CERTIFICATE OF ACCREDITATION

This is to attest that

UNIVERSAL INSPECTION SERVICES CO. LTD.

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Calibration Laboratory CL-184

has met the requirements of AC204, *IAS Accreditation Criteria for Calibration Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories.* This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date November 13, 2023

Expiration Date April 1, 2026

President

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SCOPE OF ACCREDITATION

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Accredited to ISO/IEC 17025:2017 *Effective Date November 13, 2023*

CALIBRATION AND MEASUREMENT CAPABILITY (CMC)*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Dimensional			
Vernier Caliper LC-0.01 mm	Up to 300 mm Up to 600 mm Up to 1000 mm Up to 2000 mm	13 µm 14 µm 16 µm 29 µm	By using Caliper Checker & Circular Steel Length Bar – Comparison Method
Vernier Height Gauge LC-0.01 mm	Up to 300 mm Up to 600 mm	12 µm 15 µm	By using Caliper Checker & Circular Steel Length Bar – Comparison Method
External Micrometer LC-0.001 mm	Up to 25 mm 25 mm to 50 mm 50 mm to 100 mm	1.2 µm 1.3 µm 10 µm	By using Gauge Block Grade '0', & Circular Steel Length Bar by Direct Method
Dial Indicator (Plunger) (LC-0.01 mm)	Up to 25 mm	8.2 µm	By using Electronic Dial – Comparison Method
Dial Indicator (Lever) (LC-0.001 mm)	Up to 2 mm	1.4 µm	By using Electronic Dial – Direct Method
Coating Thickness Gauge (LC-0.001 mm)	Up to 1 mm	4.2 µm	By using Master Foils - Direct Method
Internal Micrometer (LC- 0.01 mm)	Up to 100 mm	11 µm	By internal MicroChecker – Comparison method
Feeler Gauge	Up to 5 mm	3.6 µm	By using Digital Micrometer-Comparison Method
Radius Gauge	Up to 25 mm	24 µm	By Using Profile Projector Comparison Method
Mechanical			
Universal Testing Machine	0 kN to 1000 kN	0.42 kN	By using Load Cell - Comparison Method
Compression Testing Machine	0 kN to 3000 kN	7.6 kN	
Torque Wrench/ Torque Gauge/ Torque Screw Driver	0.2 N·m to 2 N·m 2 N·m to 10 N·m 10 N·m to 50 N·m	0.036 N·m 0.053 N·m 0.32 N·m	By using Torque Wrench Calibration System – Comparison Method

** If information in this CMC is presented in non-SI units, the conversion factors stated in NIST Special Publication 811 "Guide for the Use of the International System of Units (SI)" apply.*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
	50 N·m to 1000 N·m 1000 N·m to 3000 N·m	0.56 N·m 5.0 N·m	
Rockwell Hardness Tester	39.6 HRA 82.3 HRA	0.92 HRA 0.90 HRA	By using Standard Test Block, Direct Method
Vickers Hardness Tester	230 HV 701 HV 727 HV	4.6 HV 4.7 HV 4.7 HV	By using Standard Test Block, Direct Method
Brinell Hardness Tester	176 HB 383 HB	3.2 HB 3.4 HB	By using Standard Test Block, Direct Method
Hydraulic Pressure (Dial/Digital Pressure Gauge, Pressure Transducer, Pressure Switch, Pressure Recorder, Pressure Transmitter, Pressure Calibrator, Pressure Module/ Manifold)	0 psi to 1000 psi 1000 psi to 5000 psi 5000 psi to 10000 psi 10000 psi to 30000 psi	0.12 psi 2.4 psi 5.8 psi 9.5 psi	By using Digital Pressure Gauge – Comparison Method
Pneumatic Pressure (Dial/Digital Pressure Gauge, Pressure Transducer, Pressure Switch, Pressure Recorder, Pressure Transmitter, Pressure Calibrator, Pressure Module/ Manifold)	0 bar to 10 bar 10 bar to 100 bar 100 bar to 210 bar	0.001 bar 0.04 bar 0.004 bar	By using Digital Pressure Gauge – Comparison Method
Vacuum Gauge	0 bar to -1 bar	0.024 bar	By using Digital Vacuum gauge – Comparison Method
Safety Relief Valve	0 psi to 100 psi 100 psi to 1000 psi 1000 psi to 5000 psi 5000 psi to 10000 psi 10000 psi to 20000 psi	0.56 psi 2.9 psi 3.5 psi 5.8 psi 9.5 psi	By using Digital Pressure Gauge – Comparison Method
Sound Level Meter @ 1000 Hz	94 dB 114 dB	1.4 dB 1.4 dB	By using Sound Level Calibrator – By Direct Method
Weighing Balances	10 mg to 500 mg 500 mg to 2 kg 2 kg to 5 kg 5 kg to 10 kg	0.08 mg 1.2 mg 8.9 mg 22 mg	By using standard Weights - E2 Class Procedure – By Direct Method
	10 kg to 30 kg	120 mg	By using standard Weights - M1 Class -Direct Method
Electromagnetic Yoke (AC)	Lifting power 4.5 kg	0.28 kg	By using Standard Dead Weight Procedure – Direct Method

