

Ventilation Control Solutions for the Laboratory Environment



Safe, Flexible Control Solutions

Maintaining safety in laboratories is one of the greatest challenges facing owners and consulting engineers. The use of chemicals and other potentially hazardous compounds separates laboratories from other types of building spaces. Protecting the health and safety of laboratory and building occupants must be the primary concern.

Not all laboratories are alike. Different laboratories contain different hazard levels and uses. It would be inappropriate to design a high-containment biological laboratory as if it were a general chemistry laboratory due to the high consequences should a biological laboratory's containment be breached.

TSI designs and implements control solutions to meet a variety of needs and applications to help ensure the laboratory environment meets the level of containment required for a particular usage. From reviewing the plans to calibrating the product on-site, TSI will be involved throughout the process to ensure proper ventilation and temperature control of the lab environment.



TSI laboratory products offer:

Enhanced Safety

Preventing exposure to potentially hazardous compounds is paramount to laboratories. TSI's direct measurement of critical parameters is a superior method for improving laboratory safety.

Reduced Operating Expenses

TSI laboratory controls are designed to safely reduce exhausted air volumes, minimizing the cost of conditioned air supplied to laboratories.

Custom Programming

Regional regulations or specific owner needs may require a unique control strategy or additional features not present in a standard, off-the-shelf controller. TSI's engineering expertise allows for custom firmware configuration to meet these special demands.

Design Flexibility

No single solution is optimal for every application. TSI laboratory controls provide choices in control strategies and components, allowing you to match the safety and design requirements of your facility.

Ease of Design

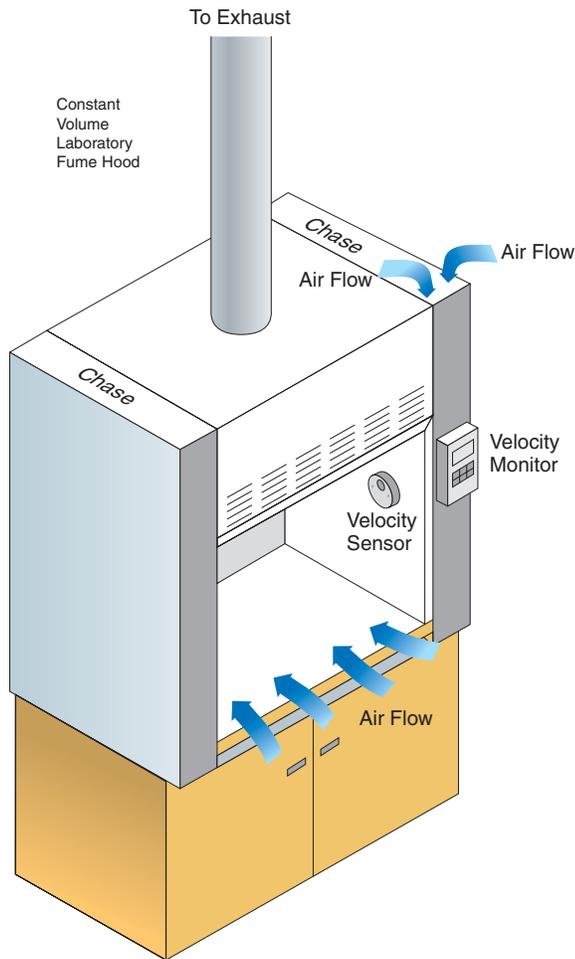
Standard components, specialized design tools and engineering support from TSI streamline the design of your laboratory facilities.

Remote Monitoring

Effective facility-wide control requires integrating your laboratory controls with other control systems. TSI laboratory controls can use analog signals or digital communications to seamlessly interface with your building automation system.

