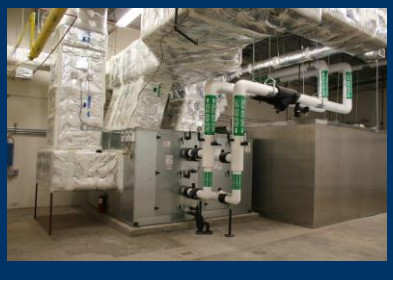
Terminal Units



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Terminal Units

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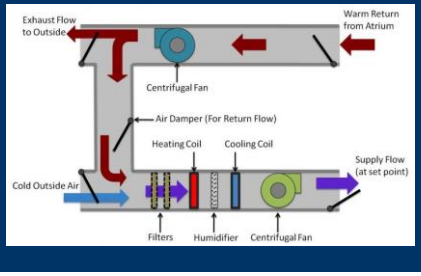
Terminal Units



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Chilled Water Coils

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Terminal Unit Piping

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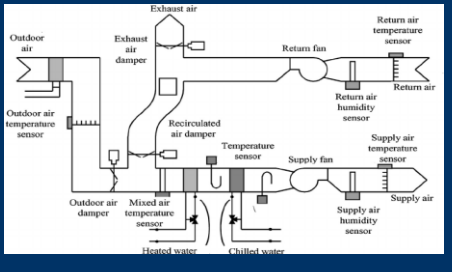
Terminal Unit Controls



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Control Valves

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Filtration

Water-side filtration

Air-side filtration

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Chilled Water System Make-up

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Metering

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Building Performance

- Delta T
- Coils
- Valves

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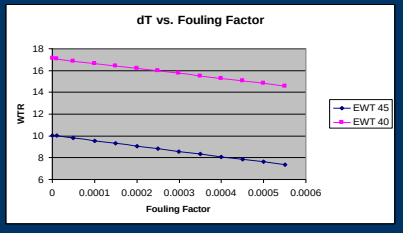
Fouled Coils
Thermal Resistance on Either Air or Water Side



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How to Maintain High DT

- Eliminate Mixing and Uncontrolled Loads
- Maintain Design Deck Set Point
- Solve Airside Problems on the Airside
- Clean Coils
- Minimize Plant DP
- Locate and Eliminate Poorest Performers

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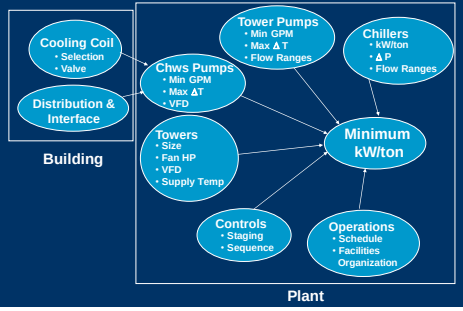
Chiller Water System Optimization



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Questions / Comments

Evaluation Forms

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

AIA Continuing Education Provider

Course Description

In a district cooling system, the cooling medium, chilled water, is produced in a central utility plant and distributed to campus buildings. The central utility plants use various pumping equipment to accomplish this task. The piping used for transfer of this chilled water to the buildings and back to the utility plant is typically underground, either in a utility tunnel or directly buried in ground. Being a closed loop, it is important to minimize losses due to leaks or improper taps into the system. Ensuring good heat rejection (through proper delta T) is important for the efficiency of the operation. This course will explore the various components that entail the cooling distribution system and the challenges that go along with operations of these equipment.

AIA Continuing Education Provider

Learning Objectives

- Learning Objective 1:
  Discuss how utility plants use various pumping equipment to distribute heating and cooling to buildings.
- Learning Objective 2:
  Discuss how the use of underground piping is used for transferring chilled water to buildings.
- Learning Objective 3:
  Learn to minimize the losses due to leaks or improper taps into the system.
- Learning Objective 4:
  Discuss the various components that entail the cooling distribution system and the challenges that go along with operating the equipment.

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This concludes The American Institute of Architects Continuing Education Systems Course

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