

# Instrumentation for Health-Care Facilities



*Solutions for  
Room Pressure and  
Indoor Environments*



## Limiting Facility—Spread Infections

It's one of your biggest concerns... you're responsible for the well-being of patients, visitors, and staff in your facility. You deal daily with patients needing isolation or protective care—pressure relationships must be validated, ventilation rates confirmed. Your surgical suites must be kept free of airborne pollutants and surface contaminants. Construction areas present unique containment challenges—the migration of dust and construction gasses must be monitored and prevented. Indoor Air Quality issues abound, and they can have life and death consequences.

You know you should monitor your critical environments, but it isn't easy picking the right instruments. Following all the regulations and recommendations relating to isolation rooms is even harder. The

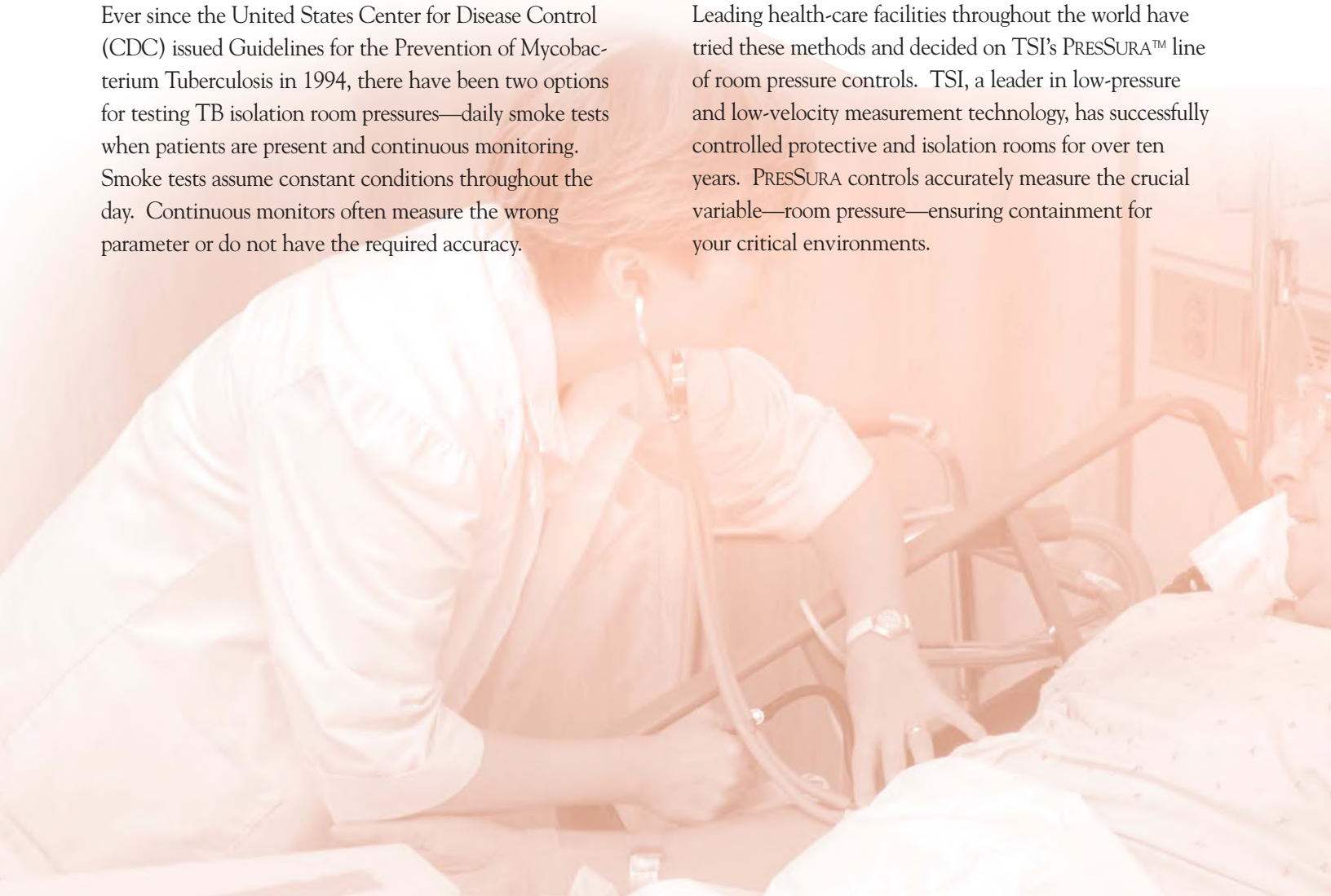
Occupational Safety and Health Administration (OSHA) has their requirements. The United States Centers for Disease Control (CDC) makes their own recommendations for negative isolation rooms. The American Institute of Architects recommends similar, but not identical, practices. And, of course, ASHRAE has its say. Compounding the problem, state and local governments add their own codes.

