



INTERNATIONAL
ACCREDITATION
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CERTIFICATE OF ACCREDITATION

This is to attest that

INDEPENDENT TESTING ENGINEERING LIMITED

FLAT S & U, 19/F, BLOCK 2, GOLDFIELD INDUSTRIAL BUILDING
144-150, TAI LIN PAI ROAD, KWAI CHUNG
NEW TERRITORIES, HONG KONG SAR

Calibration Laboratory CL-211

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 July 3, 2023

Expiration Date March 1, 2025



A handwritten signature in black ink, reading 'Raj Nathan'.

President

Visit www.iasonline.org for current accreditation information.

SCOPE OF ACCREDITATION

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INDEPENDENT TESTING ENGINEERING LIMITED

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Accredited to ISO/IEC 17025:2017

Effective Date July 3, 2023

CALIBRATION AND MEASUREMENT CAPABILITY (CMC)*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
<i>Dimensional</i>			
Angle Measuring Device	0° to 45°	0.01°	Direct method by using Sine Plate, Gauge Block (RE-TM-005)
	0° to 90°	0.1°	Master Angle Meter (RE-TM-006)
	0° to 360°	0.2°	Profile projector (RE-TM-022)
Caliper	Up to 300 mm	0.02 mm	Direct method by using Metric Gauge Block (RE-TM-031)
Coating Thickness Gauge	12 µm to 1500 µm	5 µm	Direct method by using Master Plastic Foil (RE-TM-070)
Concrete Cube Mold	Dimension (50 mm to 200 mm) Flatness Perpendicularity Parallelism	0.03 mm 0.01 mm 0.02 mm 0.05 mm	Direct method by using Caliper, Try Square, Straight Edge, Height Gauge, Filler Gauge (RE-TM-060 / CS1 Vol 1 App. A25)
Covermeter	10 mm to 200 mm	1 mm	Direct method by using Caliper (RE-TM-059 / BS1881 / Pt204 Cl.6.4 (Method C))
Depth Gauge	1 mm to 200 mm	0.02 mm	Direct method by using Metric Gauge Block (RE-TM-010)
Dial Gauge (Plunger)	Up to 25 mm	2 µm	Direct method by using Micrometer Head (RE-TM-057 / BS 907)
	>25 mm to 100 mm	6 µm	
Displacement Transducer with Digital Indicator	Up to 10 mm	0.4 µm	Direct Method by using Metric Gauge Block (RE-TM-001)
	>10 mm to 100 mm	2 µm	

* 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.

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Electronic Level	Up to 50 mm/m	0.015 mm/m	Direct Method by using Sine Plate / Gauge Block (RE-TM-009)
Engineer's Steel Rule	Up to 1000 mm	0.2 mm	Comparison method by using Steel Rule (RE-TM-030)
External Micrometer	Up to 50 mm	2 µm	Direct method by using Metric Gauge Block (RE-TM-067)
Extensometer (Up to 300 mm Gauge Length)	Up to 10 mm	0.8 µm	Comparison Method by using LVDT probe (RE-TM-020 / BS3846 Grade D & BSEN ISO9513 / Class1)
Feeler Gauge	0.01 mm to 3 mm	4 µm	Direct method by using External Micrometer (RE-TM-062)
Gauge Block	1 mm to 100 mm >100 mm to 300 mm	(0.3+3L) µm (L is length of gauge block in m) 2 µm	Comparison method by using Metric Gauge Block / Gauge Block Comparator (RE-TM-008)
Glass Scale	Up to 100 mm	4 µm	Comparison method by using Metric Glass Scale and profile projector (RE-TM-007)
Height Gauge	Up to 500 mm	0.04 mm	Direct method by using Metric Gauge Block (RE-TM-011)
Try Square	Up to 200 mm	10 µm	Comparison method by using Try Square, Metric Gauge Block and Filler Gauges (RE-TM-055)
Measuring Tape	Up to 200 m	0.8 mm per 5 m	Comparison Method by using Steel Rule (RE-TM-002)
Measuring Tape with Sensing Head	Up to 200 m	1.0 mm per 5 m	Comparison Method by using Steel Rule (RE-TM-003)
Micrometer Head	Up to 25 mm >25 mm to 50 mm	1 µm 2 µm	Direct method by using Metric Gauge Block (RE-TM-004)
Profile Projector (Linear – X & Y Axis)	0 mm to 300 mm	(2.8+16L) µm (L is length in m)	Direct method by using Metric Glass Scale (RE-TM-014)
1-D Measurement	Up to 25 mm > 25 mm to 150 mm > 150 mm to 300 mm > 300 mm to 1000 mm > 1000 mm to 5000 mm	3 µm 7 µm 0.1 mm 1 mm 3 mm	Direct method by using Profile projector/ External micrometer/ Caliper / Steel ruler / Measuring tape / Radius gauge (RE-TM-022)

