



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

Techmaster de Mexico SA de CV

Calle Seminario No. 8610 Int. 11, Col. Niños Heroes, Deleg. La Presa. C.P. 22120
Tijuana, B.C., Mexico

Calle Gales 1201 Fracc. Villa Fontana, Mexicali, B.C. C.P. 21180

Bldv. Gomez Morin 9050-L8, Col Partido Senecu, CD Juarez, Chihuahua C.P. 32469

Ave. Ignacio Morones Prieto No. 914 Ote. Int. 112 Col. La Huerta C.P. 67144 Guadalupe, Nuevo León

has been assessed by ANAB
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 of

CALIBRATION

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

AC-1342

Certificate Number


ANAB Approval

Certificate Valid: 03/03/2017-08/31/2018
Version No. 005 Issued: 03/03/2017



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).



ANSI-ASQ National Accreditation Board

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

Techmaster de Mexico SA de CV

Calle Seminario #8610 Int. 11
Col. Niños Heroes, deleg. La Presa. C.P. 22120, Parque Industrial Arboledas
Tijuana, B.C., Mexico

J. Ernesto Matamoros Phone: (52) 664-624-4444
quality.mx@techmaster.us www.techmasterdemexico.com

CALIBRATION

Valid to: August 31, 2018

Certificate Number: AC-1342

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
DC Voltage - Source	(2.2 to 220) mV 200 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1.1 kV	11 μ V/V + 0.48 μ V 6.2 μ V/V + 0.87 μ V 4.2 μ V/V + 3 μ V 4.2 μ V/V + 5.2 μ V 6.1 μ V/V + 99 μ V 8 μ V/V + 0.53 mV	Fluke 5720A
DC Voltage - Measure	(2 to 200) mV 200 mV to 2 V (2 to 20) V (20 to 200) V 200 V to 1 kV Up to 2 kV (1 to 20) kV (20 to 70) kV	6.7 μ V/V + 0.20 μ V 4.3 μ V/V + 0.50 μ V 4.3 μ V/V + 4.8 μ V 6.7 μ V/V + 98 μ V 6.7 μ V + 0.63 mV 0.50 mV/V + 11 V 0.50 mV/V + 6.9 V 0.56 mV/V + 51 V	Fluke 8508 Vitretek 4670A
Charge Analyzer	Up to 1 kV (1 to 5) kV	24 mV/V + 0.50 V 24 mV/V + 12 V	Monroe Electronics 268A



Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
DC Current - Source	(2 to 220) μ A 220 μ A to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	50 μ A/A + 7.2 nA 43 μ A/A + 8.4 nA 43 μ A/A + 48 nA 55 μ A/A + 0.84 μ A 97 μ A/A + 21 μ A	Fluke 5720A
	(2.2 to 10) A (10 to 10.9) A (10.9 to 20.5) A	0.60 mA/A + 0.77 mA 0.60 mA/A + 1 mA 1.2 mA/A + 1.4 mA	Fluke 5522A
	(10 to 550) A (550 to 1 025) A	2.5 mA/A + 0.55 A 2.6 mA/A + 0.55 A	50 Turn Coil
DC Current - Measure	(2 to 200) μ A (200 μ A to 2) mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	15 μ A/A + 0.49 nA 15 μ A/A + 4.8 nA 17 μ A/A + 48 nA 59 μ A/A + 0.96 μ A 0.23 mA/A + 25 μ A 0.49 mA/A + 0.36 mA	Fluke 8508
	(20 to 100) A (100 to 300) A	0.5 mA/A + 0.004 A 1 mA/A + 0.004 A	Guildline 9211A
	Up to 1 000 A	2.6 mA/A + 20 mA	Empro B1000-100
Resistance - Source (Fixed Values)	0.001 Ω 0.01 Ω 0.1 Ω 0.333 Ω	0.23 m Ω 0.22 m Ω 0.20 m Ω 0.9 m Ω	SRX-0.001 SRX-0.01 SRX-0.1 Guildline 9211A
	1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 k Ω 10 k Ω 19 k Ω 100 k Ω 190 k Ω 1 M Ω 1.9 M Ω 10 M Ω 19 M Ω 100 M Ω	0.12 m Ω 0.22 m Ω 0.28 m Ω 0.53 m Ω 1.3 m Ω 2.3 m Ω 11 m Ω 20 m Ω 0.11 Ω 0.20 Ω 1.4 Ω 2.6 Ω 25 Ω 51 Ω 0.50 k Ω 1.2 k Ω 14 k Ω	Fluke 5720A
Resistance - Source	100 M Ω to 1 G Ω (1 to 10) G Ω 10 G Ω to 1 T Ω	10 mV/V + 1 k Ω 11 mV/V + 0.19 M Ω 21 mV/V + 2.1 M Ω	RH9A

