# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

# *Certificate of Accreditation*

*Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:*

## *EQ-LAB, S.A. de C.V.*

***Los Amoles #137, Hacienda San Miguel***
***Guadalupe, Nuevo León, México. C.P. 67113***

*(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:*

## ISO/IEC 17025:2017

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system
(as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

***Dimensional, Mass, Force and Weighing Devices, Mechanical, Thermodynamic, Chemical, Acoustic, Time and Frequency, Optical and Electrical Calibration***
***(As detailed in the supplement)***

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President

Perry Johnson Laboratory Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

| *Initial Accreditation Date:* | *Issue Date:* | *Expiration Date:* |
|---|---|---|
| October 31, 2023 | October 31, 2023 | January 31, 2026 |

| *Accreditation No.:* | *Certificate No.:* |
|---|---|
| 122472 | L23-804 |

*The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjlabs.com*

# *Certificate of Accreditation: Supplement*

**EQ-LAB, S.A. de C.V.**
Los Amoles #137, Hacienda San Miguel
Guadalupe, Nuevo León, México. C.P. 67113
Contact Name Roberto Delgado Andrade  Phone: 813-067-7022

*Accreditation is granted to the facility to perform the following calibrations:*

Dimensional

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE (AND SPECIFICATION WHERE APPROPRIATE) | CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED | CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED |
|---|---|---|---|---|
| Micrometer Head[F] | Up to 50 mm | $(0.55 + 2.7 \times 10^{-3}L)$ µm | Gauge Blocks Set | NMX-CH-093 |
| Outside Micrometer[F] | Up to 2 000 mm | $(0.57 + 8.2 \times 10^{-3} L)$ µm | | |
| Inside Micrometer[F] | Up to 2 000 mm | $(0.55 + 2.7 \times 10^{-3}L)$ µm | | |
| Internal Micrometers with Three point (Holtest)[F] | 6.3 mm to 100 mm | $(3.8 + 4.3 \times 10^{-2} L)$ µm | Steel Setting Rings | NMX CH-92 |
| Tubular Inside Micrometer Micrometer Head[F] | Up to 25 mm | $(0.57 + 1.0 \times 10^{-3}L)$ µm | Gauge Blocks Set | JIS B 7508 |
| Tubular Inside Micrometer Extensions Rods[F] | 25 mm to 100 mm | $(0.92 + 2.8 \times 10^{-3}L)$ µm | | |
| Depth Micrometers[F] | Up to 300 mm | $(0.57 + 6.4 \times 10^{-3}L)$ µm | Gauge Blocks Set | NMX-CH-093 |
| Calipers, Vernier Dial and Digital[F] | Up to 2 000 mm | $(5.8 + 7.1 \times 10^{-3}L)$ µm | | |
| Linear Scales (Digital Rulers)[FO] | Up to 2 000 mm | $(5.8 + 7.1 \times 10^{-3}L)$ µm | | |
| Laser Distance Meter[FO] | 127 mm to 2 006.6 mm | $(0.058 + 1.0 \times 10^{-6}L)$ µm | Gague Blocks Set | ISO 16331-1 |
| Telescope Gages (Only max and min values)[FO] | 25 mm to 100 mm | $(0.73 + 3.7 \times 10^{-3}L)$ µm | | |
| Height Gages Vernier, Dial and Digital[F] | Up to 1 000 mm | $(6.0 + 6.0 \times 10^{-3}L)$ µm | Gauge Blocks Set | NMX-CH-141 |
| Height Master[F] | 5 mm to 1 010 mm | $(1.6 + 6.6 \times 10^{-3}L)$ µm | Gauge Blocks Set | NMX-CH-7863 |
| Dial and Digital Indicators[F] | Up to 25 mm | $(0.99 + 6.9 \times 10^{-2}L)$ µm | Dial Gage Tester | NMX-CH-463 NMX-CH-149 |
| Dial Test Indicator[F] | Up to 1.6 mm | $(0.99 + 6.9 \times 10^{-2}L)$ µm | | |
| Dial and Digital Bore Gage[F] | 1 mm to 25 mm | $(0.76 + 0.23L)$ µm | | |
| Pin and Plug Gages[F] | 0.25 mm to 4.7 mm | $(0.79 + 8.0 \times 10^{-4}L)$ µm | Digital Indicator | Euramet_cg-6 |
| Standard Wire Gage[F] | 0.25 mm to 4.7 mm | 0.79 µm | | |
| Setting Micrometer Standard[F] | 25 mm to 100 mm | $(0.73 + 3.7 \times 10^{-3}L)$ µm | Gague Blocks Set | JIS B 7545 |
| Steel Thickness Gages[F] | 0.04 mm to 1 mm | 0.79 µm | Digital Indicator | JIS B 7524 |
| Plastic Standard Coating Thickness Gages[F] | 0.01 mm to 12.19 mm | $(0.79 + 8.0 \times 10^{-4}L)$ µm | Digital Indicator | ASTM-D-1005 |

