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MODULE
411

Basics of field TAB Verification, HVAC Systems, and Controls

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TAB Verification is a crucial process in the commissioning and maintenance of HVAC systems, ensuring that the system operates efficiently, effectively, and in accordance with design specifications. It serves multiple purposes, including performance validation, energy efficiency, indoor air quality (IAQ), and system longevity.

Learning Objectives

- **Course Overview and Introduction**
- **CCxT's Technical, Communication, and Commissioning Skills - Working knowledge of Procedural Standards**
- **HVAC Systems - Why is CxA of buildings necessary?**
- **Basics of field TAB verification, HVAC systems and controls**
- **CxT Responsibilities by Phase**
- **Pre-function tests include sheet checking and installation tests.**
- **Point-to-point calibrate MEP and sensor systems.**
- **Verify TAB pre-functional tests and CxT responsibilities**



INTRODUCTION

- Field Testing, Adjusting, and Balancing (TAB) in HVAC Systems
- TAB is a systematic approach to measure airflow, adjust system components, and balance air and temperature distribution.
- It aims to ensure compliance, optimize performance, enhance comfort, and identify issues early.
- HVAC systems consist of Heating Equipment, Cooling Equipment, Ventilation Systems, and Controls.
- TAB process involves three phases: testing, adjusting, and balancing.
- Controls are integrated into the TAB process for maximizing system performance.
- Building Management Systems (BMS) provide centralized monitoring and control, utilizing data from sensors to optimize operation.
- Modern HVAC systems have sensors that continuously monitor parameters, providing valuable data for adjustments during TAB.
- TAB bridges system design and operational reality, ensuring optimal thermal comfort and indoor air quality.

