CERTIFICATE OF ACCREDITATION

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

This is to certify that

Compania Nacional de Metrologia S.A.S - Conamet
Carrera 68C No. 68A-20
Bogota Colombia

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

ISO/IEC 17025:2005

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-2034
Certificate Number

ANAB Approval

Certificate Valid: 07/25/2017-03/18/2018
Version No. 006 Issued: 07/25/2017

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 April 2017).

ANSI-ASQ National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Compañía Nacional de Metrología S.A.S -Conamet

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CALIBRATION

Valid to: **March 18, 2018** Certificate Number: **AC-2034**

Chemical Quantities

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Potential of Hydrogen – pH[1]	2.0 pH 4.0 pH 7.0 pH 10.0 pH 12.0 pH	0.020 pH 0.011 pH 0.011 pH 0.011 pH 0.025 pH	Certified Reference Materials of 2 pH to 12 pH Comparison Method
Electrolytic Conductivity[1]	(0.76 to 5) µS/cm (5 to10) µS/cm (10 to 100) µS/cm (100 to 1 414) µS/cm (1414 to 10 000) µS/cm (10 000 to 100 000) µS/cm (100 000 to 200 000) µS/cm (200 000) µS/cm	0.45 µS/cm 0.46 µS/cm 0.37 µS/cm 2.2 µS/cm 2.3 µS/cm 22 µS/cm 320 µS/cm 540µS/cm	Certified Reference Materials 0.76 µS/cm to 200 mS/cm Comparison Method

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Voltage[1] Source - Measure	(0 to 330) mV 330 mv to 330 V (330 to 1 020) V	$(6.9\times10^{-5}\text{V} + 3.9\times10^{-3})$ mV $(5.8\times10^{-5}\text{V} + 1.8\times10^{-5})$ V $(6.7\times10^{-5}\text{V} + 1.8\times10^{-5})$ V	Multifunction Calibrator Precision Multimeter Comparison Method
DC Current[1] Source - Measure	(0 to 330) µA (0.33 to 330) mA (0.33 to 20.5) A (20.5 to 1 000) A	$(2.5\times10^{-4}\text{A} + 2.9\times10^{-2})$ µA $(1.2\times10^{-4}\text{A} + 1.8\times10^{-4})$ mA $(7.2\times10^{-4}\text{A} + 1.7\times10^{-5})$ A $(6.8\times10^{-3}\text{A} + 1.5\times10^{-2})$ A	Multifunction Calibrator Precision Multimeter with 5500 A Coil. Comparison Method

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance[1] Source - Measure	(0 to 330) Ω (0.33 to 33) kΩ (1.1 to 330) kΩ (0.33 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 330) MΩ (330 to 1 100) MΩ	$(9.6\times10^{-5}R + 2.1\times10^{-3})$ Ω $(1.1\times10^{-4}R + 1.0\times10^{-7})$ kΩ $(1.4\times10^{-5}R - 1.4\times10^{-3})$ kΩ $(1.8\times10^{-4}R - 8.6\times10^{-6})$ MΩ $(9.1\times10^{-4}R - 2.4\times10^{-3})$ MΩ $(1.4\times10^{-3}R - 7.8\times10^{-3})$ MΩ $(6.2\times10^{-3}R - 0.11)$ MΩ $(2.2\times10^{-2}R - 5.4)$ MΩ	Multifunction Calibrator Precision Multimeter Comparison Method
AC – Voltage[1] Source - Measure	(1 to 330) mV 10 Hz to 500 kHz 0.33 mV to 33 V 45 Hz to 100 kHz (33 to 1 020) V (45 Hz to 10 kHz)	$(6.0\times10^{-4}\text{V} + 2.1\times10^{-2})\ mV$ $(3.9\times10^{-4}\text{V} + 9.0\times10^{-5})\ V$ $(6.4\times10^{-4}\text{V} - 8.0\times10^{-3})\ V$	Multifunction Calibrator Precision Multimeter Comparison Method
AC –Current[1] Source - Measure	(0.029 o 0,33mA 10 Hz to 30 kHz) (0.33 to 330) mA 10 Hz to 10 kHz) (0.33 to 20,5) A 45 Hz to 5 kHz) (20.5 to 1 000) A (45 Hz to 400 Hz)	$(1.5\times10^{-3}\text{A} + 1.3\times10^{-4})\ mA$ $(5.4\times10^{-4}\text{A} + 4.4\times10^{-4})\ mA$ $(1.4\times10^{-3}\text{A} + 8.0\times10^{-4})\ A$ $(8.0\times10^{-3}\text{A} + 0.50\times10^{-4})\ A$	Multifunction Calibrator Precision Multimeter with 5500 A Coil. Comparison Method
Capacitance [1] Source - Measure	(220 to 400) pF (0.4 to 330) nF (0.33 to 330) µF (0.33 to 11) mF (11 to 110) mF	$(6.0\times10^{-6}C + 1.2\times10^{-2})$ pF $(3.9\times10^{-3}C + 1.4\times10^{-2})$ nF $(6.2\times10^{-3}C - 8.0\times10^{-4})$ µF $(6.5\times10^{-3}C - 1.0\times10^{-4})$ mF $(1.5\times10^{-2}C - 9.0\times10^{-2})$ mF	Multifunction Calibrator Precision Multimeter Comparison Method
Electrical simulation Temperature[1] indicators Thermocouples Type B, C, E, J, K, L, N, R, S, T, U. Source - Measure	(-250 to -30) °C (-30 to 650) °C (650 to 1 550) °C (1 550 to 2 316) °C	0.16 °C 0.14 °C 0.17 °C 0.21 °C	Multifunction Calibrator Precision Multimeter Comparison Method
Electrical simulation Temperature[1] indicators RTDs Source - Measure	(-200 to 0) °C (0 to 400) °C (400 to 800) °C	0.040 °C 0.050 °C 0.080 °C	Multifunction Calibrator Precision Multimeter Comparison Method

