UNDERSTANDING, ACCELERATED

THE LEADER IN HIGH-PERFORMANCE INDOOR AIR QUALITY MEASUREMENTS

BREATHE A LITTLE EASIER WITH TSI

PROFESSIONAL MEASUREMENT SOLUTIONS THAT HELP YOU SAVE ENERGY, INCREASE OCCUPANT COMFORT AND ASSURE A HEALTHY ENVIRONMENT

Indoor air quality (IAQ) is a growing concern. With the increasing amount of time we spend indoors–over 90% according to a U.S. Environmental Protection Agency study–the problems associated with tighter building construction in the interest of conserving energy are exacerbated. In response, building owners, facility personnel, industrial hygienists and others are increasingly focused on IAQ for both comfort and health.

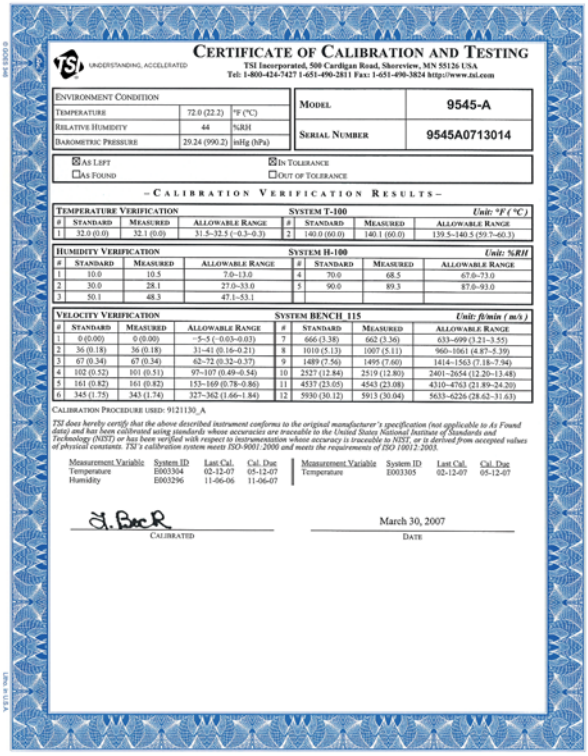
Comfort

Measures of comfort typically include temperature, humidity, ventilation and draft. TSI offers several instruments that help you quickly and accurately assess basic IAQ parameters. Maintaining comfort levels can significantly improve occupant satisfaction, as shown through increased concentration and productivity, and help reduce absenteeism.

Health Matters

Health and safety concerns are a growing part of air quality assessment. Airborne biological substances, gases, vapors and particles can cause adverse reactions in certain individuals, depending on their sensitivity to particular substances and concentrations. Some of these ever-present unwanted contaminants are potentially toxic, infectious, allergenic, irritating or otherwise harmful. Poor IAQ is listed as a top five health concern by most major associations and agencies worldwide. Recent studies claim that over one-third of the buildings in the United States have air quality problems. Now more than ever, it is increasingly important to be proactive, to identify and resolve potential problems before they get out of control. TSI Indoor Air Quality instruments are designed to help you identify and manage these tough problems.

Features	Benefits
TrakPro™ Data Analysis Software easily creates graphs and reports to document results (available with certain models)	Improved performance on critical applications results in reliable information that reduces typical operating costs
Real-time measurement of key IAQ parameters	Seeing results on the spot allows you to make fast decisions on IAQ and corrective actions
Fast turnaround calibration and repair service and exceptional customer support	Efficiency: The faster you get your instrument back, the greater your effectiveness
Certified Excellence: A Calibration Certificate is included with each instrument	Peace of mind: our promise that each instrument we manufacture meets the highest standard and is guaranteed accurate



CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-424-7427 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Condition		
Temperature	72.0 (22.2)	°F (°C)
Relative Humidity	44	%RH
Barometric Pressure	29.24 (990.2)	inHg (hPa)

Model	9545-A
Serial Number	9545A0713014

☒ As Left ☐ As Found
☒ In Tolerance ☐ Out of Tolerance

– Calibration Verification Results –

Temperature Verification — System T-100 — Unit: °F (°C)

