

International Accreditation Service  
**CERTIFICATE OF ACCREDITATION**

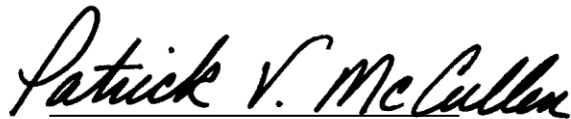
*This is to signify that*

**STANDARD CALIBRATIONS, INC.**

681 ANITA STREET, SUITE 103  
CHULA VISTA, CALIFORNIA 91911

Calibration Laboratory CL-121

has met the requirements of the IAS Accreditation Criteria for Calibration Laboratories (AC204), has demonstrated compliance with the ANS/ISO/IEC Standard 17025:2005, *General requirements for the competence of testing and calibration laboratories*, and has been accredited commencing February 29, 2012, for the calibration discipline(s) listed in the approved scope of accreditation. The laboratory meets IAS program requirements in the field of calibration. This certificate expires February 28, 2014.



Patrick V. McCullen  
Vice President



C. P. Ramani, P.E.  
President



*(see attached scope of accreditation for fields of calibration and accredited calibration methods)*

Print Date: 03/08/2012

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**SCOPE OF ACCREDITATION**

Standard Calibrations, Inc. CL-121

Standard Calibrations, Inc.  
 681 Anita Street, Suite 103  
 Chula Vista, CA 91911

Louis Ruggeri  
 Metrology Director  
 757) 549-6534

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY <sup>1</sup> (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
<i>Mechanical</i> Torque wrenches	5 to 200 lb in 75 to 750 lb in 12.5 to 1000 lb ft	% reading + Range (0.25% + 0.6R) in.lb (0.25% + 0.6R) in.lb (0.25% + 0.6R) in.lb	CDI Torque Calibrator/Torque Cell
Pressure gages/transducers	-14.5 psi to 15 psi	0.02% fs	Mensor 600
	0 to 150 psi	0.02% fs	
	250 to 500 psi	0.02% fs	
	750 to 1500 psi	0.02% fs	
	1000 to 1500 psi	0.05% fs	
	500 to 10,000 psi	0.05% fs	Mensor 2101
	10,000 to 30,000psi	0.2% fs	Omegadyne PXD 1S1-30KGI

February 29, 2012  
 Commencement Date



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<i>Mechanical</i> (continued) Vacuum gages/transducers	0 to 30 in Hg	0.02% fs	Mensor 600
<i>Thermal</i> Temperature probes, dry block calibrators, thermometers	40°F to 1199°	0.06°F	Reference PRTs with meters, oil baths, dry blocks
Infrared	122°F, 212°F, 302°F	1°F	Fluke 9135
Thermocouples Type B	600 °C to 800 °C 800 °C to 1000 °C 1,000 °C to 1,550 °C 1,550 °C to 1,850 °C	0.44°C 0.34°C 0.30°C 0.33°C	Agilent 34401A

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<i>Thermal</i> (continued) Type C	0 °C to 150 °C 150 °C to 650 °C 650 °C to 1,000 °C 1,000 °C to 1,800 °C 1,800 °C to 2,316 °C	0.30°C 0.26°C 0.31°C 0.50°C 0.84°C	Agilent 34401A
Type E	-250 °C to -100 °C -100 °C to -25 °C -25 °C to 350 °C 350 °C to 650 °C 650 °C to 1000 °C	0.50°C 0.16°C 0.14°C 0.16°C 0.21°C	Agilent 34401A

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<i>Thermal (continued)</i> Type J	-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.27°C 0.16°C 0.14°C 0.17°C 0.23°C	Agilent 34401A
Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.33°C 0.18°C 0.16°C 0.26°C 0.40°C	Agilent 34401A
Type T	-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.63°C 0.24°C 0.16°C 0.15°C	Agilent 34401A

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<i>Electrical-DC/LF</i> DC Voltage – Generate	(0 to 329.9999 mV) (0 to 3.299999 V) (0 to 32.99999 V) (30 to 329.9999 V) (100 to 1000.000 V)	ppm of output + $\mu$ V 20 + 1 11 + 2 12 + 20 18 + 150 18 + 1500	Fluke 5520A
AC Voltage – Generate	1.0 to 32.999 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)	ppm of output + $\mu$ V 800 + 6 150 + 6 200 + 6 1000 + 6 3500 + 12 8000 + 50	Fluke 5520A

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AC Voltage – Generate (continued)	33 to 329.999 mV (10 to 45 Hz)	300 + 8	Fluke 5520A
	(45 Hz to 10 kHz)	145 + 8	
	(10 to 20 kHz)	160 + 8	
	(20 to 50 kHz)	350 + 8	
	(50 to 100 kHz)	800 + 32	
	(100 to 500 kHz)	2000 + 70	Fluke 5520A
	0.33 to 3.29999 V (10 to 45 Hz)	300 + 50	
	(45 Hz to 10 kHz)	150 + 60	
	(10 to 20 kHz)	190 + 60	
	(20 to 50 kHz)	300 + 50	
(50 to 100 kHz)	700 + 125		
(100 to 500 kHz)	2400 + 600		

