



# Airside-1 Fundamentals

(2009 Session-6: June 9-11, 2009, Rochester, NY)

## 1. Load Design <11-13 hours>

- A. Human Comfort
  - 1) Principles of Heat Transfer
  - 2) Methods of Heat Transfer
  - 3) Sensible Versus Latent Heat
  - 4) Heat Generated by People
  - 5) Surrounding Air Conditions
  - 6) Factors Affecting Human Comfort
  - 7) Indoor Design Conditions
- B. Cooling Load Estimation
  - 1) Cooling Load Components
  - 2) Time of Peak Cooling Load
  - 3) Outdoor Design Conditions
  - 4) Heat Conduction Through Surfaces
  - 5) Solar Radiation
  - 6) Internal Heat Gains
  - 7) Infiltration
  - 8) Ventilation
  - 9) System Heat Gains
- C. Psychrometric Analysis
  - 1) Space Load Versus Coil Load
  - 2) Space Sensible and Latent Loads
  - 3) Calculate Sensible Heat Ratio (SHR)
  - 4) Single-Space Analysis
  - 5) Determine Supply Airflow
  - 6) Calculate Entering Coil Conditions
  - 7) Determine Supply Air Temperature
  - 8) "Sum-of-Peaks" Versus "Block"
- D. Heating Load Estimation
- E. Computerized Load Analysis

**Purpose:** A good understanding of Load Design is necessary to fully appreciate the practical aspects of HVAC systems. Very few engineers perform extensive manual load designs, and yet no one should ask a computer program to calculate something that they don't thoroughly understand.

## 2. Psychrometrics <11-13 hours>

- A. Full Load Psychrometrics:
  - 1) Terminology & Basic Psychrometrics
    - a) Concepts
    - b) Applications
    - c) Example
- B. Part Load Psychrometrics
  - 1) Concepts
  - 2) Full Load Psychrometric Analysis
  - 3) Thermostat Equation
  - 4) Part Load: Reheat
  - 5) Part Load: Coil Modulation
  - 6) Part Load: Mixture Bypass
  - 7) Part Load: Variable Air Volume
  - 8) Other Considerations

**Purpose:** The primary knowledge that comes out of this seminar is a greatly improved 'system' understanding. While very few engineers will ever need to do complex psychrometric analysis by hand, it is imperative that they understand psychrometrics well enough to verify computer program results and even predict which systems will perform better than others.