

**BEYOND**  
SMART CITIES



*wel come to*  
**BEYOND SMART CITIES**



**B**  **YOND**

**S M A R T C I T I E S**

**COMMISSIONING CERTIFIED TECHNICIAN**

**CXCT REFRESHER**

**ONLINE TRAINING BY KRISHNAJI PAWAR**

**LEED AP(BD+C), GSAS CGP, GCP, ISO 14001**

**KNOWLEDGE IS POWER**

**L E A R N . B E Y O N D S M A R T C I T I E S . I N**

**BEYOND**  
SMART CITIES

MODULE  
**911**

# Functional Tests, Records, and Observations

KRISHNAJI PAWAR - CEO & FOUNDER

LEED AP(BD+C),GSAS CGP,GCP,ISO 14001

[WWW.BEYONDSMARTCITIES.IN](http://WWW.BEYONDSMARTCITIES.IN)



# COMMISSIONING CERTIFIED TECHNICIAN CXCT REFRESHER

Functional testing of HVAC control systems is a crucial phase in the commissioning process, ensuring that systems operate according to design specifications and perform effectively within the intended environment. It involves assessing the performance of various components and their interrelated sequences under the guidance of a Commissioning Professional (CP).

# Learning Objectives

- Functional tests, records, and observations
- Airside, water, and control system troubleshooting
- Required O&M paperwork and training Preventive maintenancetems
- Retro-commissioning
- Commissioning professional certification & its importance.
- Point-to-point calibrate MEP & sensor systems.
- Green building rating systems & commissioning
- Summary and Resources
- CxCT Practice Exam: Test Your Knowledge!



# INTRODUCTION

## Functional Testing of HVAC Control Systems

Performing Functional Tests Under the Direction of a Commissioning Professional (CP)

- Tests assess the performance of components and their interrelated sequences.
- Terminal unit sequence tests are analyzed based on output from screen captures or trend data.
- Common tests include checking for consistent airflow at design conditions, examining the actuator response of the dampers, and verifying the operation of heating/cooling coils.

# DEPLOYING AND COLLECTING DATA LOGGERS



- Data loggers are crucial for collecting real-time operational data.
- Sampling rates should be aligned with the dynamics of the system.
- Loggers should be strategically placed near critical components to capture relevant data.
- Data is downloaded for analysis to identify trends, anomalies, or deviations from expected performance metrics.

## Understanding the Correct Order of Commissioning and Testing

- Commissioning follows a specific sequence to ensure all systems are properly tested and operational before handover.
- Workflow considerations include Testing, Adjusting, and Balancing (TAB) and Sequence Testing.

## Recording Documentation of Tests

- Thorough documentation is essential throughout the functional testing process.
- Documentation practices include recording trend data records, passing/fail tests, and trend reviews.

## Interpreting Trends of Simple Terminal Units

- Interpretation of trends from terminal units involves analyzing data to draw meaningful conclusions about system performance.
- Observations should be recorded in a systematic manner, using clear and concise language



# PERFORM OR OBSERVE HVAC CONTROL SYSTEM FUNCTIONAL TESTS

Functional testing of HVAC control systems is a systematic approach to verifying that a system operates according to its design specifications. In the context of HVAC systems, this means ensuring that the control sequences of terminal units, such as Variable Air Volume (VAV) and Constant Volume (CV) configurations, perform as intended. The commissioning provider, typically an independent entity, oversees the commissioning process, which includes design review, functional testing, and performance verification.



# Functional Testing of HVAC Control Systems

## Introduction to HVAC Control Systems

- HVAC systems are crucial for modern buildings, providing thermal comfort and indoor air quality.
- Variable Air Volume (VAV) and Constant Volume (CV) configurations are designed to optimize energy consumption and ensure environmental conditions.

## Understanding Functional Testing

- Functional testing verifies that a system operates according to its design specifications.
- In HVAC systems, it ensures that control sequences of terminal units perform as intended.
- The commissioning provider oversees the commissioning process, including design review, functional testing, and performance verification





## Performing Functional Tests

- Functional tests involve observation of control sequences through data monitoring and direct interaction with HVAC system controls.
- Tests often include Initialization Tests, Response Time Tests, and Sequence of Operation Tests.

## Data Analysis: Pass/Fail Determination

- Pass/fail determination relies heavily on data collected during functional tests.
- Observers should look for specific performance indicators such as damper position, airflow measurements, and temperature response.

## Common Sequence Tests for CV and VAV AHUs

- CV AHU Sequence Test checks for constant airflow regardless of load changes.
- VAV AHU Sequence Test focuses on the modulation of airflow based on demand.



# CONTACT US



+91 6363032722



[info@beyondsmartcities.in](mailto:info@beyondsmartcities.in)



[learn.beyondsmartcities.in](http://learn.beyondsmartcities.in)



#55,HMR Layout ,Bengaluru ,India



# THANK YOU

