



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board/AClass
500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

Accredited Calibration Services, Inc.

2-1016C Sutton Drive

Burlington, Ontario L7L 6B8 Canada

has been assessed by AClass
and meets the requirements of international standard

ISO/IEC 17025:2005

and national standard

ANSI/NCSL Z540-1-1994

while demonstrating technical competence in the field(s) of

CALIBRATION

in the following areas:

**Dimensional, Electrical, Temperature,
Humidity, Mechanical, Force, Hardness,
and Pressure and Vacuum**

Refer to the accompanying Scope(s) of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1172

Certificate Number

AClass Approval

Certificate Valid: 05/25/2011-05/27/2014
Version No. 005 Issued: 05/05/2011



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 January 2009).



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994**

**Accredited Calibration Services, Inc.
(Marsh Metrology)**

2-1016C Sutton Drive Burlington, Ontario L7L 6B8 Canada
Ron Bake Phone: 905-331-9783

CALIBRATION

Valid to: May 27, 2014

Certificate Number: AC-1172

I. Dimensional

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Micrometers - Outside	Up to 4 in (4 to 20) in (20 to 36) in	(44 + 16L) μin (32 + 22L) μin (32 + 22L) μin	Gage Blocks & Optical Flats	Proprietary On File with ACLASS
Calipers - Outside Jaws	Up to 6 in (6 to 40) in	(420 + 3.9L) μin (350 + 17L) μin	Gage Blocks	
Calipers - Inside Jaws	Up to 24 in (24 to 40) in	(480 + 3.9L) μin (340 + 19L) μin	Reference Bar and Gage Blocks	
Calipers - Depth	Up to 24 in	(530 + 1.7L) μin	Gage Blocks and Surface Plate	
Height Gages	Up to 24 in (24 to 40) in	(490 + 10L) μin (260 + 19.2L) μin	Reference Bar, Surface Plate, and Test Indicator	
Micrometers - Inside (Head Movement Only)	Up to 1 in	(81 + 24L) μin	Gage Blocks and Gage Holder	
Micrometers - Inside (Resolution 0.0001 in) (Resolution 0.001 in)	Up to 6 in (6 to 24) in (24 to 40) in	(100 + 12L) μin (38 + 22L) μin (460 + 16.7L) μin	Reference Bar and Gage Blocks	
Micrometers - Depth	Up to 12 in	(630 + 4.5L) μin	Gage Blocks and Surface Plate	
Bore Gages (Resolution 0.0001 in)	(0.1 to 0.5) in (0.5 to 3) in	(80 + 2L) μin (150 + 19L) μin	Master Ring Gages	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Indicators Test, Dial, Digital (Resolution 0.0001 in)	Up to 2 in	(68 + 25L) μin	Gage Blocks, Calibration Tester and Surface Plate	
Flatness	Up to 4 in	5.5 μin	Master Flat	
Optical Comparator Horizontal Readout Vertical Readout	Up to 8 in Up to 8 in	(740 + 8.6L) μin (760 + 8.7L) μin	Reading Scale	
Thickness (Feeler) Gages	(0 to 0.05) in	125 μin	Digital Micrometer	