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Resistance - Measure	Up to 2 Ω (2 to 20) Ω (20 to 200) Ω 200 Ω to 2 k Ω (2 to 20) k Ω (20 to 200) k Ω 200 k Ω to 2 M Ω (2 to 20) M Ω (20 to 200) M Ω 200 M Ω to 2 G Ω	23 $\mu\Omega/\Omega$ + 5.9 $\mu\Omega$ 12 $\mu\Omega/\Omega$ + 18 $\mu\Omega$ 9.8 $\mu\Omega/\Omega$ + 80 $\mu\Omega$ 12 $\mu\Omega/\Omega$ + 0.94 m Ω 11 $\mu\Omega/\Omega$ + 47 m Ω 11 $\mu\Omega/\Omega$ + 60 m Ω 13 $\mu\Omega/\Omega$ + 1.2 Ω 28 $\mu\Omega/\Omega$ + 0.12 k Ω 0.15 m Ω/Ω + 1.2 k Ω 1.9 m Ω/Ω + 12 k Ω	Fluke 8508A
at 500 V at 500 V at 1 kV at 1 kV at 2.5 kV at 5 kV at 5 kV at 10 kV at 10 kV	200 k Ω to 10 G Ω (10 to 100) G Ω 200 k Ω to 20 G Ω (20 to 200) G Ω 200 k Ω to 50 G Ω 200 k Ω to 100 G Ω 100 G Ω to 1 T Ω 200 k Ω to 200 G Ω 200 G Ω to 2 T Ω	61 m Ω/Ω + 0.60 M Ω 0.24 Ω/Ω + 0.60 M Ω 60 m Ω/Ω + 0.60 M Ω 0.24 Ω/Ω + 0.60 M Ω 60 m Ω/Ω + 0.60 M Ω 60 m Ω/Ω + 0.60 M Ω 0.24 Ω/Ω + 0.60 M Ω 62 m Ω/Ω + 0.60 M Ω 0.24 Ω/Ω + 0.60 M Ω	Fluke 1555
AC Voltage - Source	Up to 2.2 mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (2.2 to 22) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (22 to 220) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.29 mV/V + 4.8 μ V 0.11 mV/V + 4.8 μ V 96 μ V/V + 9.6 μ V 0.24 mV/V + 4.8 μ V 0.60 mV/V + 6 μ V 1.3 mV/V + 12 μ V 1.7 mV/V + 24 μ V 3.3 mV/V + 24 μ V 0.30 mV/V + 4.8 μ V 0.13 mV/V + 4.8 μ V 0.12 mV/V + 4.8 μ V 0.24 mV/V + 4.8 μ V 0.62 mV/V + 6 μ V 1.3 mV/V + 12 μ V 1.7 mV/V + 24 μ V 3.3 mV/V + 24 μ V 0.29 mV/V + 20 μ V 0.11 mV/V + 8.9 μ V 98 μ V/V + 8.5 μ V 0.24 mV/V + 8.5 μ V 0.55 mV/V + 21 μ V 1.1 mV/V + 24 μ V 1.7 mV/V + 32 μ V 3.3 mV/V + 54 μ V	Fluke 5720A

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
AC Voltage - Source (cont.)	<p>220 mV to 2.2 V (10 to 20) Hz (20 to 40) Hz 40Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz</p> <p>(2.2 to 22) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz</p> <p>(22 to 220) V (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (500 kHz to 1 MHz)</p> <p>220 V to 1.1 kV (15 to 50) Hz 50 Hz to 1 kHz</p>	<p>0.29 mV/V + 48 μV 0.11 mV/V + 18 μV 57 μV/V + 9.6 μV 91 μV/V + 12 μV 0.13 mV/V + 36 μV 0.50 mV/V + 96 μV 1.2 mV/V + 0.24 mV 2.1 mV/V + 0.36 mV</p> <p>0.29 mV/V + 0.14 mV 0.11 mV/V + 41 μV 57 μV/V + 23 μV 91 μV/V + 21 μV 0.13 mV/V + 43 μV 1.2 mV/V + 0.25 mV 2.1 mV/V + 0.40 mV</p> <p>0.29 mV/V + 0.12 V 0.12 mV/V + 1.9 mV 75 μV/V + 0.72 mV 0.10 mV/V + 1.2 mV 0.19 mV/V + 3 mV 1.1 mV/V + 19 mV 5.3 mV/V + 48 mV 9.7 mV/V + 96 mV</p> <p>0.29 mV/V + 48 mV 0.11 mV/V + 18 mV</p>	Fluke 5720A
AC Voltage - Measure	<p>Up to 200 mV (1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz</p> <p>200 mV to 2 V (1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz</p>	<p>0.20 mV/V + 29 μV 0.17 mV/V + 5 μV 0.14 mV/V + 5 μV 0.17 mV/V + 2 μV 0.17 mV/V + 5 μV 0.42 mV/V + 10 μV 0.93 mV/V + 24 μV</p> <p>0.19 mV/V + 0.33 mV 0.15 mV/V + 3 μV 0.12 mV/V + 24 μV 0.17 mV/V + 24 μV 0.14 mV/V + 24 μV 0.27 mV/V + 48 μV 0.70 mV/V + 0.24 mV</p>	Fluke 8508 A



Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment	
AC Voltage - Measure (cont.)	(2 to 20) V		Fluke 8508 A	
	(1 to 10) Hz	0.18 mV/V + 3.3 mV		
	(10 to 40) Hz	0.14 mV/V + 0.3 mV		
	(40 to 100) Hz	0.11 mV/V + 0.24 mV		
	100 Hz to 2 kHz	0.15 mV/V + 0.24 mV		
	(2 to 10) kHz	0.14 mV/V + 0.24 mV		
	(10 to 30) kHz	0.27 mV/V + 0.48 mV		
	(30 to 100) kHz	0.69 mV/V + 2.4 mV		
	(100 to 300) kHz	3.6 mV/V + 24 mV		
	300 kHz to 1 MHz	12 mV/V + 0.24 mV		
	(20 to 200) V			
	1 to 10 Hz	0.19 mV/V + 58 mV		
	(10 to 40) Hz	0.15 mV/V + 2.7 mV		
	(40 to 100) Hz	0.12 mV/V + 2.4 mV		
	100 Hz to 2 kHz	0.15 mV/V + 2.4 mV		
	(2 to 10) kHz	0.14 mV/V + 2.4 mV		
	(10 to 30) kHz	0.27 mV/V + 4.8 mV		
(30 to 100) kHz	0.69 mV/V + 24 mV			
(100 to 300) kHz	3.6 mV/V + 0.24 mV			
300 kHz to 1 MHz	12 mV/V + 2.4 V			
200 V to 1 kV		Vitrek 4670A		
(1 to 10) Hz	0.19 mV/V + 84 mV			
(10 to 40) Hz	0.16 mV/V + 24 mV			
40 Hz to 10 kHz	0.29 mV/V + 24 mV			
(10 to 30) kHz	0.28 mV/V + 48 mV			
(30 to 100) kHz	0.72 mV/V + 0.24 V			
(1 to 2) kV				
(20 to 400) Hz	0.86 mV/V + 11 V			
(2 to 20) kV				
(20 to 100) Hz	0.52 mV/V + 49 V			
(20 to 70) kV				
(50 to 60) Hz	0.49 mV/V + 0.21 kV			
AC Current - Source	Up to 220 μA			Fluke 5720A
	(10 to 20) Hz		0.38 mA/A + 21 nA	
	(20 to 40) Hz		0.30 mA/A + 12 nA	
	40 Hz to 1 kHz		0.27 mA/A + 9.9 nA	
	(1 to 5) kHz		0.41 mA/A + 15 nA	
	(5 to 10) kHz	1.4 mA/A + 78 nA		
	220 μA to 2.2 mA			
	(10 to 20) Hz	0.30 mA/A + 68 nA		
	(20 to 40) Hz	0.19 mA/A + 48 nA		
	40 Hz to 1 kHz	0.15 mA/A + 48 nA		
	(1 to 5) kHz	0.27 mA/A + 0.13 μ A		
	(5 to 10) kHz	1.3 mA/A + 0.78 μ A		