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Plastic Calibration Foil	Up to 1500 µm	4 µm	Direct method by using External Micrometer (RE-TM-063)
Welding Gauge	Scale measuring bevel angle (0° to 60°) Ruler (Up to 60 mm) Scale measuring high low weld cap and leg length (Up to 20 mm) Scale measuring undercut depth (Up to 2 mm) Scale measuring weld throat (2 mm to 20 mm)	1.7° 0.3 mm 0.3 mm 0.3 mm 0.3 mm	Direct measurement by using Steel Rule, Metric Gauge Block, Pin Gauge, Angle Gauges Block, Profile Projector (RE-TM-054)
Test sieve (wire cloth type/ perforated type)	Ø 50 µm to Ø 4 mm > Ø 4 mm to Ø 50 mm	3 µm 0.05 mm	Direct measurement by using Profile projector / Caliper (RE-TM-056 & 58 / BS 410-1/2 & ISO 3310-1/2)
Spirit Level	Up to 50 mm/m	0.015 mm/m	Comparison method by using Electronic Level (RE-TM-013)
Step Wedge	1 mm to 20 mm	4 µm	Direct method by using External Micrometer (RE-TM-022)
Straight Edge	Up to 1.4 m	7 µm	Direct method by using Surface Plate/ Gauge block (RE-TM-027)
Surface Plate	Up to 3 m x 3 m	4 µm	Direct method by using electronic level (RE-TM-012)
Taper Gauge	Up to 20 mm	0.04 mm	Direct method by using Caliper (RE-TM-022)
Thickness Gauge	Up to 25 mm	2 µm	Direct Method by Metric Gauge Block (RE-TM-026)
Mechanical			
Anemometer- (Vane, Pitot, Hot Wire Type)	0.5 m/s to 1 m/s >1 m/s to 20 m/s	0.1 m/s 0.4 m/s	Comparison method by using Reference Anemometer & Wind Tunnel (RE-TM-032)
Weighing Balance	1 mg to 5 g 5 g to 200 g 200 g to 5 kg 5 kg to 30 kg 30 kg to 300 kg 300 kg to 2000 kg	0.008 mg 0.1 mg 0.01 g 0.2 g 0.02 kg 1 kg	Direct ABBA Method by using OIML Class E2 to M3 mass (RE-TM-033)
Barometer	960 hPa to 1050 hPa	0.6 hPa	Comparison Method by using Master barometer (RE-TM-034)

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Charpy V notch Impact Tester	1 J to 50 J 50 J to 225 J	1.3 J 4.2 J	Direct method by using reference block (RE-TM-069 / BS EN 10045-2 (Cl. 6) or BS EN ISO 148-2 or BS EN ISO 148-2)
Compression Machine (Force)	0.01 kN to 3000 kN	0.5 %	Direct method by using Master loadcells (RE-TM-035/ BS 1610: Part 1 / BS EN 12390-4/ CS1)
	0.01 kN to 10000 kN	1.0 %	
Compression machine (Stability)	200 kN to 2000 kN (Class 1)	0.03 strain ratio	RE-TM-036 / BS 1881: Part 115 & BS EN 12390-4 / CS1
Dead weight tester	0.1 bar to 1000 bar	0.05 %	Comparison Method by using Master pressure gauges (RE-TM-037)
Hardness testing machine	100 HV5 to 700 HV5	1.6 %	Direct method by using Reference hardness block, (RE-TM-068 / BS EN ISO 6507-2)
	100 HV10 to 700 HV10	1.6 %	
	100 HV30 to 700 HV30	1.6 %	
Hydraulic cylinder	0.01 kN to 10000 kN	1.0 %	Direct method by using master load cell (RE-TM-038)
Lux meter	20 lux to 5000 lux	2.0 %	Comparison method by using master lux meter (RE-TM-065)
Mass	1 mg	2 µg	Comparison method by using Mass comparators, OIML class E2 to F1 mass and weighing scale (RE-TM-039)
	2 mg	2 µg	
	5 mg	2 µg	
	10 mg	2 µg	
	20 mg	3 µg	
	50 mg	3 µg	
	100 mg	5 µg	
	200 mg	5 µg	
	500 mg	5 µg	
	1 g	8 µg	
	2 g	10 µg	
	5 g	0.03 mg	
	10 g	0.03 mg	
	20 g	0.03 mg	
	50 g	0.05 mg	
	100 g	0.08 mg	
	200 g	0.12 mg	
	500 g	0.3 mg	
	1 kg	2 mg	
	2 kg	4 mg	
5 kg	10 mg		
10 kg	0.02 g		
20 kg	0.1 g		