Direct Measurement Improves Fume Hood Safety

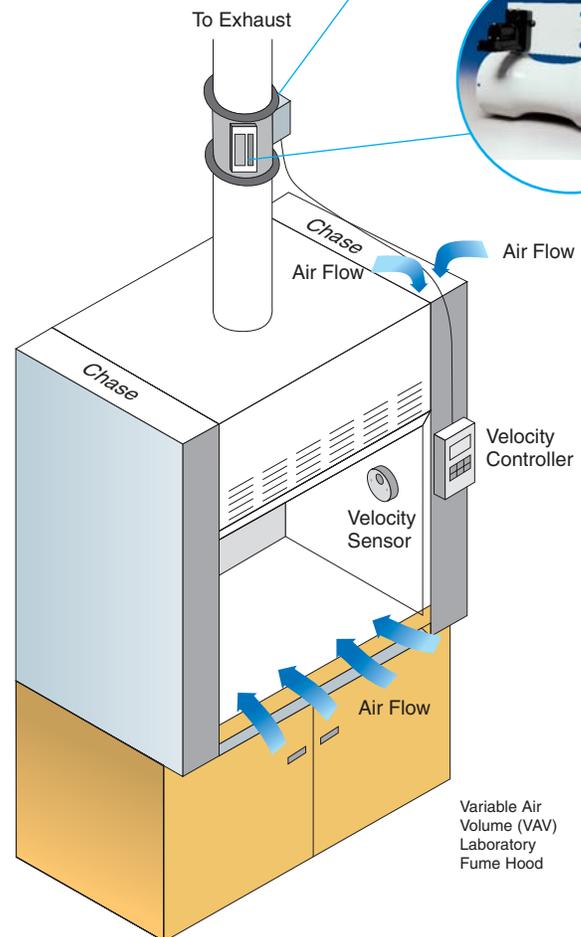
Fume hoods are a primary means of protection within laboratories. Face velocity measurements are often used to gauge the fume hood's ability to contain and exhaust harmful vapors. Standards written by NFPA, ANSI and even the U.S. OSHA require specific acceptable fume hood face velocities, with local alarms to warn if face velocity drops to an unsafe level.



To ensure the safety of your fume hoods, **EVERWATCH® Face Velocity Monitors** directly measure the average face velocity. TSI's sensor, mounted in the sidewall of the fume hood, detects face velocity disturbances caused by a moving sash, splash shield use, or even a user standing in front of the hood! If the face velocity falls outside of an acceptable range, audible and visual alarms warn users of the unsafe condition.



TSI **SUREFLOW™ Face Velocity Controllers** represent a higher level of fume hood safety and energy efficiency. SUREFLOW controllers modulate an exhaust control device to maintain the face velocity at an optimal level under most conditions. By reducing the air volume exhausted when the sash is lowered, the SUREFLOW controllers offer significant energy-saving opportunities.



Satisfy Your Unique Room Pressure Requirements

Chemicals escaping into the laboratory atmosphere must not drift to other areas. Laboratory controls are your building's second line of defense. Safety and design requirements, however, are not identical for every laboratory. TSI offers laboratory controllers to match the safety requirements, from critical to desirable, of a wide variety of applications.

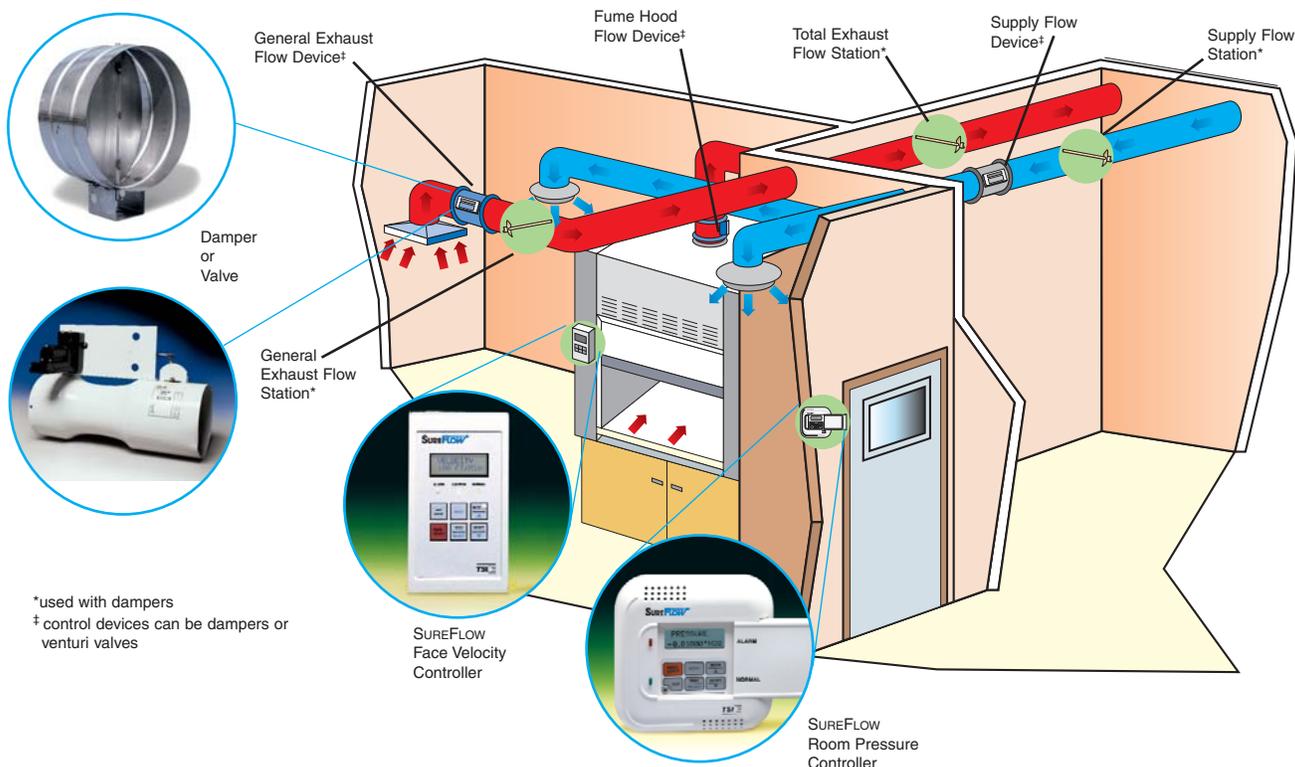
Many organizations directing fume hood practices, such as NFPA, ANSI and the U.S. OSHA, require laboratories to be maintained at a small negative pressure relative to surrounding areas. In practice, this negative

