

Sustainable Airflow for Critical Environments Distinctly Innovative, Safe, Low Energy

Evolution of Airflow Control Technology



Overview

Worldwide, owners of facilities and their engineering teams are getting involved early when making the decisions regarding the critical airflow control systems utilized within their buildings. They understand the issues of safety, lower energy and sustainable practices within critical environments. The reason? Over the past 5-10 years, airflow control technology has gone through an evolution, with Accutrol setting the new standards and leading the way.

Choosing Your Critical Environment Airflow Control

Owners and engineers are faced with an ever challenging task of providing airflow systems that deliver the greatest opportunity for energy savings, while incorporating safety and comfort features. This is especially true for those that are within critical building areas such as laboratories.

Over the last 5 years there has been increased awareness by owners that they don't have to settle for "how it has always been done." They recognize the importance of choosing the correct airflow control system for their buildings, whether they are in the midst of designing a new facility or renovating older buildings. **Let's talk about the importance of that decision.**



Evolution

The late 1990s brought about a change in the way owners and engineers looked at critical environment control. Laboratories were notorious for high energy usage and were ripe for technological advancement in airflow control. More laboratories were designed using VAV controls for energy savings and safety reasons. Just following the turn of the 21st century, Accutrol was developing an innovative design utilizing the latest technologies that would lead to the first change for airflow technology in over 30 years. Industry professionals were looking for a change from the Venturi valves and blade dampers that lacked the design requirements for true sustainability. The Accutrol airflow control valve, introduced in 2006, would offer energy savings through low pressure drop as well as the safety of true airflow measurement. In addition, the airflow control valve would not require duct straight run. It would provide high turndown and be simple to install and use.



It's All About the Valve

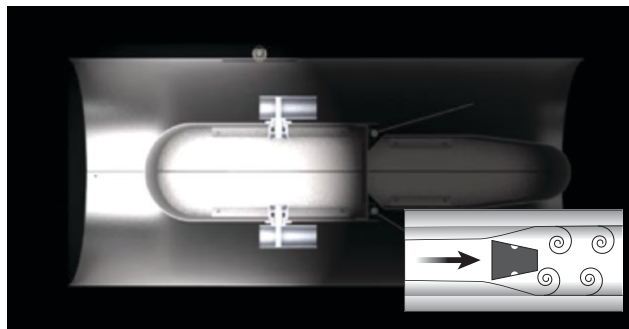
The airflow valve that is chosen for use in critical environment airflow control is the most important piece of equipment to be considered. The reason is that this single device will be responsible for providing operational safety, low energy use through reduction of system static pressure, and continued sustainable user features and operation for the life of the building.

Airflow Measurement and Safety

Safety Rule – Measure what you want to control. This is one of the most important aspects of providing balanced airflow to critical spaces and ensuring a safe environment for people working in the laboratory. Therefore, the measurement device is critical to your operation.

Systems are designed to provide specific Air Changes per Hour (ACH) to ensure fresh air exchange in controlled spaces. Owners and building occupants need to have the piece of mind that they are using proven products that provide them with direct and true feedback of this critical piece of information. Without the knowledge of true airflow measurement, safety can be compromised and may keep an owner in the dark as to an issue regarding balanced air space.

The AccuValve was designed to incorporate an integrated airflow sensor. This proven technology provides true airflow measurement, delivering stable, drift-free operation, which never requires recalibration. Unlike all other airflow measurement devices used in critical airflow control valves, the vortex shedder is contamination resistant. The sensor is also unaffected by airflow density and humidity.



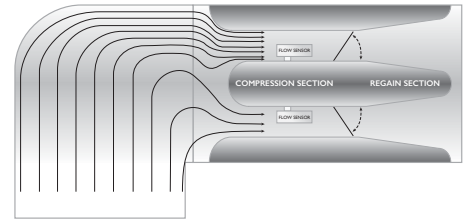
The AccuValve incorporates the integrated vortex sensor (as seen in the AccuValve Airflow Control Valve Operational Features Video).