II. Electrical

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Voltage - Source	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	1.2 μV + 14 μV/V 10 μV + 6.3 μV/V 81 μV + 7.7 μV/V 780 μV + 12 μV/V 1.4 mV + 14 μV/V	Multifunction Calibrator	Proprietary On file with ACLASS
DC Voltage - Measure	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	1.1 μV + 9.6 μV/V 10 μV + 3.8 μV/V 3.3 μV + 8.4 μV/V 38 μV + 10 μV/V 130 μV + 10 μV/V	Long Scale DMM	
	Up to 6 kV (6 to 20) kV (20 to 35) kV	600 mV + 10 mV/V 2.4 V + 20 mV/V 51 V + 90 mV/V	DMM and High Voltage Probe	
DC Current - Source	Up to 330 μA 330 μA to 3.3 mA (3.3 to 330) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A	61 nA + 59 μA/A 57 nA + 73 μA/A 210 nA + 77 μA/A 2.8 μA + 75 μA/A 31 μA + 160 μA/A 31 μA + 290 μA/A 31 μA + 420 μA/A	Multifunction Calibrator	
	(10 to 16.5) A (16.5 to 150) A (150 to 1 000) A	29 mA + 4.7 mA/A 210 mA + 4.7 mA/A 990 mA + 4.7 mA/A	Multifunction Calibrator and Current Coil	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
DC Current - Measure	Up to 100 nA 100 nA to 1 µA (1 to 10) µA (10 to 100) µA 100 µA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	45 pA + 16 µA/A 54 pA + 11 µA/A 100 pA + 20 µA/A 810 pA + 20 µA/A 14 nA + 15 µA/A 51 nA + 20 µA/A 510 nA + 35 µA/A 5.5 µA/A + 35 µA/A	Long Scale DMM	
AC Voltage - Source	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz 330 mV to 3.3 V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz 330 V to 1 kV 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	4.8 µV + 620 µV/V 4.7 µV + 120 µV/V 4.8 µV + 150 µV/V 4.7 µV + 780 µV/V 9.4 µV + 2.7 mV/V 39 µV + 6.2 mV/V 6.8 µV + 390 µV/V 7.1 µV + 110 µV/V 7.4 µV + 120 µV/V 6.7 µV + 270 µV/V 25 µV + 620 µV/V 54 µV + 1.6 mV/V 43 µV + 230 µV/V 66 µV + 110 µV/V 58 µV + 140 µV/V 42 µV + 230 µV/V 100 µV + 540 µV/V 470 µV + 1.9 mV/V 530 µV + 230 µV/V 530 µV + 110 µV/V 490 µV + 190 µV/V 500 µV + 270 µV/V 1.3 mV + 700 µV/V 2.4 mV + 110 µV/V 5.5 mV + 150 µV/V 5.4 mV + 190 µV/V 5.3 mV + 230 µV/V 39 mV + 1.6 mV/V 8.1 mV + 230 µV/V 8 mV + 190 µV/V 8.2 mV + 230 µV/V	Multifunction Calibrator	Proprietary On file with ACLASS



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Voltage - Measure	<p>Up to 10 mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz</p> <p>(10 to 100) mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz</p> <p>100 mV to 1 V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz</p> <p>(1 to 10) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz</p> <p>(10 to 100) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz</p> <p>100 V to 1 kV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz</p> <p>Up to 6 kV 60 Hz</p> <p>(6 to 35) kV 60 Hz</p>	<p>4 μV + 470 μV/V 3 μV + 140 μV/V 3 μV + 220 μV/V 2.7 μV + 890 μV/V</p> <p>4.3 μV + 70 μV/V 2.1 μV + 70V/V 2.1 μV + 140 μV/V 2.1 μV + 300 μV/V</p> <p>40 μV + 70 μV/V 21 μV + 70 μV/V 21 μV + 140 μV/V 23 μV + 300 μV/V</p> <p>400 μV + 70 μV/V 220 μV + 70 μV/V 210 μV + 140 μV/V 210 μV + 300 μV/V</p> <p>4 mV + 200 μV/V 2 mV + 200 μV/V 2.1 mV + 200 μV/V 2.1 mV + 350 μV/V</p> <p>40 mV + 400 μV/V 20 mV + 400 μV/V 20 mV + 600 μV/V 79 mV + 1.1 mV/V</p> <p>5 V + 10 mV/V</p> <p>9 V + 51 mV/V</p>	<p>Long Scale Multimeter Multifunction Calibrator</p>	<p>Proprietary On File with ACLASS</p>
AC Current - Source	<p>(10 to 16.5) A (45 to 65) Hz (65 to 440) Hz</p> <p>(16.5 to 150) A (45 to 65) Hz (65 to 440) Hz</p> <p>(150 to 1 000) A (45 to 65) Hz (65 to 440) Hz</p>	<p>33 mA + 5.5 mA/A 35 mA + 10 mA/A</p> <p>270 mA + 5.6 mA/A 270 mA + 10 mA/A</p> <p>1.7 A + 5.1 mA/A 1.1 A + 12 mA/A</p>	<p>Multifunction Calibrator and Current Coil</p>	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current - Source	<p>(29 to 330) µA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz</p> <p>330 µA to 3.3 mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz</p> <p>(3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz</p> <p>(33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz</p> <p>330 mA to 3 A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz</p> <p>(3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (5 to 10) kHz</p>	<p>78 nA + 1.6 µA/mA 78 nA + 1.2 µA/mA 78 nA + 970 nA/mA 120 nA + 2.3 µA/mA 160 nA + 6.2 µA/mA 310 nA + 12 µA/mA</p> <p>130 nA + 1.6 µA/mA 120 nA + 970 nA/mA 120 nA + 780 nA/mA 160 nA + 1.6 µA/mA 230 nA + 3.9 µA/mA 470 nA + 7.8 µA/mA</p> <p>1.6 µA + 1.4 mA/A 1.6 µA + 700 µA/A 1.6 µA + 310 µA/A 1.6 µA + 620 µA/A 2.3 µA + 1.6 mA/A 3.1 µA + 3.1 mA/A</p> <p>16 µA + 1.4 mA/A 16 µA + 700 µA/A 16 µA + 310 µA/A 39 µA + 780 µA/A 78 µA + 1.6 mA/A 160 µA + 3.1 mA/A</p> <p>78 µA + 1.4 mA/A 78 µA + 470 µA/A 780 µA + 4.7 mA/A 3.9 mA + 19 mA/A</p> <p>1.9 mA + 450 mA/A 1.6 mA + 770 mA/A 1.6 mA + 23 mA/A</p>	Multifunction Calibrator	Proprietary On file with ACLASS