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
AC Current – Source (cont.)	(2.2 to 22) mA		Fluke 5720A
	(10 to 20) Hz	0.30 mA/A + 0.49 μ A	
	(20 to 40) Hz	0.20 mA/A + 0.43 μ A	
	40 Hz to 1 kHz	0.15 mA/A + 0.43 μ A	
	(1 to 5) kHz	0.39 mA/A + 0.66 μ A	
	(5 to 10) kHz	1.4 mA/A + 6 μ A	
	(22 to 220) mA		
	(10 to 20) Hz	0.43 mA/A + 7.9 μ A	
	(20 to 40) Hz	0.37 mA/A + 4.7 μ A	
	40 Hz to 1 kHz	0.36 mA/A + 3.9 μ A	
	(1 to 5) kHz	0.41 mA/A + 4.3 μ A	
	(5 to 10) kHz	3.3 mA/A + 12 μ A	
	220 mA to 2.2 A		Fluke 5522A
	20 Hz to 1 kHz	0.50 mA/A + 55 μ A	
	(1 to 5) kHz	4 μ A/A + 96 μ A	
	(5 to 10) kHz	9.3 mA/A + 0.19 mA	
	(3 to 20) A		
	(45 to 100) Hz	0.50 mA/A + 1.4 mA	
	100 Hz to 1 kHz	0.70 mA/A + 1.4 mA	
	(1 to 5) kHz	20 mA/A + 1.4 mA	
(11 to 20.5) A			
(45 to 100) Hz	0.80 mA/A + 3.4 mA		
100 Hz to 1 kHz	1 mA/A + 3.4 mA		
(1 to 5) kHz	20 mA/A + 3.4 mA		
(16.5 to 55) A		Fluke 50 Turn Coil	
65 Hz	2.8 mA/A + 0.17 A		
440 Hz	7.9 mA/A + 0.19 A		
(55 to 150) A			
65 Hz	2.8 mA/A + 0.31 A		
440 Hz	7.9 mA/A + 0.16 A		
(150 to 550) A			
65 Hz	2.8 mA/A + 1.3 A		
440 Hz	7.9 mA/A + 0.41 A		
(550 to 1 025) A			
65 Hz	2.9 mA/A + 0.71A		
440 Hz	8 mA/A + 1.2 A		

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment		
AC Current - Measure	Up to 200 μA 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.42 mA/A + 24 nA 0.88 mA/A + 24 nA 4.8 mA/A + 24 nA	Fluke 8508A		
	200 μA to 2 mA 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.36 mA/A + 0.24 μ A 0.86 mA/A + 0.24 μ A 4.8 mA/A + 0.24 μ A			
	2 to 20 mA 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.37 mA/A + 2.4 μ A 0.86 mA/A + 2.4 μ A 4.8 mA/A + 2.4 μ A			
	20 to 200 mA 10 Hz to 10 kHz (10 to 30) kHz	0.35 mA/A + 24 μ A 0.75 mA/A + 24 μ A			
	200 mA to 2 A 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.75 mA/A + 0.25 mA 0.87 mA/A + 0.27 mA 3.6 mA/A + 0.26 mA			
	2 to 20 A 10 Hz to 2 kHz (2 to 10) kHz	0.99 mA/A + 2.4 mA 3.1 mA/A + 2.4 mA			
	(20 to 1 000) A (60 to 100) Hz	2.6 mA/A + 0.28 A		Empro B1000-100	
	Electrical Simulation of Thermocouple Indicators	Type B (600 to 800) $^{\circ}$ C (800 to 1 000) $^{\circ}$ C (1 000 to 1 550) $^{\circ}$ C (1 550 to 1 820) $^{\circ}$ C		0.53 $^{\circ}$ C 0.43 $^{\circ}$ C 0.37 $^{\circ}$ C 0.41 $^{\circ}$ C	Fluke 5522A
		Type C (0 to 150) $^{\circ}$ C (150 to 650) $^{\circ}$ C (650 to 1 000) $^{\circ}$ C (1 000 to 1 800) $^{\circ}$ C (1 800 to 2 316) $^{\circ}$ C		0.36 $^{\circ}$ C 0.30 $^{\circ}$ C 0.37 $^{\circ}$ C 0.61 $^{\circ}$ C 1 $^{\circ}$ C	
		Type E (-250 to -100) $^{\circ}$ C (-100 to -25) $^{\circ}$ C (-25 to 350) $^{\circ}$ C (350 to 650) $^{\circ}$ C (650 to 1 000) $^{\circ}$ C		0.6 $^{\circ}$ C 0.19 $^{\circ}$ C 0.17 $^{\circ}$ C 0.19 $^{\circ}$ C 0.26 $^{\circ}$ C	
Type J (-200 to -100) $^{\circ}$ C (-100 to -30) $^{\circ}$ C (-30 to 150) $^{\circ}$ C (150 to 760) $^{\circ}$ C (760 to 1 200) $^{\circ}$ C		0.19 $^{\circ}$ C 0.32 $^{\circ}$ C 0.17 $^{\circ}$ C 0.21 $^{\circ}$ C 0.28 $^{\circ}$ C			

