



SCOPE OF ACCREDITATION TO ISO 17025:2017
& ANSI/NCSL Z540-1-1994 & ANSI/NCSL Z540.3-2006

GRAFTEL
95 Chancellor Dr.
Roselle, IL 60172
David Glover Phone: (847) 364 2600

CALIBRATION

Valid To: September 30, 2021

Certificate Number: 5827.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,7}:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4,6} (±)	Comments
DC Current – Measure ³	(0 to 200) μ A (0.2 to 2) mA (2 to 20) mA (20 to 200) mA (0.2 to 2) A	0.042 % + 0.02 μ A 0.023 % + 0.2 μ A 0.056 % + 8 μ A 0.041 % + 32 μ A 0.12 % + 0.8 mA	Fluke 8808A digital multimeter
Resistance – Measure ³	(0 to 200) Ω (0.2 to 2) k Ω (2 to 200) k Ω (0.2 to 2) M Ω	0.036 % + 0.016 Ω 0.037 % + 0.069 Ω 0.042 % + 0.012 Ω 0.095 % + 0.07 Ω	Fluke 8808A digital multimeter
DC Voltage – Measure ³	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V	0.18 % + 0.009 mV 0.02 % + 0.12 mV 0.04 % + 1.6 mV 0.026 % + 12 mV	Fluke 8808A digital multimeter

II. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2, 4, 6} (±)	Comments
Gas Flow Rate – Measuring Equipment ⁸	(2.471 to 25 491) slm	0.21 %	Sonic nozzles
Gas Flow Rate – Measuring Equipment ^{3,8}	(0.1 to 54) sccm (54 to 5391) sccm (1 to 1168) slm (205 to 1415) slm (566 to 4247) slm (3029 to 17 546) slm	0.25 % + 0.002 sccm 0.15 % 0.5 % 0.46 % 0.46 % 0.46 %	Mesa Dry-Cal Laminar elements Coriolis flow systems
Liquid Flow Rate – Measuring Equipment	(1 to 300) lpm (300 to 2650) lpm (189 to 2650) lpm (0 to 30) fps	0.06 % 0.064 % 0.1 % 0.7 %	Gravimetric method Coriolis flow system Remote calibration module (RCM)
Liquid Flow Rate – Measuring Equipment ³	(0.06 to 378) lpm (2 to 48) in lines	0.1 % 1 %	Coriolis flow system Ultrasonic flow meters
Air Velocity – Measuring Equipment	(2 to 50) m/s (0.5 to 50) m/s	1.3 % + 0.01 m/s 1.3 % + 0.01 m/s	Wind tunnel pitot tube Sonic nozzles
Air Velocity – Measuring Equipment ³	(2 to 50) m/s (2 to 45) m/s	2 % + 0.01 m/s 2.2 %	Pitot tube 3D ultrasonic anemometer
Pressure – Measuring Equipment	(1.7 to 100) psi (2 to 1000) psi	0.001 % + 0.0004 psi 0.0026 % + 0.0004 psi	Ruska 2465 deadweight pressure calibrator

Parameter/Equipment	Range ⁵	CMC ^{2, 4, 6} (\pm)	Comments
Pressure – Measuring Equipment ³	(500 to 1100) hPa	0.13 hPa	Vaisala pressure transducer
	(0 to 100) psia (100 to 1000) psia	0.011 psia 0.11 psia	Paroscientific 760 pressure transmitter
Differential Pressure – Measuring Equipment ³	(-250 to -30) in·H ₂ O	0.11 %	Fluke 7252i pressure controller
	(-30 to -10) in·H ₂ O	0.018 %	
	(-10 to 0.025) in·H ₂ O	0.018 %	
	(0.025 to 10) in·H ₂ O	0.019 %	
	(10 to 30) in·H ₂ O	0.019 %	
	(30 to 250) in·H ₂ O	0.018 %	

III. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 4, 6} (\pm)	Comments
Relative Humidity – Measure and Measuring Equipment	(10 to 95) % RH	1.1 % RH	Thunder Scientific 1200 humidity chamber
Temperature – Measuring Equipment ³	(-80 to 95) °C	0.023 °C	Temperature baths & PRT
Dew Point Temperature – Measuring Equipment	(-80 to -20) °C	0.22 °C	Two temperature generator & PRT
	(-20 to 50) °C	0.2 °C	Thunder Scientific 1200 humidity chamber

¹ This laboratory offers commercial calibration service.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

- ³ Field calibration service is available for this calibration and this laboratory meets A2LA *R104 – General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC
- ⁴ In the statement of CMC, percentages are percentages of reading.
- ⁵ In the statement of range, the inches of water (in·H₂O) are those at 4 °C.
- ⁶ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.
- ⁷ This scope meets A2LA's *P112 Flexible Scope Policy*.
- ⁸ Standard Temperature and Pressure (STP): Air @14.69 psia & 70 °F

