

**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017,
ANSI/NCSL Z540-1-1994 (R2002) AND ANSI/NCSL Z540.3-2006 (R2013)**

Graftel
870 Cambridge Drive
Elk Grove Village, IL 60007
David Glover 847-364-2600

CALIBRATION

Valid to: **March 28, 2023**

Certificate Number: **L2115-1**

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gas Flow Rate	200 sccm to 6 slm	0.15 % of reading	Balance and timer – Gravimetric method
Gas Flow Rate	1 sccm to 24 slm	0.28 % of reading	Flow Tubes
Gas Flow Rate	(23.9 to 141 584) slm	0.21 % of reading	Sonic Nozzles
Gas Flow Rate ¹	(0.1 to 54) sccm (54 to 5 388) sccm	0.25 of reading + 0.002 sccm 0.15 of reading	Mesa Dry-Cal
Gas Flow Rate ¹	(205 to 1 415) slm (566 to 4 247) slm (3 029 to 17 546) slm	0.46 % of reading 0.46 % of reading 0.46 % of reading	Coriolis Flow Systems
Liquid Flow Rate	1 ccm to 300 lpm	0.06 % of reading	Weighing Method
Liquid Flow Rate	(300 to 3 407) lpm	0.064 % of reading	Gravimetric method
Liquid Flow Rate	(189 to 3 407) lpm	0.1 % of reading	Coriolis Flow System
Liquid Flow Rate ¹	(0.06 to 400) lpm	0.1 % of reading	Coriolis Flow System
Liquid Flow Rate ¹	(2 to 48) in lines	1 % of reading	Ultrasonic Flow Meters
Liquid Flow Rate	(0 to 30) fps	0.7 % of reading	Remote Calibration Module (RCM)
Air Velocity	(2 to 50) m/s	1.3 % of reading + 0.01 m/s	Wind Tunnel Pitot Tube
Air Velocity	(0.5 to 50) m/s	1.3 % of reading + 0.01 m/s	Sonic Nozzles

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Air Velocity	(2 to 50) m/s ¹	2 % of reading + 0.01 m/s	Pitot Tube
Air Velocity	(2 to 45) m/s ¹	2.2 % or reading	3D Ultrasonic Anemometer
Pressure	(1.7 to 100) psi (2 to 1 000) psi	0.001 % of reading + 0.000 4 psi 0.002 6 % of reading + 0.000 4 psi	Ruska 2465 Deadweight Pressure Calibrator
Pressure ¹	(500 to 1 100) hPa	0.123 hPa	Vaisala Pressure Transducer
Pressure ¹	(0 to 100) psia (100 to 1 000) psia	0.011 psia 0.102 psia	Paroscientific 760 Pressure Transmitter
Differential Pressure ¹	(-250 to -30) inH ₂ O@4 °C (-30 to -10) inH ₂ O@4 °C (-10 to 0.025) inH ₂ O@4 °C (0.025 to 10) inH ₂ O@4 °C (10 to 30) inH ₂ O@4 °C (30 to 250) inH ₂ O@4 °C	0.11 % of reading 0.018 % of reading 0.018 % of reading 0.019 % of reading 0.019 % of reading 0.018 % of reading	Fluke 7252i Pressure Controller

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current-Measure ¹	(0 to 200) μA (0.2 to 2) mA (2 to 20) mA (20 to 200) mA (0.2 to 2) A	0.042 % reading + 0.02 μA 0.023 % reading + 0.2 μA 0.056 % reading + 8 μA 0.041 % reading + 32 μA 0.12 % reading + 0.8 mA	Fluke 8808A Digital Multimeter
Resistance Measurement ¹	(0 to 200) Ω (0.2 to 2) kΩ (2 to 200) kΩ (0.2 to 2) MΩ	0.036 % reading + 0.016 Ω 0.037 % reading + 0.069 Ω 0.042 % reading + 0.012 Ω 0.095 % reading + 0.07 Ω	Fluke 8808A Digital Multimeter
DC Voltage-Measure ¹	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V	0.18 % reading + 0.009 mV 0.02 % reading + 0.12 mV 0.04 % reading + 1.6 mV 0.026 % reading + 12 mV	Fluke 8808A Digital Multimeter

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Relative Humidity	(10 to 95) % RH	1.1 % RH	Thunder Scientific 1200 Humidity Chamber
Temperature – Measuring Equipment ¹	(-80 to 95) °C	0.023 °C	Temperature Baths & PRT
Dew Point Temperature	(-80 to -20) °C	0.22 °C	Two Temperature Generator & PRT
	(-20 to 50) °C	0.2 °C	Thunder Scientific 1200 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. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. Calibrations may be performed 95 Chancellor Dr. Roselle, IL 60172 during relocation.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. L2115-1.



R. Douglas Leonard Jr., VP, PILR SBU