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Type K	(-200 to -100) °C	0.57 °C	Fluke 5522A
	(-100 to -25) °C	0.22 °C	
	(-25 to 120) °C	0.19 °C	
	(120 to 1 000) °C	0.31 °C	
	(1 000 to 1 372) °C	0.48 °C	
Type L	(-200 to -100) °C	0.45 °C	
	(-100 to 800) °C	0.32 °C	
	(800 to 900) °C	0.21 °C	
Type N	(-200 to -100) °C	0.48 °C	
	(-100 to -25) °C	0.26 °C	
	(-25 to 120) °C	0.23 °C	
	(120 to 410) °C	0.22 °C	
	(410 to 1 300) °C	0.33 °C	
Type R	(0 to 250) °C	0.69 °C	
	(250 to 400) °C	0.42 °C	
Type S	(400 to 1 000) °C	0.48 °C	
	(1 000 to 1 767) °C	0.6 °C	
Type T	(0 to 250) °C	0.57 °C	
	(250 to 1 000) °C	0.43 °C	
	(1 000 to 1 400) °C	0.44 °C	
	(1 400 to 1 767) °C	0.57 °C	
Type U	(-250 to -150) °C	0.76 °C	
	(-150 to 0) °C	0.29 °C	
	(0 to 120) °C	0.19 °C	
	(120 to 400) °C	0.48 °C	

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Electrical Simulation of RTDs Pt 385, 100 Ω Pt 385, 200 Ω Pt 385, 500 Ω Pt 385, 1000 Ω Pt 3926, 100 Ω	(-200 to 0) $^{\circ}\text{C}$	0.06 $^{\circ}\text{C}$	Fluke 5522A
	(0 to 100) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(100 to 300) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(300 to 400) $^{\circ}\text{C}$	0.12 $^{\circ}\text{C}$	
	(400 to 630) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	(630 to 800) $^{\circ}\text{C}$	0.28 $^{\circ}\text{C}$	
	(-200 to 100) $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	(100 to 260) $^{\circ}\text{C}$	0.06 $^{\circ}\text{C}$	
	(260 to 300) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	(300 to 400) $^{\circ}\text{C}$	0.16 $^{\circ}\text{C}$	
	(400 to 600) $^{\circ}\text{C}$	0.17 $^{\circ}\text{C}$	
	(600 to 630) $^{\circ}\text{C}$	0.19 $^{\circ}\text{C}$	
	(-200 to -80) $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$	
	(-80 to 100) $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$	
	(100 to 260) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(260 to 400) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(400 to 600) $^{\circ}\text{C}$	0.12 $^{\circ}\text{C}$	
	(600 to 630) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	(-200 to 0) $^{\circ}\text{C}$	0.06 $^{\circ}\text{C}$	
	(0 to 100) $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$	
(100 to 260) $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$		
(260 to 300) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$		
(300 to 600) $^{\circ}\text{C}$	0.1 $^{\circ}\text{C}$		
(600 to 630) $^{\circ}\text{C}$	0.28 $^{\circ}\text{C}$		
(-200 to 0) $^{\circ}\text{C}$	0.06 $^{\circ}\text{C}$		
(0 to 100) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$		
(100 to 300) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$		
(300 to 400) $^{\circ}\text{C}$	0.12 $^{\circ}\text{C}$		
(400 to 630) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$		
Capacitance - Source			
10 Hz to 10 kHz	(200 to 400) pF	6 mF/F + 12 pF	
10 Hz to 10 kHz	400 pF to 1.1 nF	6 mF/F + 12 pF	
10 Hz to 3 kHz	(1.1 to 3.3) nF	6 mF/F + 12 pF	
10 Hz to 1 kHz	(3.3 to 11) nF	3 mF/F + 13 pF	
10 Hz to 1 kHz	(11 to 33) nF	3 mF/F + 0.12 nF	
10 Hz to 1 kHz	(33 to 110) nF	3 mF/F + 0.14 nF	
10 Hz to 1 kHz	(110 to 330) nF	3 mF/F + 0.43 nF	
(10 to 600) Hz	330 nF to 1.1 μF	3 mF/F + 1.5 nF	
(10 to 300) Hz	(1.1 to 3.3) μF	3 mF/F + 4.1 nF	
(10 to 150) Hz	(3.3 to 11) μF	3 mF/F + 14 nF	
(10 to 120) Hz	(11 to 33) μF	4.8 mF/F + 41 nF	
(10 to 80) Hz	(33 to 110) μF	5.4 mF/F + 0.16 μF	