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|---|---|---|---|---|
| Thread Plug Gages and Spline Gages Pitch Diameter[F] | 2.1 mm to 46.7 mm | $(1.1 + 1.4 \times 10^{-2}L)$ µm | Micrometer and Wire Set | ANSI B92.1 DIN 5480 ANSI/ASME B1.2 |
| Coating Thickness Gages[F] | 0.01 mm to 12.19 mm | 5.9 µm | Foil Thickness | Standard ASTM D7091 |
| Measure Tape[F] | Up to 50 m | $(0.029 + 6 \times 10^{-3} L)$ mm | Rule Standard and Reticule | JIS B 7512 |
| Pi Tape[F] | Up to 8 m | $(0.25 + 2 \times 10^{-5}L)$ mm | | |
| Rulers[F] | Up to 1 000 mm | $(0.025 + 2 \times 10^{-5}L)$ mm | | |
| Scantling Gages[F] | Up to 1 000 mm | 0.29 mm | Rule Standard | |
| Surface RoughnessGage[F] (Ra) | 1 µm to 9.5 µm | $(0.77 + 1.2 \times 10^{-3}L)$ µm | Precision Roughness Specimen | NMX-CH-12179 |
| Surface Roughness Gage[F] (Rz) | 6.6 µm to 40 µm | $(0.79 + 1.8 \times 10^{-3}L)$ µm | | |
| Surface Roughness Gage[F] (Rt) | 8 µm to 43 µm | $(0.77 + 2.3 \times 10^{-3}L)$ µm | | |
| Surface Roughness Gage[F] (Rp) | 1.9 µm to 18 µm | $(0.78 + 3.7 \times 10^{-3}L)$ µm | | |
| Blocks Gages Grade 1 and 2[F] | 1 mm to 100 mm | $(0.6.3 + 3.7 \times 10^{-3}L)$ µm | Blocks Standard Grade 0 Digital Indicator | NMX-CH-3650 |
| 4 Step Block Gage | 6.35 mm to 25.4 mm | $(0.73 + 3.7 \times 10^{-3}L)$ µm | Blocks Standard Grade 0 Digital Indicator | |
| Thickness Gages | Up to 25.4 mm | 2.9 µm | | |
| Protractor Goniometer Digital Level[F] | 0° to 90° | $(0.049 + 1 \times 10^{-5}L)$° | Angle Blocks Standard | NMX-CH-151 |
| Squares[F] | 0° to 90° | 0.09° | Digital Protractor | ASME Y14.5 |
| Squares Perpendicularity[F] | Up to 300 mm | 0.011 mm | Test Indicator | NMX-CH-062 |
| Profile Projector Angle error[O] | 0° to 90° | $(0.049 + 1 \times 10^{-5}L)$ ° | Angle Blocks Set | JIS B 7184 |
| Profile Projectors X Axis error Y Axis error[O] | Up to 300 mm | (1.1 + 0.15L) µm | Standard Glass Scales | |
| Profile Projector - Magnification[O] | 120 mm to 170 mm | $(0.055 + 4 \times 10^{-5}L)$ mm | | |
| Microscope and Vision System X Axis Linearity Y Axis Linearity[O] | Up to 300 mm | (1.5 + 0.15L) µm | | |