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
AC Current - Measure	100 μA to 1 mA (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (1 to 10) mA (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (10 to 100) mA (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz 100 mA to 1 A (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz	200 nA + 1.5 mA/A 200 nA + 600 μA/A 200 nA + 300 μA/A 2 μA + 4 mA/A 2 μA + 1.5 mA/A 2 μA + 600 μA/A 2 μA + 300 μA/A 20 μA + 4 mA/A 20 μA + 1.5 mA/A 20 μA + 600 μA/A 20 μA + 300 μA/A 200 μA + 4 mA/A 200 μA + 1.6 mA/A 200 μA + 600 μA/A 200 μA + 1 mA/A	Long Scale Multimeter	
Resistance - Source	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω 330 Ω to 1.1 kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ 330 kΩ to 1.1 MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (330 to 1 100) MΩ	1.2 mΩ + 27 μΩ/Ω 1.7 mΩ + 19 μΩ/Ω 1.4 mΩ + 20 μΩ/Ω 2 mΩ + 21 μΩ/Ω 1.8 mΩ + 22 μΩ/Ω 22 mΩ + 20 μΩ/Ω 17 mΩ + 22 μΩ/Ω 300 m Ω + 19 μΩ/Ω 520 m Ω + 19 μΩ/Ω 2.7 Ω + 24 μΩ/Ω 3.8 Ω + 24 μΩ/Ω 100 Ω + 24 μΩ/Ω 120 Ω + 95 μΩ/Ω 3.1 k Ω + 170 μΩ/Ω 3.7 k Ω + 380 μΩ/Ω 81 k Ω + 2.3 mΩ/Ω 400 kΩ + 12 mΩ/Ω	Multifunction Calibrator	Proprietary On File with ACLASS
Resistance - Measure	Up to 10 Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ	75 μΩ + 14 μΩ/Ω 520 μΩ + 12 Ω/Ω 570 μΩ + 10 μΩ/Ω 13 mΩ + 9.7 μΩ/Ω 57 mΩ + 10 μΩ/Ω 2.1 Ω + 15 μΩ/Ω 120 Ω + 49 μΩ/Ω 79 kΩ + 160 μΩ/Ω 560 kΩ + 4.5 mΩ/Ω	Long Scale Multimeter	



PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Capacitance - Source	10 Hz to 1 kHz Charge/Discharge Rate (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF 10 Hz to 600 Hz Charge/Discharge rate (0.33 to 1.1) μF 10 Hz to 300 Hz Charge/Discharge rate (1.1 to 3.3) μF 10 Hz to 150 Hz Charge/Discharge rate (3.3 to 11) μF 10 Hz to 120 Hz Charge/Discharge rate (11 to 33) μF 10 Hz to 80 Hz Charge/Discharge rate (33 to 110) μF Up to 50 Hz Charge/Discharge rate (110 to 330) μF Up to 50 Hz Charge/Discharge rate 330 μF to 1 mF	11 pF + 1.8 pF/nF 95 pF + 1.7 pF/nF 130 pF + 1.7 pF/nF 570 pF + 1.4 pF/nF 910 μF + 1.9 pF/nF 5.7 nF + 1.4 pF/nF 10 nF + 1.8 nF/μF 52 nF + 2.6 nF/μF 88 nF + 3.4 nF/μF 510 nF + 3 nF/μF 990 nF + 3.4 nF/ μF	Multifunction Calibrator	Proprietary On File with ACLASS
Capacitance - Source Fixed Values	1 nF 1 kHz 1 μF 100 Hz 120 Hz 1 kHz 10 μF 100 Hz 120Hz 1 kHz 100 μF 100 Hz 120Hz 1 kHz 1 mF 100 Hz 120Hz 1 kHz	280 pF 1.5 nF 1.5 nF 1.5 nF 15 nF 15 nF 15 nF 150 nF 150 nF 150 nF 1.9 μF 2.1 μF 2.1 μF	Standard Capacitors	