Low Energy Usage

The airflow control valve needs to incorporate features which ensure energy savings for the lifetime of a facility. How a valve is designed will determine its energy requirements. A mechanical pressure independent valve uses fan energy to operate, thereby requiring greater electrical usage. On the other hand, a valve that measures airflow and maintains pressure independence using closed loop control does not require fan energy to operate, which inherently requires less energy. Take a close look at the way an airflow control valve is designed before making the important decision that will affect the operating cost of your building for its lifetime.

Product Design

The **AccuValve** was designed to be a low pressure drop control valve. It is electronically pressure independent and does not require fan energy to operate thereby reducing fan energy requirements. The AccuValve utilizes a streamline design and provides a much lower drag coefficient. Reducing the overall pressure drop in a ventilation system equates to less fan horsepower and a significant reduction in energy cost. This energy reduction not only saves money, but it also reduces the building's environmental impact and carbon footprint. By operating at lower duct pressures, noise levels are lowered in the duct, making the building environment more pleasant to work in.



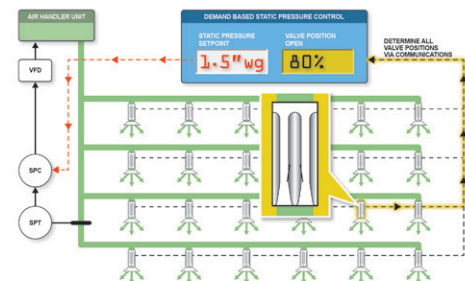
A compression section in the front of the valve compresses the air removing turbulence and increasing air velocity.

Demand Based Static Pressure Reset Control

I2SL (International Institute for Sustainable Laboratories) has recommended reducing the static pressure drop of the devices in the airstream for both supply and exhaust systems in labs. ASHRAE Standard 90.1-6.5.3.2.3 discusses its implementation. By using demand based static pressure reset control, the system is operating at the lowest possible static pressure.

In order to properly meet the intent of ASHRAE Standard 90.1 without additional duct hardware and changes to the design of the system, **the airflow valve must incorporate this capability of control within its design.** So how is that accomplished?

The **AccuValve** was designed to meet this important criteria without any external devices. Since the AccuValve measures airflow, the valve will modulate to whatever position is required for control of the airflow. The blade position can be monitored to check which valve within a system is most open and the associated system static pressure can be adjusted to the most energy efficient set point. These steps ensure that the fan is operating at the lowest possible static pressure, while maintaining laboratory safety. This simple control strategy allows the fans to run at minimum electrical input at all times.



By using demand based static pressure reset control, the system is operating at the lowest possible static pressure.

Sustainability

What makes a product “sustainable?” Webster’s dictionary describes sustainable as “...involving methods that do not completely use up or destroy natural resources” and “...able to last or continue for a long time.” Definitions of sustainability will be viewed by owners and engineers differently. When making the decision on airflow control products that will be the heart of our building systems, it is important to consider the design, installation, operation and maintenance required now and in the future.



The criteria you will want to insure your airflow valve allows:

For the Designer

- Simplified layout **without** the need to be concerned about mounting position or duct layout
- Ability to choose an airflow valve for either flow range or by **operating pressure**, which can maximize system static pressure savings
- A product that can meet ASHRAE 90.1 standard for Demand Based Static Pressure Reset Control without the need to add additional parts and pieces throughout the building duct work to try to make it work properly
- Peace of mind with the safety of true airflow measurement

For the Installer

- Ease of installation without concern about duct mounting arrangement
- Ability to mount airflow valve with control/wiring access underneath the valve (at 6:00 position)

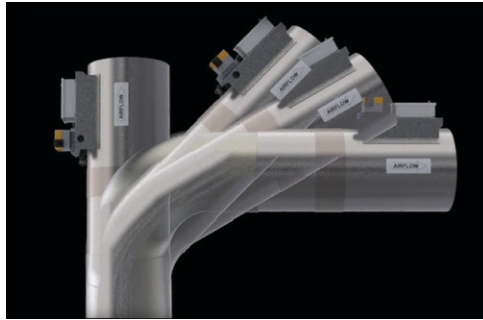
For the Owner

- Flexibility of product allowing direct control by Building Automation System (BAS) or full communication (e.g., BACnet) to the critical environment control system
- Simplified understanding and ability for owner change control of complicated Fume Hood Control Systems
- No recalibration of airflow valve required
- Peace of mind that they will always know the true airflow affecting their critical systems operation and safety of staff and clients
- Maximized sustainable energy savings for the life of the building
- Capability for Demand Based Static Pressure Reset Control without need for additional parts