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## Dimensional

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|---|---|---|---|---|
| Surface Plates: Local Area Flatness[O] | 250 mm x 250 mm to 2 500 mm x 1 600 mm | 0.71 µm | Repeat Reading Gage | JIS B 7513 |
| Ultrasonic Thickness Gage[F] | 6.35 to 25.4 mm | 6.9 µm | Step Block | ASTM E797 |
| Levels[F] | Up to 300 mm Sensitivity 0.02 mm/m | 0.046 mm/m | Reference Flat Surface | DIN 877 |

## Mass, Force and Weighing Devices

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|---|---|---|---|---|
| Scales and Balances[O] | Up to 50 g (Res.= 0.05 mg) | 0.064 mg | Weight Set OIML E2 | NOM-010-SCFI |
| | Up to 100 g (Res.= 0.05 mg) | 0.089 mg | | |
| | Up to 200 g (Res.= 0.1 mg) | 0.17 mg | | |
| | Up to 500 g (Res.= 0.2 mg) | 0.39 mg | | |
| | Up to 1 kg (Res.= 2 mg) | 3 mg | Weight Set OIML F1 | NOM-010-SCFI |
| | Up to 2 kg (Res.= 5 mg) | 6.4 mg | | |
| | Up to 5 kg (Res.= 10 mg) | 15 mg | | |
| | Up to 10 kg (Res.= 2 g) | 1.6 g | Weight Set OIML M1 | NOM-010-SCFI |
| | Up to 20 kg (Res.= 5 g) | 4 g | | |
| | Up to 50 kg (Res.= 10 g) | 8.1 g | | |
| | Up to 100 kg (Res.= 20 g) | 16 g | | |
| | Up to 200 kg (Res.= 50 g) | 40 g | | |
| | Up to 500 kg (Res.= 100 g) | 80 g | | |
| | Up to 1 000 kg (Res.= 500 g) | 0.4 kg | | |

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Mass, Force and Weighing Devices

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|---|---|---|---|---|
| Floor, Hopper & Scales | Up to 2 000 kg (Res.= 100 g) | 0.8 kg | Weight Set OIML M1 and Material Substitution | CENAM Technical Guide |
| | Up to 6 000 kg (Res.= 1 kg) | 2.4 kg | | |
| | Up to 10 000 kg (Res.= 1 kg) | 4 kg | | |
| Weight OIML Class F1and F2 and ASTM Class 3 and 4[F] | 1 g | 0.033 mg | Weight Set OIML E2 Double Substitution | |
| | 2 g | 0.04 mg | | |
| | 5 g | 0.05 mg | | |
| | 10 g | 0.067 mg | | |
| | 20 g | 0.083 mg | | |
| | 50 g | 0.1 mg | | |
| | 100 g | 0.17 mg | | |
| | 200 g | 0.33 mg | | |
| | 500 g | 0.83 mg | | |
| | 1 000 g | 1.7 mg | | |
| Weighth OIML Class M1, M2 and M3, ASTM Class 5, 6 and 7[F] | 1 g | 0.33 mg | Weight Set OIML E2 and F1 Double Substitution | |
| | 2 g | 0.4 mg | | |
| | 5 g | 0.82 mg | | |
| | 10 g | 0.83 mg | | |
| | 20 g | 0.83 mg | | |
| | 50 g | 0.84 mg | | |
| | 100 g | 0.88 mg | | |
| | 200 g | 0.99 mg | | |
| | 500 g | 1.6 mg | | |
| | 1 kg | 2.9 mg | | |
| | 2 kg | 9.8 mg | | |
| | 5 kg | 83 mg | | |
| | 10 kg | 86 mg | | |
| | 20 kg | 98 mg | | |
| Force, Gages and Instruments Only Compression[FO] | 100 N to 1 000 N | (0.69 + 3.8 x $10^{-3}$F) % of reading | Load Cells | ISO-7500-1 ASTM E4 |
| | 1 000 N to 10 000 N | (0.69 + 4 x $10^{-4}$F) % of reading | | |

