



Systems Fundamentals

(2009 Session-1: January 13-15, 2009, Rochester, NY)

1. Introduction to HVAC Systems <6-hours>

- a. Dissecting HVAC Systems
 - i. Comfort Requirements
 - ii. The Five Systems Loops (Airside, Chilled Water, Refrigeration, Heat Rejection & Controls)
- b. Direct Expansion (DX) Versus Chilled Water Systems
- c. Common HVAC Systems Types
- d. Factors That Affect Selection of the HVAC System

2. Improving Dehumidification in HVAC Systems <4-hours>

- a. Full Load vs. Part Load Dehumidification Performance
 - i. Dehumidification vs. Compressor Run Time
- b. Ways to Improve Dehumidification in:
 - i. Chilled-Water Terminal Systems
 - ii. Single-Zone Unitary (DX) Systems
 - iii. Central Air-Handling Systems
- c. Various Strategies Covered
 - i. Automatic Fan-Speed Adjustment
 - ii. Face-and-Bypass Dampers (& Ideal Return Air Bypass)
 - iii. Supply-Air Tempering (Reheat)
 - iv. Dedicated Conditioning of Outdoor Air
 - v. Total-Energy Recovery
 - vi. Single-Zone VAV
 - vii. Dual-Path Air Handler
 - viii. CDQ
 - ix. Colder Supply Air

3. Air to Air Energy Recovery <3-hours>

- a. Applications
- b. Technologies
- c. Integrating into Systems

4. Waterside Heat Recovery <3-hours>

- a. Historical Perspective
- b. Reasons to Use
- c. Feasibility
- d. Analysis Tools
- e. Common Uses
- f. Comparison of Options
- g. Control Methods

5. Ice Storage Systems <4-hours>

- a. Benefits of Ice Storage
- b. System Components
- c. Design Process
- d. System Layout
- e. System Control

6. Commercial Building Pressurization <4-hours>

- a. Why Control Building Pressure
- b. System Configurations
- c. Application Considerations