



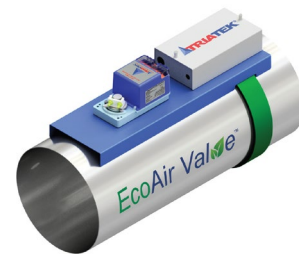
Introduction to Critical Environment Control

May 20, 2021

WELCOME!

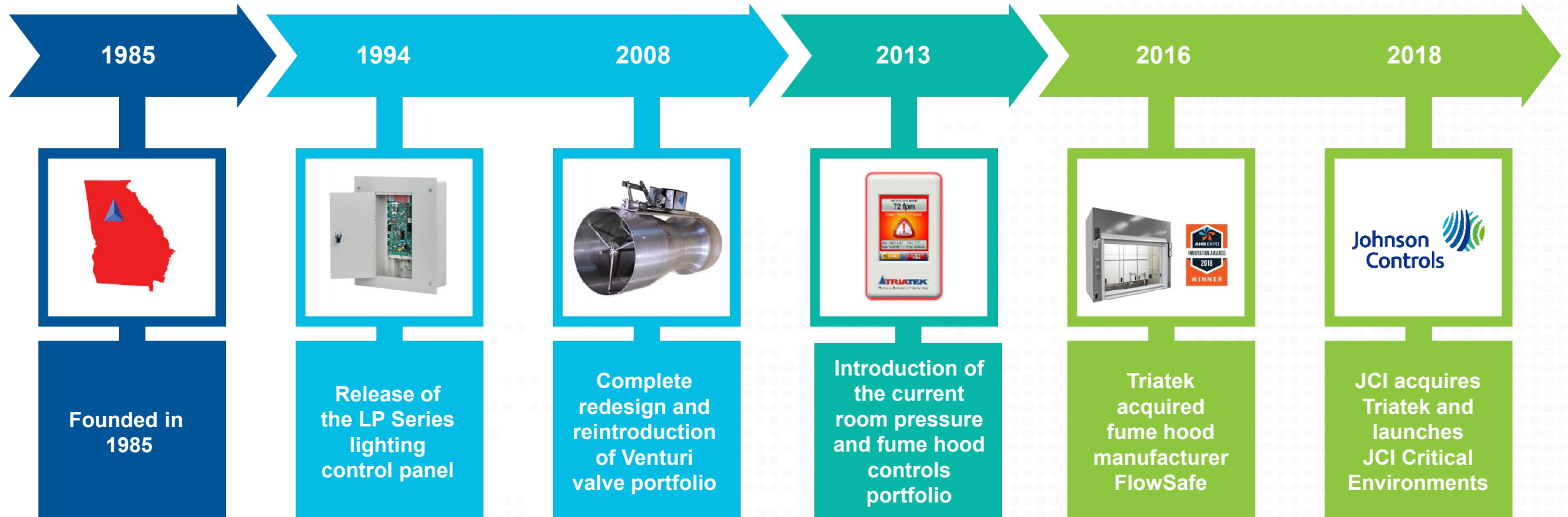
Today's Agenda

- Introduction
- What Is A Venturi Valve vs a Blade Damper
- Metered vs Measured Flow
- Critical Room Control Methodology
- High Containment Fume Hoods



History and Capabilities of Triatek | History

Triatek had a long history of leadership in manufacturing critical environment control systems



Product and Solutions Portfolio | Applications

Our solutions are applied where precise and fast control of critical spaces are required



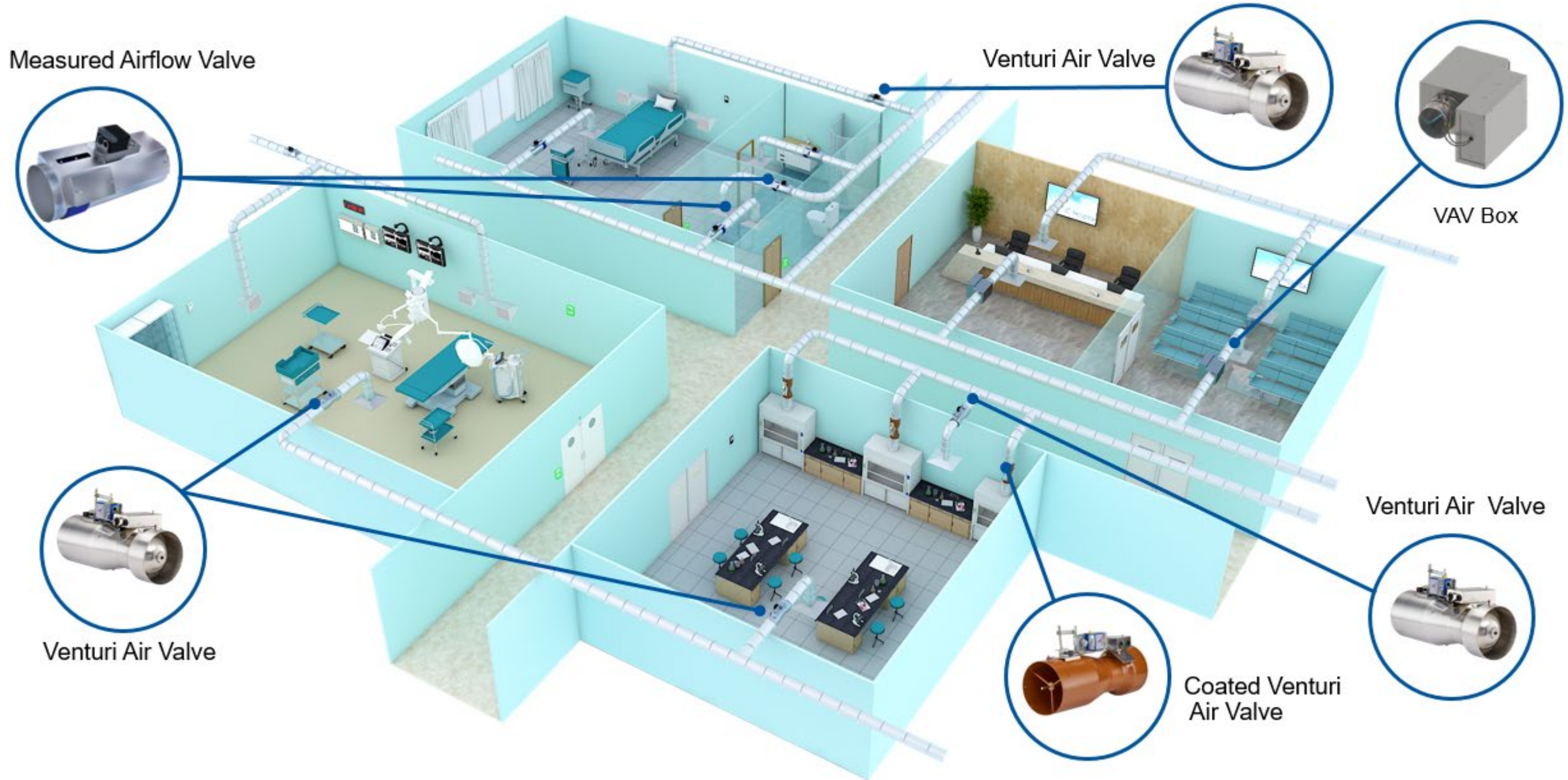
Healthcare/Higher Ed

- Operating suites
- Ante rooms
- Isolation rooms
- Emergency rooms
- Oncology suites
- Nuclear medicine suites
- Burn units
- K-12 and University labs
- Wet chemistry labs

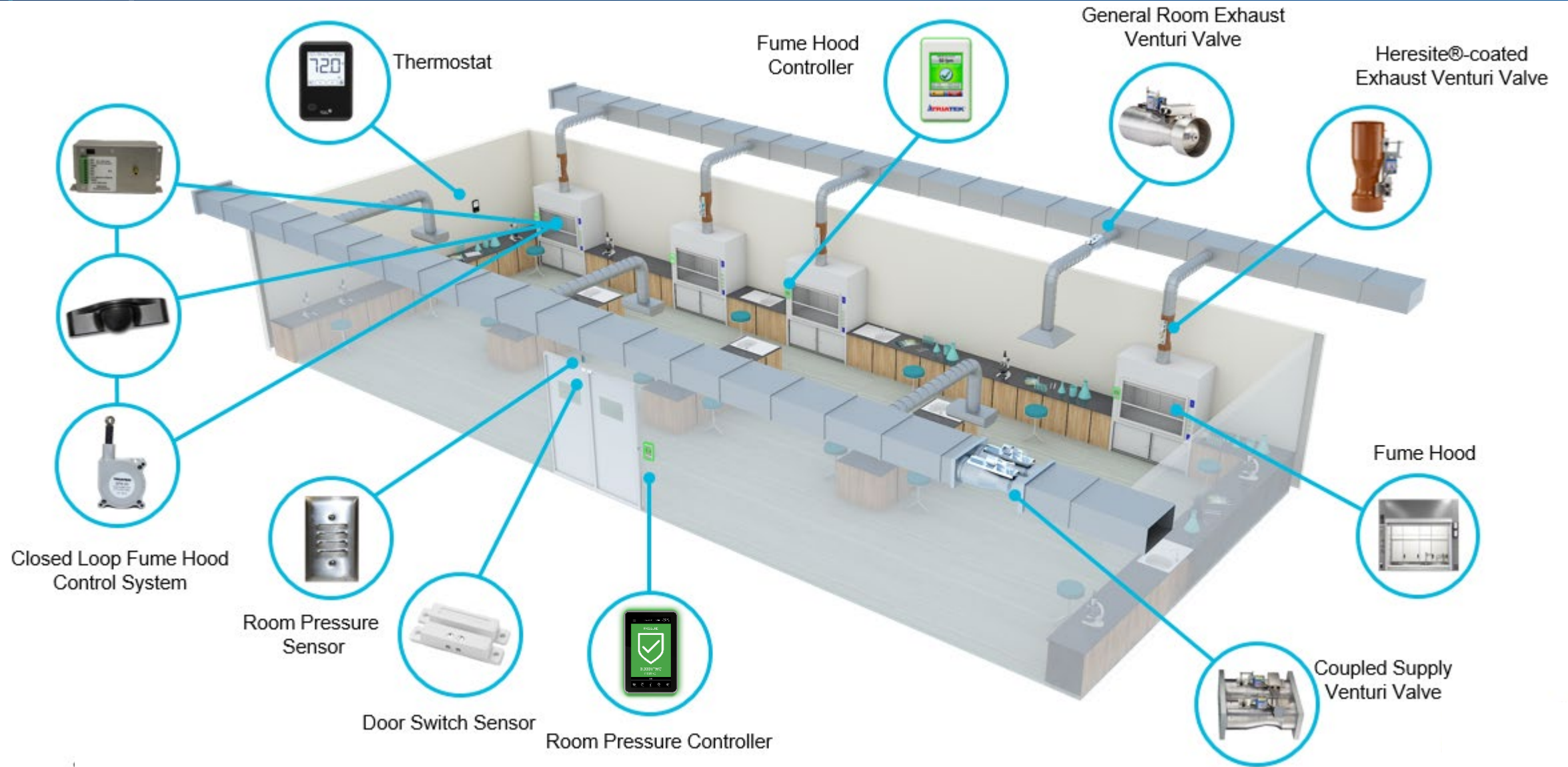
Pharma & Other

- Pharmaceutical manufacturing
- Government facilities
- Corporate labs
- Mortuary labs
- Vivariums
- Biocontainment facilities
- Food research labs
- Crime labs