pressure is achieved by exhausting more air than is supplied. The extra air exhausted must infiltrate into the laboratory from surrounding spaces, helping to ensure that chemical vapors cannot diffuse throughout a facility.

Maintaining this room pressure differential in the face of changing fume hood exhaust flows can be challenging. The wrong controls could jeopardize the safety, energy efficiency and comfort of your laboratory spaces. TSI SUREFLOW controls maintain your laboratory environment using one of the following techniques:

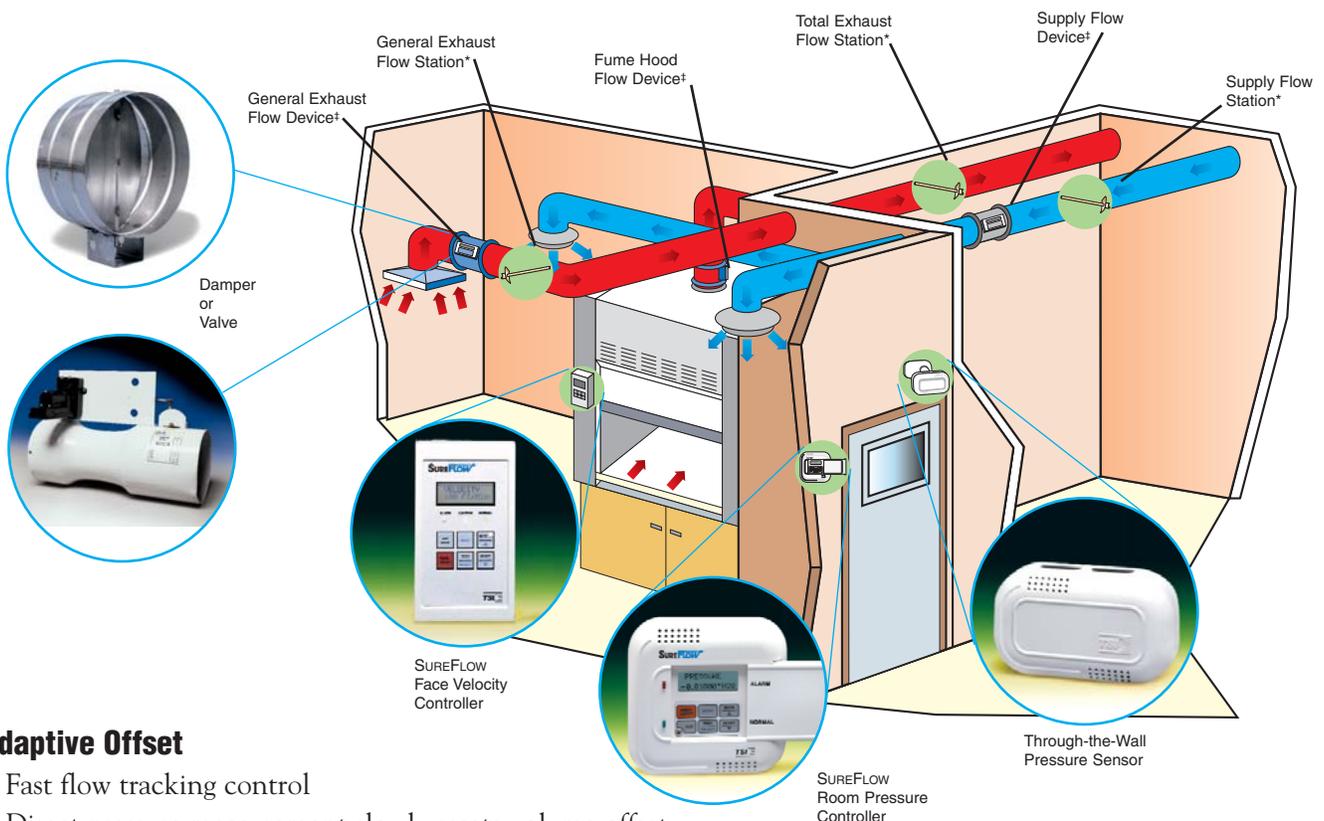
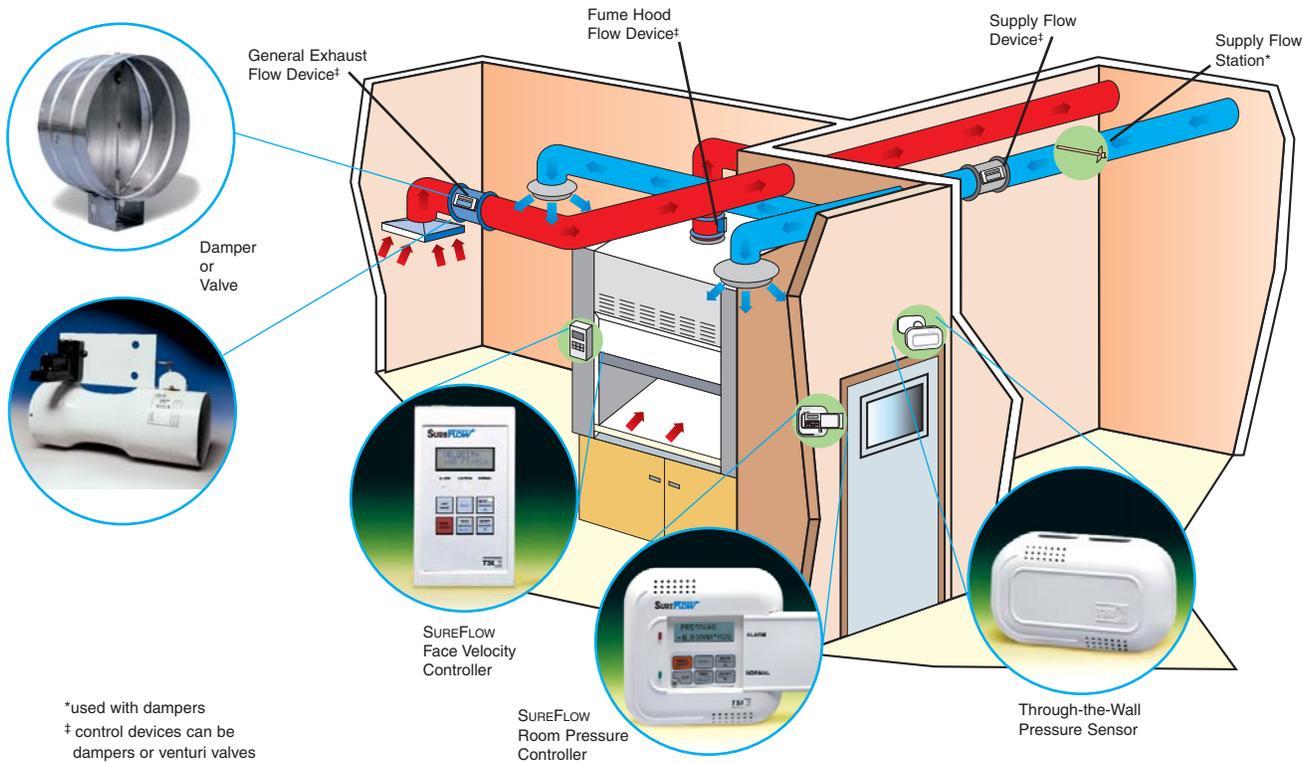
Flow Tracking

