CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 20 February 2026
Certificate Number: AC-2850

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AND

ANSI/NCSL Z540-1-1994 (R2002)

TSI Incorporated
500 Cardigan Road
Shoreview, MN 55126
Larry Lemanski

CALIBRATION

Valid to: **February 20, 2026** Certificate Number: **AC-2850**

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Airborne particle counting efficiency [1]	(0.50 to 0.80) efficiency Particle size 10 nm > 0.90 efficiency Particle size 15 nm (0.38 to 0.62) efficiency Particle size 23 nm > 0.90 efficiency Particle size 41 nm (0.90 to 1.1) efficiency Particle size 55 nm	 0.068 0.05 0.054 0.19 0.046	Electrometer, 3068B ISO 27891:2015
Airborne particle concentration counting efficiency [1,2] Calibration factor for condensation particle counters (CPC/PNC)	(0.9 to 1.1) efficiency Particle Concentration Range 300 counts/cm^3 600 counts/cm^3 1 000 counts/cm^3 2 000 counts/cm^3 4 000 counts/cm^3 6 000 counts/cm^3 8 000 counts/cm^3 10 000 counts/cm^3 25 000 counts/cm^3 50 000 counts/cm^3	 0.11 0.11 0.13 0.03 0.04 0.03 0.03 0.03 0.04 0.04	Electrometer, 3068B ISO 27891:2015

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Airborne particle counting efficiency [1]	(0.30 to 0.70) efficiency Particle size 0.1 µm Particle size 0.15 µm Particle size 0.2 µm Particle size 0.3 µm Particle size 0.5 µm (0.90 to 1.1) efficiency Particle size 1.0 µm	 0.066 0.078 0.069 0.067 0.067 0.066	Calibration performed using monodispersed spherical particles method ThermoFisher Scientific Polystyrene Latex Microspheres ISO 21501-4:2018/Amd 1:2023, TSI 3068B
Threshold determination for spherical particles, size error	0.1 µm 0.15 µm 0.2 µm 0.25 µm 0.3 µm 0.5 µm 0.7 µm 1.0 µm 3.0 µm 5.0 µm 10 µm	0.002 µm 0.002 5 µm 0.004 7 µm 0.003 1 µm 0.003 1 µm 0.004 µm 0.007 µm 0.013 µm 0.095 µm 0.031 µm 0.26 µm	ISO 21501-4:2018/ AMD1:2023 ThermoFisher Scientific™ Polystyrene Latex Microspheres (“PSL”)

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pneumatic Pneumatic Pressure (Anemometer)	(0 to 15) inH_2O	0.21 % of reading + 0.003 1 inH_2O	MKS Pressure Transducer 220DD-00100A2B
Pneumatic Barometric Pressure (Anemometer)	(8 to 40) inHg	0.042 inHg	Setra 276 Barometric Pressure Sensor
Air Velocity	(35 to 8 000) fpm	2.6 % of reading	MKS Instruments Pressure Transducer 220DD-00010A2B MKS Pressure Transducer-220DD-22769 Omega Thermistor ON-901-44030
Pneumatic Differential Pressure (Low Flow Meter)	(-153 to 153) cmH2O	0.58 cmH2O	PPC4-ui A1.4 Ms/A200Kp Pressure Controller

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pneumatic Differential Pressure (High Flow Meter)	(-11 to 152) psig	0.023 psig	PPC4-ui A1.4 Ms/A200Kp Pressure Controller
Mass Flow (Gas Type: Air, O_2, N_2)	(0.01 to 0.02) slpm (0.021 to 0.03) slpm (0.031 to 0.1) slpm	6.1 % of reading 4.1 % of reading 2.4 % of reading	Flow Calibrator with FPP T-916-TD Bronkhorst Mercury Sealed Piston Prover
Mass Flow (Gas Type: Air, O_2, N_2)	(0.11 to 0.2) slpm (0.21 to 0.4) slpm (0.41 to 0.8) slpm (0.81 to 1.6) slpm (1.61 to 3) slpm	2 % of reading 1.5 % of reading 1.2 % of reading 1.1 % of reading 1 % of reading	Flow Calibrator with FPP T-950-TD Bronkhorst Mercury Sealed Piston Prover
Mass Flow (Gas Type: Air, O_2, N_2)	(3 to 300) slpm	0.81 % of reading	Flow Calibrator with Fluke (0.019, 0.039, 0.078) inch Sonic Nozzles
Mass Flow (Gas Type: CO_2)	(0.01 to 0.02) slpm (0.021 to 0.03) slpm (0.031 to 0.1) slpm	5.9 % of reading 4 % of reading 2.4 % of reading	Flow Calibrator with FPP T-916-TD Bronkhorst Mercury Sealed Piston Prover
	(0.11 to 0.2) slpm (0.21 to 0.4) slpm (0.41 to 0.8) slpm (0.81 to 1.6) slpm (1.61 to 3) slpm	2.3 % of reading 1.7 % of reading 1.3 % of reading 1.1 % of reading 1 % of reading	Flow Calibrator with FPP T-950-TD Bronkhorst Mercury Sealed Piston Prover
Mass Flow (Gas Type: CO_2)	(3 to 50) slpm	0.76 % of reading	Flow Calibrator with Fluke (0.019, 0.039) inch Sonic Nozzles
Mass Flow (Gas Type: N_2O)	(0.01 to 0.02) slpm (0.021 to 0.03) slpm (0.031 to 0.1) slpm	5.9 % of reading 4 % of reading 2.4 % of reading	Flow Calibrator with FPP T-916-TD Bronkhorst Mercury Sealed Piston Prover
	(0.11 to 0.2) slpm (0.21 to 0.4) slpm (0.41 to 0.8) slpm (0.81 to 1.6) slpm (1.61 to 3) slpm	2.3 % of reading 1.7 % of reading 1.2 % of reading 1.1 % of reading 1 % of reading	Flow Calibrator with FPP T-950-TD Bronkhorst Mercury Sealed Piston Prover
	(3 to 25) slpm	0.75 % of reading	Flow Calibrator with Fluke (0.019, 0.039) inch Sonic Nozzles

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Size Resolution	0.2 µm 0.3 µm 0.5 µm	0.01 µm 0.012 µm 0.01 µm	ISO 21501-4:2018/Amd 1:2023
Volume Flow (Gas Type: Air)	(2.83 to 100) SLPM	0.81 % of reading	ISO 21501-4:2018/Amd 1:2023
False Counts	(0 to 20) counts/m³	2.9 counts	ISO 21501-4:2018/Amd 1:2023

Thermodynamics

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature	0 °C 60 °C	0.12 °C	ThermoFisher Scientific Temperature Baths, PRT
Humidity	(9.8 to 95) %RH	0.61 %RH	Thunder Scientific 2500 Humidity Chamber

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

1. Unitless linear measure.
2. The nominal values listed are approximate.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2850.

Jason Stine, Vice President