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Capacitance - Source Fixed Values (cont.)	10 mF 100 Hz 120Hz 1 kHz	110 µF 110 µF 150 µF	Standard Capacitors	Proprietary On File with ACLASS
Inductance - Source Fixed Values	10 mH 100 Hz 1 kHz	6.5 µH 6.5 µH	Standard Inductors	
Resistors - Source Fixed Values (at 1 kΩ)	24.9 Ω 375.6 Ω 5.97 kΩ 95.3 kΩ	6.9 m Ω 51 m Ω 790 mΩ 12 Ω	Standard Resistors Kit	
Frequency - Source Using Calibrator's Normal Output	(0.01 to 120) Hz 120 Hz to 1.2 kHz (1.2 to 12) kHz (12 to 120) kHz 120 kHz to 1.2 MHz (1.2 to 2) MHz	110 µHz + 1.2 µHz/Hz 480 µHz + 1.6 µHz/Hz 400 µHz + 1.9 µHz/Hz 1.2 mHz + 1.9 µHz/Hz 1.2 mHz + 1.9 µHz/Hz 14 mHz + 1.9 µHz/Hz	Multifunction Calibrator	
Using Calibrator's Oscilloscope Output	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz	5.1 Hz + 1.9 Hz/MHz 300 mHz + 1.9 Hz/MHz 70 mHz + 1.9 Hz/MHz		
Frequency - Measure	1 Hz to 10 MHz	100 nHz + 500 µHz/Hz	Long Scale Multimeter	
Oscilloscopes Bandwidth (Leveled Sine Wave)	50 kHz to 600 MHz	(4.8 + 0.0068 X ¹) %		
DC Voltage 50 Ω load 1 M Ω load	0 V to 6.6 V 0 V to 130 V	370 µV + 1.9 mV/V 500 µV + 460 µV/V		
Square Wave Amplitude 50 Ω load 1 M Ω load	0 V to 6.6 V 0 V to 130 V	460 µV + 190 µV/V 640 µV + 770 µV/V	Multifunction Calibrator	
Rise Time	3.5 ns Pulse Edge	40.85 ps		
Time Marker	(2 to 10) ns (20 to 100) ns (100 to 500) ns (1 to 20) ms (50 to 500) ms (1 to 5) s	7.8 ps + 2.9 ns/s 7.7 ps + 27 ns/s 7.7 ps + 150 ns/s 8.6 ns + 4.6 ps/ms 44 ns + 1.4 ps/ms 9 ms + 2.8 ms/s		

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Thermocouple Simulation and Measure				
J-type thermocouple	(63 to 1 473) K (-210 to 1 200) °C	0.24 K (0.24 °C)	Multifunction Calibrator	Proprietary On File with ACLASS
K-type thermocouple	(73 to 1 645) K (-200 to 1 372) °C	0.25 K (0.25 °C)		
S-type thermocouple	(273 to 1 673) K (0 to 1 400) °C	0.52 K (0.52 °C)		
T-type thermocouple	(23 to 673) K (-250 to 400) °C	0.25 K (0.25 °C)		
RTD Simulation				
Pt 385 (100 Ω)	(73 to 1 073) K (-200 to 800) °C	0.09 K (0.09 °C)		
Pt 385 (1 000 Ω)	(73 to 903) K (-200 to 630) °C	0.10 K (0.1 °C)		
Pt 3916 (100 Ω)	(73 to 903) K (-200 to 630) °C	0.09 K (0.09 °C)		
Pt 3926 (100 Ω)	(73 to 903) K (-200 to 903) °C	0.09 K (0.09 °C)		
Ni 120 (120 Ω)	(193 to 533) K (-80 to 260) °C	0.13 K (0.13 °C)		
Pt 385 (200 Ω)	(73 to 903) K (-200 to 630) °C	0.10 K (0.1 °C)		
Pt 385 (500 Ω)	(73 to 903) K (-200 to 630) °C	0.1 K (0.1 °C)		

III. Temperature

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Temperature at Ice Point	273.15 K (0 °C)	0.033 K 0.033 °C	Standard Multimeter and Platinum Resistance Thermometer	Proprietary On File with ACLASS
Temperature - Measure	(73 to 933) K (-200 to 660) °C	(0.032 K + 0.000004 K/K) (0.032 °C + 0.000004 °C/°C)		