Product and Solutions Portfolio | Applications



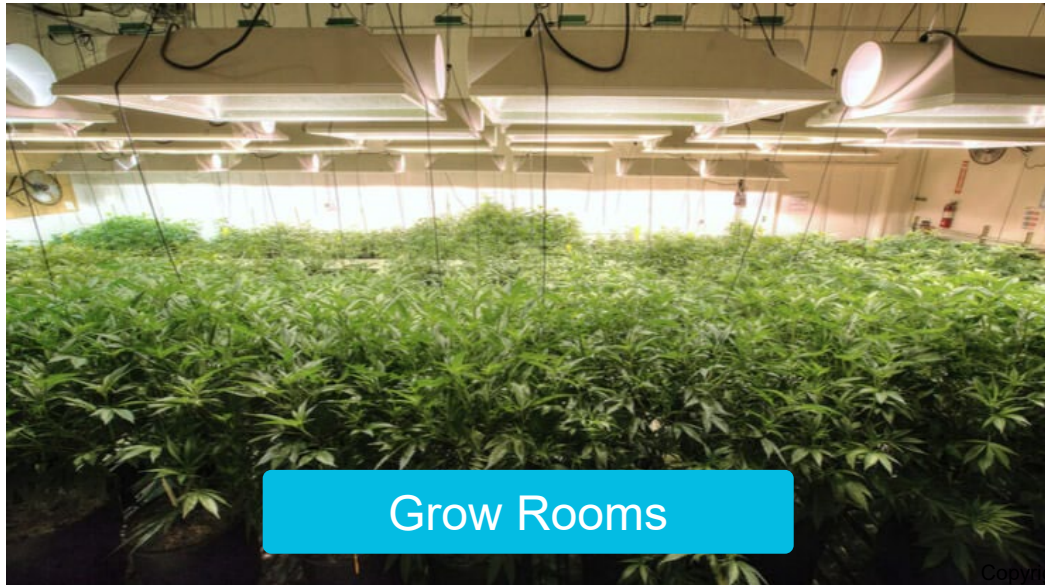
Product and Solutions Portfolio | Applications



Product and Solutions Portfolio | Applications



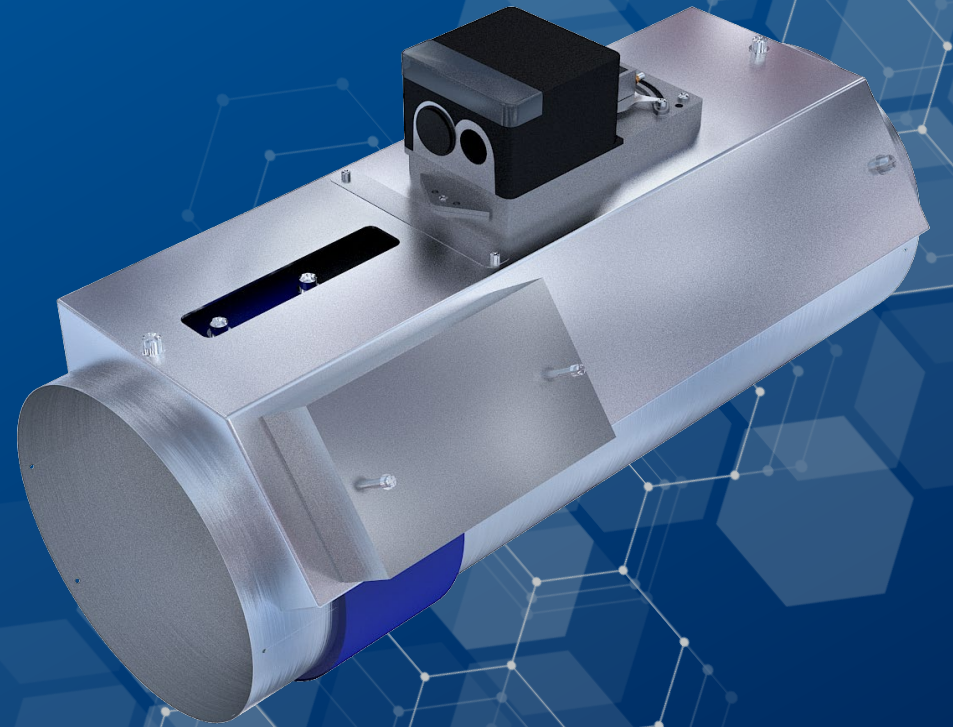
Manufacturing Clean Rooms



Grow Rooms

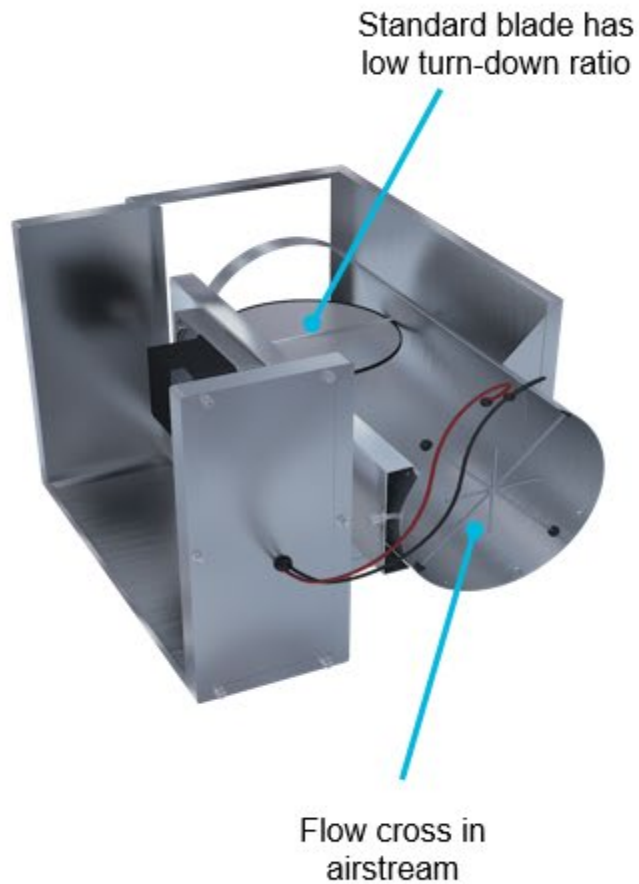


Measured Air Flow Valves

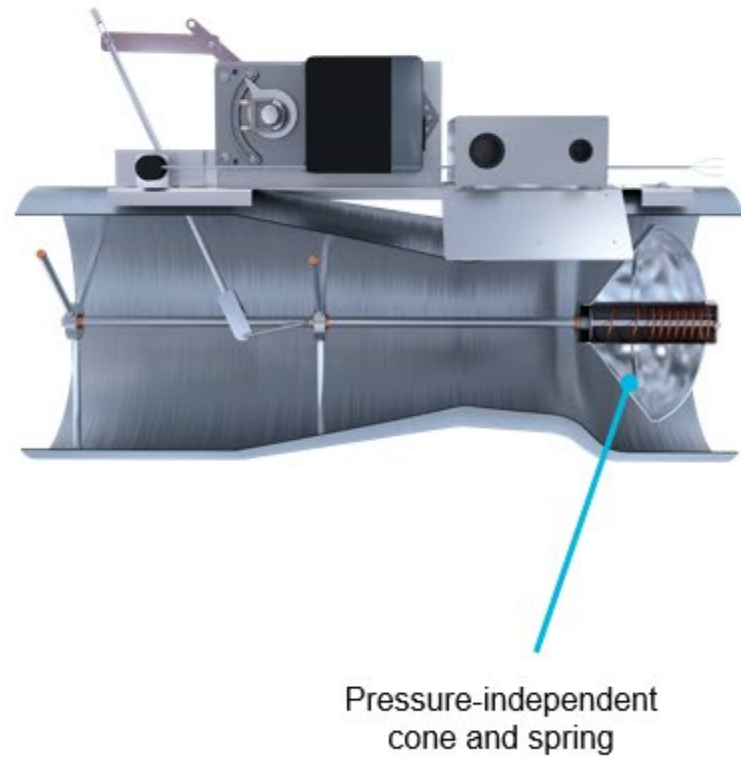


Metered and Measured Flow

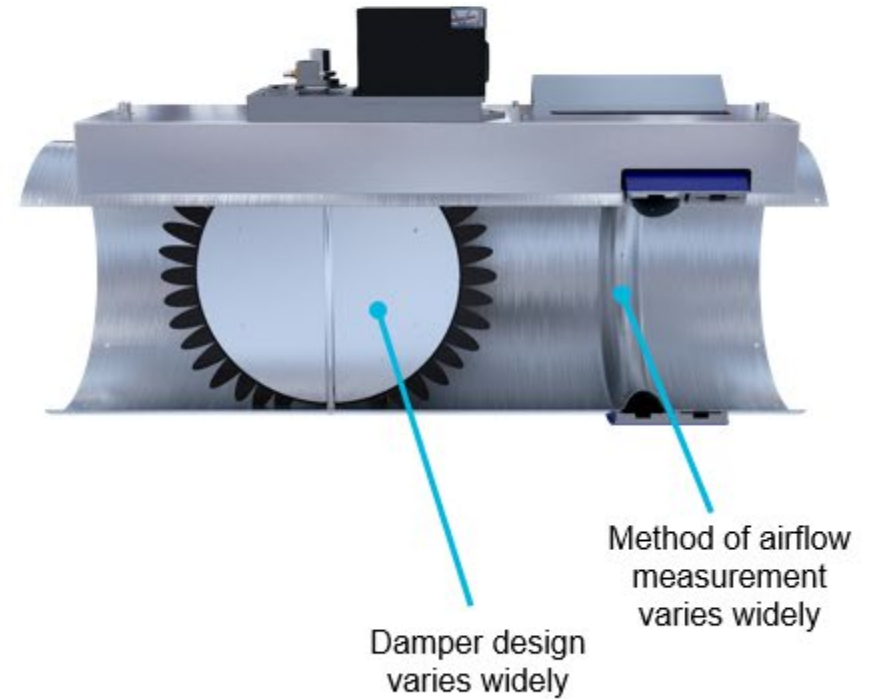
VAV Box



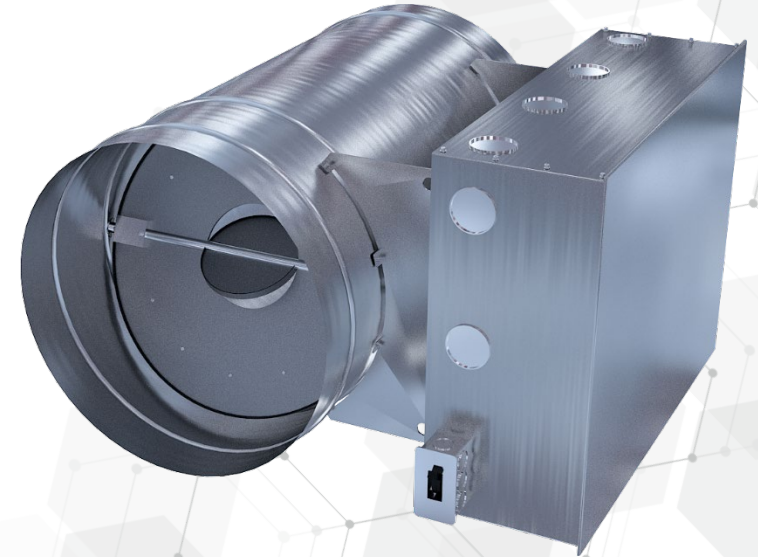
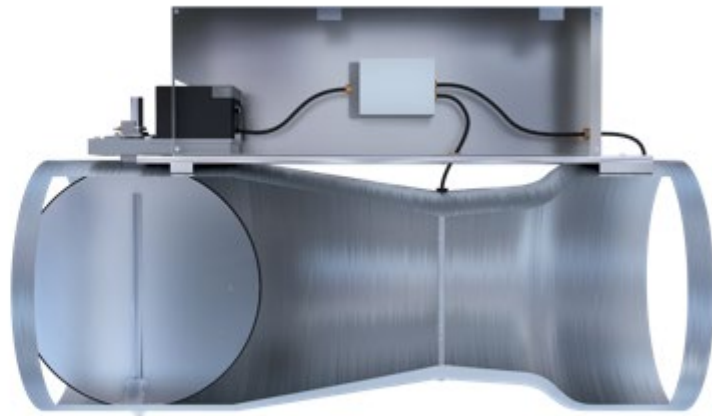
Venturi Air Valve