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## Mechanical

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|---|---|---|---|---|
| Pressure / Vacuum Gages<br>Air Medium and Water Medium[FO] | -14.5 psi to 0 psi | $(0.59 + 4 \times 10^{-4}P)$ psi | Pressure Gauge and Pressure Module Fluke | CENAM Technical Guide |
| | 0 psi to 36 psi | 0.059 psi | | |
| | -1 psi to 1 psi | 0.029 psi | | |
| | Up to 30 psi | 0.29 psi | | |
| | Up to 300 psi | 1.5 psi | | |
| | Up to 1 000 psi | 5.8 psi | | |
| | Up to 10 000 psi | 58 psi | | |
| Dynamic Viscosity Meters @25°C[FO] | 500 cP | 2.1 cP | Cannon Standard Oil @ 25°C | ASTM D7042 |
| | 5 000 cP | 24 cP | | |
| | 30 000 cP | 162 cP | | |
| Kinematic Viscosity Cups: Zahn, Ford, ISO, ASTM, DIN, Gradco, Shell, Frikmar Saybolt @25°C[FO] | 36 cSt | 0.1 cSt | Cannon Standard Oil | ASTM D1200<br>ASTM D4212 |
| | 126 cSt | 0.29 cSt | | |
| | 1 000 cSt | 1.3 cSt | | |
| Indirect Verification of Rockwell Hardness Tester HRB[O] | 20 HRB to 50 HRB | 1.1 HRB | Test Block | ISO 6508-2<br>ASTM E18 |
| | 50 HRB to 80 HRB | 1 HRB | | |
| | 80 HRB to 100 HRB | 0.55 HRB | | |
| Indirect Verification of Rockwell Hardness Tester HRC[O] | 20 HRC to 30 HRC | 0.48 HRC | | |
| | 30 HRC to 55 HRC | 0.57 HRC | | |
| | 55 HRC to 70 HRC | 0.37 HRC | | |
| Indirect Verification of Leeb Hardness Tester LD[FO] | 365 HLD | 16 HLD | Test Block | ASTM A956 |
| Direct Verification of Durometer Shore Tester<br>Types A, B, E & O[F]<br>Durometer Force Spring | 0.55 N to 8.05 N | 0.000 14 N | Load Cell | ASTM D2240<br>ISO 21509 |
| Type M | 4.445 N to 44.45 N | 0.000 14 N | | |
| Type OO, OOO | 0.324 N to 0.765 N | 0.000 14 N | | |
| Type OOO-S | 0.203 N to 1.111 N | 0.000 14 N | | |
| Type C, D & DO | 0.167 N to 1.932 N | 0.000 14 N | | |
| Micropipettes[F] | 10 µL to 200 µL | 0.38 µL | Gravimetric Method Balances OHAUS | CENAM Technical Guide |
| | 200 µL to 500 µL | 0.39 µL | | |