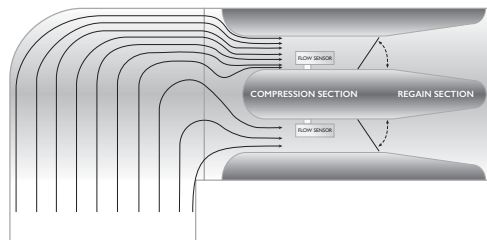
Accutrol's Innovative Airflow Products Meet Sustainability Goals

The **AccuValve** was designed to be a sustainable product from its inception. Its innovative features and benefits pulled the industry forward into the 21st century with a product that's designed for ease of layout, installation and operation with no recalibration and maintenance requirements. That is why it was the AHR Award Winner for Building Automation in 2008.

Installation – The AccuValve can be installed in any plane. Since it directly measures airflow and is not factory calibrated with a mechanical cone/spring arrangement (such as a Venturi valve), all valves can easily be installed in any orientation as required by the project. In addition, the valve can be installed with the controls accessible from underneath (at 6:00 position) when needed.



Airflow Measurement without Straight Run – The all important criteria of being able to measure airflow without duct straight run is critical to valve design. The AccuValve incorporates a compression section in the inlet of the valve producing a uniform velocity profile for the airflow sensors without the need for straight duct into or out of the valve. Therefore, if needed, the AccuValve can also be mounted where there is no straight run available and meet the specified accuracy for airflow measurement.



Universal Controllability – The AccuValve was designed to give owners the option of being able to choose the airflow valve technology based upon its merits and not be tied down to the airflow valve manufacturer for control. Since many owners have a large commitment to their facility BAS (Building Automation System), the AccuValve allows them the flexibility to be controlled either through an Accutrol System of Controllers to their BAS or directly by their choice of BAS.

No Maintenance Required – The AccuValve does not require any scheduled maintenance.

Sustainable Retrofit for Older Venturi Airflow Systems

Many previously installed Venturi valve systems are in the process of being updated. This is especially true since owners are realizing that those systems are high energy users and require high maintenance as they age. Owners also want to upgrade from analog to digital based control. These retrofits are not without higher cost, so owners are seeing opportunities to switch to products that will give them more system flexibility, greater energy savings and in some cases, the ability to utilize their current BAS contractor for direct control.

The AccuValve is designed to meet these demands.

Installation – Knowing that older installations with Venturi valves would ultimately need replacement, Accutrol designed the AccuValve to be nearly identical in dimensions. This alleviates additional cost to the owner by allowing a one-for-one replacement without transitions for the majority of choices.

Energy Savings – Most older Venturi valve installations will have valves requiring an excessive 0.6"-3.0" operating pressure drop. Accutrol designed the AccuValve to meet the required airflow ranges within the same size valve, while at the same time providing a reduced operating pressure loss of 0.1"-0.3" at maximum CFM. By retrofitting older Venturi valves with the AccuValve, the system static pressure can be drastically reduced saving tremendous amounts of energy dollars. An additional benefit of operating at lower pressures is that the sound levels will also be reduced, making for a much quieter environment. In most cases when the original Venturi manufacturer replaces their own valve with a newer version that is lower pressure (0.3"-3.0"), the valve size is increased. This requires additional money (and interruption) for duct work transitions.

Owner Flexibility – The AccuValve was designed with the owner in mind when tasked with retrofitting their older critical environment control system with energy efficient technology. The AccuValve offers owners maximum retrofit flexibility. The retrofit can be done anywhere from a phased approach to replacing the entire system. In addition, the owner can also decide if they want to keep a stand-alone control system in the laboratories or have their own Building Automation System take direct control of the spaces.