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Capacitance - Measure (1 to 100) kHz 300 Hz to 100 kHz (50 to 100) kHz (50 to 200) kHz 50 Hz to 10 kHz 50 Hz to 1 kHz	100 pF to 1 nF (1 to 10) nF (10 to 100) nF (0.1 to 1) μ F (1 to 10) μ F (10 to 100) μ F	1.3 mF/F + 0.013 pF 1.3 mF/F + 0.17 pF 1.2 mF/F + 2.7 pF 1.2 mF/F + 0.14 nF 1.2 mF/F + 1.1 nF 1.2 mF/F + 1.7 nF	Fluke PM6304
Capacitance - Source (Fixed Values @ 1 kHz)	1 nF 10 nF 100 nF 1 μ F	0.8 pF 14 pF 0.14 nF 0.65 nF	Genrad 1409
Inductance - Source 100 Hz to 10 kHz	100 μ H 1 mH 20 mH 100 mH @ (0.1 to 1) kHz 101.88 mH @ 10 kHz	0.85 μ H 18 μ H 27 μ H 0.13 mH 0.15 mH	Genrad 1482-B Genrad 1482-E Genrad 1482-J Genrad 1482-L
Inductance - Measure (2 to 100) kHz 300 Hz to 100k Hz 100 Hz to 100 kHz (50 to 100) kHz 50 Hz to 10 kHz 50 Hz to 2 kHz	100 μ H to 1 mH (1 to 10) mH (10 to 100) mH 100 mH to 1 H (1 to 10) H (10 to 100) H	1.2 mH/H + 23 nH 1.2 mH/H + 0.27 μ H 1.2 mH/H + 3.3 μ H 1.3 mH/H + 27 μ H 1.3 mH/H + 1.1 μ H 1.3 mH/H + 3.5 mH	Fluke PM6304
Oscilloscopes Amplitude Square Wave 50 Ω Load 1 M Ω Load Leveled Sine Wave Time Marker into 50 Ω	1 mV to 6.6 V p-p 10 Hz to 10 kHz 1 mV to 130 V p-p 10 Hz to 10 kHz [5 mV to 5.5 V] 50 kHz to 100 MHz (100 to 300) MHz (300 to 500) MHz (500 to 600) MHz 1 nS to 50 mS 20 mS to 5 S	3 mV/V + 0.96 mV 3 mV/V + 1.8 mV 42 mV/V + 1.4 mV 48 mV/V + 1.4 mV 66 mV/V + 1.4 mV 72 mV/V + 1.4 mV 1 μ S/S + 60 nS 3 μ S/S + 9 μ S	Fluke 5800
DC Power - Source	Up to 3.06 kW (3.06 to 20.91) kW	20 μ W/W + 0.39 W 50 μ W/W + 3.1W	Fluke 5522A
AC Power - Source (45 to 65 Hz)	Up to 336.6 W 336.6 W to 2.244 kW (2.244 to 4.59) kW (4.59 to 20.91) kW	50 μ W/W + 0.39 W 60 μ W/W + 2.8 W 90 μ W/W + 2.8 W 50 μ W/W + 2.8 W	

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Phase	(10 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	1.4° 1.5° 2.2° 3.7° 6.9°	Fluke 5522A

Electromagnetic - RF/Microwave

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
RF Power/Gain - Measure*	(10 to 20) MHz (20 to 50) MHz (50 to 100) MHz 100 MHz to 1 GHz (1 to 4) GHz (4 to 8) GHz (8 to 18) GHz	2.1 % of rdg 1.8 % of rdg 1.4 % of rdg 1.2 % of rdg 1.2 % of rdg 1.4 % of rdg 2.5 % of rdg	F1109, 1805B TEGAM
Frequency Modulation - Measure	Rate: 20 Hz to 10 kHz Deviation: \leq 40 kHz peak 250 kHz to 10 MHz Rate: 20 Hz to 10 kHz Deviation: \leq 400 kHz peak 10 MHz to 1.3 GHz	2.4 % of rdg + 210 Hz 1.2 % of rdg + 210 Hz	HP 8902A w/11722A
Amplitude Modulation - Measure	Rate: 50 Hz to 10 kHz Depths;(5 to 99) % 150 kHz to 10 MHz Rate 10 MHz to 1.3 GHz Depths (5 to 99) % 50 Hz to 50 kHz	2.4 % of rdg + 0.19 % depth 1.2 % of rdg + 0.19 % depth	
Phase Modulation - Measure	Rate: 200 Hz to 10 kHz 150 kHz to 10 MHz Rate: 200 Hz to 20 kHz 10 MHz to 1.3 GHz	4.8 % of rdg + 0.32 rad 3.6 % of rdg + 0.32 rad	
RF Power - Measure	(+30 to -20) dBm 100 kHz to 2.6 GHz (+20 to -30) dBm 100 kHz to 4.2 GHz 50 MHz to 26.5 GHz	0.1 dB 4.9 % of rdg 3.1 % of rdg	HP 8902A with HP 11722A HP 8482A HP 8485A

Electromagnetic - RF/Microwave

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Tuned RF Power Relative - Measure	2.5 MHz to 1.3 GHz		HP 8902A w/11722A
	(0 to -10) dB	0.03 dB	
	(-10 to -40) dB	0.06 dB	
	(-40 to -50) dB	0.13 dB	
	(-50 to -80) dB	0.18 dB	
	(-80 to -90) dB	0.16 dB	
	(-90 to -110) dB	0.43 dB	
	(-110 to -127) dB	0.44 dB	
RF Power - Source	10 MHz to 2 GHz		HP 83630A
	(13 to 10) dBm	1.5 dB	
	(10 to -10) dBm	0.73 dB	
	(-10 to -60) dBm	1.1 dB	
	(-60 to -110) dBm	1.7 dB	
	2 to 20 GHz		
	(13 to 10) dBm	1.6 dB	
	(10 to -10) dBm	0.84 dB	
	(-10 to -60) dBm	1.2 dB	
	(-60 to -110) dBm	1.8 dB	
	20 GHz to 26.5 GHz		
	(13 to -10) dBm	1.1 dB	
	(-10 to -60) dBm	1.5 dB	
	(-60 to -1) dBm	1.8 dB	

Electromagnetic-Fiber Optic (Optical Power)

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Optical Power Source 850,1300,1310 and 1550 nm	-7 dBm to 0 dBm	0.35 dBm	JDSU OLS-56
Optical Power Measure-Linearity Measure –Accuracy 800 nm to 1650 nm	-80 dBm to 10 dBm Up to 10 mW	0.035 dBm 3.5% of rdg + 0.073 uW	Agilent 81635A
Optical Attenuation Source 1310 nm – 1550 nm	0 to -60 dB	0.13 dB	Agilent 81570A
Optical Power Source 850,1300,1310 and 1550 nm	-7 dBm to 0 dBm	0.35 dBm	JDSU OLS-56