Bottom line, you could place your facility in jeopardy if you don't follow the differing criteria. Fail to maintain your isolation rooms properly, and you run the risk of spreading airborne diseases throughout your facility. You could be liable if infection spreads. What you need is a simple, effective method of complying with these mandates and recommendations.

### TSI—The Market Leader

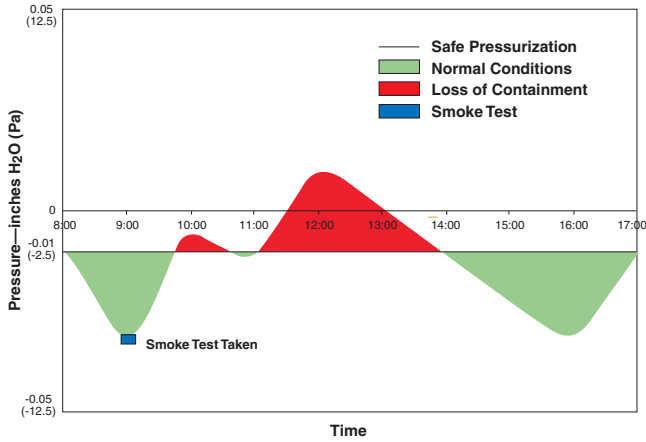
Ever since the United States Center for Disease Control (CDC) issued Guidelines for the Prevention of Mycobacterium Tuberculosis in 1994, there have been two options for testing TB isolation room pressures—daily smoke tests when patients are present and continuous monitoring. Smoke tests assume constant conditions throughout the day. Continuous monitors often measure the wrong parameter or do not have the required accuracy.

Leading health-care facilities throughout the world have tried these methods and decided on TSI's PRESSURA™ line of room pressure controls. TSI, a leader in low-pressure and low-velocity measurement technology, has successfully controlled protective and isolation rooms for over ten years. PRESSURA controls accurately measure the crucial variable—room pressure—ensuring containment for your critical environments.



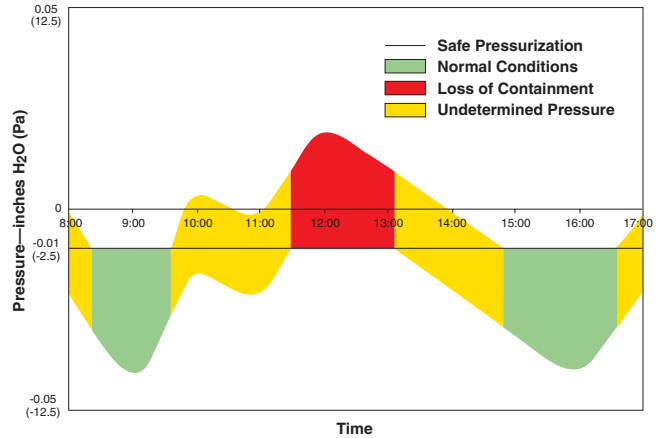
# Stopgap Measures— Simple but Ineffective

## Smoke Test Snapshots



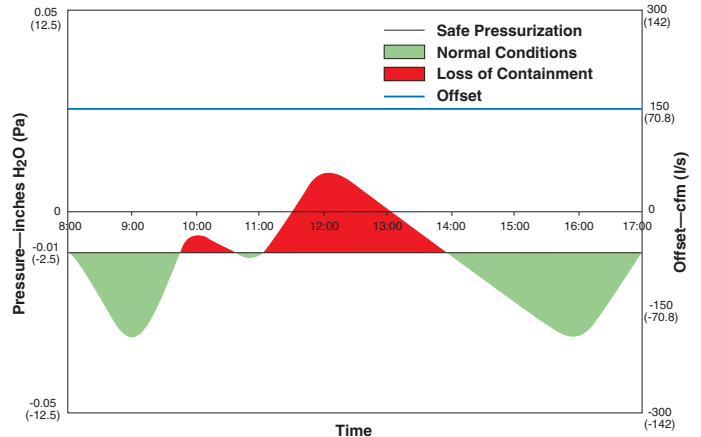
A daily smoke test only takes a snapshot of directional airflow at the time of the test. No warning is given when room pressure changes, risking the spread of infection.