Measured Air Flow Valve

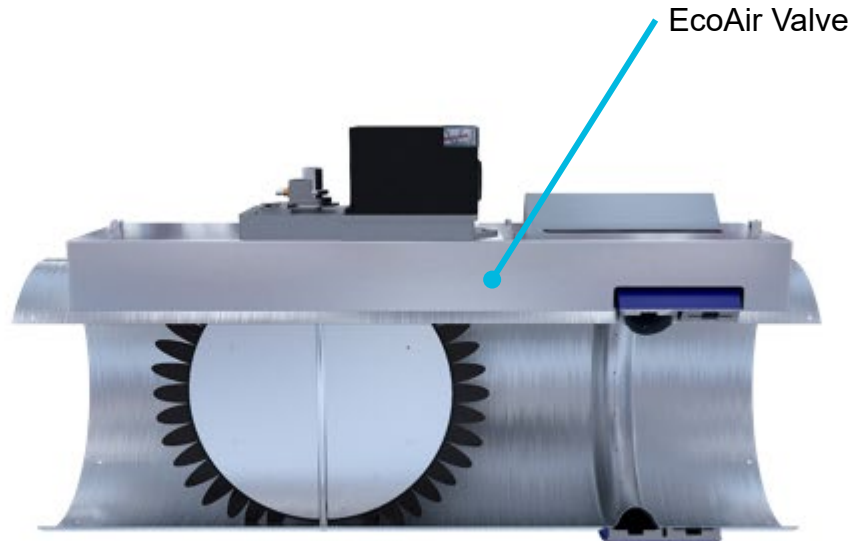
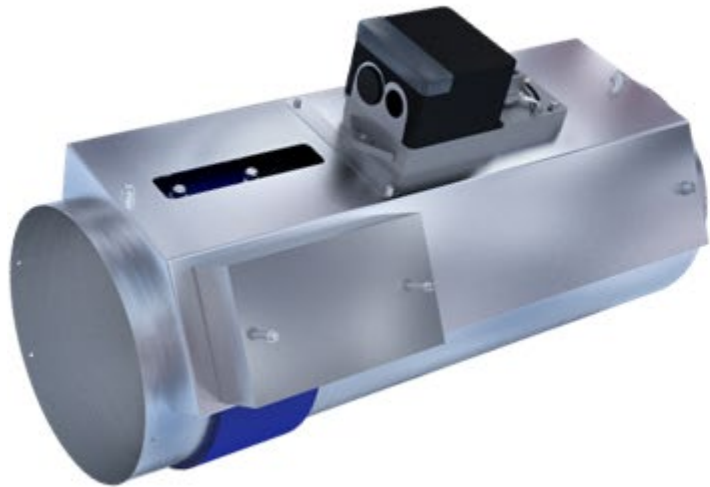


Measured Flow

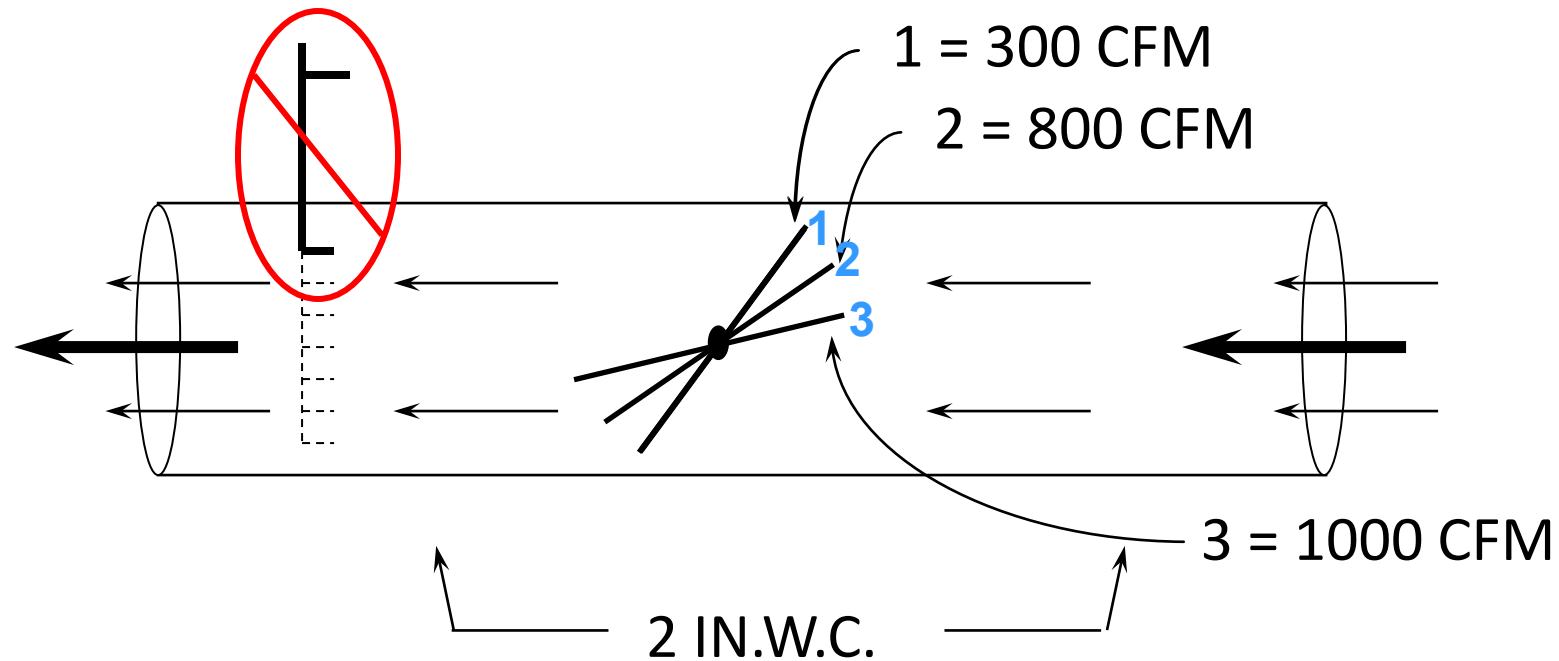


Measured Flow

- Many ways to measure airflow
- Not pressure independent
- Fast or standard speed actuator
- Broad operating pressure range, 0.1" W.C. to 5" W.C.