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## Mechanical

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|---|---|---|---|---|
| Micropipettes[F] | 500 µL to 1 000 µL | 0.42 µL | Gravimetric Method Balances OHAUS | CENAM Technical Guide |
| | 1 000 µL to 2 000 µL | 0.52 µL | | |
| Pipettes[F] | 10 mL to 200 mL | 0.018 % of reading | | |
| Burettes[F] | 10 mL to 100 mL | 0.018 % of reading | | |
| Cylinders and Cubic Cups[F] | 200 mL to 1 000 mL | 0.02 % of reading | | |
| Volumetric Flasks[F] | 10 mL to 100 mL | 0.018 % of reading | | |
| | 200 mL to 1 000 mL | $(0.02 + 2 \times 10^{-4}V)$ mL | | |
| | 1 000 mL to 2 000 mL | 0.02 % of reading | | |
| Beakers[F] | 10 mL to 200 mL | 0.018 % of reading | | |
| | 200 mL to 1 000 mL | $(0.02 + 2 \times 10^{-4}V)$ mL | | |
| | 1 000 mL to 2 000 mL | 0.02 % of reading | | |
| Pycnometers[F] | 10 mL to 200 mL | 0.018 % of reading | | |
| Containers[F] | 1 000 mL to 20 000 mL | 0.02 % of reading | | |
| Anemometer[F] (Air Flow) | Up to 9 m/s | $(0.58 + 0.23\ L)$ m/s | Anemometer Comparison | IEC 61400-12-1 ASTM D5096 |
| Torque Tools[F] | 3.4 Nm to 17 Nm | $(0.066 + 2.6 \times 10^{-3}\ L)$ Nm | Torque Analyzer | Euramet_cg-14 |
| | 68 Nm to 339 Nm | $(0.75 + 6 \times 10^{-4}\ L)$ Nm | | |

## Thermodynamic

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|---|---|---|---|---|
| Infrared Guns, Pyrometers and Cameras[F] | 50 °C to 1 000 °C | $(0.68 + 2.7 \times 10^{-3}T)$ °C | Precision Infrared Calibrator | CENAM Technical Guide |
| Bi-Metallic Thermometers[F] | -10 °C to 120 °C | 0.83 °C | Dry-Well and Digital Thermometer w/ Pt-1000 | Euramet cg-20 |
| | 30 °C to 600 °C | $(0.79 + 2.8 \times 10^{-3}T)$ °C | Fluke 725 w/TC-k | |
| Climatic Chambers: Ovens, Furnaces, Mufflers, Incubators, Refrigerators, Freezers, Cold Rooms Error of Indication[O] | 0 °C to 60 °C | $(0.2 + 2.4 \times 10^{-3}T)$ °C | Reference Thermo Hygrometer | Euramet cg-20 |

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|---|---|---|---|---|
| Climatic Chambers: Ovens, Furnaces, Mufflers, Incubators, Refrigerators, Freezers, Cold Rooms Error of Indication[O] | -40 °C to 200 °C | (0.58 + 4.0 x $10^{-5}$T) °C | Digital Thermometer w/Pt-1000 | Euramet cg-20 |
| | 8 °C to 800 °C | (1.1 + 2.0 x $10^{-3}$T) °C | Fluke 725 w/TC-k | |
| RTDs, Rods and Probes with Thermocouple J, K, T, E, R, S, B, L U and N[F] | -10 °C to 120 °C | 0.83 °C | Dry-Well and Digital Thermometer w/ Pt-1000 | |
| | 35 °C to 600 °C | (0.57 + 3.0 x $10^{-3}$T) °C | Dry-Well and Fluke 725 w/TC-k | |
| Liquid in Glass Thermometers[F] | -25 °C to 150 °C | (0.14 + 1.0 x $10^{-4}$T) °C | Bath Circulator and Digital Thermometer w/ Pt-1000 | |
| Thermo Hygrometer[F] (Humidity) | 11.5 % RH to 97.5 % RH | (1.5 + 2.3 x $10^{-3}$H) % RH | Reference Thermohygrometer and Humidity Chamber | |
| Climatic Chambers (Humidity) Sensors and Recorders[FO] | 11.5 % RH to 97.5 % RH | (0.97 + 2.3 x $10^{-3}$H) % RH | | |
| Thermo Hygrometer (Temperature)[F] | 2 °C to 60 °C | 0.31 °C | Reference Thermohygrometer and Temperature Chamber | |
| Heating Plates[FO] | Up to 260 °C | (1.1 + 4 x $10^{-4}$T) °C | Digital Thermometer Fluke 54 w/TC-K | |
| Dry Well[F] | -40 °C to 200 °C | (0.58 + 4 x $10^{-5}$T) °C | Digital Thermometer w/Pt-1000 | |
| Baths Circulators[FO] | -40 °C to 200 °C | (0.58 + 5 x $10^{-5}$T) °C | Digital Thermometer w/Pt-1000 | |
| | 35 °C to 600 °C | (0.55 + 3.1 x $10^{-3}$T) °C | Dry-Well and Fluke 725 w/TC-k | |

