


## COMPARING MANUAL MANOMETER TESTING TO ROOM PRESSURE MONITORS

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### Abstract

*In Certified environments, HVAC systems are an important part of managing clean air to minimize airborne contaminants. Maintaining reliable and sufficient room differential pressure keeps people safe and processes clean. But can you trust the readings you see on room pressure monitors and building management systems? Are they accurate? When you test with a handheld manometer and differs from wall-mounted units, which one do you believe? This session will get into detail about sensing technologies and calibration, and provide guidance to help you certify with confidence and report accurate numbers that are supported by science.*



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### What are "critical environments?"

Healthcare	Compounding Pharmacies	Laboratories	Vivarium	Pharma Manufacturing
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- Maintaining proper HVAC airflow, room pressure, temperature, humidity, and particle counts is a life safety concern
- Customer has high-consequence applications; safety & money on the line
- Customer environment is regulated by codes and government standards
- High value placed on reliability, accuracy, and quality



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### Example of Room Differential Pressure

**Pharma**

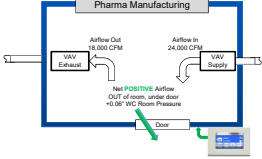


**Drug Manufacturing**

- **POSITIVE (+) Pressure, +0.01" WC**, typical +0.03 to +0.06" WC
- **Goal:** Protect the product from contaminants
- Keep the bad stuff **OUT**

**Other Spaces with the Same Requirements**

1. Cleanroom manufacturing
2. Compounding Pharmacy
3. Bio-safety Laboratories



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### Permanently-mounted Differential Pressure (dP) Devices



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### Technologies Behind Wall-mounted Units

- Have evolved less
- Stable and reliable technology for 25+ years

Mechanical	Hot-wire Anemometer	Capacitive Transducer	MEMS (newest)
			

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### Wall Units – ranges, accuracies, error, drift

	<b>Mechanical</b> dP Ranges n/a Accuracy % of FS n/a Drift/yr % of FS n/a	unknown
	<b>Hot-wire Anemometer</b> dP Range $\pm 0.2"$ Accuracy % of reading $\pm 10\%$ Drift/yr depends on cleaning	best, only if clean
	<b>Transducers</b> dP Ranges $\pm 0.05"$ to $\pm 1"$ Accuracy % of FS $\pm 0.25\%$ to $1\%$ Drift/yr % of FS $< 0.5\%$	excellent, calibrated
	<b>MEMS</b> dP Ranges $\pm 0.5"$ +up Accuracy % of FS $\pm 3\%$ Drift/yr % of FS 0.50%	not accurate for dP

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### Handhelds Used To Verify dP

- Industry workhorse for certification professionals
- Stable and reliable technology for 25+ years

Fluke



Shortidge



TSI



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### Specifications Side-by-Side

Wall-mount Devices		Handheld Devices	
	Range Example $\pm 0.2"$ Common Field Accuracy Common Field Accuracy $\pm 0.001$ to $0.0007$ WC $\pm 0.001$ to $0.0007$ WC		Range Example $\pm 15"$ Common Field Accuracy Common Field Accuracy $\pm 0.001$ to $0.0007$ WC $\pm 0.001$ to $0.0007$ WC
<b>Best</b> (but only if clean, re-zeroed, or calibrated)		<b>Adequate</b> (be skeptical of true reading accuracy)	

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### My Handheld Does Not Agree With My Wall Unit

Figure 3. Differential Pressure Measurement

**WHAT DO I DO NOW?**

- Reconciling differences between handheld and wall unit
- Implementing handheld best practices
- Re-zero wall units – a simple procedure in many cases
- Advise facility about vendor’s recommended PM on wall units

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### My Handheld Does Not Agree With My Wall Unit

Figure 3. Differential Pressure Measurement

- Using handheld (assume it is calibrated)**
  - Have you inspected the airflow characteristics inside the room?
  - Are there drafts near the floor?
  - Have you inserted the probe far enough into the room?
  - Is the reference side of the manometer free from drafts or ancillary airflow?
- Wall-mount units**
  - Does facility manager have a PM schedule for these units?
  - Are they following manufacturers recommendations?
  - When were hot-wire sensors last cleaned and re-zeroed?
  - When were transducers last calibrated or re-zeroed?
  - Is a supply diffuser near a pressure pickup port?

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### Survey Your Situation

What else could be contributing to this difference?

- Is a supply diffuser near a pressure pickup port?
- Some rooms have a lot of equipment, potentially with exhaust fans that create air turbulence that can affect readings

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