



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

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

This is to certify that

Alteq de México S.A. de C.V.
General Treviño 615 Sur. Zona Centro
San Nicolás de los Garza, Nuevo León, 66400

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.

L2275

Certificate Number


ANAB Approval

Certificate Valid: 11/14/2017-02/10/2021
Version No. 002 Issued: 11/14/2017



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).



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Alteq de México S.A. de C.V.

General Treviño 615 Sur. Zona Centro
San Nicolás de los Garza, Nuevo León, 66400
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CALIBRATION

Valid to: February 10, 2021

Certificate Number: L2275

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
pH Meters, Controllers, Recorders	4 pH 7 pH 10 pH	0.05 pH	Certified Buffer Solutions Thermometer Omega HH308
pH Meters, Controllers, Recorders	(0 to 14) pH	0.015 pH	pH/mV Calibrator
	(-1 000 to 1 000) mV	1.3 mV	
Conductivity Meters, Controllers and Recorders	100 μ S/cm 147 μ S/cm 500 μ S/cm 1 000 μ S/cm 1 413 μ S/cm 10 000 μ S/cm	1 μ S/cm 1.5 μ S/cm 5 μ S/cm 10 μ S/cm 14 μ S/cm 100 μ S/cm	Certified Conductivity Standards Thermometer Omega HH308

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance Source	(3.3 to 10) nF (10 to 30) nF (30 to 100) nF (100 to 300) nF (0.3 to 1) μ F (1 to 3) μ F (3 to 10) μ F (10 to 30) μ F (30 to 100) μ F	0.81 % of reading 0.6 % of reading 0.56 % of reading 0.35 % of reading 0.35 % of reading 0.46 % of reading 0.47 % of reading 0.51 % of reading 0.61 % of reading	Fluke Calibrator 5500A



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance Measure	(4 to 40) nF	4.1 % of reading	Extech 380282 DMM
	(40 to 400) nF	2.7 % of reading	
	(400 to 1 000) nF	2.4 % of reading	
	(1 000 to 4 000) nF	2.4 % of reading	
	(4 to 40) μ F	2.2 % of reading	
	(40 to 400) μ F	2.4 % of reading	
DC Current Measure	(0.2 to 200) μ A	0.084 % of reading	6 ½ DMM KEITHLEY
	(0.2 to 2) mA	0.056 % of reading	
	(2 to 20) mA	0.044 % of reading	
	(20 to 200) mA	0.054 % of reading	
	(0.21 to 2) A	0.1 % of reading	
DC Current Measure	(2 to 10) A	0.28 % of reading	Fluke 45 4½ DMM Clamp Meter Fluke 375
DC Current Measure	(10 to 550) A	2.5 % of reading	
AC Current Measure 50 Hz to 1 kHz	(0.2 to 200) μ A	12 % of reading	6 ½ DMM KEITHLEY
	(0.2 to 2) mA	0.2 % of reading	
	(2 to 20) mA	0.2 % of reading	
	(20 to 200) mA	0.2 % of reading	
	(0.2 to 2) A	0.25 % of reading	
AC Current Measure 50 Hz to 1 kHz	(2 to 10) A	1.2 % of reading	Fluke 45 4½ DMM
AC Current Measure 50 Hz to 1 kHz	(10 to 550) A	2.8 % of reading	Clamp Meter Fluke 375
DC Current Source	(0.3 to 3.3) mA	0.015 % of reading	Fluke Calibrator 5500A
	(3.3 to 33) mA	0.011 % of reading	
	(33 to 300) mA	0.011 % of reading	
	(0.3 to 2) A	0.033 % of reading	
	(2 to 11) A	0.066 % of reading	
DC Current Source	(11 to 550) A	0.61 % of reading	Fluke 5500A/COIL
AC Current Source 50 Hz to 1 kHz	(0.3 to 3.3) mA	0.18 % of reading	Fluke Calibrator 5500A
	(3.3 to 33) mA	0.1 % of reading	
	(33 to 330) mA	0.1 % of reading	
	(0.3 to 1) A	0.12 % of reading	
	(1 to 11) A	0.082 % of reading	
AC Current Source 50 Hz to 1 kHz	(11 to 550) A	1.2 % of reading	Fluke 5500A/COIL