## Chemical

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|---|---|---|---|---|
| pH Meter[FO] | 4 pH | 0.062 pH | Buffer Solutions | NMX-CH-166 CEM QU-003 |
| | 7 pH | 0.061 pH | | |
| | 10 pH | 0.082 pH | | |

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|---|---|---|---|---|
| Conductivity Meter[FO] | 1 415 µS/cm | 15 µS/cm | Buffer Solution | OIML R 68 |
| Karl Fisher Titration Equipment[O] | 1 mg/g | 0.013 mg/g | Standard Solutions | ASTM E 203-01 |
| | 10 mg/g | 0.19 mg/g | | |

## Acoustic

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|---|---|---|---|---|
| Acoustic Level Generate (F=1 kHz)[FO] | 94 dB | 0.37 dB | Acoustic Calibrator | IEC 61672-1 NMX-CH-389-1-IMNC |
| | 104 dB | 0.4 dB | | |
| | 114 dB | 0.43 dB | | |
| Acoustic Level Measurement (F=1 kHz)[FO] | 94 dB | 0.79 dB | Acoustic Calibrator Sonometer of Reference | IEC 61672-1 NMX-CH-389-1-IMNC |
| | 114 dB | 0.87 dB | | |

## Time and Frequency

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| Equipment to Output Frequency[FO] | 113 rpm to 28 800 rpm | $(0.53 + 6 \times 10^{-4} V)$ rpm | LUTRON DT-2259 Digital Tachometer / Stroboscope AS432B | CENAM Technical Guide |
| Equipment to Output Time[FO] | 1 s to 36 000 s | $(0.49 + 4 \times 10^{-6} t)$ s | JUNSD Stopwatch ITTC-7.6-02-07 | |

## Optical

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|---|---|---|---|---|
| Eν Light Meters[F] | 120 lux to 3 000 lux | $(1.1 + 2.4 \times 10^{-2}$ Eν) lux | Luxometer | CENAM Technical Guide |
| Eν Illuminance[F] | 260 lux to 1 880 lux | $(1 + 2.5 \times 10^{-2}$ Eν) lux | Luxometer | ASTM E1164 |
| Refractive Index[F] | 1 ºBrix to 85 ºBrix | $(0.51 + 2 \times 10^{-4} B)$ % Brix | Sucrose Standards | OIML R-108 |
| Gloss/Specular Reflectance Meter Angle of Incline[FO] | 20° / 93.9 Gloss Units<br>60° / 96.5 Gloss Units<br>85° / 99.7 Gloss Units | 0.2 Gloss Units<br>0.2 Gloss Units<br>0.23 Gloss Units | Ceram Research Gloss Standard | ASTM D523-14 |

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Los Amoles #137, Hacienda San Miguel
Guadalupe, Nuevo León, México. C.P. 67113
Contact Name Roberto Delgado Andrade  Phone: 813-067-7022

*Accreditation is granted to the facility to perform the following calibrations:*

