

Dear Sir,

ISHRAE Mumbai offers an excellent and unique opportunity to participate in the 4 days seminar (20 ~ 23rd Jan 2010) with Theory and Hands on training in TAB (Testing, Adjusting, Balancing) HVAC systems. The course will be conducted by eminent and renowned faculties listed below. Since the seats are limited , you are requested to register early. The fees for the course are absolutely reasonable , taking into consideration the magnitude of the subject and the class of the faculties. However 20% discount is awarded to two or more sponsored candidates and ofcourse the same to ISHRAE and ASHRAE members. May be this is one time opportunity to be availed of. The venue will be "*Tropical Airconditioning and Refrigeration Institute, Arch 11, below Mahalaxmi Bridge, Jacob Circle, Mahalaxmi, Mumbai 400 011*". I earnestly solicit and look forward to your participation in the seminar to learn with practicals from the highly qualified and renowned experts from the HVAC Industry. Thanks and regards.

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"HVAC Performance Testing, Adjusting and Balancing (TAB)"

❖ Objectives:

To make participants conversant with

- a. HVAC Fundamentals**
- b. Psychrometry**
- c. HVAC Performance Testing and System Evaluation**
- d. Use of TAB Instruments and Hands on Experience**
- e. Practical on Testing, Adjusting and Balancing of Air and Hydronic Systems.**

Contents

HVAC Performance Testing, Adjusting and Balancing (TAB)

Day 1:

HVAC Fundamentals

10.00 a.m. to 01.30 p.m.

- Basic Concepts: Pressure, Temperature, Modes of heat transfer
- Basic Refrigeration cycle
- Analysis of Vapour Compression cycle using Pressure Enthalpy (p-h) chart

02.00 p.m. to 06.00 p.m.

- Continuation of Analysis of Vapour Compression cycle using p-h chart
- System Evaluation on p-h chart

Day 2:

Psychrometry

10.00 a.m. to 01.30 p.m.

- Basic Definitions and Concepts
- Psychrometric Processes

02.00 p.m. to 06.00 p.m.

- Use of Psychrometric chart and Psychrometric software
- Numerical on Psychrometry

Day 3:

10.00 a.m. to 01.30 p.m.

- Introduction to TAB
- Fans and Fan Laws, Fan testing, AHU Testing
- Use of TAB Instruments and Limitations

02.00 p.m. to 06.00 p.m.

- Hands on Experience on different TAB Instruments

Day 4:

10.00 a.m. to 01.30 p.m.

- TAB Air Systems

- Hands on experience on Air Balancing
- Pumps and Pump laws

02.00 p.m. to 06.00 p.m.

- TAB Hydronic Systems
- Hands on experience on Hydronic Balancing

❖ **Highlights of the training:**

The contents of each day will be explained with the help of Practical / Case studies.

❖ What is HVAC Testing, Adjusting and Balancing (TAB):

TAB, a critical yet often overlooked area of HVAC commissioning plays a pivotal role in overall plant performance.

TAB is an excellent tool towards reducing energy consumption and optimizing HVAC system performance.

The purpose of testing, adjusting, and balancing (TAB) is to assure that the HVAC system is providing required inside conditions at the lowest energy cost.

❖ Meaning of TAB:

1. Test: To determine quantitative performance of equipment.
2. Adjust: To regulate the specified fluid flow rate and air patterns at the terminal equipment (e.g., reduce fan speed, adjust a damper.)
3. Balance: To proportion flows within the distribution system (sub-mains, branches and terminals) according to specified design quantities.

❖ Benefits of TAB:

1. Optimization of HVAC Performance
2. Reduction in Energy consumption.
3. Balancing of Air and Hydronic system ensures that proportionate and required amount of flow is delivered.

❖ History of TAB:

- In the past, when HVAC systems were less complex and when system designers, owners and occupants of indoor environments were less demanding, system balancing was considered to be a simple adjustment of some dampers in the ductwork and perhaps few valves in the piping.
- Later.....
Some serious attempts were made to balance HVAC system air flow with little or no thought to the hydronic flow.
- In recent years.....
HVAC installations have become sophisticated systems of complex environmental control, not only for human comfort in schools, hospitals, auditoriums, offices but also for variety of industrial processes as well. Testing, Adjusting and Balancing ensures that the HVAC system is providing required inside conditions at the lowest energy cost.