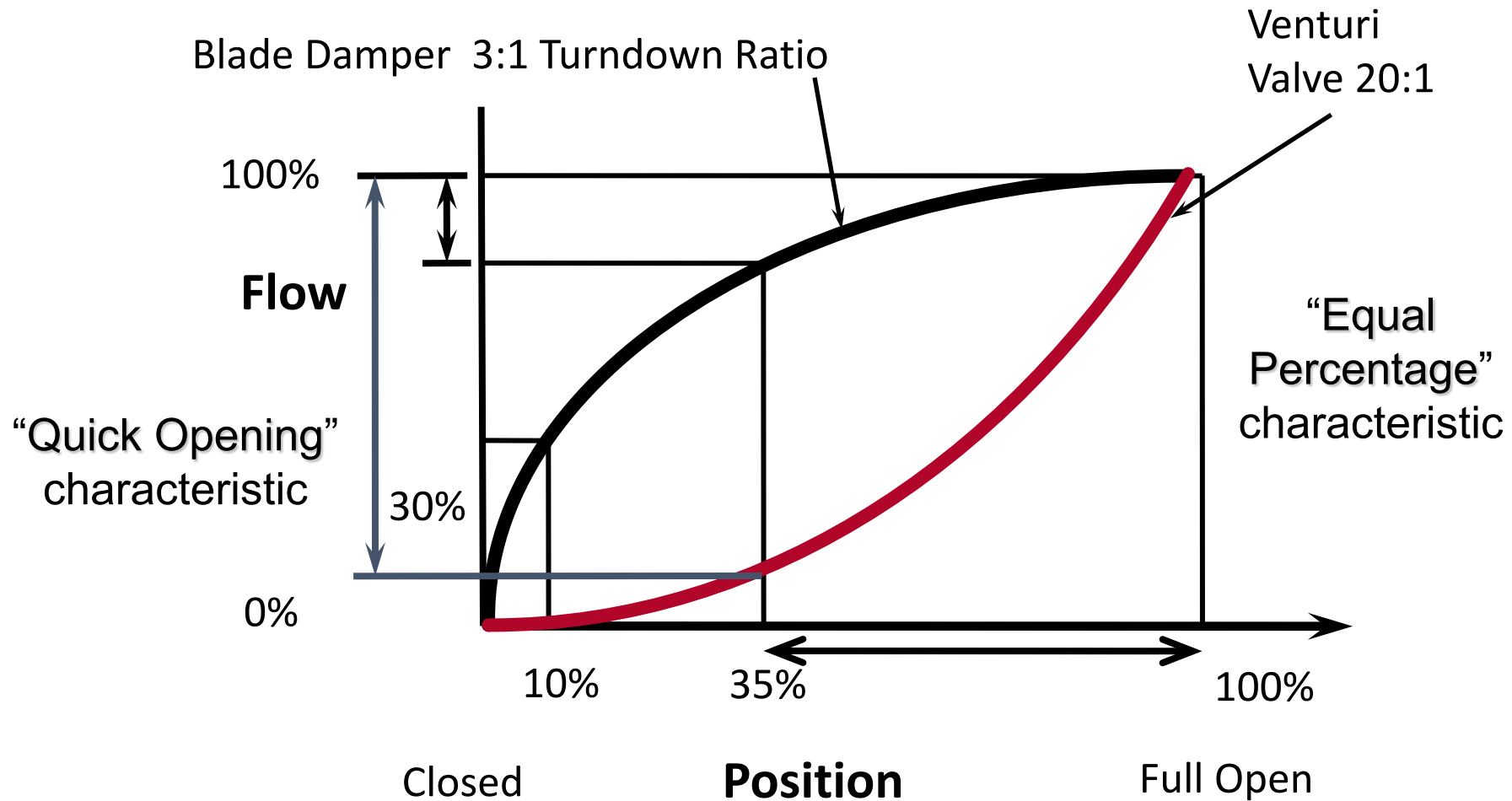
Flow Metering vs. Flow Measuring



Assume constant pressure

Therefore **position equals volume** when static pressure remains constant

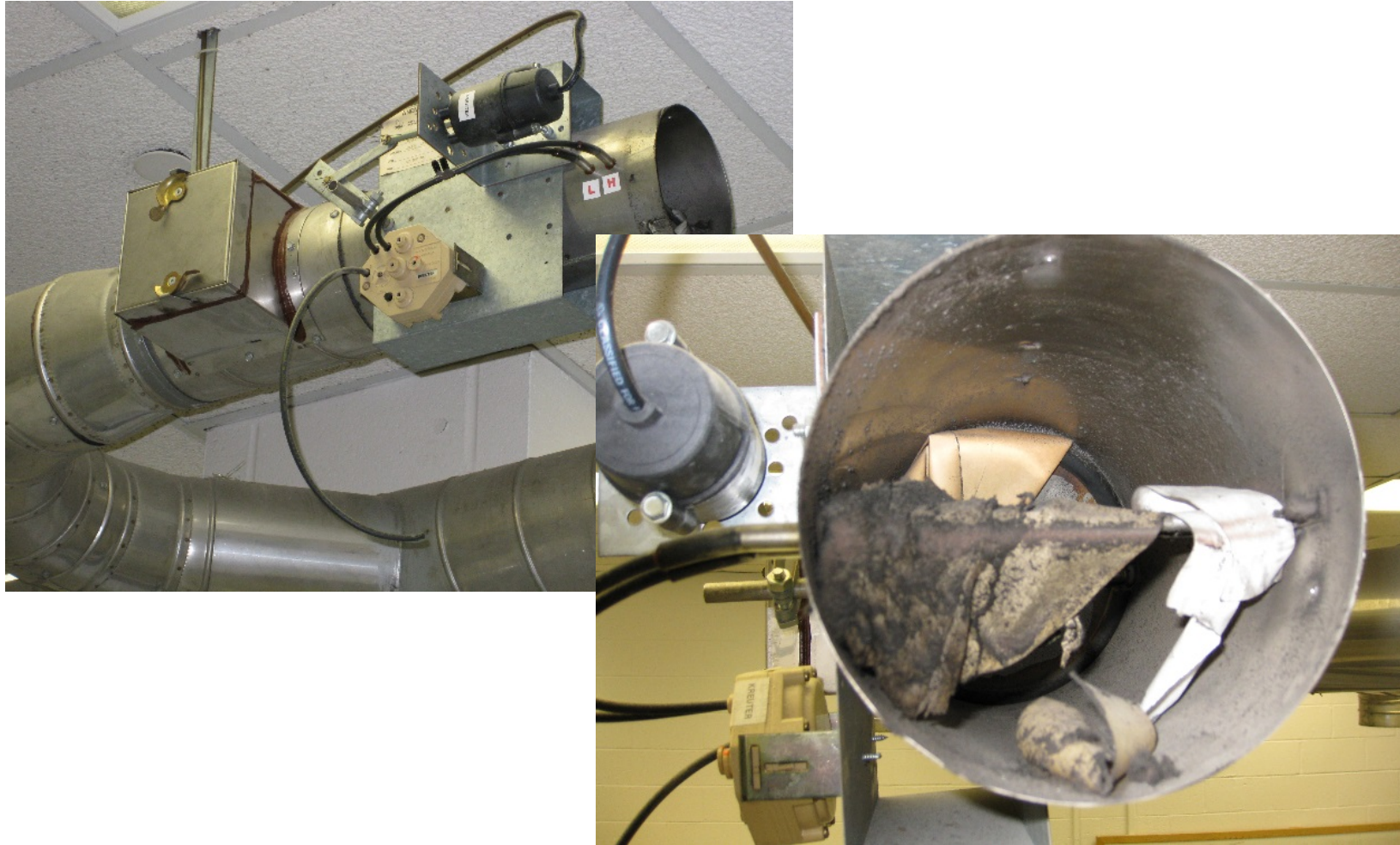
Venturi Valve vs. Traditional Damper Design



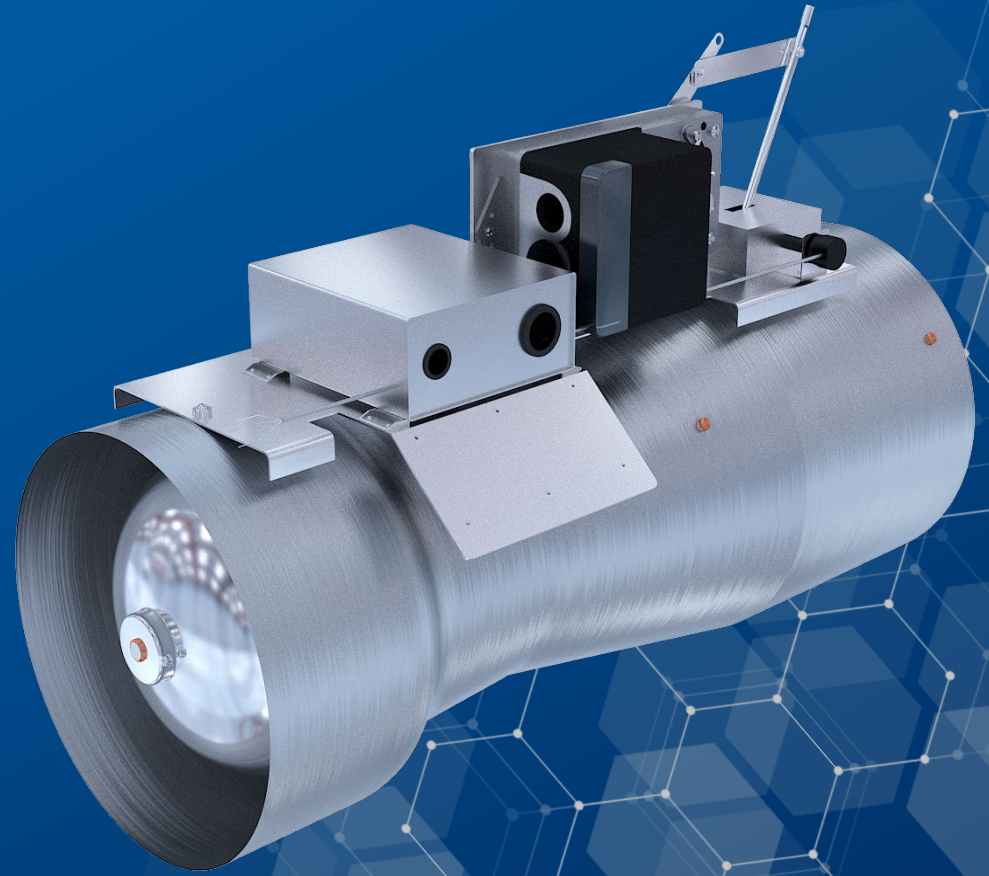
Cleaning Issues?



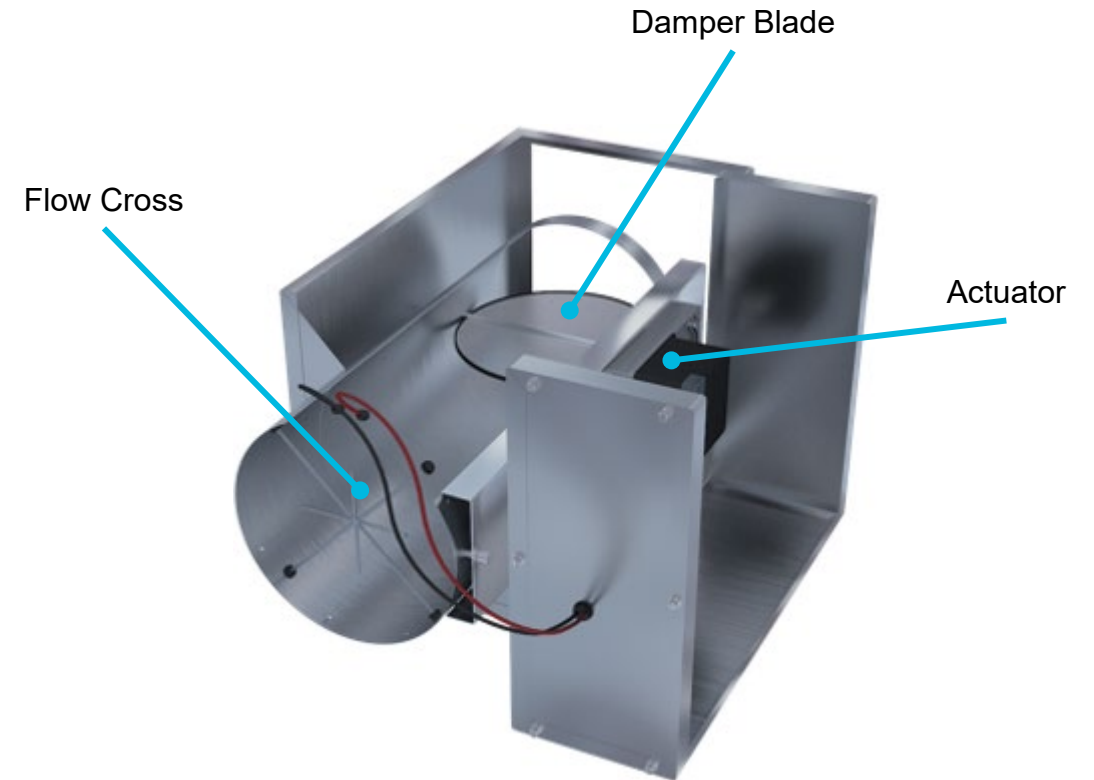
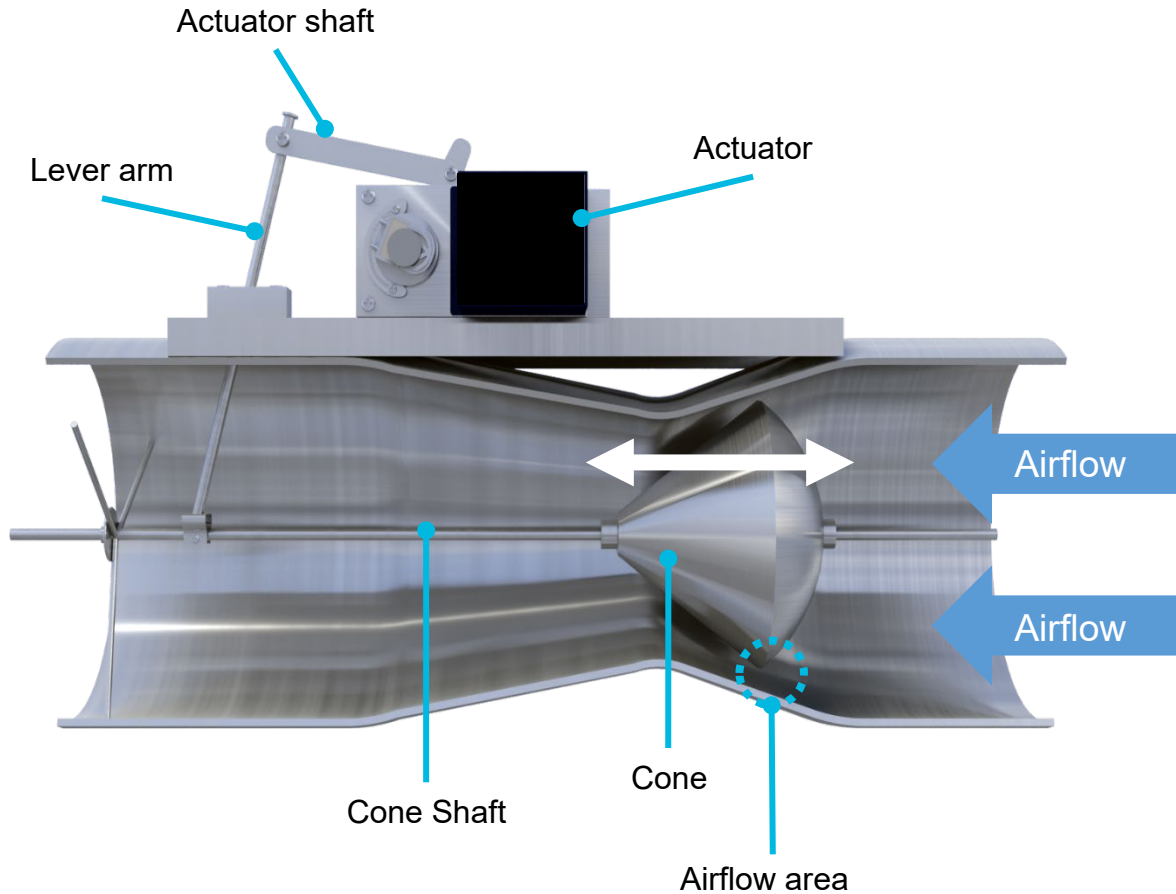
Cleaning Issues?