Time & Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Chronometers, Stopwatches, Timers	1 ms to 100 000 S	0.12 mS	HP 53131A
Time - Source	1 ms to 100 000 S	$(4.8 \times 10^{-3}) \mu\text{S}$	HP 53131A
Frequency - Measure	150 kHz to 1.3 GHz DC to 3.2 GHz	$(2.4 \times 10^{-8}) \text{ Hz} + 2\text{R}$ $(9.4 \times 10^{-6}) \text{ Hz} + 2\text{R}$	HP 8902A HP 53131A
Frequency - Source	(0.01 to 120) Hz 120 Hz to 1.2 kHz (1.2 to 120) kHz 120 kHz to 1.2 MHz (1.2 to 2) MHz	3 $\mu\text{Hz}/\text{Hz} + 61 \mu\text{Hz}$ 3 $\mu\text{Hz}/\text{Hz} + 61 \mu\text{Hz}$ 3 $\mu\text{Hz}/\text{Hz} + 120 \mu\text{Hz}$ 3 $\mu\text{Hz}/\text{Hz} + 10 \text{ mHz}$ 3 $\mu\text{Hz}/\text{Hz} + 12 \text{ mHz}$	Fluke 5520
	2MHz to 6 GHz 10 MHz to 26.5 GHz	1.3 $\mu\text{Hz}/\text{Hz} + 0.02 \text{ Hz}$ $(1.2 \times 10^{-7}) \text{ Hz} + \text{R}$	HP E4438C HP 83630A

Thermodynamic

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Humidity	(0 to 90) %RH	1.2 %RH	Vaisala MI70/HMP76B
Temperature - Source (Black Body)	(50 to 100) °C	0.63 °C	Hart Scientific 9132
	(100 to 500) °C (100 to 1 200) °C	1 °C 2.5 °C	Isotech Pegasus R970
Temperature Measurement	(-200 to 0) °C	0.03 °C	Fluke 1523 w/ 5628 PRT
	(0 to 100) °C	0.05 °C	
	(100 to 300) °C (300 to 420) °C (420 to 650) °C	0.07 °C 0.11 °C 0.14 °C	
	0 to 1 200 °C	0.6 °C	Fluke 5649
	(650 to 1 200) °C	0.1 Of rdg + 1.4 °C	Pegasus Type R Thermocouple
Dew Point	(-40 to 60) °C	2.51 °C	Vaisala Mi70

Mechanical

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Force - Tension/Compression	Up to 500 lbf Up to 1 000 lbf (1 000 to 5 000) lbf (5 000 to 10 000) lbf (10 000 to 50 000) lbf	0.26 lbf 0.68 lbf 6.3 lbf 24 lbf 60 lbf	FSH01043 LSB 352 FSH01065 LSB 400 Futek L2901 Futek
Scales/Balances	Up to 5 g	0.021 mg +0.6R	Class 0 Weights
	Up to 50 g (50 to 200) g 200 g to 10 kg (10 to 500) kg 25kg to 1000 kg	0.046 mg + 0.6R 0.1 mg + 0.6 R 88.32 mg + 0.6 R 4.5 g + 0.6R (2.7 M) g +0.6R	Class F Weights
Torque - Measure	Up to 20 ozf-in 50 lbf-in 250 lbf-in 1 000 lbf-in 250 lbf-ft 1 000 lbf-ft	0.5 % rdg + 0.38 ozf-in 0.33 % rdg + 0.006 lbf-in 0.31 % rdg + 0.04 lbf-in 0.31 % rdg + 0.12 lbf-in 0.31 % rdg + 1.9 lbf-ft 0.31 % rdg + 0.88 lbf-ft	Futek Torque Cell 950 DT CDI 1000-F-TTP-CDI
Torque - Source	(0.07 to 0.28) Nm (0.28 to 8.47) Nm (8.47 to 16.93) Nm (16.93 to 56.44) Nm (56.44 to 67.71) Nm (67.71 to 225.7) Nm (225.7 to 1 221.05) Nm	0.054 % + 0.00018 Nm 0.053 % + 0.0015 Nm 0.015 % + 0.0021 Nm 0.0075 % + 0.022 Nm 0.0029 % + 0.021 Nm 0.0074 % +0.025 Nm 0.0025 % +0.02 Nm	Calibration Arms and Weights
Pressure - Measure	(-14.7 to 300) psig (15 to 1 000) psig (1 000 to 10 000) psig (0.25 to 2.5) psig	0.09 psi 0.32 psig 3.8 psi 0.0008 psi	Druck DPI 610, Druck PDCR 2200-1000 psi, Druck PDCR 2200, Druck PDCR2200-A145
Pressure Source	(-14 to -0.43) psig (0 to 1 000) psig (90 to 10 000) psig	0.016 % + 0.0005 psig 0.016 % + 0.0012 psig 0.006 % + 0.008 psig	Mensor CPB5000 Mensor CPB5800
Sound - Source	114 dB @ 1 kHz	1.3 dB	Quest QC-10
	(30 to 140) dB	0.43 dB	Quest 2400
Tachometer (Stroboscope)	Up to 100 rpm (100 to 1 000) rpm (1 000 to 99 999) rpm	0.03 % + 0.014 rpm 0.03 % + 0.14 rpm 0.0 3% + 1.4 rpm	Amprobe TACH20 Ametek TACH20
Volumetric Calibration	Up to 5 ml (5 to 100) ml (100ml to 250) ml 250ml to 1.2 L (1.2 to 25) L	0.018 ml 0.071 ml 0.355 ml 0.63 ml 0.81 ml	Analytical Balance and DI Water