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Inductance Source 100 Hz and 1 kHz	(1 to 10) mH (11 to 100) mH (0.101 to 0.9) H (1 to 10) H	2.1 % of reading 2.1 % of reading 2.1 % of reading 2.1 % of reading	Inductance Substituter
Electrical Simulation of Power Level Indicators @ 1 kHz	(-30 to 60) dB	1.1 % of reading	Fluke Calibrator 5500A
Electrical Simulation of Sound Pressure Level Indicators @ 1 kHz	(80 to 130) dB	0.62 % of reading	Fluke Calibrator 5500A
Resistance Measure	(10 to 30) Ω (20 to 200) Ω (200 to 1 000) Ω (1 to 20) kΩ (20 to 200) kΩ (200 to 1 000) kΩ (1 to 20) MΩ (20 to 330) MΩ	0.096 % of reading 0.063 % of reading 0.025 % of reading 0.016 % of reading 0.018 % of reading 0.027 % of reading 0.15 % of reading 2.1 % of reading	6 ½ DMM KEITHLEY
Resistance Source	(1 to 10) Ω (10 to 30) Ω (30 to 100) Ω (100 to 300) Ω (0.3 to 1) kΩ (1 to 3) kΩ (3 to 10) kΩ (10 to 30) kΩ (30 to 100) kΩ (100 to 300) kΩ (0.3 to 1) MΩ (1 to 3) MΩ (3 to 10) MΩ	0.86 % of reading 0.096 % of reading 0.024 % of reading 0.024 % of reading 0.015 % of reading 0.015 % of reading 0.015 % of reading 0.015 % of reading 0.017 % of reading 0.017 % of reading 0.021 % of reading 0.021 % of reading 0.066 % of reading	Fluke Calibrator 5500A
Resistance Source	(10 to 30) MΩ (30 to 100) MΩ (100 to 300) MΩ	0.12 % of reading 0.51 % of reading 0.51 % of reading	Fluke Calibrator 5500A
Resistance Source	(300 to 1 000) MΩ	1.1 % of reading	Resistance Substituter



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RTD Simulation ¹	Pt 385.100 Ω (-190 to 800) °C	0.24 °C	Fluke Calibrator 5500A
	Pt 3916.100 Ω (-190 to 600) °C	0.24 °C	
	Pt 3926.100 Ω (0 to 400) °C	0.13 °C	
	Cu.10 Ω (0 to 200) °C	0.31 °C	
	Ni.120 Ω (0 to 200) °C	0.15 °C	
RTD Measure ¹	Pt 385.100 Ω (-190 to 800) °C	0.34 °C	Altek Calibrator 211
	Pt 3916.100 Ω (-190 to 600) °C	0.25 °C	
	Pt 3926.100 Ω (0 to 400) °C	0.23 °C	
	Cu.10 Ω (0 to 200) °C	0.58 °C	
	Ni.120 Ω (0 to 200) °C	0.19 °C	
DC Volts Source	(33 to 329) mV	0.007 % of reading	Fluke Calibrator 5500A
	(0.329 to 3.29) V	0.005 3 % of reading	
	(3.29 to 32.9) V	0.005 3 % of reading	
	(32.9 to 329) V	0.005 8 % of reading	
	(329 to 1 000) V	0.005 8 % of reading	
DC Volts Source	(1 to 6) kV	2 % of reading	Hipot Tester 3565D
AC Volts Source 45 Hz to 10 kHz	(3 to 33) mV	0.11 % of reading	Fluke Calibrator 5500A
	(33 to 330) mV	0.057 % of reading	
	(0.33 to 3.3) V	0.033 % of reading	
	(3.3 to 33) V	0.043 % of reading	
	(33 to 330) V	0.053 % of reading	
	(330 to 1 000) V	0.059 % of reading	
AC Volts Source 50 to 60 Hz	(1 to 5) kV	2.1 % of reading	Hipot Tester 3565D
DC Volts Measure	(2 to 200) mV	0.008 7 % of reading	6 ½ DDM KEITHLEY
	(0.2 to 2) V	0.006 % of reading	
	(2 to 20) V	0.006 1 % of reading	
DC Volts Measure	(20 to 200) V	0.007 2 % of reading	6 ½ DDM KEITHLEY
	(200 to 1 000) V	0.007 5 % of reading	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Volts Measure	(1 to 6) kV	2 % of reading	Fluke 80K-6
DC Volts Measure	(6 to 40) kV	2 % of reading	Fluke 80K-40
AC Volts Measure 50 Hz to 1 kHz	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 750) V	0.11 % of reading 0.093 % of reading 0.1 % of reading 0.1 % of reading 0.13 % of reading	6 ½ DDM KEITHLEY
AC Volts Measure (50 to 60) Hz	(0.75 to 6) kV (6 to 28) kV	5 % of reading 5 % of reading	Fluke 80k-40
Thermocouple Simulation ¹	Type T (0 to 390) °C Type J (0 to 800) °C Type K (0 to 1 200) °C Type E (0 to 390) °C Type B (600 to 1 000) °C Type R (0 to 390) °C Type S (0 to 700) °C	0.15 °C 0.24 °C 0.34 °C 0.22 °C 0.34 °C -0.4 °C 0.46 °C	Fluke Calibrator 5500A
Thermocouple Measure ¹	Type T (0 to 390) °C Type J (0 to 800) °C Type K (0 to 1 200) °C Type E (0 to 390) °C Type B (600 to 1 000) °C Type R (0 to 390) °C Type S (0 to 700) °C	0.18 °C 0.29 °C 0.35 °C 0.27 °C 0.43 °C 0.45 °C 0.47 °C	Altek Calibrator 422

Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pin Gauges	(0.01 to 25.4) mm	0.91 μm	Digital Outside Micrometer
Feeler Gauges	(0.001 to 25.4) mm	0.91 μm	Digital Outside Micrometer
Gauge Blocks	(1 to 1 016) mm	(0.18 + 0.003 8L) μm	Gauge Blocks and digital indicators
Ring Gauges	(5 to 300) mm	(0.047 + 0.004 2L) μm	Micrometer Heads and Gauge Blocks and Digital Outside Micrometer (accessories)
Micrometer standards	(0 to 1 016) mm	(0.18 + 0.003 8L) μm	Gauge Blocks and indicators digital
Squares	(5 to 90) °	0.082 °	Digital Protractor and Angle Blocks
Surface Plates (overall flatness only)	100 to 1 830 mm (Diagonal Length)	(0.21 + 0.005 6L) μm	Digital Indicator. Parallel Set and Gauge Blocks
Radius Gauges	(0 to 50.8) mm	(0.99 + 0.013L) μm	Micrometer Heads
Thread Ring Gauges Pitch Diameter Minor Diameter	(1 to 68) mm (1 to 68) mm	1.3 μm	Digital Micrometer and Thread Pitch Master Inserts
Thread Plug Gauges Pitch Diameter Major Diameter	(1 to 68) mm (1 to 68) mm	1.3 μm	Digital Micrometer and Thread Pitch Master Inserts
Inside Micrometers	(0 to 500) mm	(0.58 + 0.003 3L) μm	Gauge Blocks
Micrometer Heads	(0 to 50.8) mm	(0.58 + 0.000 8L) μm	Gauge Blocks
Digital and Dial Calipers	(0 to 1 016) mm	(5.8 + 0.001 7L) μm	Gauge Blocks
Hole Gauges	(1 to 300) mm	(0.58 + 0.002 4L) μm	Gauge Blocks
Height Gauges	(0 to 1 016) mm	(0.58 + 0.003 5L) μm	Gauge Blocks
Thickness Gauges (plastic)	(0.024 to 5) mm	(0.67 + 0.28L) μm	Plastic Shims (Standards)
Thickness Gauges (steel)	(1 to 508) mm	(0.58 + 0.003 3L) μm	Gauge Blocks
Measuring Tapes	(0.1 to 20) m	0.13 mm	Steel Rule and Optical Mini Comparator
Precision Rules	(28 to 2 000) mm	(97 + 0.002L) μm	Steel Rule and Optical Mini Comparator



Length – Dimensional metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Digital and Dial Test Indicators	(1 to 100) mm	(0.58 + 0.001 3L) μm	Gauge Blocks
Digital Indicators	(0 to 50.8) mm	(0.95 + 0.014L) μm	Micrometer Head
Outside Micrometers Digital / Analog	(1 to 1 016) mm	(0.58 + 0.003 5L) μm	Gauge Blocks
Depth Micrometers	(1 to 300) mm	(0.58 + 0.002 4L) μm	Gauge Blocks
Profile Projectors	(1 to 500) mm	(0.58 + 0.003 2L) μm	Rectangular and Angle Gauge Blocks
Microscopes	(1 to 300) mm	(0.58 + 0.002 4L) μm	
Protractors	(1 to 180) °	0.019 °	Angle Blocks
Precision Levels	(0.01 to 1.57) mm/m	1.6 $\mu\text{m}/\text{m}$	Micrometer Head