Venturi Air Valves



Relevant products: Venturi Valve vs. Blade Style Damper



History and Capabilities of Triatek | Atlanta Facility



Venturi Calibration Room

- NIST® Traceable Testing
- Assembly & testing of all products take place under one roof
- NIST certified airflow calibration station
- Every valve is individually “*characterized*” prior to leaving the factory

Venturi Valve Calibration

AirMeter CALIBRATING

193.9 FPM × $\frac{1.396}{912}$ = 270.7 CFM

1.162 inWG

Table:

Lever Position	CFM	Static Press
20	201.540	2.146
20	198.780	2.359
20	198.140	2.650
20	196.700	3.032
40	250.560	0.344
40	278.920	0.555
40	270.700	0.900

Average = 269.620 CFM

Percent CFM change: ???

Displacement: 0
Force: 0

Buttons: Automate, EndAuto, Add Reading, Start Time: 5:55:10 PM, Duration: 00:10:10, Assign Custom Position, Clear Readings, Assign Custom SetPoint, Show LabelSheet, Show Spreadsheet1, Save LabelSheet, Save Spreadsheet1

Job Number: EAV-8 | Calibration Range: 100-1100 | Calibrated By: w/A | Serial Number: 5700-1

Valve Count: 1 | Valve Size: 10 inch | Material: Aluminium | Insulation: Non Insulated | Actuation: Fully Actuated | Closure: Partially Closed

Create Certificate

NIST® Traceable Testing

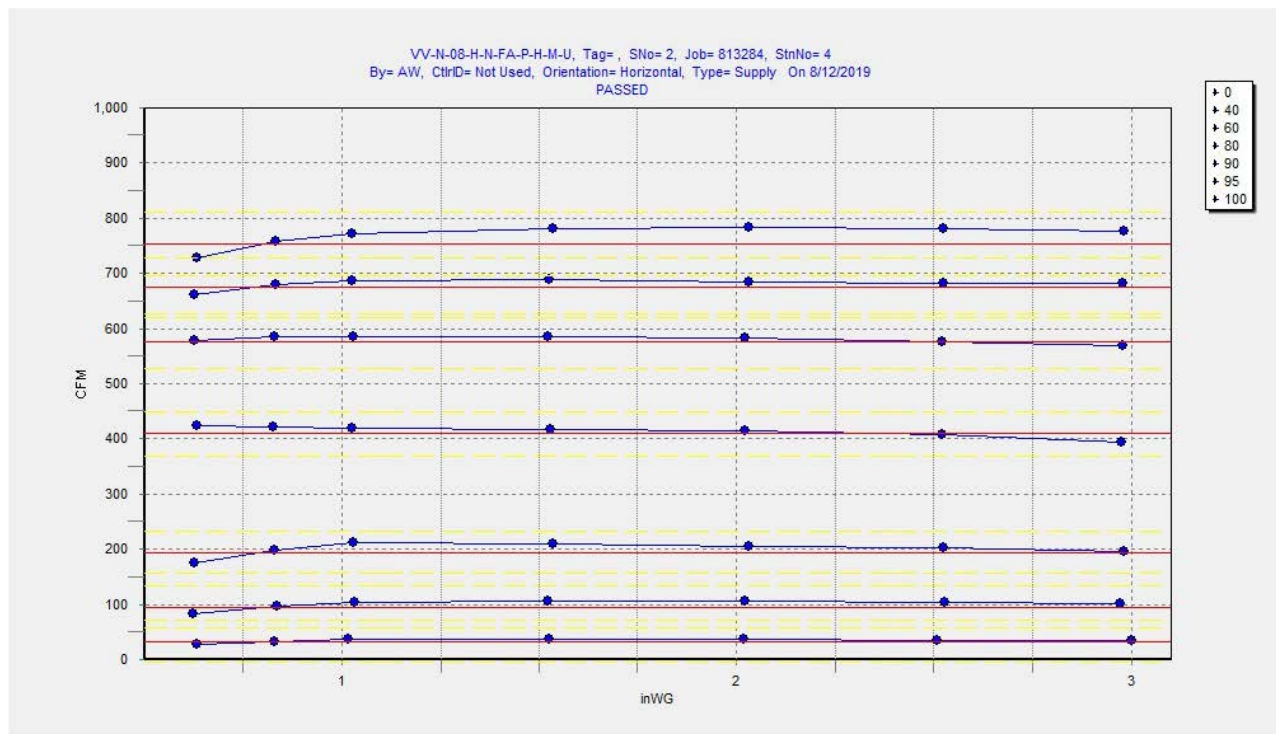
- Airflow accuracy
- Pressure independence
- 49 point calibration

Flow Curves Generated

- Attached to valve
- Loaded into airflow controller
- Stored at the factory for reference – corresponds to serial number

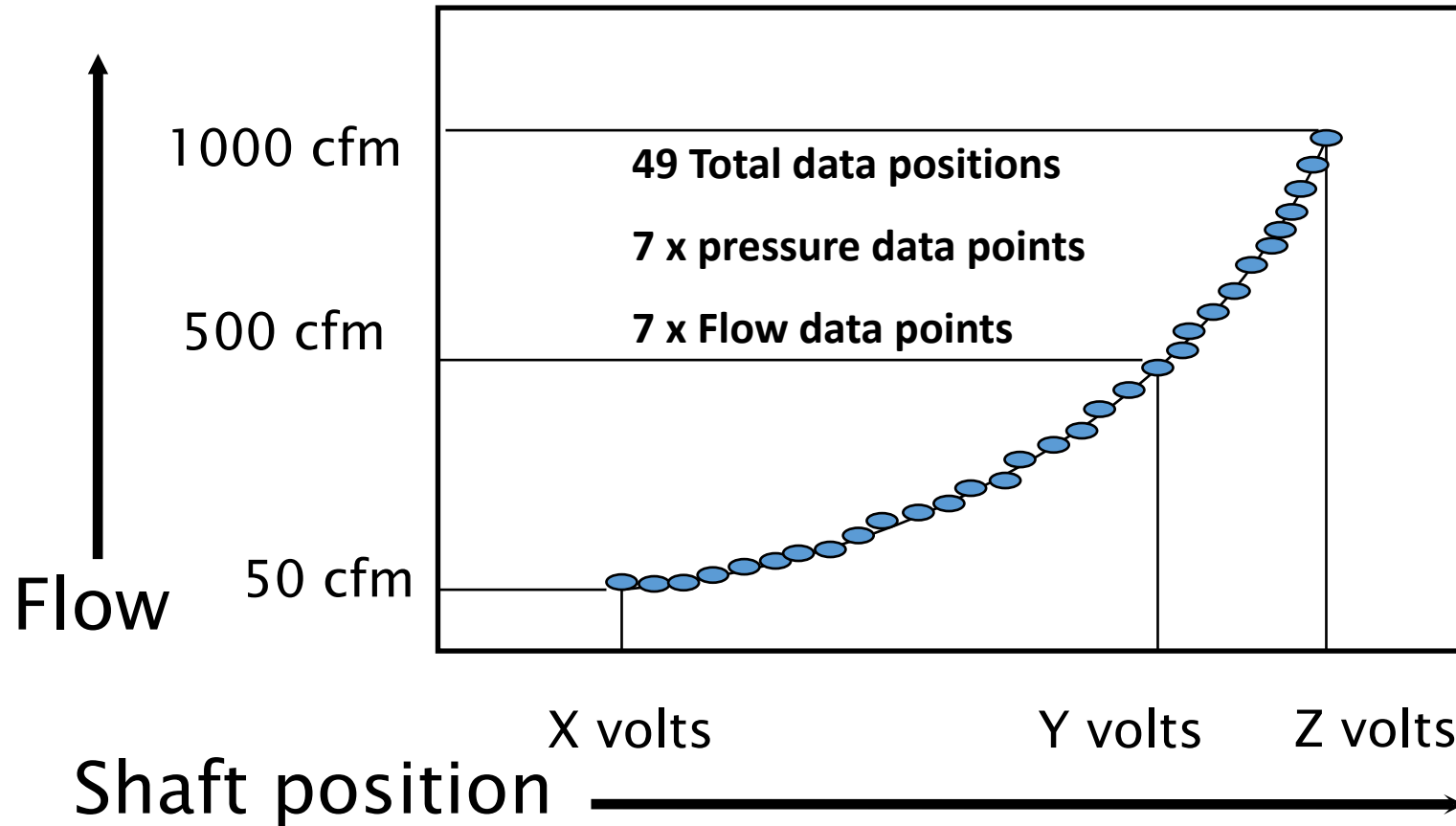
Characterization Of The Venturi Valve

8in - Partially Closed (PC) - Medium Pressure (MP)