Mechanical

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Air Flow	(0 to 30) sccm	1.35 % of rdg + 0.01 sccm	CME 60B-1-.3-10A
	(30 to 300) sccm (1 to 10) slm (10 to 100) slm (100 to 1 000) slm (0 to 200) sccm	1.35 % of rdg + 0.1 sccm 1.35 % of rdg + 0.001 slm 1.35 % of rdg + 0.01 slm 1.35 % of rdg + 0.91 slm 1% of rdg + 2 sccm	Uson Testra 1100
Air Velocity	(100 to 6 800) fpm	1.3 % + 41 fpm	Omega HHF710-P1-137-0166
Mass DOD Midas, OEM and GIDEP Sourced Procedures NIST 105-1 Handbook Up to Class F only	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 25 kg	0.13 mg 0.15 mg 0.17 mg 0.21 mg 0.24 mg 0.42 mg 0.52 mg 0.65 mg 0.74 mg 1.1 mg 1.3 mg 1.8 mg 2.4 mg 4.8 mg 12 mg 24 mg 48 mg 84 mg 0.14 g 0.25 g 0.61 g 0.6 g	Troemner Class F Weights and Balances
Vibration	(7 to 100) Hz 100 Hz to 5 kHz (5 to 10) kHz	3.5 % of rdg + 0.03 gpk 3.1 % of rdg + 0.03 gpk 3.6 % of rdg + 0.03 gpk	9100 D Portable Vibration Calibrator

Mechanical

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (±)]	Reference Standard or Equipment
Leak Standards	0.3175 sccm @ 6.22 psi	0.008 sccm	American Specialty Gold Restrictor
	0.3921 sccm @ 8.68 psi	0.008 sccm	
	0.5545 sccm @ 11.12psi	0.009 sccm	
	0.6608 sccm @ 13.08 psi	0.009 sccm	
	0.7616 sccm @ 14.56 psi	0.01 sccm	
	0.4350 sccm @ 5.38 psi	0.007 sccm	
	0.6411 sccm @ 7.49 psi	0.009 sccm	
	0.9769 sccm @ 10.54psi	0.012 sccm	
	1.3161 sccm @ 13.30psi	0.015 sccm	
	1.6584 sccm @ 15.79psi	0.019 sccm	
	1.6813 sccm @ 4.30psi	0.018 sccm	
	3.0969 sccm @ 7.27psi	0.032 sccm	
	4.8716 sccm @ 10.51psi	0.05 sccm	
	6.2687 sccm @ 12.80psi	0.063 sccm	
	8.2315 sccm @ 15.76psi	0.083 sccm	
3.4512 sccm @ 4.39psi	0.036 sccm		
5.9868 sccm @ 48.81psi	0.061 sccm		
9.4685 sccm @ 10.35psi	0.096 sccm		
12.7553 sccm @ 13.15psi	0.13 sccm		
15.6443 sccm @ 15.46psi	0.16 sccm		
(0.803 to 1.017) sccm	1.2 % of rdg + 0.17 sccm		
(-6.5 to -10.35) psi	1.2 % of rdg + 0.16 sccm		
(31.25 to 102.06) sccm	1.2 % of rdg + 0.16 sccm		
(5.62 to 15.84) psi	1.2 % of rdg + 0.16 sccm		
(35.33 to 113.43) sccm	1.2 % of rdg + 0.16 sccm		
(5.73 to 16.15) psi	1.2 % of rdg + 0.16 sccm		
Leak Tester	Up to 10 sccm (10 to 200) sccm	0.17 sccm 1 % rdg. + 2 sccm	Uson Optima VT Uson Testra 1100



Mechanical

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Hardness ASTM E18 Indirect Verification of Rockwell Hardness Testers	49.20 HRC 62.42 HRC 27.11 HRC 29.51 HR45N 47.37 HR45N 70.07 HR45N 82.57 HRBW 62.56 HRBW 45.28 HRBW 82.41 HR30TW 59.90 HR30TW 54.51 HR30TW 91.10 HR15N 81.10 HR15N 74.04 HR15N 92.21 HR15TW 81.07 HR15TW 75.69 HR15TW 76.15 HREW 89.62 HREW 97.23 HREW 56.88 HRKW 72.56 HRKW 91.62 HRKW	1.2 HRC 0.68 HRC 1.2 HRC 1.3 HR45N 1.3 HR45N 0.75 HR45N 1.3 HRBW 1.5 HRBW 2.1 HRBW 1.2 HR30TW 1.2 HR30TW 1.4 HR30TW 0.77 HR15N 1.1 HR15N 1.2 HR15N 1.1 HR15TW 1.1 HR15TW 1.2 HR15TW 1.3 HREW 1.4 HREW 1.3 HREW 1.1 HRKW 1.1 HRKW 1 HRKW	Hardness Test Blocks
Hardness ASTM E10 Indirect Verification of Brinell Hardness Testers	100HBW 10/500 142HBW 10/3000 163HBW 10/500 197 HBW 3000 239 HBW 10/500 248 HBW 10/3000	4.3 HBW 5.7 HBW 7.9 HBW 8.7 HBW 9 HBW 14 HBW	
Hardness ASTM E92 Indirect Verification of Micro-Indentation Hardness Testers	712 HK 714 HV 117 HV 393 HV	36 HK 35 HV 24 HV 28 HV	
Durometers Force Types A, B, O Types C, D, DO Types M, OO Indenter Length	(20 to 90) Duro (0.096 to 0.104) in	0.8 grf 4.9 grf 0.31 grf 0.001 in	Partial Direct Verification to T.O 33K6-4-1362-1