## Optical

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE (AND SPECIFICATION WHERE APPROPRIATE) | CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED | CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED |
|---|---|---|---|---|
| Spectrophotometers Transmittance[FO] | τ: 10 % | $(0.056 + 2 \times 10^{-5}\tau)$ % τ | Neutral Density Filters, Holmium Oxide Glass | CENAM Technical Guide |
| | τ: 20 % | $(0.061 + 4 \times 10^{-5}\tau)$ % τ | | |
| | τ: 30 % | $(0.067 + 6 \times 10^{-5}\tau)$ % τ | | |
| | λ: 440 nm to 750 nm | 0.05 nm | | |
| ρ (λ) Spectral Reflectance[FO] | Color Values: | | Ceramic Research Tiles | CENAM Technical Guide ASTM E-1164 |
| CIE L: | 9 to 93 Units | $(1.8 + 1.6 \times 10^{-2}L)$ Units | | |
| CIE a*: | -27 to 29 Units | $(0.45 + 3.6 \times 10^{-3}a^*)$ Units | | |
| CIE b*: | -15 to 55 Units | $(0.5 + 4.9 \times 10^{-3}b^*)$ Units | | |

## Electrical

| MEASURED INSTRUMENT, QUANTITY OR GAUGE | RANGE (AND SPECIFICATION WHERE APPROPRIATE) | CALIBRATION OR MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±) | CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED | CALIBRATION MEASUREMENT METHOD OR PROCEDURES USED |
|---|---|---|---|---|
| High Voltage DC Output[O] | 2.5 kV to 35 kV | 0.42 kV | Fluke 80K-40 w / Fluke 289 | CENAM Technical Guide |
| High Voltage AC Output (60 Hz)[O] | 2.5 kV to 25 kV | 0.31 kV | | |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type B[FO] | 600 ºC to 1 800 ºC | 0.46 ºC | Fluke 725 Electrical Simulation of Thermocouple Output | Euramet_cg-11 |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E[FO] | -200 ºC to 950 ºC | 0.18 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J[FO] | -200 ºC to 1 200 ºC | 0.2 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type K[FO] | -200 ºC to 1 370 ºC | 0.22 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type L[FO] | -200 ºC to 900 ºC | 0.2 ºC | | |

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|---|---|---|---|---|
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type N[FO] | -200 ºC to 400 ºC | 0.11 ºC | Fluke 725 Electrical Simulation of Thermocouple Output | Euramet_cg-11 |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type R[FO] | -20 ºC to 1 750 ºC | 0.48 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type S[FO] | -20 ºC to 1 750 ºC | 0.46 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type T[FO] | -250 ºC to 400 ºC | 0.18 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type U[FO] | -200 ºC to 600 ºC | 0.11 °C | | |
| Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 385, 100 Ω[FO] | -200 ºC to 800 ºC | 0.11 ºC | Fluke 725 Electrical Simulation of RTD Output | Euramet_cg-11 |
| Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt Ni 385, 120 Ω (Ni 120)[FO] | -80°C to 260°C | 0.18 °C | | |
| Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 385, 200 Ω[FO] | -200 ºC to 630 ºC | 0.11 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 385, 500 Ω[FO] | -200 ºC to 630 ºC | 0.11 ºC | | |
| Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 385, 1 000 Ω[FO] | -200 ºC to 630 ºC | 0.11 ºC | | |