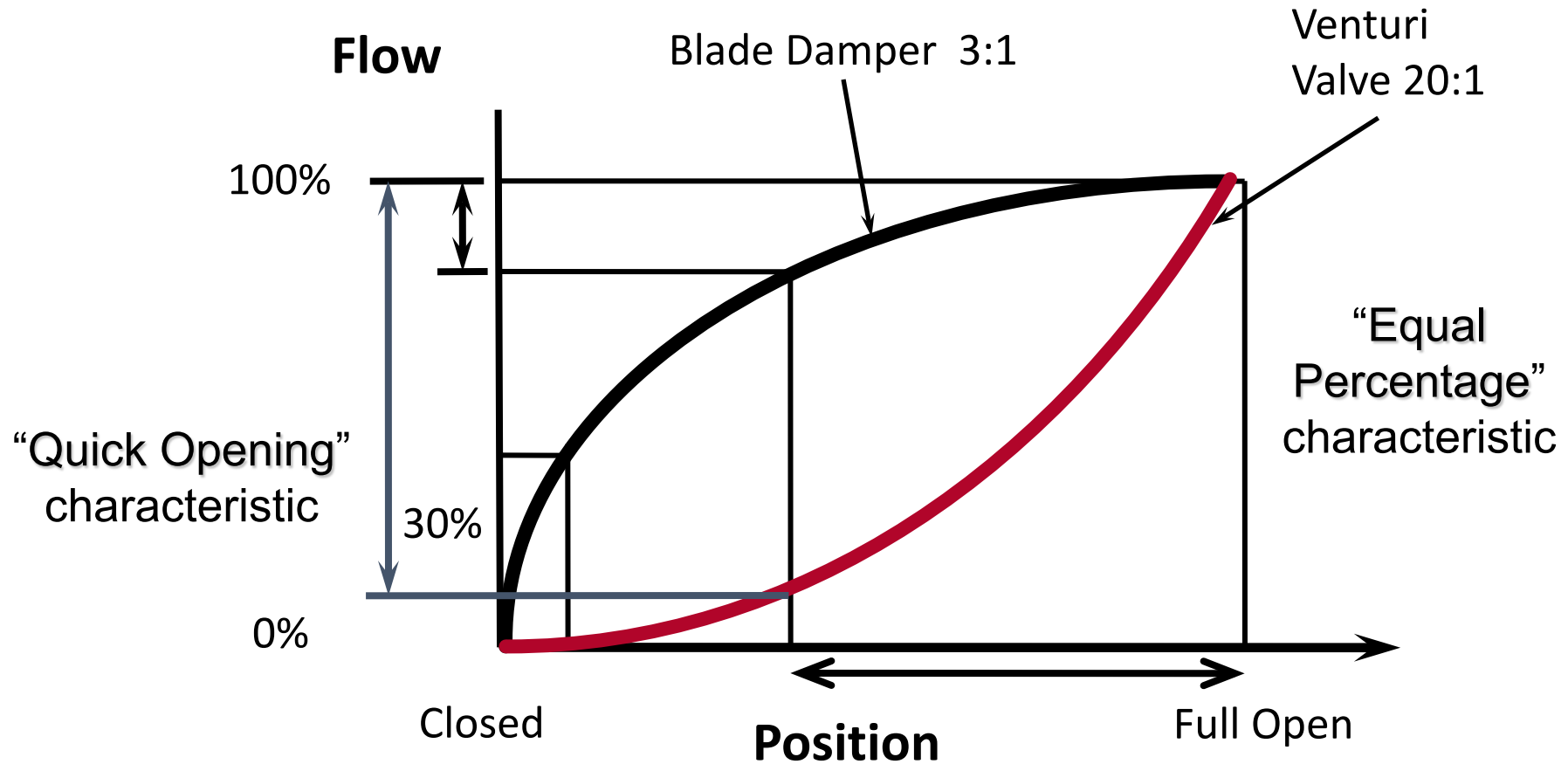


- Assembly & testing of all products takes place under one roof
- Every valve is individually “*characterized*” prior to leaving the factory on a NIST certified airflow calibration station
- A “*linearization*” module on the valve effectively memorizes every exact position for each individual input signal

Venturi Valve Calibration

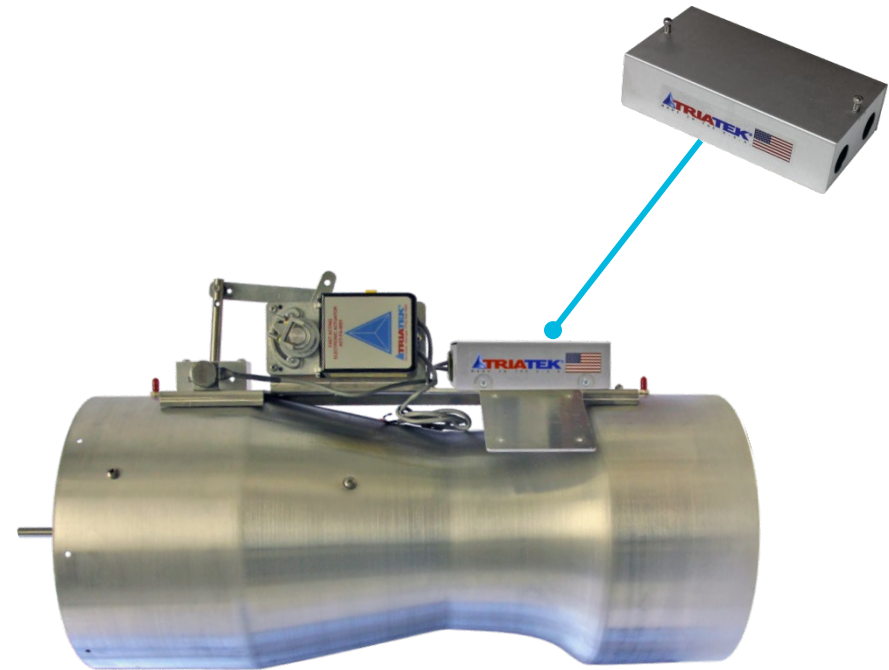


Venturi Valve vs. Traditional Damper Design



UVM – Universal Valve Module

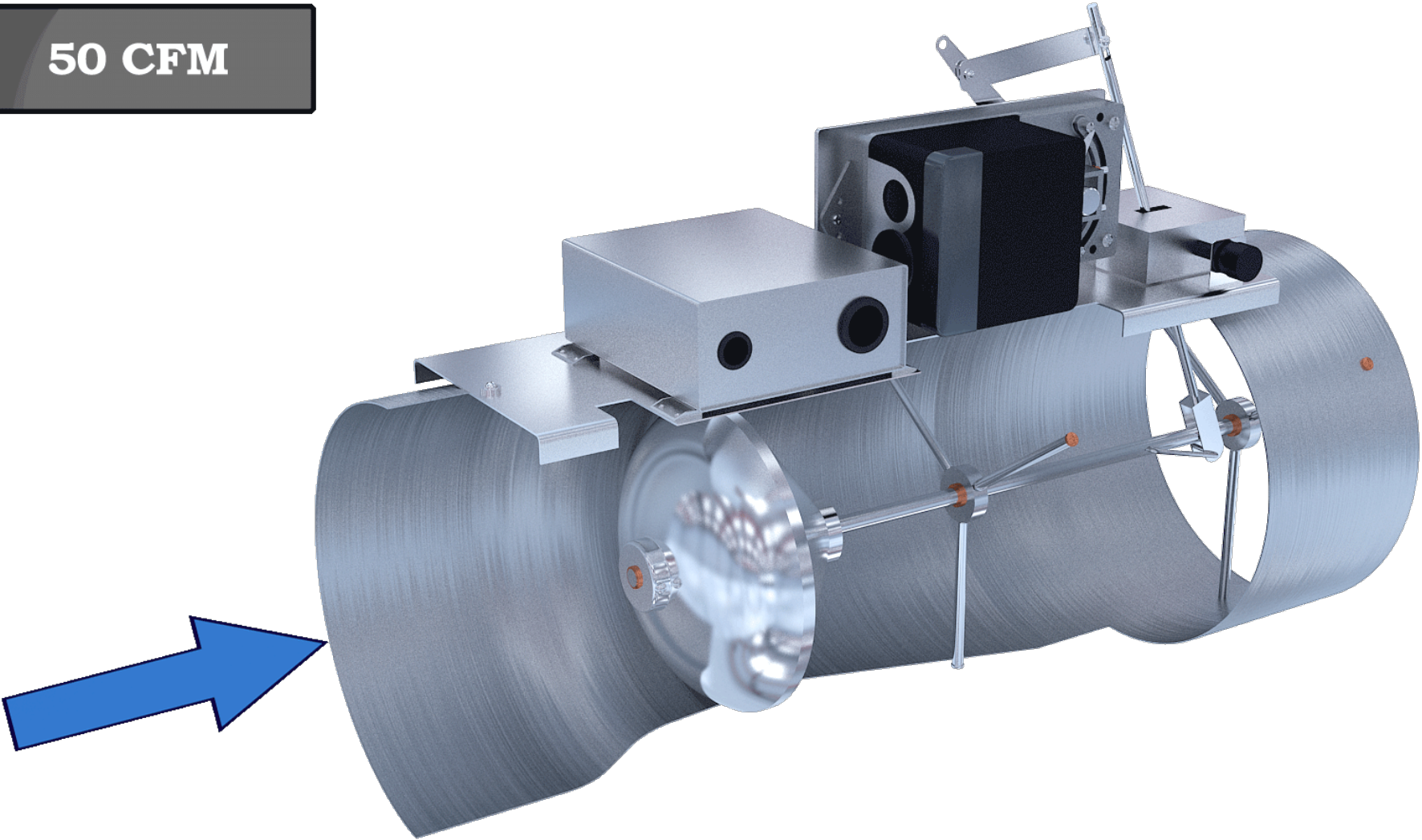
- Accepts ANY 0-10VDC signal from any controller
- 0-10VDC CFM feedback signal
- Increased Owner Independence
- Simplified Integration



Universal Valve Module (UVM)