Mass

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Density Measuring Device - Liquid	(0.6 to 1.6) g/cm ³	0.000 62 g/cm ³	Balance Thermometer
Dynamometers, Tensile Testing Machine and Load Cell (Tension and/or compression)	(0 to 98.06) N (0 to 245.16) N (0 to 490.33) N (0 to 980.66) N (0 to 2 451.66) N	0.002 9 N 0.11 N 0.057 N 0.57 N 0.61 N	Standard Weights Set
	(0 to 8 904.43) N	6.3 N	Load Cell
Rockwell Superficial Hardness Testers ¹	HR15N Low Mid High HR15TW Low Mid High	0.72 HR15N 0.59 HR15N 0.58 HR15N 0.62 HR15TW 0.59 HR15TW 0.72 HR15TW	Indirect Verification per ASTM E18 using Hardness Test Blocks



Mass

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness Testers ¹	HRBW Low Mid High HRC Low Mid High	1.2 HRBW 0.64 HRBW 0.7 HRBW 0.69 HRC 0.67 HRC 0.66 HRC	Indirect Verification per ASTM E18 using Hardness Test Blocks
Durometer Indenter Spring: Types A, B and O Types C, D and DO	(0.55 to 8.05) N (4.445 to 44.45) N	0.29 N 0.29 N	Direct Verification of Durometers using ASTM D2240 Electronic Balance
Direct verification of Durometer Hardness Tester types A, B, C, D, DO, and O Indenter Extension Indenter Diameter Indenter Tip Radius Indenter Tip Angle	(0 to 5) mm (0 to 12) mm (25 to 40) °	1.1 μm 1.1 μm 1.1 μm 0.065 °	Direct Verification of Durometers using ASTM D2240 Digital Microscope
Weights	20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g	0.1 mg	Standard Weight Class OIML E2 and OIML R 111-14



Mass

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Weights	50 g	0.12 mg	Standard Weight Class OIML E2, F1 and F2 and OIML R 111-1
	100 g	0.15 mg	
	200 g	0.16 mg	
	500 g	8.4 mg	
	1 000 g	6 mg	
	2 000 g	6.7 mg	
	5 000 g	8.3 mg	
	10 000 g	0.083 g	
20 000 g	0.12 g		
Pneumatic Positive Pressure: Water Columns	(0 to 4) inH ₂ O	0.007 inH ₂ O	Dwyer digital manometer
Pneumatic Positive Pressure: Transducers, Pressure Gages, Safety valve and Recorders	(0 to 30) psig	0.005 5 psi	Fluke Pressure Module and display unit
	(30 to 300) psig	0.033 psi	
Hydraulic Positive Pressure: Transducers, Pressure Gages, Safety valve and Recorders	(0 to 30) psig	0.005 5 psi	Fluke Pressure Module and display unit
	(30 to 300) psig	0.033 psi	
	(300 to 1 500) psig	0.3 psi	
	(1 500 to 5 000) psig	0.57 psi	
	(5 000 to 10 000) psig	1.6 psi	Digital Pressure Gauge
Vacuum Gauges	(-20 to 0) inHg	0.008 1 inHg	Fluke Pressure Module and display unit
Balances Resolution: 0.000 1 g Resolution: 0.0 1 g Resolution: 0.1 g Resolution: 1 g	(20 to 210) g	0.1 mg	Standard Weights Class OIML E2 and F1 NOM-010-SCFI-1994
	(0.5 to 5000) g	9.4 mg	
	(0.5 to 5 000) g	58 mg	
	(0.5 to 5 000) g	0.58 g	
Balance Resolution: 2 g	(5 to 20) kg	0.001 2 kg	Standard Weights Class OIML F1 and NOM-010-SCFI-1994
Scale Resolution: 10 g	(20 to 500) kg	0.058 kg	Standard Weights Class OIML M2 and NOM-010-SCFI-1994
Digital, Dial, Click and Preset Torque Meters (Clockwise and Counter Clockwise) ¹	(0.56 to 5.65) N·m	0.021 N·m	Torque Analyzer