## Inaccurate Pressure Transducers



Common HVAC pressure transducers do not have the resolution needed to measure the low room pressure differentials seen in critical environments. The pressure differential might not be sufficiently negative, or may even be positive, when measured with insufficient accuracy. In the yellow shaded area, you simply won't know if containment is maintained.

## Offset—The Wrong Measurement



An offset system indicates normal conditions whenever the supply and exhaust flows match. This condition can be met even when the room pressure fluctuates. Can you trust a system that doesn't measure pressure differential?



# The Proven Solution

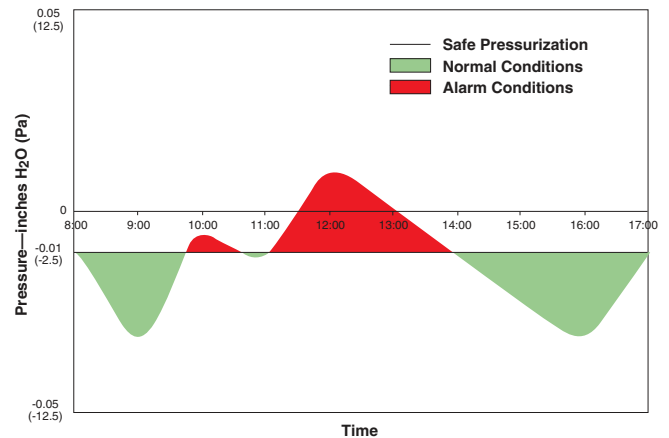
Leading health-care facilities throughout the world use TSI's PRESSURA Room Pressure Monitors and Controls. At the heart of any effective room pressure control system is the pressure measurement itself. For this critical role, TSI uses a unique, bi-directional sensor. The sensor resolution of 0.000014 inches H<sub>2</sub>O (0.0035 Pa) measures even the smallest room pressure changes. You no longer need to wonder if conditions have changed—you'll know!

TSI's PRESSURA Room Pressure Products are about more than just accurate measurements. We have worked diligently to mate these controls with an intuitive, easy-to-use interface. System configuration is accomplished directly through a keypad on the unit, eliminating the need for external programming tools. An easy-to-read display indicates the current pressure differential and the PRESSURA system status. Passcode protection even prevents unauthorized access.

If the room pressure differential exceeds a user-configured threshold, the PRESSURA monitors and controls will activate audible and visual alarms to alert the staff. In addition,

relay contacts will close, sending a signal over the building management system to alert maintenance. Optional RS-485 communications integrate the PRESSURA Room Pressure Controls into building automation systems.

## TSI's High-Resolution Measurement



The high resolution PRESSURA sensor measures the pressure differential with unmatched accuracy. Now you will know the status of your isolation rooms!



The large display, integral keypad and menu-driven software ease configuration.