Dimensional

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Plug Gages*	Up to 0.5 in (0.5 to 1) in (1 to 2.5) in (2.5 to 4) in (4 to 12) in	(6.5 + 2.6L) μ in (7.8 + 2.3L) μ in (11 + 4.6L) μ in (18 + 3L) μ in (13 + 7.7L) μ in	Pratt & Whitney LabMaster
Ring Gages*	Up to 1 in (1 to 4) in (4 to 10) in (10 to 40) in	(9 + 19.6L) μ in (8.1 + 8.4L) μ in (11 + 10.7L) μ in [26 + 13 (L-10)] μ in	
Gage Blocks*	Up to 1 in (1 to 4) in 6 in 10 in (10 to 40) in	(4 + 0.8L) μ in (3.1 + 1.7L) μ in 14 μ in 23 μ in [9.7 + 13 (L-10)] μ in	
Thread Plug Gages*	(0.05 to 1) in (1 to 2) in (2 to 12) in (10 to 40) in	100 μ in 100 μ in 130 μ in [68 + 13 (L-10)] μ in	
Thread Ring Gages*	(0.19 to 1) in (1 to 2) in (2 to 10) in (10 to 40) in	38 μ in 40 μ in 77 μ in [60 + 13 (L-10)] μ in	
OD Micrometers	Up to 12 in	(66 + 9.6L) μ in	Grade 2 Gage Blocks
ID Micrometers	Up to 12 in (12 to 40) in	(66 + 9.5L) μ in (150 + 10L) μ in	
Calipers	Up to 12 in (12 to 40) in (40 to 80) in (80 to 120) in	(610 + 1.1L) μ in (630 + 4.3L) μ in (940 + 0.25L) μ in (1 000 + 7.5L) μ in	
Dial Indicators	Up to 4 in	(62 + 5.6L) μ in	
Test Indicators	Up to 0.06 in	(6.2 + 4.4L) μ in	
Pin Gages	Up to 60 mm	3 μ m	Mitutoyo LSM-9506
Laser Micrometer	Up to 60 mm	0.64 μ m	Master Plug Gages
Height Gages	Up to 12 in (12 to 40) in	(130 + 7L) μ in (130 + 13L) μ in	Grade 2 Gage Blocks
Optical Length	(0 to 50) mm (50 to 100) mm	(2.1 + 0.005L) μ m (2.6 + 0.005L) μ m	172-116 Glass Scale 182-512-10 Glass Scale

Dimensional

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Optical Flat - Flatness	Up to 4 in	9.6 μ m	157-112 157-111 157-110 157-109
Distance Measurement	Up to 972 mm Up to 1 200 in	(2.4+0.7L/600) μ m 0.06 in	Mitutoyo LH-600 Fluke 416D
Protractor/Angle	(Up to 90) $^{\circ}$	2 arc min	Angle Block Set
Square/Block Parallelism	(-0.1 to 0.10) in	21 μ m	Federal Head/832 Amplifier
Surface Plates Repeatability	Up to 1 in	34 μ m /step	Rahn Repeat-o-Meter
Flatness	Up to 1 000 arc sec	12 arc sec	Federal Level System
Surface Finish - Source	118 μ m	2.6 μ m	178-602
Surface Finish - Measure	(0 to 300) μ m	5.6 μ m	SJ-201 Mitutoyo

Chemical Quantities

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
pH	4.011 pH 6.987 pH 10.03 pH	0.04 pH 0.04 pH 0.03 pH	pH Solutions
Viscosity Kinematic @ 25 $^{\circ}$ C	33.76 mm ² /s 64.35 mm ² /s 117.5 mm ² /s 237.4 mm ² /s	0.49 mm ² /s 0.74 mm ² /s 1.24 mm ² /s 2.45 mm ² /s	Standard Solutions C20 C35 C60 C100
Viscosity Dynamic @ 25 $^{\circ}$ C	7.239 cP 100.9 cP 498.1 cP 717.7 cP 4 595 cP 7 686 cP 200 050 cP	0.26 cP 1.1 cP 5.1 cP 7.4 cP 48 cP 80 cp 210 cP	Standard Solutions: S6 S60 D500 N350 S2000 D7500 S8000
Density	0.8455 g/ml 0.8518 g/ml 0.8638 g/ml 0.9451 g/ml 0.9635 g/ml 0.9702 g/ml	0.008 g/ml 0.009 g/ml 0.009 g/ml 0.009 g/ml 0.010 g/ml 0.010 g/ml	Standard Solution

Chemical Quantities

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Conductivity	2 μ mhos/cm 10 μ mhos/cm 100 μ mhos/cm 1 000 μ mhos/cm 1 400 μ mhos/cm 10 000 μ mhos/cm 100 000 μ mhos/cm	0.25 μ mhos/cm 1.2 μ mhos/cm 15 μ mhos/cm 120 μ mhos/cm 180 μ mhos/cm 2 200 μ mhos/cm 8 000 μ mhos/cm	Conductivity Solutions

Dimensional Inspection/Measurement

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Dimensional* (CMM)	X axis to 705 mm Y axis to 1 005 mm Z axis to 605 mm	(7.6 + 4.6L/1 000) μ m	Mitutoyo CRTAS7106 with TP20 Probe per Customer Print or Report
Dimensional* (Non-Contact)	X axis to 250 mm Y axis to 200 mm Z axis to 200 mm	(2.5+3.5L/1 000) μ m (2.5+3.5L/1 000) μ m (3.9+4.6L/1 000) μ m	Quick Vision QV-E202 per Customer Print or Report

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 laboratories and on-site at customer-designated locations. 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.
 3. Capabilities denoted with an asterisk (*) cannot be performed on-site.
 4. This scope also applies to the laboratory's satellite sites at:
 - (1) MEXICALI, B.C. - Calle Gales 1201 Fracc. Villa Fontana, Mexicali, B.C. C.P. 21180. Contact: Mauricio Garayzar. Tels: 01(686) 555-1660, 557-6117. Fax: 01(686) 555-1766 mxl_sales@techmaster.us
 - (2) CD JUAREZ, CHIHUAHUA - Blvd. Gomez Morin 9050-L8, Col. Partido Senecu, C.P. 32469, Tel 01(656) 687-2471,648-1181 ventasjuarez@techmaster.us
 - (3) Monterrey, NL - Ave. Ignacio Morones Prieto No. 914 Ote. Int. 112 Col. La Huerta C.P. 67144 Guadalupe, Nuevo León Tels: 01(81)1334-0701 monterrey@techmaster.us
- Only one certificate and scope of accreditation is issued with the corporate organization's address.
5. The use of (R) signifies an expression of the Resolution of the unit under test or monitoring device.
 6. The use of (L) refers to Length.
 7. For surface plate flatness, (N) is the length of the surface plate in inches divided by 4.
 8. This scope is formatted as part of a single document including the Certificate of Accreditation AC-1342.


 Vice President