The ABC's of BSCs

Commissioning and Certification (Part 3)

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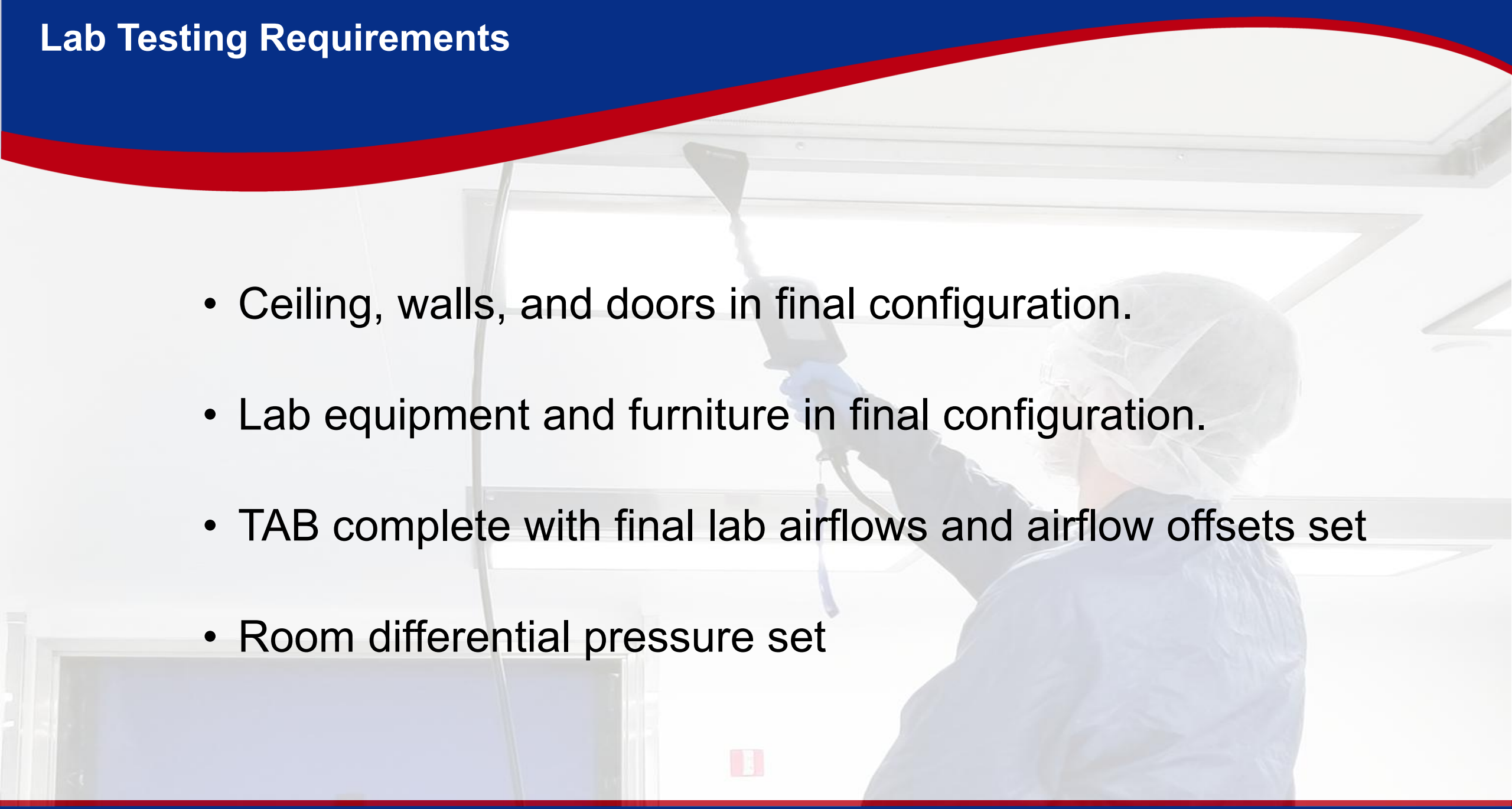
Learning Objectives

1. Understand the testing requirements for the BSC and surrounding lab that must be completed prior to certification
2. Generally understand the certification process and the field certification requirements of NSF 49. Understand the room conditions that drive the local requirement for duct static pressure.
3. Have a basic understanding of the relationship between lab exhaust airflow and BSC operation and safety for IIB2 BSCs
4. Be aware of common issues related to Testing and Balancing, Commissioning and Certification of BSCs and their associated HVAC systems and lab environments

