

BALANCING OF AIR & WATER FOR HVAC SYSTEMS

Are there cold or hot rooms in your office? Do people complain about the different temperatures in the office? If so, then your cooling and/or heating system is out of balance.

Learn step-by-step procedures on how to evaluate your current operating condition & how to change the balance of the system

- **Equipment & System Sizing impact and how to verify what you have and what you need.**
- **Optional: Use your own equipment and actually BALANCE parts of their own building.**

A well performed testing, adjusting and balancing (TAB) of a HVAC system is essential for the proper performance of that system and can enhance indoor air quality and efficiency of the systems. National averages indicate that most AC systems operate at 50-60% efficiency and out of balance.

This course builds on our basic and advanced AC courses and is all about how to move air / water to the proper place in a building. Air – for AC systems, Water – for Chiller Systems. This is a step-by-step HOW TO evaluate what you have and change it to optimal state for performance. By doing so you'll save money on energy use and prolong the life of your equipment system. This course assumes a basic knowledge HVAC principles.

CLASS FORMAT:

Lecture or Hands-On Lab

STANDARD CLASS SIZE:

NTT recommends a class of no more than 35 participants to obtain the best results.

NTT TO PROVIDE:

- Textbooks
- Classroom consumables
- Completion certificates
- Shipping and instructor travel logistics

CLIENT PROVIDES:

- Classroom of 500 square feet or greater
- Projection screen, white board and/or flip chart(s)

WHO SHOULD ATTEND:

- HVAC maintenance and Repair Technicians
- Plant & facility maintenance technicians
- Building engineers
- Building managers & superintendents
- Plant & facility managers
- Environmental health & safety personnel
- Apprentice and experienced HVAC technicians
- Stationary engineers
- Energy management personnel

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What you'll learn depends on which course options you choose. Our regional classes are Lecture based, however if you bring us to On Site you can use your own equipment for hands-on lab training.

You'll learn:

- The Step-by-step procedure on how to evaluate current operating condition + how to change balance of system
- Equipment & System Sizing impact and how to verify what you have and what you need.
- Optional: Use your own equipment and actually BALANCE parts of their own building

After this class you will know:

- The Preliminary Procedures
- Airflow Measurement
- Calculation of CFM from Heat Flow
- Kitchen Ventilation
- Principles and Procedures for Balancing Hydronic Systems
- Automatic Valves
- Procedures
- Expansion or Compression Tanks
- Series Loop
- Basic Testing
- Field Performance Testing of Chillers
- Cooling Tower Testing

COURSE AGENDA

Classroom Training

- HVAC testing and balancing
- The Preliminary Procedures
- Air side
- Boiler
- Chiller and condenser
- The Balancing Procedures
- Air side procedures
- Water side procedures
- Airflow Measurement
- Duct flow
- Capture hoods
- Preparation for use
- Low-flow adapter application
- Zero adjustment
- Manifold
- Calibration
- Theory of operation
- Troubleshooting guide
- CFM of ducts at a friction loss in inches of water
- CFM of ducts at different velocities
- Balancing devices
- Turning vanes
- Air balancing tolerances
- Fan tracking
- Duct system pressure
- Static pressure
- Calculation of CFM from Heat Flow
- Air density: tables
- Altitude correction
- Altitude correction CFM
- Enthalpy
- Air total heat calculation
- Kitchen Ventilation

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Classroom Training (Continued)

- Air balancing
- Multiple-hood systems
- Principles and Procedures for Balancing Hydronic Systems
- Heat transfer at reduced flow rate
- Hydronic pressure-measuring instruments
- Hydronic flow measuring
- Hydronic balancing methods
- Pump hydronic volume measurement
- Centrifugal pump performance
- Automatic Valves
- Procedures
- Constant volume water-balancing
- Expansion or Compression Tanks
- Series Loop
- Basic Testing
- Water-cooled chiller
- Field Performance Testing of Chillers
- General procedures
- Cooling Tower Testing
- Basic test
- Performance test parameters
- General procedures
- Performance test

Hands-On Lab Exercises – Optional & based on Client provided equipment:

- Measure Air Flow
- Digital Manometer for Water Measurement
- Hydronic Flow Measuring
- Calibration of valves
- Proportional Balancing
- Variable Speed Pumping
- Flowhood - while not absolutely necessary, it is strongly recommended the client have a flowhood. A flowhood is the most effective tool in balancing.