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Densitometers	0 D to 14 D	0.04 D	By using Reference Density Film Procedure – Comparison method
Anemometer	2.5 m/s 5 m/s 10 m/s 15 m/s	0.53 m/s 0.46 m/s 0.57 m/s 0.74 m/s	By using Reference Wind tunnel Generator – Direct method
Thermal			
Infrared Thermometer/ Non-Contact Thermometers	50 °C to 500 °C	2.8 °C	By using Black Body Furnace – Comparison method
RTD/Thermocouple Sensor with and without Indicators, Temperature Gauges	-30 °C to 600 °C 600 °C to 1100 °C	0.87 °C 0.87 °C	By using PRT with temp calibrator – Comparison Method
Thermo-hygrometer	20 %RH to 90 %RH @ (30 °C to 50 °C) 20 °C to 50 °C @ (30 %RH to 90 %RH)	2.1 %RH 0.81 °C	By Using Humidity Calibrator – Comparison Method
Liquid Baths, Refrigerator, Dry Well Blocks, Ovens, Furnace	-15 °C to 500 °C 500 °C to 1200 °C	0.63 °C 1.2 °C	By using Standard Temp Sensor (PRT/ S type) with Indicator (by Single Position Calibration) – Comparison Method
Electrical – DC/LF			
Temperature Simulation - Source[3] Type K Type E Type T Type J PT-100	 -200 °C to 1372 °C -200 °C to 900 °C -200 °C to 400 °C -200 °C to 1200 °C -200 °C to 800 °C	 0.87 °C 0.87 °C 0.87 °C 0.87 °C 0.87 °C	By using Electrical Simulation & Measurements – Comparison Method
Temperature Simulation – Measure[4] Type K Type E Type T Type J PT-100	 -200 °C to 1372 °C -200 °C to 900 °C -200 °C to 400 °C -200 °C to 1200 °C -200 °C to 800 °C	 0.87 °C 0.86 °C 0.87 °C 0.95 °C 0.87 °C	By using Electrical Simulation & Measurements – Comparison Method
DC Resistance Source[3]	0 kΩ to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 50 MΩ	0.96 Ω 1.6 Ω 5.6 Ω 0.97 kΩ 4.3 kΩ	By using Multifunction Calibrator – Comparison Method
	10 kΩ 100 kΩ	0.56 Ω 5.6 Ω	By using High Resistance Standard Procedure –