# Applications

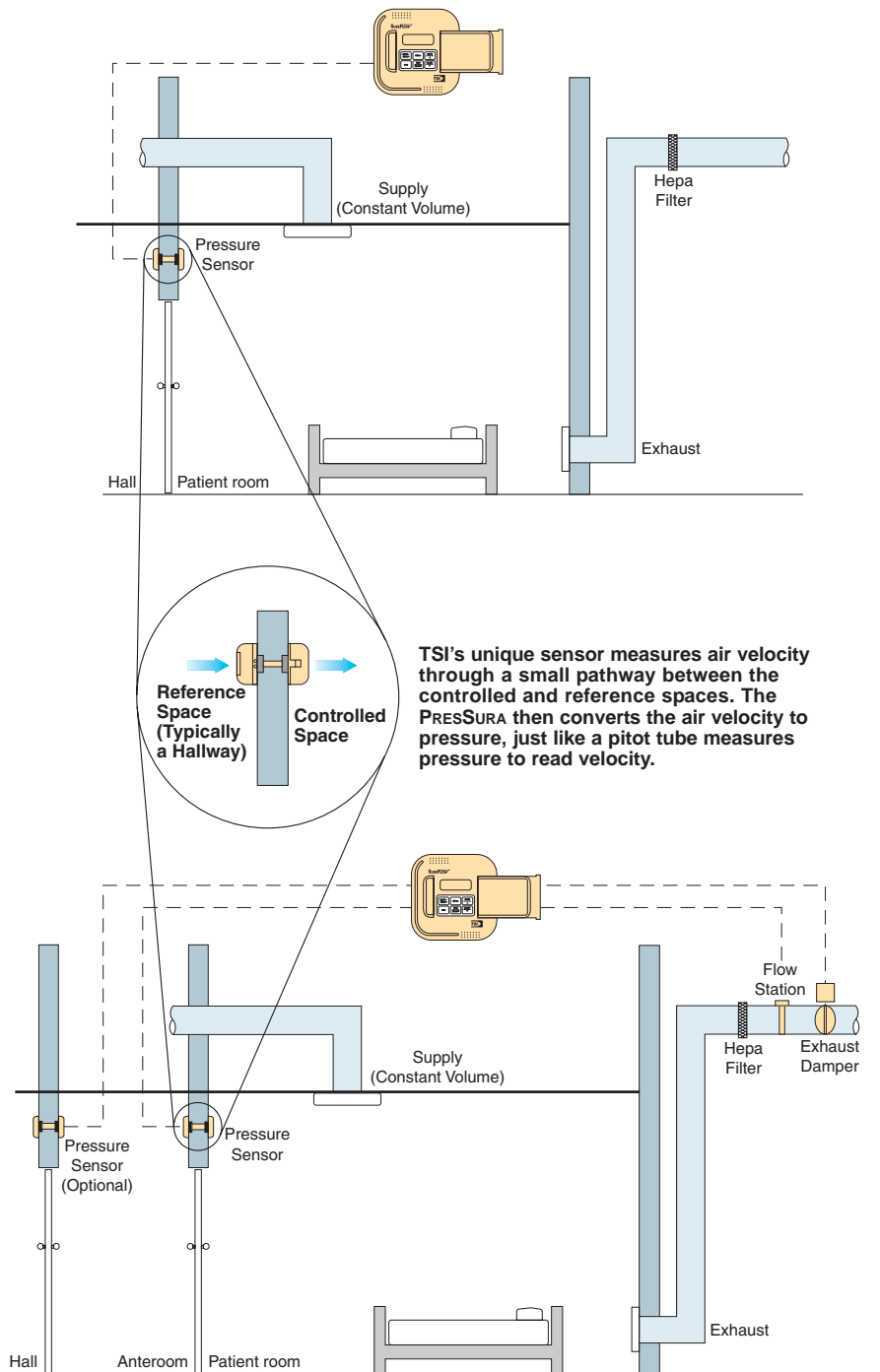
While airflow patterns are different for isolation and protection rooms, PRESSURA products are applied in a similar fashion—position the sensor to measure the critical pressure differential between the controlled and reference spaces.

The supply air in isolation and protective environment rooms is typically set up as constant volume, due to the required high ventilation rate. A thermostat directly controls the reheat valve to maintain a comfortable temperature.

In monitoring applications, the room exhaust volume remains constant. The PRESSURA monitor continuously measures the current room pressure differential. If the differential drifts beyond user-defined limits for more than a configurable period of time, the PRESSURA monitor will activate audible and visual alarms. An optional flow measurement verifies that the HVAC system provides sufficient air to dilute any contaminants within the room. A key switch option can disable all alarms when your critical environments are used for standard patient care.

When controller versions of the PRESSURA are used, the room exhaust will be variable air volume. Here, the PRESSURA controller continuously measures the current room pressure differential and modulates a damper in the exhaust duct to correct the pressure differential. Audible and visual alarms will warn the staff if the pressure differential should exceed user-configured limits.

*In a standard isolation room, the PRESSURA monitor measures the critical pressure differential between the isolation room and the corridor.*



*When anterooms are used, the PRESSURA controller measures each critical pressure differential.*

# TSI Meets Your Measurement Needs For...



## Assessing your Indoor Air Quality

Air quality can have life and death consequences in health-care environments. TSI's P-TRAK™ Ultrafine Particle Counters help you quickly trace indoor air pollutants and their pathways. DUSTTRAK™ Aerosol Monitors measure particulate mass concentrations to assess dust migration from construction and similar sources, minimizing your risk of exposure to contaminants such as Aspergillus.