Lab Testing Requirements



- Ceiling, walls, and doors in final configuration.
- Lab equipment and furniture in final configuration.
- TAB complete with final lab airflows and airflow offsets set
- Room differential pressure set

BSC Certification Requirements

- BSC certification assures personnel, product, and environmental protection are performing per design
- Most BSCs are NSF listed though some are not
- BSCs should be certified in accordance with NSF/ANSI 49 Normative Annex 5 (Field Tests) at least annually
- Some applications like sterile compounding require testing semi-annually

NSF 49 Primary Tests – Product Protection

Downflow Velocity Test

Supply HEPA Filter Leak Test

NSF 49 Primary Tests - Personnel Protection

Inflow Velocity Test DIM Method

Inflow Velocity Test Constricted Method

NSF 49 Primary Tests – Environmental Protection

Exhaust HEPA Filter Leak Test Scan Method

Exhaust HEPA Filter Leak Test Probe Method

NSF 49 Primary Tests

Airflow Smoke Pattern Test

The airflow smoke pattern test consists of 4 individual tests. They verify product, personnel, and environmental protection.

-Downflow Test

-View Screen Retention Test

-Work Opening Edge Retention Test

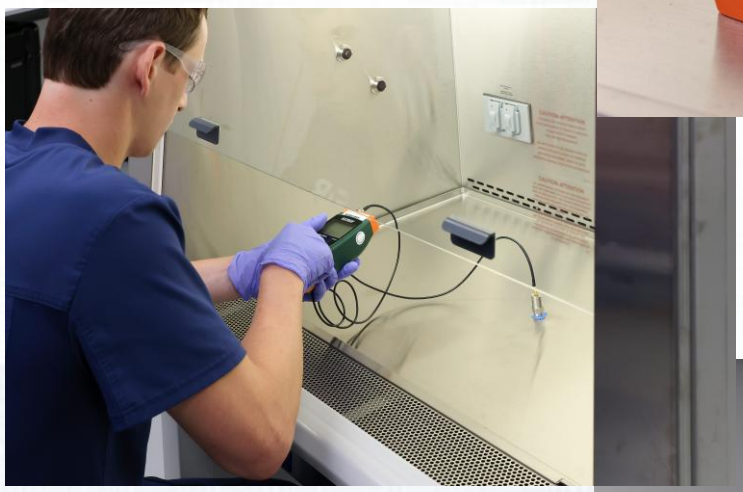
-Sash Seal Test

Site Installation Assessment Test

Secondary Tests

- Lighting Intensity Test
- Vibration Test
- Noise Level Test

  - These are not required for field certification and are designed to assess user comfort. The owner can elect to have them performed.



Lab Exhaust and BSCs

IIB2 BSC Exhaust

- High static requirements (2-2.5” w.c.)
  - Problems arise when mixed with other components on the system
  - ANSI / NSF 49 requires dedicated exhaust systems, but these cabinets are routinely connected to common systems
- Direct correlation between exhaust flow and inflow
  - NSF committee is evaluating a 2% accuracy requirement for lab valves serving these cabinets

Common Issues Preventing Certification

- Exhaust airflow is insufficient
  - Concurrent balance value (CBV)
- Exhaust airflow is modulating outside of face velocity criteria (100 – 110 FPM).
  - Exhaust fan performance
  - Terminal unit performance
  - BSC on the end of an exhaust system
- A type cabinet is hard-ducted to the building exhaust system
  - A type cabinets used for hazardous applications must be canopy connected
    - This prevents backflow at the sash in the case of building exhaust failures.
- Supply Diffuser installed directly above the BSC or near it causing a cross draft

Common Issues during Test and Balance (TAB) and Commissioning (Cx)

- Exhaust airflow is insufficient by design or controls configuration
  - Concurrent balance value (CBV) vs. design airflow
  - Exhaust pitot tube traverse vs. certifier readout
- Insufficient static pressure in exhaust system
  - Wrong design static for connected BSCs
  - Lab air valve performance due to mixed components on exhaust system
  - BSC on the end of an exhaust system
- Redundant fan system control strategies
  - Fans must be sequenced in a way that prevents loss of static pressure and airflow
    - Typically requires VFDs on fans and modulating isolation dampers.

QUESTIONS

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