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AC Voltage – Generate (continued)	3.3 to 32.9999 V (10 to 45 Hz)	300 + 650	Fluke 5520A
	(45 Hz to 10 kHz)	150 + 600	
	(10 to 20 kHz)	240 + 600	
	(20 to 50 kHz)	350 + 600	Fluke 5520A
	(50 to 100 kHz)	900 + 1600	
	33 to 329.999 V (45 Hz to 1 kHz)	190 + 2000	
	(1 to 10 kHz)	200 + 6000	Fluke 5520A
	(10 to 20 kHz)	250 + 6000	
	(20 to 50 kHz)	300 + 6000	
(50 to 100 kHz)	2000 + 50000	Fluke 5520A	
330 to 1020 V (45 Hz to 1 kHz)	300 + 10000		
(1 to 5 kHz)	250 + 10000		
(5 to 10 kHz)	300 + 10000		

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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY <sup>1</sup> (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
DC Current – Generate	(0 to 329.999 µA) (0 to 3.29999 mA) (0 to 32.9999 mA) (0 to 329.999 mA) (0 to 1.09999 A) (1.1 to 2.99999 A) (0 to 10.9999 A on 20 A Range) (11 to 20.5 A) <sup>2</sup>	ppm of output + µA 150 + 0.02 100 + 0.05 100 + 0.25 100 + 2.5 200 + 40 380 + 40 500 + 500 1000 + 750	Fluke 5520A
AC Current – Generate	30 to 330µA >330µA to 3.3mA >3.3 to 33mA >33 to 330mA >330mA to 1.1A >1.1 to 3A >3 to 11A >11 to 20.5A	% of output + µA 0.13 % + 0.1 µA 0.1 % + 0.15 µA 0.04 % + 2 µA 0.04 % + 20 µA 0.05 % + 0.1 mA 0.06 % + 0.1 mA 0.1 % + 2 mA 0.15 % + 5 mA	Generate is at 1kHz only, LCOMP is off

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Ohms – Generate	0 to 11Ω >11 to 33Ω >33 to 110Ω >110 to 330Ω >330Ω to 1.1kΩ >1.1 to 3.3kΩ >3.3 to 11kΩ >11 to 33kΩ >33 to 110kΩ >110 to 330kΩ >330kΩ to 1.1MΩ >1.1 to 3.3MΩ	ppm of output + floor 40 + 1mΩ 30 + 1.5mΩ 28 + 1.4mΩ 28 + 2mΩ 28 + 2mΩ 28 + 0.02Ω 28 + 0.02Ω 28 + 0.2Ω 28 + 0.2Ω 32 + 2Ω 32 + 2Ω 60 + 30Ω	Floor is 12 hours at 1°C
	>3.3 to 11MΩ >11 to 33MΩ >33 to 110MΩ >110MΩ to 1.1GΩ	0.13% + 50Ω 0.025% + 2.5kΩ 0.05% + 3kΩ 1.5% + 500kΩ	Floor is 12 hours at 1°C

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DC Voltage – Measure	Up to 100mV >100mV to 1V >1 to 10V >10 to 100V >100 to 1000V	5 µV/V + 0.8 µV 4 µV/V + 0.8 µV 4 µV/V + 1 µV 6 µV/V + 31 µV 6 µV/V + 100 µV	Agilent 34401A
DC Current – Measure	Up to 1µA >1 to 10µA >10 to 100µA >100µA to 1mA >1 to 10mA >10 to 100mA >100mA to 1A	22 µA/A + 45 pA 22 µA/A + 110 pA 22 µA/A + 900 pA 22 µA/A + 6 nA 22 µA/A + 60 nA 37 µA/A + 0.6 µA 0.01 % + 12 µA	Agilent 34401A
AC Voltage - Measure	Up to 10mV (1 to 40Hz) (40Hz to 1kHz) (1 to 20kHz) (20 to 50kHz) (50 to 100kHz) (100 to 300kHz)	0.03 % + 3 µV 0.02 % + 1.1 µV 0.03 % + 1.1 µV 0.1 % + 1.1 µV 0.5 % + 1.1 µV 4 % + 2 µV	Agilent 34401A

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AC Voltage – Measure (continued)	>10 to 100mV (1 to 40Hz) (40Hz to 1kHz) (1 to 20kHz) (20 to 50kHz) (50 to 100kHz) (100 to 300kHz) (300kHz to 1MHz) (1 to 2MHz)	0.007 % + 4 µV 0.007 % + 2 µV 0.014 % + 2 µV 0.03 % + 2 µV 0.08 % + 2 µV 0.3 % + 10 µV 1 % + 10 µV 1.5 % + 10 µV	Agilent 34401A
	>100mV to 1V (1 to 40Hz) (40Hz to 1kHz) (1 to 20kHz) (20 to 50kHz) (50 to 100kHz) (100 to 300kHz) (300kHz to 1MHz) (1 to 2MHz)	0.007 % + 40 µV 0.007 % + 20 µV 0.014 % + 20 µV 0.03 % + 20 µV 0.08 % + 20 µV 0.3 % + 100 µV 1 % + 100 µV 1.5 % + 100 µV	Agilent 34401A