Mass

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Volume[1] / Piston-operated volumetric apparatus, glassware volumetric instruments. Metallic volumetric containers. Others volumetric devices	(0.000 1 to 0.01) mL (0.01 to 10) mL (10 to 200) mL (200 to 500) mL (500 to 25 000) mL	$(6\times10^{-4}Y + 4\times10^{-6})\ mL$ $(2.7\times10^{-4}Y + 6\times10^{-6})mL$ $(3.73\times10^{-5}Y + 2.3\times10^{-3})\ mL$ $(1.91\times10^{-4}Y - 2\times10^{-2})\ mL$ $(8.1\times10^{-5}Y + 2{,}7\times10^{-2})\ mL$	Gravimetric Calibration. Electronic Comparators and weighing instruments Gravimetric Method with reference to: ISO 8655-6, ISO 4787, OIML R120
Balances / Scales Truck scale, Weighing instruments[1]	Up to 1 000 g (d ≤ 1 mg) (1 to 30) kg (d ≥ 1 mg) (30 to 2 000) kg (d ≥ 0.1 mg) 2 000 kg to 100 t (d ≥ 0.1 kg)	$(9.2\times10^{-7}W + 1.1\times10^{-7})\ g$ $(1.7\times10^{-7}W + 9.1\times10^{-4})\ g$ $(1.7\times10^{-7}W + 9.1\times10^{-2})\ g$ $(2.3\times10^{-7}W + 9.1\times10^{-2})\ kg$	Mass – OIML Class E1, E2, F1, F2, M1, M2 Comparison Method
Mass - Measure / OIML Class E2 to M3 ASTM Class 1 to 6, No normalized Mass[1]	(1 to 100) mg (100 to 500) mg (0,5 to 50) g (50 to 200) g (200 to 2 000) g (2 000 to 5 000) g (5 to 10) kg (10 to 20) kg (20 to 2 000) kg	$(6.1\times10^{-6}M + 1.6\times10^{-3})\ mg$ $(2.9\times10^{-6}M + 2.0\times10^{-3})\ mg$ $(4.4\times10^{-7}M + 4.2\times10^{-6})\ g$ $(5.0\times10^{-7}M - 1.0\times10^{-6})\ g$ $(1.3\times10^{-6}M - 1.5\times10^{-4})\ g$ $(3.3\times10^{-7}M + 1.8\times10^{-3})\ g$ $(1.3\times10^{-6}M - 3.0\times10^{-3})\ g$ $(5.0\times10^{-7}M + 5.0\times10^{-3})\ g$ $(2.8\times10^{-5}M + 1.0\times10^{-3})\ kg$	Mass – OIML Class E1, Class E2, Class F1, Class F2, Class M1 y Class M2. Electronic Comparators and weighing instruments Comparison and Substitution Method
Density / Hydrometers	(600 to 1 000) kg/m³ (1 000 to 1 600) kg/m³ (1 600 to 2 500) kg/m³	0.13 kg/m³ 0.16 kg/m³ 0.26 kg/m³	Weighing Instruments Comparison Method
Pressure Hydraulic cross floating dead weight tester	(50 to 1 000) psi (1 000 to 20 000) psi	0.005 5 psi 0.10 psi	Comparison to DH-Budenberg Standard Dead Weight Tester up to 20 000 psi. Comparison Method

Mass

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Pressure/Vacuum[1] Pressure gauges[1], vacuum gauges[1], differential pressure[1] gauge, transducer pressure gauge[1].	(-10 to 1.81) psi (1.81 to 50) psi (50 to 20 000) psi (20 000 to 40 000) psi	0.003 9 psi 0.000 41 psi 0.035 psi 4.1 psi	Standard pressure gauges, Dead weight tester DH-Budenberg Comparison Method

Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Thermometry[1] **Temperature - Measure** / RTD Thermocouple and Liquid-in-glass thermometers, direct reading thermometers, data-loggers, ambient thermometers, and others thermometers	0 °C (-80 to 200) °C (200 to 660) °C (660 to 1 000) °C (1 000 to 1 200) °C	0.010 °C 0.018 °C 0.032 °C 0.13 °C 1.9 °C	Calibration baths and drywells Black body cavities Comparison Method
Thermometry **Temperature - Measure** Radiation thermometers[1]	(-80 to 200) °C (200 to 660) °C (660 to 1 000) °C (1 000 to 1 200) °C	0.59 °C 0.63 °C 1.3 °C 2.8 °C	Calibration baths and drywells Black body cavities Comparison Method
Thermometry[1] **Temperature - Source** Climatic chambers, steam sterilizer, dry blocks and liquid baths, black body cavities and plates	(-80 to 200) °C (200 to 660) °C (660 to 1 000) °C (1 000 to 1 200) °C	0.071 °C 0.096 °C 0.17 °C 2.3 °C	Thermometer with RTD r=0.001°C Thermometer with RTD and thermocouple r = 0.1/0.01 °C Dataloggers thermometers with RTD, r = 0.05 °C Comparison Method
Relative Humidity, humidity meters, and humidity chambers	(5 to 40) % RH (40 to 85) %RH (85 to 90) % RH (90 to 98) % RH	1.9 %RH 1.5 %RH 1.7 %RH 1.9 %RH	Humidity Meter Psychrometer Humidity chamber Thermometers with RTD. Comparison Method

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. *The use of (V) signifies Voltage in volts; The use of (A) signifies Current in amperes; The use of (R) signifies Resistance in ohms; The use of (Y) signifies Volume in milliliters; The use of (C) signifies Capacitance in farads*
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2034.