



## Chilled Water Systems

Course Duration: 8 Hours

### **CHILLED WATER SYSTEMS OVERVIEW**

- Calculating flow rate required
- Selecting system equipment and piping system design
- Coil characteristics
- Control valves
- Piping system types
- Head loss calculation
- System curves

### **CENTRIFUGAL PUMPS**

- Operation
- Pump types used in large systems
- Pump seals
- Installation issues
  - Shaft alignment
  - Bearing lubrication
  - Suction piping problems
  - Discharge piping problems

### **PUMP CURVES**

- Head/capacity
- Water Horsepower and Brake Horsepower
- Pump efficiency
- Motor selection
- NPSHR and cavitation
- Interpreting the pressure gauge readings
- Pump affinity laws
- Pump selection basics

### **CONSTANT VOLUME CHILLED WATER SYSTEMS**

- Pump selection example
- Typical system problems
- Variable volume systems
- Primary-secondary basics, design of the “common pipe”
- P/S system operation
- Providing pump minimum flow protection

### **VARIABLE SPEED PUMPING SYSTEMS**

- V/S drive basics
- Theoretical cost savings and reality
- The control curve, control by delta pressure sensors
- Variable head loss ratio

### **VARIABLE FLOW CONSIDERATIONS**

- Variable flow, primary only systems
- Comparison to standard P/S
- Minimum flow bypass
- Flow rate of change
- Turndown considerations
- Various example problems