Flow Control

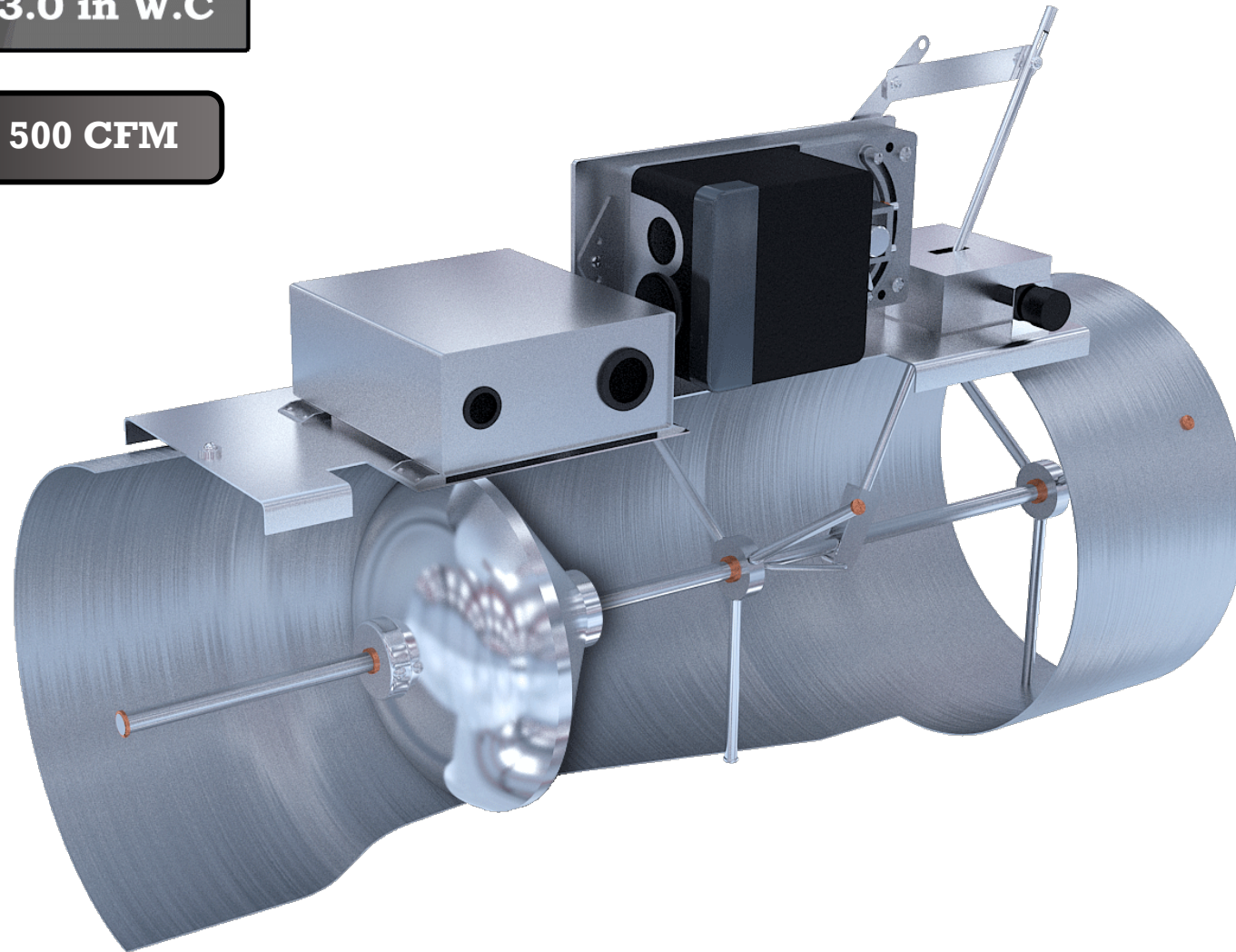
50 CFM



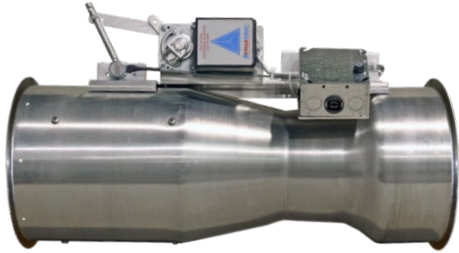
Pressure Independence

3.0 in W.C

500 CFM



Venturi Valves | Overview



Flanged Venturi Valve



Heresite® Coated Valve



Ganged Valves

Valve Size	Aluminum	Heresite®	Kynar® ¹	Stainless Steel ²	Ganged ³	Full Shut-off ⁴	Flanged ⁵
8"	✓	✓	✓	✓		✓	✓
10"	✓	✓	✓	✓	✓	✓	✓
12"	✓	✓	✓	✓	✓	✓	✓
14"	✓	✓	✓		✓		✓

¹Kynar® valves cannot be ganged or flanged

²Stainless steel valves are not available in full shut-off or low pressure options

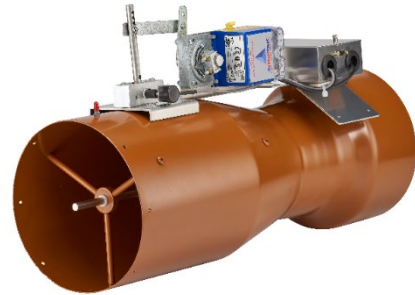
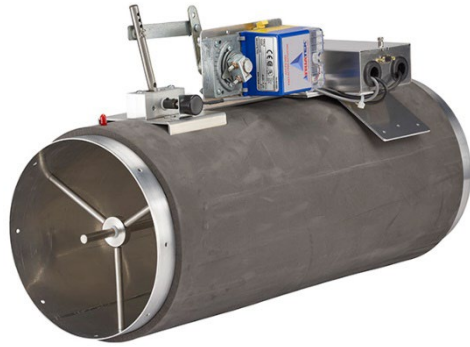
³Ganged valves cannot be flanged and are not available with Kynar® coating

⁴Full shut-off valves are not available with Kynar® coating

⁵Flanged valves cannot be ganged

Venturi Valves | Benefits

JCI Venturi valves provide trusted control of critical environments, with many benefits over traditional VAV box designs



- **Proven technology** used in vast majority of critical spaces
- Fast-acting actuator provides **<3 sec full stroke control**
- **Cost-efficient** solution to flow control with minimal energy usage
- Pressure independent and **accurate to within +/- 5%** of the flow set point
- **Repeatable airflow rates** regardless of static pressure
- Cone and spring assembly requires **no routine maintenance**

isolation room



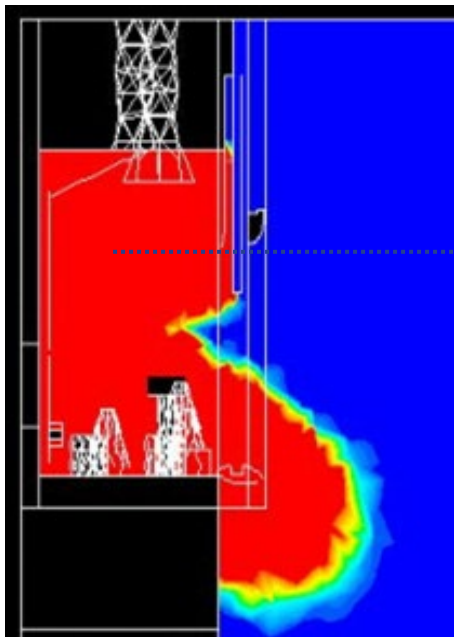
“The patient in the next bed is highly infectious. Thank God for these curtains.”



The art of efficiency. The science of safety.



Unstable Vortex = Spill



Fume Hood Spill



Fireplace Spill

No stable vortex

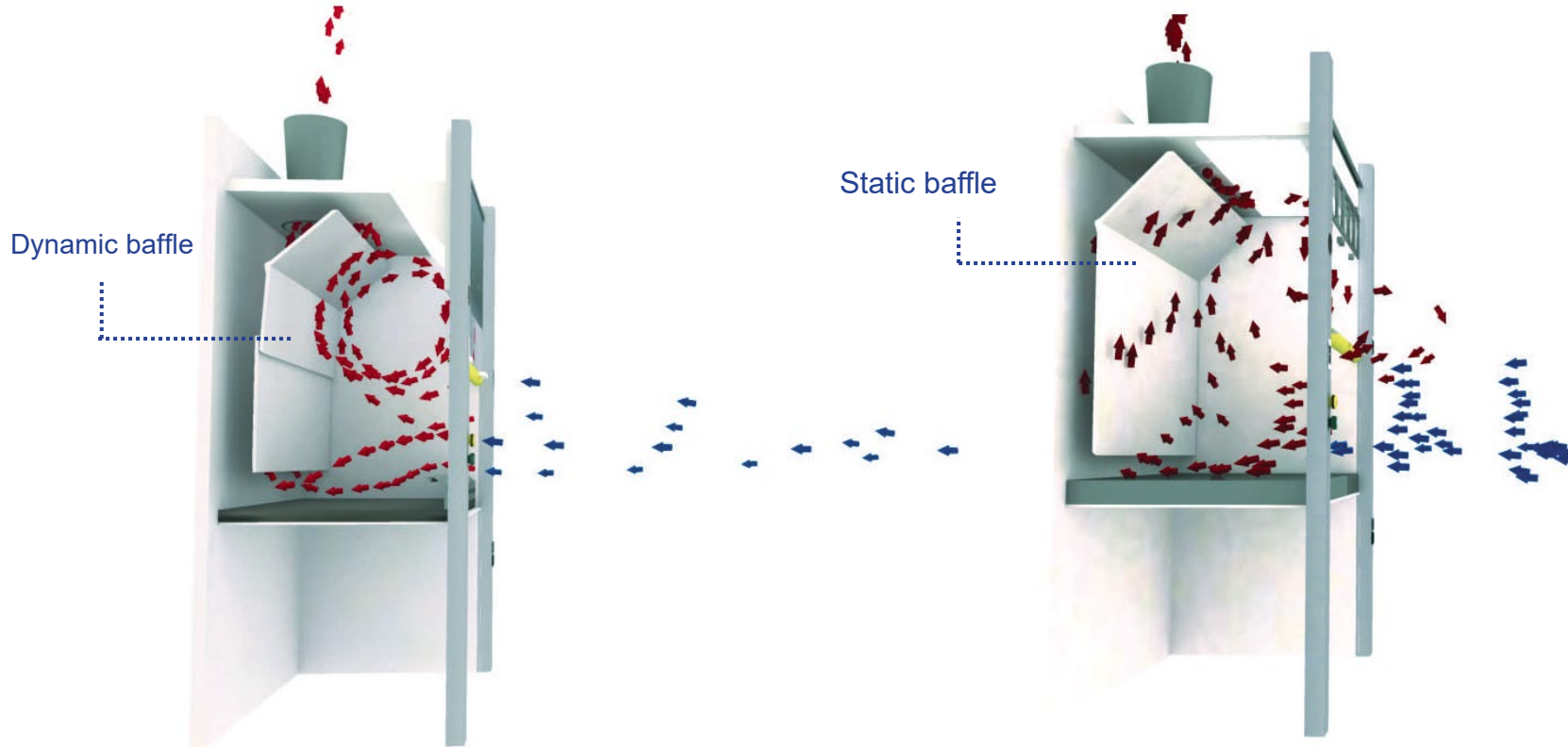
Toxic materials spill back into the user's breathing zone like this fireplace if the vortex collapses