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	32.0 (0.0)	32.1 (0.0)	31.5–32.5 (–0.3–0.3)	2	140.0 (60.0)	140.1 (60.0)	139.5–140.5 (59.7–60.3)

Humidity Verification — System H-100 — Unit: %RH

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	10.0	10.5	7.0–13.0	4	70.0	68.5	67.0–73.0
2	30.0	28.1	27.0–33.0	5	90.0	89.3	87.0–93.0
3	50.1	48.3	47.1–53.1				

Velocity Verification — System BENCH_115 — Unit: ft/min (m/s)

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	0 (0.00)	0 (0.00)	–5–5 (–0.03–0.03)	7	666 (3.38)	662 (3.36)	633–699 (3.21–3.55)
2	36 (0.18)	36 (0.18)	31–41 (0.16–0.21)	8	1010 (5.13)	1007 (5.11)	960–1061 (4.87–5.39)
3	67 (0.34)	67 (0.34)	62–72 (0.32–0.37)	9	1489 (7.56)	1495 (7.60)	1414–1563 (7.18–7.94)
4	102 (0.52)	101 (0.51)	97–107 (0.49–0.54)	10	2527 (12.84)	2519 (12.80)	2401–2654 (12.20–13.48)
5	161 (0.82)	161 (0.82)	153–169 (0.78–0.86)	11	4537 (23.05)	4543 (23.08)	4310–4763 (21.89–24.20)
6	345 (1.75)	343 (1.74)	327–362 (1.66–1.84)	12	5930 (30.12)	5913 (30.04)	5633–6226 (28.62–31.63)

Calibration Procedure used: 9121130_A

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system meets ISO-9001:2000 and meets the requirements of ISO 10012:2003.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003304	02-12-07	05-12-07
Humidity	E003296	11-06-06	11-06-07

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003305	02-12-07	05-12-07

Calibrated

March 30, 2007
Date

CERTIFIED ACCURACY WITH RELIABLE RESULTS

Your TSI calibration certificate ensures that you are reading and obtaining the most accurate and reliable data for a range of indoor air quality needs.

TSI MEETS YOUR MEASUREMENT NEEDS

WE SET THE STANDARD FOR FAST, ACCURATE AND RELIABLE IAQ TEST RESULTS

General Comfort

IAQ monitors provide accurate measurement and data logging of VOC, CO_2, temperature, humidity, and CO, as well as calculations of dew point, wet bulb and percentage of outside air. More than half of IAQ complaints can be attributed to comfort problems.

Ventilation

Air movement or draft has a significant effect on how people perceive comfort. Too much of it and people sense that it is "drafty," too little and it is "stuffy." To ensure that the proper volumes of air are being supplied to each individual occupied area, measurements should be taken at air diffusers.

Aerosols and Gases

Inhalation of aerosols (dust, particles) or gases can challenge the body's natural defenses by causing reactions ranging from relatively mild to severe. Respirable substances that need to be monitored include emissions from certain industrial processes like welding, grinding and cutting, construction, and other situations where dust, smoke, fumes and mist are produced.

INDOOR AIR QUALITY AFFECTS THE COMFORT, SAFETY AND HEALTH OF BUILDING OCCUPANTS AND DIRECTLY IMPACTS CONCENTRATION AND PRODUCTIVITY.

Maintaining a comfortable environment includes making measurements and taking corrective action for thermal comfort involving temperature, humidity, draft and ventilation. Providing a healthy and safe environment starts with locating and controlling sources of unwanted contamination from chemicals, biological substances and airborne particles. Be proactive in assessing air quality so that you are prepared for occupant concerns.

Pressure

Small airborne particles and gases are transported by air movement and also migrate from areas of relatively high to low pressure. Managing differential pressure between indoors and outdoors, and between different areas of the building by regulating supply and return air volumes is a key method of controlling the migration of unwanted contaminants. This is especially critical in healthcare facilities where infectious, contagious or toxic substances need to be contained and controlled.

Ultrafine Particles

Unless air is specially filtered, any given air sample contains many airborne particles. Many of these are classified as ultrafine or less than one-tenth of a micron in diameter. A Condensation Particle Counter (CPC) allows a user to follow pathways of particles directly to their source where they can be controlled by repair, removal or replacement of the source.