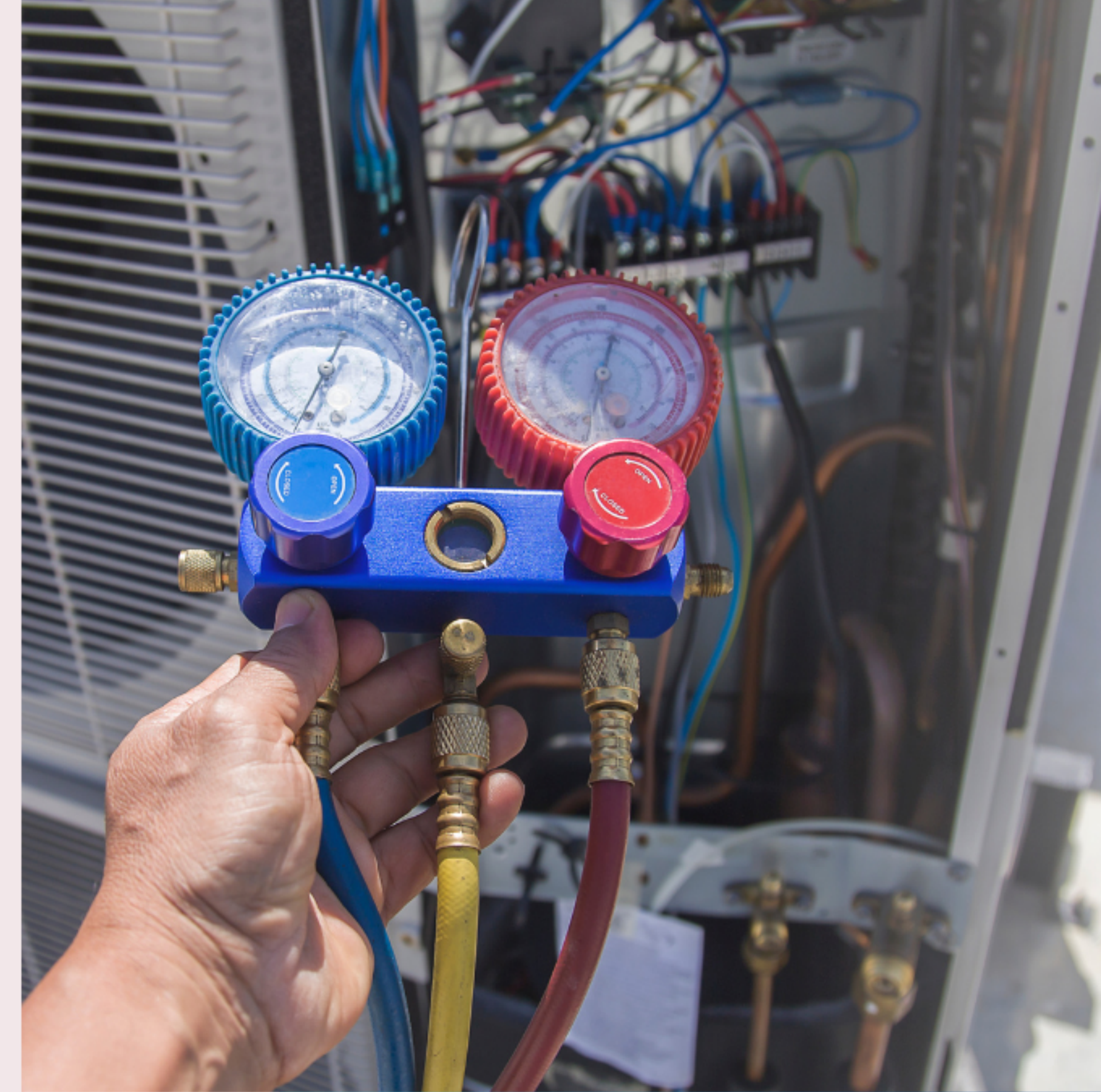
TAB VERIFICATION IN HVAC SYSTEMS



- TAB verification is a crucial process in HVAC systems to ensure system operation.
- It involves assessing airflow, temperature, and pressure differentials to confirm system functionality within specified tolerances.
- Understanding TAB verification requires knowledge of duct traverse calculations, system posturing for repeatability, verification of tolerances, and comparison of reported versus measured data.
- Duct traverse measures airflow within ducts, ensuring correct volume of air delivery to each outlet.
- To achieve repeatability, system stability, environmental control, and standardized measurement protocols are essential.
- To verify repeatability, acceptable tolerances based on industry standards are established.
- Re-measurement is necessary after initial measurement.
- Comparison of results from both measurements is necessary to determine if the difference falls within the established tolerance.
- Compliance determination involves comparing reported data with measured data obtained during the TAB process.
- Attention to detail and adherence to standardized practices are vital components of successful TAB verification.

CHALLENGES IN TAB VERIFICATION

- System complexity: Complexity of modern HVAC systems involving multiple components and control strategies.
- Environmental Variables: External factors like building occupancy, weather conditions, and equipment performance can impact measurements and adjustments.
- Data Interpretation: Accurate interpretation of data collected during testing requires expertise and experience.



FIELD TAB VERIFICATION AND DUCT TRAVERSE IN HVAC SYSTEMS

Understanding Duct Traverse

- Duct traverse is the process of measuring air velocity, temperature, and other parameters at multiple points across a duct cross-section.
- Key instruments for duct traverse include anemometers, thermometers, and manometers.

Calculating Duct Traverse

- The process involves determining the Traverse Area, dividing the duct into segments, and selecting measurement points.
- An example calculation involves a round duct with a diameter of 12 inches.



POSTURING COMMON HVAC SYSTEMS FOR REPEATABILITY

- HVAC systems must be postured to ensure stable conditions during measurements.
- Techniques for achieving repeatability include consistent start-up procedures, controlled environment, and multiple trials.

Verifying Repeatability Tolerances

- Each HVAC system has specific tolerances for parameters like air velocity and temperature.
- Industry standards typically define these tolerances, which should be referenced before testing.
- Methods of verification include statistical analysis, data collection, analysis, and compliance determination.



UNDERSTANDING THE USE OF COMMISSIONING MEASUREMENT INSTRUMENTS

- Commissioning measurement instruments are crucial in the Testing, Adjusting, and Balancing (TAB) process and in building systems commissioning (Cx) efforts.
- These instruments ensure that mechanical, electrical, and plumbing systems operate according to design specifications and meet operational requirements.

Importance of Commissioning Measurements

- Measurement instruments verify that systems achieve desired performance criteria during the commissioning process.
- They serve as objective tools that provide quantifiable data, allowing engineers and technicians to make informed decisions.



COMMON COMMISSIONING MEASUREMENT INSTRUMENTS



- Anemometers: Measure air velocity and volume flow rate in ventilation systems.
- Manometers: Devices designed to measure pressure differentials.
- Flow Meters: Measure the flow rate of liquids or gases within a system.
- Pressure Gauges: Measure the absolute or gauge pressure of fluids in various systems.
- Temperature Sensors: Monitor the temperature of fluids, air, and surfaces.
- Sound Level Meters: Measure the level of sound pressure in an environment.
- Data Loggers: Electronic devices designed to record measurements over time.



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