Mass

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Digital, Dial, Click and Preset Torque Meters (Clockwise and Counter Clockwise) ¹	(2.83 to 28.25) N·m	0.069 N·m	Torque Analyzer
Digital, Dial, Click and Preset Torque Meters (Clockwise and Counter Clockwise) ¹	(33.9 to 339.0) N·m	0.39 Nm	Torque Analyzer
Torque Analyzer and Calibrators (Clockwise and Counter Clockwise)	(1.13 to 43.8) N·m (0.83 to 32.3) lbf·ft	0.02 % of reading	Standard Weights and torque arm
	(> 43.8 to 201.5) N·m (> 32.3 to 148.6) lbf·ft	0.026 % of reading	
	(> 201.5 to 344.1) N·m (> 148.6 to 253.8) lbf·ft	0.037 % of reading	
	(> 344.1 to 543.2) N·m (> 253.8 to 400.6) lbf·ft	0.042 % of reading	
	(> 543.2 to 689.9) N·m (> 400.6 to 508.8) lbf·ft	0.056 % of reading	
Viscosity Cups (ISO, Zahn, Ford, Shell) @ (20 to 25) °C	(110 to 128) cSt	0.16 cSt	Viscosity Solutions Thermometer
	(230 to 258) cSt	0.33 cSt	
	(397.6 to 533.1) cSt	0.58 cSt	
Viscometers @ (15°C to 45) °C	< 10 mm ² /s	0.08 % of reading	Viscosity Solutions Thermometer
	(10 to 100) mm ² /s	0.11 % of reading	
	(100 to 1 000) mm ² /s	0.15 % of reading	
	(1000 to 10 000) mm ² /s	0.19 % of reading	
	(10 000 to 100 000) mm ² /s	0.22 % of reading	
Volume – Micropipettes	(0 to 100) µl	0.06 µl	Analytical Balance and Digital Balance Thermometer
Volume - Pycnometers	(0 to 100) ml	31 µl	
Volume - Pipettes	(0 to 200) ml	0.004 8 ml	Analytical Balance and Digital Balance Thermometer
Volume - Test Tubes and Burettes	(0 to 5) ml	0.001 2 ml	
	(5 to 2 000) ml	0.031 ml	
Volume - Test Tubes and Jars	(0 to 5 000) ml	3.2 ml	
	(5 000 to 20 000) ml	5.2 ml	



Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
IR Thermometers	(25 to 400) °C	1.2 °C	Blackbody
	(400 to 1 000) °C	1.8 °C	Blackbody and Digital Thermometer
Humidity Meters and Recorders	(10 to 90) %RH	1.8 %RH	Thermo-hygrometer
Digital, Dial, RTD, Thermocouple and Bimetal Thermometers ¹	(0 to 600) °C (601 to 1 000) °C	0.21 °C 0.92 °C	Type K Thermocouple and Fluke 52II Indicator
Temperature (wall thermometers, Recorder, thermocouple) ¹	(-25 to 50) °C	0.21 °C	RTD and Thermometer
Liquid in Glass	(-25 to 250) °C	0.21 °C	RTD and Thermometer
Ovens, Furnaces, Baths and Incubators	(0 to 600) °C (601 to 1 000) °C	0.21 °C 0.92 °C	Type K Thermocouple and Fluke 52II Indicator

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tachometers ¹	(60 to 9 000) rpm (>9 000 to 18 000) rpm (>18 000 to 96 000) rpm	0.85 rpm 0.93 rpm 2.6 rpm	Standard Digital Tachometer
Stopwatches, Timers ¹	(15 to 7 200) s (7 201 to 18 000) s (18 001 to 36 000) s (36 001 to 86 400) s	0.01 s 0.03 s 0.06 s 0.14 s	Standard Timers
Revolutions Counter ¹	(0 to 2 000) rpm	1.2 rpm	Direct Comparisons and Optical Counter
Frequency Source	(45 to 120) Hz (120 to 1 000) Hz (1 to 10) kHz (10 to 100) kHz	0.04 % of reading 0.032 % of reading 0.043 % of reading 0.3 % of reading	Fluke Calibrator 5500A
Frequency Measure	(45 to 1 000) Hz (1 to 10) kHz (10 to 100) kHz	0.053 % of reading 0.053 % of reading 0.3 % of reading	Keithley 6 ½ DMM

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. L = length in inches.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. L2275.



Vice President