Parameter	Limit/Range		Reference	TSI Instrument
Temperature	**Summer** 73 to 79°F (23 to 26°C) **Winter** 68 to 74.5°F (20 to 23.6°C)		ASHRAE Standard 55-2010	Q-Trak IAQ-Calc TH-Calc VelociCalc
Relative Humidity	30% to 65%		ASHRAE Standard 55-2010 ISO 7730	Q-Trak IAQ-Calc TH-Calc VelociCalc
Air Movement	0.8 ft/s (0.25 m/s)		WHO ISO 7730	VelociCalc DP-Calc AccuBalance
Ventilation (outdoor air)	Recommended volume/ person minimum depending on type of space and activity		ASHRAE Standard 62-2003 (Table 2)	Q-Trak IAQ-Calc TH-Calc
Ventilation (CO_2)	No more than 700 ppm over outdoor ambient		ASHRAE Standard 62-2003	Q-Trak IAQ-Calc
Carbon Monoxide	**8 hr. TWA**	**1 hr. TWA**	OSHA NIOSH EPA ASHRAE ACGIH WHO	Q-Trak IAQ-Calc
	50 ppm	+		
	35 ppm	+		
	9 ppm	35 ppm		
	9 ppm (peak)	+		
	25 ppm	+		
	9 ppm	26 ppm		
Particulates (Dust)	Total PM PM10 Respirable (4µm) PM2.5		OSHA NIOSH EPA ASHRAE ACGIH WHO	DustTrak II DustTrak DRX SidePak AM520

INDOOR AIR QUALITY SOLUTIONS FROM TSI

MICROMANOMETER

Model EBT730

Model EBT730

+ Accurately measures differential and static pressure
+ Wide measurement range of -15 to +15 in. H_2O (-3,735 - 3,735 Pa)
+ Automatic conversion of actual and standard flows
+ Flow rate automatically calculated
+ Measures velocity with Pitot tube in high temperature and contaminated areas
+ Auto-zeroing

DUSTTRAK™ AEROSOL MONITOR

Model 8530, 8532

+ Measures aerosol mass concentrations in real time
+ PM10, PM2.5, PM1.0 and respirable size fractions
+ Portable, battery operated
+ Long-term unattended sampling
+ Data logs and downloads to a PC for analysis and reporting

Model 8530 Model 8532

BALOMETER® AIR CAPTURE HOOD

Model EBT731

Model EBT731

+ Accurate direct air flow readings from a vent, diffuser or grille
+ Automatically detects supply or return flows
+ Lightweight
+ Variety of hood sizes available

SIDEPAK™ PERSONAL AEROSOL MONITOR

Model AM520

Model AM520

+ Measure aerosol mass concentrations in real time
+ STEL alarms visual alerts
+ PM10, PM2.5, PM1.0 respirable fractions and 0.8 µm DPM impactor
+ Built for taking measurements at breathing zone
+ 20 hour run time
+ Data logs and downloads to a PC for analysis and reporting

VELOCICALC® AIR VELOCITY METERS

Models 9535, 9545, 9565

Model 9545

+ Accurate air velocity measurements
+ Easy recording of multiple measuring points
+ Calculates valuable statistics–average, maximum and minimum values, and records the number of samples
+ Flow rate calculated automatically
+ Durable telescoping probe with etched length marks
+ Humidity measurement (Model 9545, 9565)
+ Available with optional articulating probe

P-TRAK™ ULTRAFINE PARTICLE COUNTERS

Model 8525

+ Counts ultrafine particles less than 1 micron diameter in real time
+ Tracks particles to the source
+ Portable, battery operated
+ Data logs to document results

Model 8525

AEROTRAK™ HANDHELD PARTICLE COUNTERS

Model 9306

+ Measures up to 6 size channels from 0.3 -10 µm
+ 0.1 CFM (2.83 LPM) flow rate
+ 10,000 sample record storage
+ 250 alphanumeric location labels
+ USB output
+ Easily configurable with Microsoft® Windows® CE interface
+ 3.7-inch color touchscreen for easy on-screen report viewing

Model 9306

AEROTRAK™ HANDHELD PARTICLE COUNTERS

Model 9303

+ Measures up to 3 size channels from 0.3 -10 µm
+ 0.1 CFM (2.83 LPM) flow rate
+ 1,500 sample record storage
+ 999 location labels
+ USB serial output
+ Large 3.6-inch display for easy on-screen data review
+ Weighs only 1.3 lbs (0.58 kg)