Other TSI instruments focus on comfort level. IAQ-CALC™ and Q-TRAK™ Plus Indoor Air Quality Meters measure fundamental IAQ parameters such

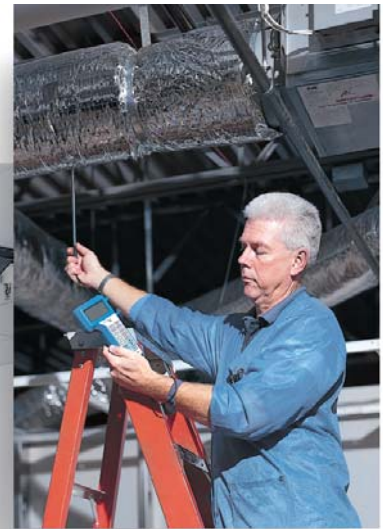
as CO<sub>2</sub>, CO, temperature, and relative humidity. They calculate wetbulb, dewpoint, absolute humidity, and humidity ratios, virtually eliminating the need for psychrometric charts, and they even determine % Outside Air using CO<sub>2</sub> or temperature measurements.



## Testing HVAC System Performance

TSI is a premier supplier to the HVAC test and balancing industry. Our VELOCICALC® Plus Multi-Parameter Ventilation Meters are some of the most powerful and versatile ventilation test instruments available. They measure air velocity, temperature, pressure and humidity simultaneously.

ACCUBALANCE® Plus Air Capture Hoods measure supply and return air flows to quickly assess room balance. Together, VELOCICALC Plus meters and ACCUBALANCE Plus hoods form a powerful duo for the professional charged with adjusting and maintaining your HVAC system.



### Fume Hood Face Velocity Controls

TSI EVERWATCH® Fume Hood Monitors and SUREFLOW™ Fume Hood Controllers directly measure the actual average hood face velocity to warn of unsafe conditions. SUREFLOW VAV controllers maintain a constant face velocity, slashing hood energy costs and improving hood safety.

### Laboratory Pressurization

Pressure control in laboratories differs significantly from isolation room pressure control. Laboratories have additional opportunities to save energy by minimizing the supply air volume. TSI SUREFLOW Room Pressure Controls maintain proper ventilation rates, room pressurization, and temperature in laboratory spaces.



### Quantitative Respirator Fit Testing

Proper room pressurization is just the first step in safeguarding against the spread of airborne infectious disease. Respirators must also be used to limit exposure. TSI's PORTACOUNT® Respirator Fit Tester provides a reliable, hassle-free quantitative fit test. When fitted with the N95-Companion, the PORTACOUNT is the only method for quantitatively fit testing N95 respirators.



### Combustion Analysis

TSI's CA-CALC™ Combustion Analyzers provide real-time analysis of flue gases for optimizing the combustion efficiency of combustion appliances. The CA-CALC measures CO, O<sub>2</sub>, flue draft pressure and temperature, and ambient air temperature with optional measurements of NO, NO<sub>2</sub>, and SO<sub>2</sub>.

# Limiting Facility—Spread Infections

Four models of the PRESSURA Room Pressure Monitors and Controllers are available to meet your specific needs. Monitor versions continuously measure the pressure differential, alarming if it exceeds a user-configured value. Controller versions add an output to modulate a damper to correct alarms before they happen.

## Model 8630-SM

- Continuously measures room pressure
- Audible, visual alarms warn of loss of containment
- Accepts optional key switch for use when room is not occupied
- Communicates with building management system using analog output

## Model 8630-PM

Features listed above, plus:

- Accepts pressure measurements from isolation room and anteroom
- Accepts volume flow measurements to monitor ventilation rate
- Communicates with building management system using analog output or RS-485 communications

## 8631-HM

Features listed above, plus:

- LONWORKS® communications

**Note:** 8631-HM does not support standard RS-485 communications or an analog output.

## Model 8630-SC

- Continuously measures room pressure
- Modulates exhaust damper to maintain pressure differential
- Audible, visual alarms warn of loss of containment
- Accepts optional key switch for use when room is not occupied
- Accepts volume flow measurement to monitor ventilation rate
- Communicates with building management system using analog output or RS-485 communications.

## Model 8630-PC

Features listed above, plus:

- Accepts pressure measurements from isolation room and anteroom
- Accepts volume flow measurements in both supply and exhaust ducts

## 8631-HC

Features listed above, plus:

- LONWORKS® communications

**Note:** 8631-HC does not support standard RS-485 communications or an analog output. Additionally, the 8631-HC only accepts one flow measurement.

TSI's network of local representatives is available for your support. To find your local representative, please either contact TSI directly or visit our web site, [www.tsi.com](http://www.tsi.com).



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