A Sustainable Lab
University of St. Thomas

"The replacement of the venturi valve system with the low pressure AccuValve system has proven to save the university money by significantly lowering our monthly utility bill!"
David Carlson
St. Thomas Lab Manager

| Project Highlights | | |
|-------------------------|----------|----------|
| | Before | After |
| Exhaust Static Pressure | 1.07 in. | 0.17 in. |
| Exhaust Fan Size | 130 HP | 60-70 HP |
| Room Sound Level | 54 dBA | 49 dBA |

Annual Energy Savings Over \$75,000

**Less Pressure, Less Sound
Less Energy, Less Money...
More Sustainable**

The University of St. Thomas in St. Paul, Minnesota is known for academic excellence and state-of-the-art facilities. An innovative project to upgrade the laboratory airflow control system in Chivers Science Hall fulfilled energy, sound and performance requirements that surpassed even optimistic expectations. In addition, the new system provided over \$75,000 in annual energy savings.

Accutrol AccuValves allow easy control of flow without the need for duct work transitions.

The original venturi system exceeded the "Tight Ship sailing through the channel!"
© New Technology
Chemistry Department, Chd

ACCUTROL
LLC

[Download Our Retrofit Case Study >](#)

No other critical environment airflow control company has won a single AHR Innovation Award.



Winner of 2 AHR Innovation Awards!



AccuValve® is the Winner of the 2008 AHR Innovation Award for Building Automation.

[WATCH THE VIDEO >](#)

Technology Leadership

In 2006, the AccuValve® by Accutrol, LLC was brought to the market as the first technology designed to meet the needs of the critical airflow control for the 21st century.

The AccuValve was the beginning of innovative designs, which would become a hallmark of Accutrol over the next 10 years and beyond. In 2008, the AccuValve by Accutrol was the recipient of the AHR Innovation Award for Building Automation.

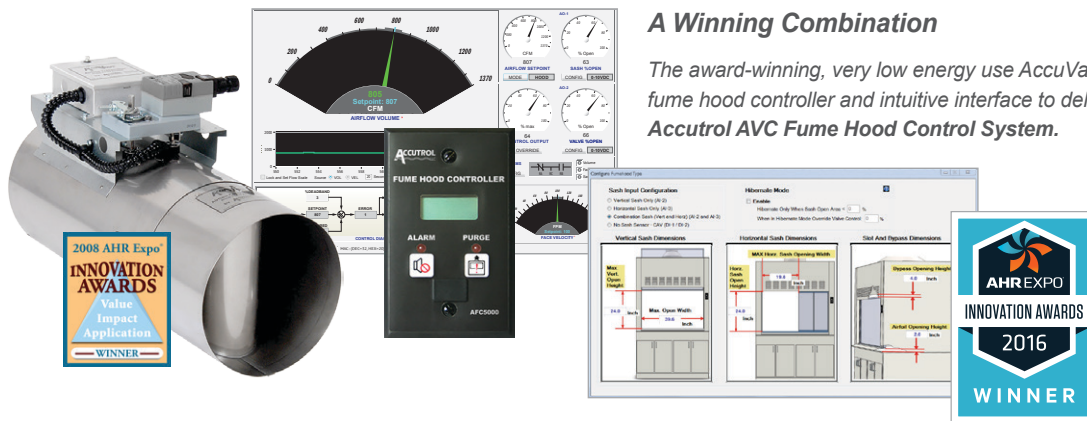


[WATCH THE VIDEO >](#)

Accutrol = Innovation

In 2015, Accutrol released the newest of its products that would “demystify” Fume Hood Control Systems with an Intuitive User Interface.

The Accutrol AVC Fume Hood Control System, with its free downloadable Insight Graphical User Interface, provides an evolution in fume hood control technology by simplifying the start-up, operation and owner change control for VAV fume hoods. This product combines the award winning design of the low pressure drop AccuValve Airflow Control Valve with a “smart” fume hood display and a powerful, uncomplicated and intuitive user interface, which allows owners to easily setup and change the fume hood configuration.



A Winning Combination

The award-winning, very low energy use AccuValve combines with our fume hood controller and intuitive interface to deliver the award-winning Accutrol AVC Fume Hood Control System.