Conventional Fume Hood



Stable Vortex® Visualization

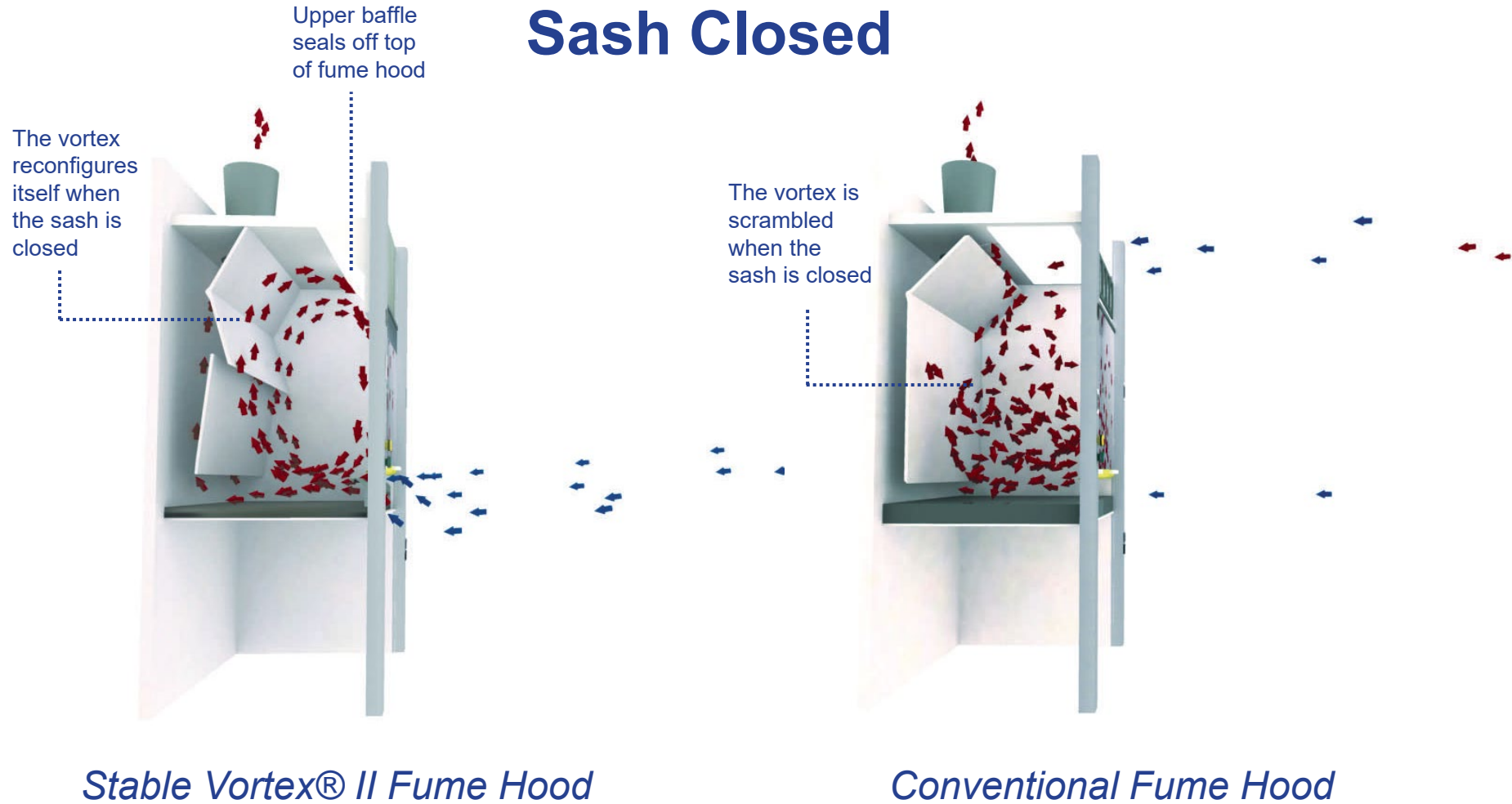
Sash Open



Stable Vortex® II Fume Hood

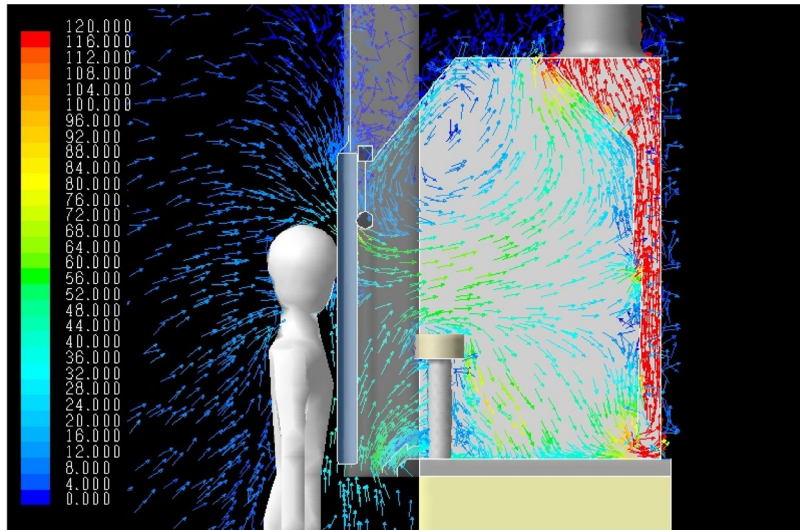
Conventional Fume Hood

Stable Vortex® Visualization



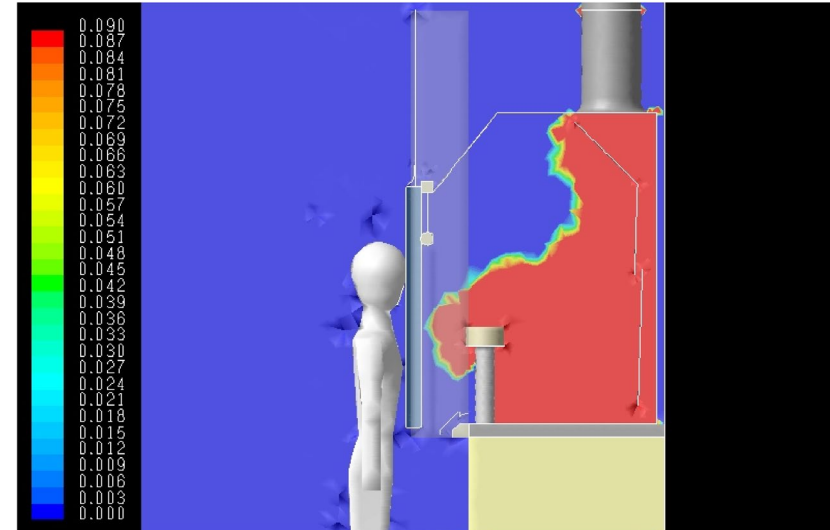
Stable Vortex® Visualization

Intensity and flow visualization



- 51 FPM Face Velocity
- 0 PPM, No Leakage

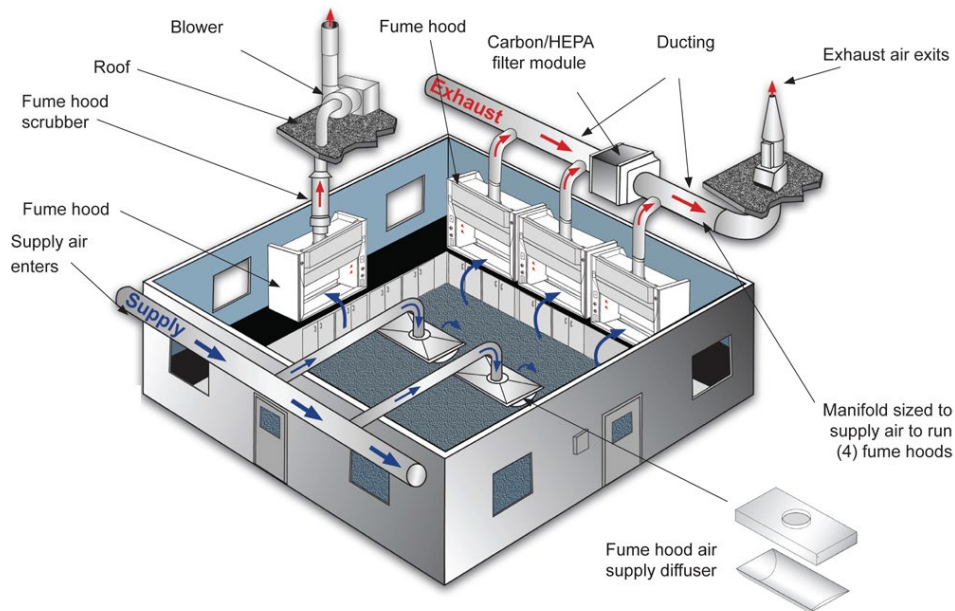
Concentration contour plot showing contamination gradient and intensity



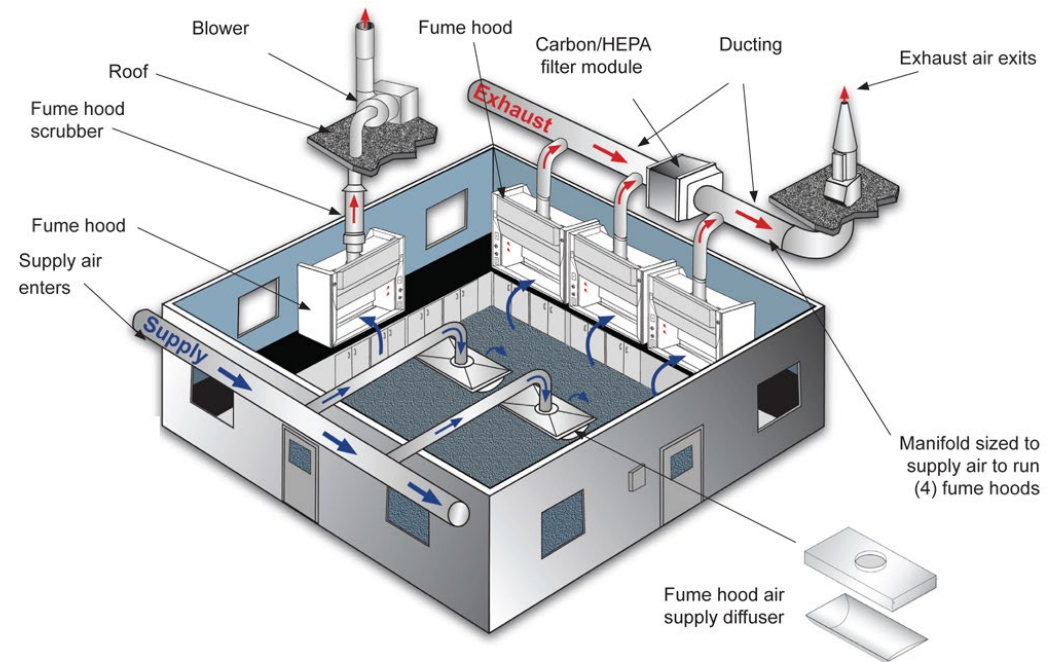
- 100 FPM Face Velocity
- Leakage

VAV vs. Constant Volume

Variable Air Volume, 100 fpm 3,200 CFM Lab



Constant Air Volume, 60 fpm 1,920 CFM Lab



CUSTOM



Stable Vortex™ Fume hoods & fume hood conversion kits



Venturi valve upgrade kits

Energy-savings and investment protection opportunities!

- JCI FlowSafe fume hoods and fume hood conversion kits help maximize safety and efficiency
- Venturi valve upgrade kits provide a cost-effective migration path away from legacy technology (including pneumatics) to JCI & *Metasys!*

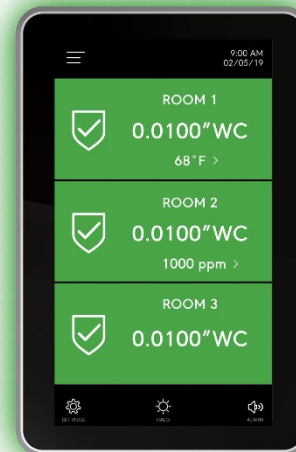
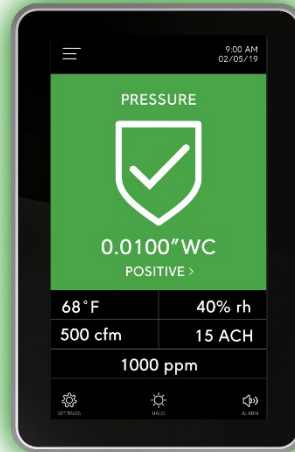
Fume Hood Renovations | Your Customer's Responsibilities



Controllers

Benefits of Partnering with Johnson Controls | New Products in Development

In FY21 we will release both new and upgraded products to refresh and expand our critical environments offering



Metasys and Johnson Controls Critical Environments | JCI Native BACnet MSTP

However, we are leading the industry with a full BACnet solution that carries many benefits for end-users and installing contractors

JCI BACnet product offering for Critical Environments

- Venturi valves
- FMS (hospital and labs)
- HMS (labs)
- CMS (hospital and labs)
- UVM
- *Metasys* field controllers



Flattened learning curve – no reliance on LonWorks

UVM is factory-mounted and wired to actuator

Leverage *Metasys* FEC as laboratory controller!

THANKS!

Joe Pustai, PE
Business Development Manager
Critical Environments

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