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
	1 MΩ 10 MΩ 100 MΩ 1000 MΩ	0.85 kΩ 3.7 kΩ 4.7 kΩ 0.31 MΩ	Euramet CG-15 and UIC/P/ECP-01
DC Voltage Source[3]	0 µV to 20 mV 20 mV to 200 mV 200 mV to 240 V 240 V to 1000 V	0.0016 mV 0.0011 mV 1.5 mV 51 mV	By using Multifunction Calibrator – Comparison Method
AC Voltage Source[3] @ 50 Hz	1 mV to 20 mV 20 mV to 200 mV 200 mV to 2 V 2 V to 240 V 240 V to 1000 V	0.016 mV 0.031 mV 0.24 mV 2.5 mV 43 mV	By using Multifunction Calibrator – Comparison Method
AC Current Source[3] @ 50 Hz	1 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 20 A	0.42 µA 0.81 µA 0.032 mA 0.083 mA 3.1 mA	By using Multifunction Calibrator – Comparison Method
DC Current Source[3]	1 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 20 A	0.058 µA 0.0030 mA 0.0030 mA 6.9 mA 6.9 mA	By using Multifunction Calibrator – Comparison Method
DC Voltage Measure[4]	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	0.011 mV 0.35 mV 0.35 mV 56 mV 56 mV	By using Precision Multimeter, Comparison Method
AC Voltage Measure[4] @ 50 Hz	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	0.091 mV 0.21 mV 12 mV 26 mV 0.96 V	By using Precision Multimeter, Comparison Method
DC Current Measure[4]	0 µA to 100 µA 100 µA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 400 mA 400 mA to 1 A 1 A to 3 A 3 A to 10 A	0.057 µA 0.38 µA 1.8 µA 0.018 mA 0.32 mA 3.2 mA 1.6 mA 6.6 mA	By using Precision Multimeter, Comparison Method
AC Current Measure[3] @ 50 Hz	0 µA to 1 mA 1 mA to 10 mA 10 mA to 400 mA 400 mA to 1 A	1.5 µA 8.9 µA 0.084 mA 3.3 mA	By using Precision Multimeter, Comparison Method

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
	1 A to 3 A 3 A to 10 A	1.8 mA 0.011 A	
DC Resistance Measure[4]	10 Ω to 300 Ω 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 50 MΩ	0.048 Ω 3.0 Ω 6.2 Ω 0.06 kΩ 0.47 MΩ	By using Precision Multimeter, Comparison Method
Capacitance Measure[4]	1 nF to 100 nF 1µF to 100 µF	2 nF 2 nF	By using Decade Capacitance Box - Comparison Method
Holiday Detector	0 kV to 150 kV	0.015 kV	By using AC/DC High Voltage Probe & High Voltage Divider Comparison Method
Pin Hole Detector	0 V to 90 V	0.012 V	By using Precision Multimeter Comparison Method
Welding Machine	Up to 600 A	1.4 A	By using Load Bank, Comparison Method
Time and Frequency			
Tachometer	Contact: 12000 rpm Photo: 12000 rpm	2.3 rpm 2.6 rpm	By Using Tachometer Calibrator, Comparison Method
Chemical/Gas			
pH Meters	0 pH to 14 pH	0.47 pH	By using Reference Buffer Solution, Direct Method
Conductivity Meter (TDS)	84 µS/cm 1413 µS/cm	0.97 % 0.99 %	By using Reference Conductivity Solution – Direct Method
Gas Detectors	O_2: 18 % Methane: 50 % LEL CO: 100 ppm H_2S: 25 ppm	2 % 2.2 % 2.1 % 2 %	By using Standard Span Calibration Gases – Direct Method
Oxygen Analyzer	O_2: 20.9 %	2 %	

[1]The uncertainty covered by the Calibration and Measurement Capability (CMC) is expressed as the expanded uncertainty having a coverage probability of approximately 95 %. It is the smallest measurement uncertainty that a laboratory can achieve within its scope of accreditation when performing calibrations of a best existing device. The measurement uncertainty reported on a calibration certificate may be greater than that provided in the CMC due to the behavior of the calibration item and other factors that may contribute to the uncertainty of a specific calibration.

[2]When uncertainty is stated in relative terms (such as percent, a multiplier expressed as a decimal fraction or in scientific notation), it is in relation to instrument reading or instrument output, as appropriate, unless otherwise indicated.

[3]Capability is suitable for the calibration of measuring devices in the stated ranges.

[4]Capability is suitable for the calibration of devices intended to generate the indicated quantity in the stated ranges.

Notes:
ppm = parts per million
D = Degree of Darkness (optical density)
LEL = Lower Explosive Level
TDS = Total Dissolved Solids