- Maintains a fixed volumetric difference (offset) between supply and exhaust flows
- Used in areas where uninterrupted containment is not critical
- Design of choice for open architecture laboratories
- Room pressure may fluctuate



Direct Pressure

- Maintains a measured pressure differential between lab and corridor
- Ideal for small, closed labs with critical safety requirements
- Design of choice when monitoring constant volume laboratories
- Volumetric flow rates may fluctuate



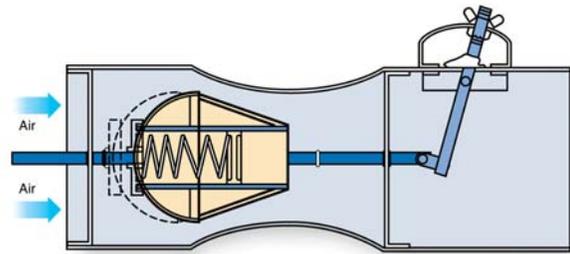
Adaptive Offset

- Fast flow tracking control
- Direct pressure measurement slowly resets volume offset
- Combines the safety of direct pressure with the air flow stability of flow tracking

Customize Your Laboratory Designs

The Best Component for the Application

Just as different control strategies are needed for various applications, different control components best fit your various criteria. TSI controls do not limit you to a single style of control device, but allow you to select components to fit your specific application.



Dampers and Flow Stations

- Controller modulates damper for pressure independence
- Low pressure drop reduces operating expenses
- Quick-acting characteristics suited to large load changes
- VAV box may be substituted for separate components

Unique Software Solutions

Contact TSI when you are faced with an uncommon application. We can help break your design down to its basic requirements and program our controllers to meet your exact criteria.

Venturi Valves

- Valve mechanically responds to changing static pressure
- Compact installation with minimal straight duct runs required
- Linear over wide range of flow rates and static pressures
- Multiple valves may be ganged for high air flows