Model 9303

Model 7575

IAQ-CALC™ INDOOR AIR QUALITY METERS

Models 7515, 7525, 7545

+ Fast, accurate measurements in a single probe
+ Model 7515 measures carbon dioxide (CO_2) only
+ Models 7525 and 7545 simultaneously measure and data log CO_2, temperature, and humidity and calculate % outside air
+ Model 7545 also measures carbon monoxide (CO)
+ LogDat2 downloading software included (except Model 7515)

Q-TRAK™ INDOOR AIR QUALITY MONITORS

Model 7575

+ One instrument with multiple plug-in probe options including:
  + CO_2, temperature, humidity, and CO
    + Calculate % outdoor air
    + Calculate dew point and wet bulb temperature
  + Thermal anemometers
  + Rotating vanes
  + Thermocouples
  + Draft
  + Volatile Organic Compounds (VOC)
    + PID for ppm or ppb
+ Displays up to five measurements simultaneously
+ Data log and review statistics
+ Downloads for analysis and reporting using TrakPro™ software

PARAMETERS AND FEATURES CHART

THE CHART BELOW IS A GUIDE FOR SELECTING AN INSTRUMENT TO BEST FIT YOUR MEASUREMENT NEEDS.

	Model	CO_2 (Carbon Dioxide)	Temperature	Humidity, Wet Bulb, Dew Point	CO (Carbon Monoxide)	% Outside Air	VOC (Volatile Organic Compounds)	Air Velocity	Flow Rate	Differential Pressure	Particles (Dust)	Data Logging/ Downloading	Review Data	Statistics	Field Calibration	Optional Plug-In Probes
Q-Trak	7575	+	+	+	+	+	O	O	O			+	+	+	+	+
IAQ-Calc	7515	+													+	
	7525	+	+	+		+						+	+	+	+	
	7545	+	+	+	+	+						+	+	+	+	
DustTrak	8530										+	+	+	+	+	
	8532										+	+	+	+	+	
SidePak	AM520										+	+	+	+	+	
P-Trak	8525										+	+	+	+		
AeroTrak	9303										+	+	+	+		
	9306										+	+	+	+		
VelociCalc	9515		+					T								
	9535		+					T	T			+	+	+	+	
	9535-A[1]		+					T	T			+	+	+	+	
	9545		+	+				T	T			+	+	+	+	
	9545-A[1]		+	+				T	T			+	+	+	+	
	9565	O	+	+	O	O	O	T, P	T, P, C	+		+	+	+	+	+
	9565-A[1]	O	+	+	O	O	O	T, P	T, P, C	+		+	+	+	+	+
VelociCalc Rotating Vane	5725		+					V	V			+	+	+	+	
AccuBalance	8380[2]		+	O				P	D, P, C	+		+	+	+	+	+
Micro-manometer	8715		O	O				P	P, C	+		+	+	+	+	+

All instruments include a free NIST or EA traceable Certificate of Calibration. [1]Articulating Probe [2]Back Pressure Compensated

+ = Standard Feature
T = Thermal Anemometer
P = Pitot Tube Reading
C = Calculated from Differential Pressure
R = Rotating Vane Anemometer
O = Optional
D = Direct Reading

Optional Probes for VelociCalc 9565 Series and Q-Trak 7575

Model	Probe Description
960	Air Velocity and Temperature, straight probe
962	Air Velocity and Temperature, articulating probe
964	Air Velocity, Temperature, and Humidity, straight probe
966	Air Velocity, Temperature, and Humidity, articulating probe
995	100 mm Rotating Vane probe
792	Surface Temperature probe
794	Air Temperature probe
980	Indoor Air Quality probe, CO_2, Temperature, Humidity
982	Indoor Air Quality probe, CO_2, Temperature, Humidity, CO
984	Low Concentration (ppb) VOC and Temperature
985	High Concentration (ppm) VOC and Temperature
986	Low Concentration (ppb) VOC, Temperature, CO_2, and Humidity
987	High Concentration (ppm) VOC, Temperature, CO_2, and Humidity

UNDERSTANDING, ACCELERATED

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