IV. Humidity

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Humidity - Source	(10 to 95) %RH	0.81 %RH + 0.014 %RH/%RH	Humidity Chamber and Humidity Meter	Proprietary On File with ACLASS
Humidity - Measure	(10 to 95) %RH	0.7 %RH + 0.15 %RH/%RH		

V. Mechanical

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Balances	Up to 410 g	1.6 mg + 0.016 mg/g	Class 3 Weights	Proprietary On File with ACLASS
	Up to 9 kg (20 lb)	0.1 g + 0.092 mg/g (0.00022 lb + 0.000092 lb/lb)	Class 6 Weights	
Scales	Up to 400 lb	(0.24 + 0.00021) lb/lb	Class 6 Weights	

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Torque Tools	(0.4 to 2) Nm	(0.000034 Nm + 0.00056 Nm/Nm)	Torque Tester	Proprietary On File with ACLASS
	(4 to 18) lbf in	(0.003 lbf in + 0.00056 lbf in/lbf in)		
	(2.26 to 11.29) Nm	(0.0339 Nm + 0.00261 Nm/Nm)		
	(20 to 100) lbf in	(0.3 lbf in + 0.00231 lbf in/lbf in)		
	(67 to 338.9) Nm	(0.22 Nm + 0.00727 Nm/Nm)	Torque Transducer and Torque Display	
	(50 to 250) lbf ft	(0.16 lbf ft + 0.005359 lbf ft/lbf)		
	(271.1 to 1355.8) Nm	(0.46 Nm + 0.0781 Nm/Nm)		
(200 to 1000) lbf ft	(0.34 lbf ft + 0.00576 lbf ft/lbf ft)			

VI. Pressure and Vacuum

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(+)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Pressure - Pneumatic	(-10 to 30) psi (30 to 50) psi (50 to 100) psi (100 to 300) psi (300 to 600) psi (600 to 1 000) psi	0.0065 psi + 0.43 µpsi/psi 0.0089 psi + 0.59 µpsi/psi 0.016 psi + 0.83 µpsi/psi 0.041 psi + 2.4 µpsi/psi 0.075 psi + 2.5 µpsi/psi 0.18 psi + 1.7 µpsi/psi	Precision Pressure Controller used as Standard Calibration Media - Nitrogen	Proprietary On File with ACLASS
Pressure - Hydraulic Cross Floating	41.4 kPa to 16.5 MPa (6 to 2 400) psi	220 Pa + 0.19 Pa/Pa (0.032 psi to 0.000028 psi/psi)	Comparison to Ruska 2400 Standard Dead Weight Tester	
	207 kPa to 82.7 MPa (30 to 12 000) psi	1.24 kPa + 0.19 Pa/Pa (0.18 psi + 0.000028 psi/psi)		
	41.4 kPa to 16.5 MPa (6 to 2 400) psi	282 Pa + 0.17 Pa/Pa (0.041 psi + 0.000025 psi/psi)		
	207 kPa to 82.7 MPa (30 to 12 000) psi	344 Pa + 0.25 Pa/Pa (0.05 psi + 0.000037 psi/psi)		
	34.48 to 137.92 MPa (5 000 to 20 000) psi	76.8 kPa + 0.00055 Pa/kPa (11.2 psi + 0.00008 psi/psi)		



VII. Force

PARAMETER/ EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Tensiometers	(5 to 600) lb	$(1.6 + 0.034 X^2)$ lb	Class 6 Weights	Proprietary On File with ACLASS

VIII. Hardness

PARAMETER / EQUIPMENT	RANGE	CALIBRATION AND MEASUREMENT CAPABILITY [EXPRESSED AS UNCERTAINTY(±)]	REFERENCE STANDARD OR EQUIPMENT	METHOD(S)
Hardness (Rockwell scale) B Scale	Low	2 HRB	Indirect Comparison to Hardness Test Blocks	Proprietary On File with ACLASS
	Mid	1.6 HRB		
	High	1.8 HRB		
C scale	Low	1.3 HRC		
	Mid	1.3 HRC		
	High	1.1 HRC		
Superficial 30T scale	Low	1.6 HR 30T		
	Mid	1.3 HR 30T		
	High	1.4 HR 30T		

Notes:

1. Calibration and Measurement Capabilities (CMC) (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of $k=2$.
2. This laboratory offers calibration services in its laboratory and on-site at customer-designated locations. Satellite sites may also be established at key customer locations. Since on-site and/or satellite 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.
3. X^1 = measured value, X^2 = measured value in lbf. L = Length in inches.
4. This scope is part of and must be included with the Certificate of Accreditation No. AC-1172.



Vice President