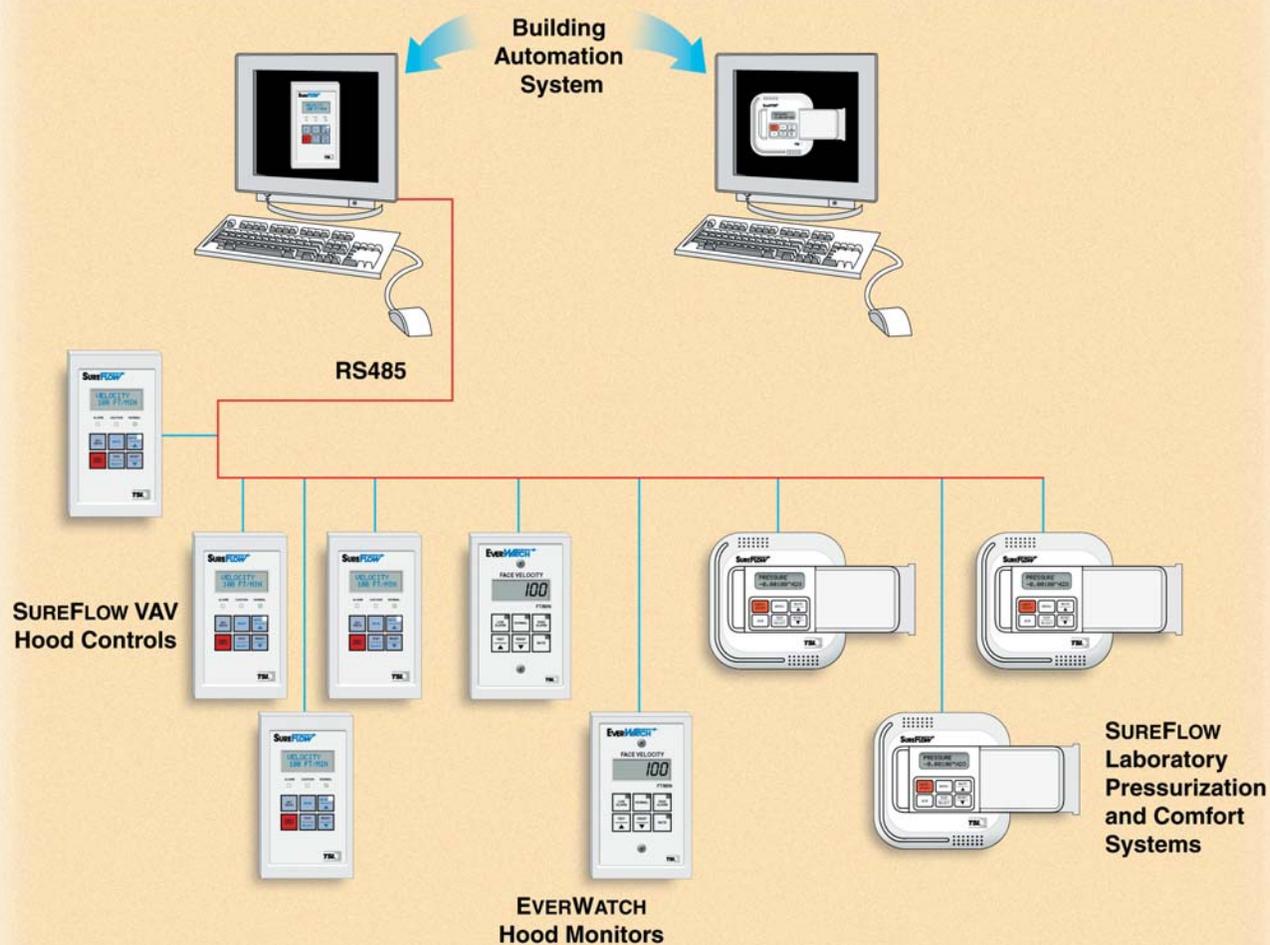
Expert Support on Demand

It takes more than a great product to assure a successful laboratory project. Proper application of the controls is important. TSI's worldwide network of representatives is committed to working with you through the design, installation and operation of your laboratory facility. TSI factory support is also available to guide you.

Integrate to Your Building Automation System

Local control of your laboratory spaces is only the first step to optimal building efficiencies. Linking the laboratory controls to your building automation system (BAS) enables the implementation of building-wide control strategies, including:

- Night setback of face velocities, flow rates and temperature to reduce operating expenses
- Automated data collection, trend analysis and report generation
- Remote temperature adjustment to improve occupant comfort
- Remote diagnostics



TSI lab controls are easily integrated to the building automation system using digital communications and standard protocols.

TSI laboratory controls are designed to communicate with many manufacturer's BAS using digital communications. Our laboratory controls support analog communications and the following protocols:

- Modbus™
- LONWORKS®
- BACnet™
- Johnson Controls Metasys® N₂

Contact your local representative or TSI for more information on communicating with your BAS.

TSI Meets Your Needs for...

Clean Room Controls

Good Manufacturing Practices require proper clean room pressurization to limit the migration of contaminants. TSI's **PRESSURA™**



Clean Room

Monitors and Controllers continuously measure the room pressure differential using either TSI's unique thermal sensor or pressure transducers.

Isolation Room Controls

Protecting against the spread of airborne disease is of utmost importance in health-care facilities.



Leading healthcare facilities use TSI's

PRESSURA™ Room Pressure Monitors and Controllers to maintain negative pressure for infectious patients and positive pressure for immune-compromised patients.

Ventilation Testing

Building air flows must be properly balanced to provide peak operating efficiencies and adequate ventilation. Leading companies use TSI's **VELOCICALC® Plus Multi-parameter Ventilation Meters** and **ACCUBALANCE® Plus Air Capture Hoods** to adjust volumetric flow rates through HVAC systems. Many also use the **VELOCICALC Plus** meter to verify fume hood face velocities.



Air Quality Assessments

Air quality in indoor spaces is a growing concern. TSI provides a complete line of portable instruments for assessing indoor air quality. The **Q-TRAK™ Plus** and **IAQ-CALC™ Indoor Air Quality Meters** provide powerful solutions using traditional IAQ parameters like temperature, humidity, CO₂, CO and ventilation rates. The **DUSTTRAK™ Aerosol Monitor** detects airborne particles from 1 to 10 microns in size, while the **P-TRAK™ Ultrafine Particle Counter** can track ultrafine particles smaller than 0.1 micron in diameter to their source.



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