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AC Voltage – Measure (continued)	>1 to 10V (1 to 40Hz) (40Hz to 1kHz) (1 to 20kHz) (20 to 50kHz) (50 to 100kHz) (100 to 300kHz) (300kHz to 1MHz) (1 to 2MHz)	0.007 % + 400 µV 0.007 % + 200 µV 0.014 % + 200 µV 0.03 % + 200 µV 0.08 % + 200 µV 0.3 % + 1 mV 1 % + 1 mV 1.5 % + 1 mV	Agilent 34401A
	>1 to 10V (1 to 40Hz) (40Hz to 1kHz) (1 to 20kHz) (20 to 50kHz) (50 to 100kHz) (100 to 300kHz) (300kHz to 1MHz) (1 to 2MHz)	0.007 % + 400 µV 0.007 % + 200 µV 0.014 % + 200 µV 0.03 % + 200 µV 0.08 % + 200 µV 0.3 % + 1 mV 1 % + 1 mV 1.5 % + 1 mV	Agilent 34401A

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AC Voltage – Measure (continued)	>10 to 100V (1 to 40Hz) (40Hz to 1kHz) (1 to 20kHz) (20 to 50kHz) (50 to 100kHz) (100 to 300kHz) (300kHz to 1MHz)	0.02 % + 4 mV 0.02 % + 2 mV 0.02 % + 2 mV 0.035 % + 2 mV 0.12 % + 2 mV 0.4 % + 10 mV 1.5 % + 10 mV	Agilent 34401A
	>100 to 1000V (1 to 40Hz) (40Hz to 1kHz) (1 to 20kHz) (20 to 50kHz) (50 to 100kHz)	0.04 % + 40 mV 0.04 % + 20 mV 0.06 % + 20 mV 0.12 % + 20 mV 0.3 % + 20 mV	Agilent 34401A

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AC Current – Measure	5 to 100µA >100µA to 1mA >1 to 10mA >10 to 100mA >100mA to 1A	0.06 % + 0.03 µA 0.03 % + 0.2 µA 0.03 % + 2 µA 0.03 % + 20 µA 0.1 % + 0.2 mA	Measure is at 1kHz only
Resistance - Measure	Up to 10Ω >10 to 100Ω >100Ω to 1kΩ >1 to 10kΩ >10 to 100kΩ >100kΩ to 1MΩ >1 to 10MΩ >10 to 100MΩ >100MΩ to 1GΩ	16 µΩ/Ω + 50 13 µΩ/Ω + 0.5 mΩ 11 µΩ/Ω + 1 mΩ 11 µΩ/Ω + 0.01 Ω 11 µΩ/Ω + 0.6 Ω 16 µΩ/Ω + 3 Ω 55 µΩ/Ω + 120 Ω 0.052 % + 1.2 kΩ 0.75 % + 12 kΩ	Measure is at 1kHz only

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Capacitance - Source	0.19 to 0.4nF >0.4 to 1.1nF >1.1 to 3.3nF >3.3 to 11nF >11 to 33nF >33 to 110nF >110 to 330nF >330nF to 1.1µF >1.1 to 3.3µF >3.3 to 11µF	% of output + floor 0.5 + 0.01 nF 0.5 + 0.01 nF 0.5 + 0.01 nF 0.25 + 0.01 nF 0.25 + 0.1 nF 0.25 + 0.1 nF 0.25 + 0.3 nF 0.25 + 1 nF 0.25 + 3 nF 0.25 + 10 nF	Fluke 5520A

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Capacitance – Source (continued)	11 to 33µF >33 to 110µF >110 to 330µF >330µF to 1.1mF >1.1 to 3.3mF >3.3 to 11mF >11 to 33mF >33 to 110mF	0.40 + 30 nF 0.45 + 100 nF 0.45 + 300 nF 0.45 + 1 µF 0.45 + 3 µF 0.45 + 10 µF 0.75 + 30 µF 1.1 + 100 µF	Fluke 5520A

<sup>1</sup>“Calibration Measurement Capability” 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 of nearly ideal measuring instruments. Calibration Measurement Capabilities are expressed as uncertainties at approximately the 95% level of confidence, usually using a coverage factor of  $k=2$ . The measurement uncertainty of a specific calibration performed by the laboratory may be greater than the least uncertainty due to the behavior of the customer’s device, to the environment (if the calibration is performed in the field), and to influences from the circumstances of the specific calibration.

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