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|---|---|---|---|---|
| Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 3 916, 100 Ω[FO] | -200 ºC to 630 ºC | 0.11 ºC | Fluke 725 Electrical Simulation of RTD Output | Euramet_cg-11 |
| Temperature Calibration, Indication, and Control Equipment used with RTD Type Pt 3 926, 100 Ω[FO] | -200 ºC to 630 ºC | 0.11 ºC | | |
| Equipment Output DC Voltage[FO] | 10 mV to 100 mV | 0.012 mV | Fluke 725 | CENAM Technical Guide |
| | 3 V to 30 V | 0.006 2 V | | |
| | 5 mV to 50 mV | 0.004 mV | Fluke 289 | |
| | 50 mV to 500 mV | 0.17 mV | | |
| | 1 V to 5 V | 0.000 27 V | | |
| | 5 V to 50 V | 0.001 7 V | | |
| Equipment Output AC Voltage 60 Hz[FO] | 50 V to 500 V | 1.4 V | Fluke 289 | |
| | 100 V to 1000 V | 5.8 V | | |
| Equipment Output DC Current | 4 mA to 24 mA | 0.019 mA | Fluke 725 | |
| | 50 µA to 500 µA | 0.55 µA | | |
| | 500 µA to 5000 µA | 40 µA | Fluke 289 | |
| | 5 mA to 50 mA | 0.005 5 mA | | |
| | 40 mA to 400 mA | 0.19 mA | | |
| Equipment Output AC Current 60 HzV | 1 A to 5 A | 0.000 34 A | Fluke 289 | |
| | 1 A to 10 A | 0.001 3 A | | |
| | 1 mA to 10 mA | 0.005 9 mA | ETCR7000 | |
| | 10 mA to 100 mA | 0.013 mA | | |
| | 100 mA to 1000 mA | 0.11 mA | | |
| | 1 A to 10 A | 0.005 9 A | | |
| | 10 A to 100 A | 0.013 A | | |
| | 100 A to 1000 A | 0.11 A | | |
| | 1000 A to 2000 A | 0.26 A | | |
| Equipment Output Resistance[FO] | 15 Ω to 3 200 Ω | 4.1 Ω | Fluke 725 | |
| | 5 Ω to 50 Ω | 0.036 Ω | Fluke 289 | |
| | 50 Ω to 500 Ω | 0.64 Ω | | |

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|---|---|---|---|---|
| Equipment Output Resistance[FO] | 1 kΩ to 5 kΩ | 0.000 068 kΩ | Fluke 289 | CENAM Technical Guide |
| | 5 kΩ to 50 kΩ | 0.004 kΩ | | |
| | 50 kΩ to 500 kΩ | 0.41 kΩ | | |
| | 1 MΩ to 5 MΩ | 0.027 MΩ | | |
| | 5 MΩ to 50 MΩ | 2.8 MΩ | | |
| | 50 MΩ to 500 MΩ | 75 MΩ | | |
| Equipment Output Frequency[FO] | 50 Hz to 900 Hz | 0.008 5 Hz | Fluke 725 | |
| | 1 kHz to 10 kHz | 0.001 2 kHz | | |
| Equipment Input DC Current[FO] | 4 mA to 24 mA | 0.000 58 mA | | |
| Equipment Input Resistance[FO] | 15 Ω to 3200 Ω | 4.1 Ω | | |
| Equipment Input Frequency[FO] | 50 Hz to 900 Hz | 0.008 2 Hz | | |
| | 1 kHz to 10 kHz | 0.000 13 kHz | | |

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor *k* (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.

2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.

3. The presence of a superscript F means that the laboratory performs calibration of the indicated parameter at its fixed location. Example: Outside Micrometer[F] would mean that the laboratory performs this calibration at its fixed location.

4. The presence of a superscript O means that the laboratory performs calibration of the indicated parameter onsite at customer locations. Example: Outside Micrometer[O] would mean that the laboratory performs this calibration onsite at the customer's location.

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5. The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer$^{FO}$ would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.

6. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.

7. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.

8. The term T represents temperature in ºC or ºF as appropriate to the uncertainty statement.

9. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.

10. The term H represent Relative Humidity in units of RH as appropriate to the uncertainty statement.

11. The term V represents Volume in liters or milliliters (including SI multiple and submultiple units) as appropriate to the uncertainty statement.

12. The term V represents velocity in rpm

13. The term t represents time in seconds (s) or millisecond (ms) as appropriate to the uncertainty statement.

14. The term P represents pressure in psi.

15. The term F represents force applied in Newton or kilogram-force