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Mass (Direct weighing)	Up to 5 g 5 g to 200 g 200 g to 5 kg 5 kg to 30 kg 30 kg to 300 kg	20 µg 0.6 mg 0.05 g 0.4 g 0.02 kg	Direct method by using weighing balances (RE-TM-040)
Manometer	5 Pa to 130 kPa	5 Pa	Comparison Method by using reference Manometer (RE-TM-041)
Nuclear density gage	1 g/cm ³ to 3 g/cm ³	1 %	Direct method by using Master density blocks (RE-TM-042)
Pressure measuring device	0.1 bar to 1000 bar	0.1 %	Direct method by using Hydraulic and Pneumatic Dead Weight Tester (RE-TM-044)
	0.1 bar to 1000 bar	0.3 %	Comparison method by using Master pressure gauges (RE-TM-043)
Proving device (Compression Mode)	0.01 kN to 3 kN	0.05 %	Direct method by using Dead Weights (RE-TM-061 / ISO 376)
	0.01 kN to 3000 kN	0.2 %	Comparison method by using reference load cell (RE-TM-061 & RE-TM-045 / ISO 376: 2011)
	0.01 kN to 9000 kN	1.0 %	
Rebound hammer	At 80 rebound count	1 rebound count	Direct method (RE-TM-046 / BS EN 12504-2 cl. 4.2)
Rebound hammer's anvil	HRC Weight	1 HRC 0.01 kg	Direct method by using Master anvil & master balance (RE-TM-079)
Sound level meter	Level response (74 dB to 114 dB) @ 1 kHz Frequency response (125 Hz to 4 kHz) @ 94 dB	0.2 dB	Comparison method by using master sound calibrator (RE-TM-80)
Sound calibrator	74 dB to 114 dB @ 1kHz	0.2 dB	Comparison method by using master sound calibrator (RE-TM-81)
Torque meter	0.1 N·m to 2000 N·m	0.5 %	Direct method by using Torque bar & dead weight (RE-TM-048)
Torque wrench	0.1 N·m to 2000 N·m	1.0 %	Direct method by using Toque meters (RE-TM-050 / BS EN 26789 / ISO 6789)
	1000 N·m to 10000 N·m	2.0 %	
Universal testing machine	0.01 kN to 3000 kN in Compression	1.0 %	Direct method by using reference load cell (RE-TM-

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	0.01 kN to 50 kN in Tension		051 / BS EN ISO 7500-1 / BS 1610: Part 1)
Vacuum gauge	-0.1 kPa to 100 kPa	0.4 %	Comparison method by using By Master vacuum gage (RE-TM-052)
Volumetric measurement	1 µL to 10 L	0.5 %	Direct method by Using micro balances / balance by gravimetric method (RE-TM-053)
Thermal			
Curing Tank	Temperature distribution (5 °C to 80 °C) Circulation within 30 minutes	0.5 °C 30 s	Comparison method by using Thermocouples and Stopwatch (RE-TM-071)
Thermometer/ Glass Thermometer	-80 °C to 80 °C 80 °C to 250 °C 250 °C to 600 °C 600 °C to 1200 °C	0.1 °C 0.2 °C 1.5 °C 3 °C	Comparison method by using Liquid Baths, Dry Block Calibrator and SPRT (RE-TM-023)
Environmental Chamber	2 °C to 80 °C 11 %RH to 98 %RH	0.4 °C 4 %RH	Comparison method by using multi-channel Temperature & Humidity data logger and sensors – mapping (RE-TM-015)
Humidity Meter (at 5 °C to 50 °C)	11 %RH to 98 %RH	2 %RH	By Comparison method by using Master electronic psychrometer / reference humidity meter in environmental chamber (RE-TM-017)
Humidity Meter @ Ambient Temp.	11 %RH 33 %RH 75 %RH 98 %RH	1.0 %RH 1.0 %RH 1.0 %RH 1.6 %RH	Direct method by using Master Saturated Salts (LiCl, MgCl ₂ , NaCl, K ₂ SO ₄ - RE-TM-016)
Heat Soak Oven	30 °C to 320 °C	0.5 °C	Direct method by using Thermocouples (RE-TM-018)
Infrared Thermometer	15 °C to 200 °C 200 °C to 500 °C	1.2 °C 2.6 °C	Comparison method by using Reference Infrared Thermometer and Blackbody Temperature Source (RE-TM-021)
SPRT	-38 °C to 660 °C	0.04 °C	Fixed point cell (Hg, Water, Ga, In, Sn, Zn, Al) (RE-TM-019)

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Temperature Chamber	-50 °C to 200 °C	0.4 °C	Direct method by using Thermocouples / temperature data loggers – Mapping (BS EN 60068-3-5/ RE-TM-018)
Furnace	200 °C to 1200 °C	3 °C	Direct method by using Thermocouples / temperature data loggers – Mapping (RE-TM-025)
Temperature Simulation - Thermocouple			Direct method by using Thermocouple Calibrator (RE-TM-029)
Type J	-100 °C to 1200 °C	0.15 °C	
Type K	-100 °C to 1370 °C	0.18 °C	
Type E	-100 °C to 1000 °C	0.14 °C	
Type T	-100 °C to 400 °C	0.19 °C	
Type S	0 °C to 1765 °C	0.89 °C	
Type R	0 °C to 1765 °C	0.89 °C	
Type B	500 °C to 1820 °C	0.96 °C	
Type N	-100 °C to 1300 °C	0.24 °C	
Electrical – DC/LF			
DC Voltage - Generate ³	25 mV to 1000 V	0.5 %	Comparison method by using master calibrator and multimeter (RE-TM-073)
Measure ⁴	25 mV to 50 kV	0.5 %	
AC Voltage (50/60Hz)- Generate ³	25 mV to 1000 V	0.5 %	
Measure ⁴	25 mV to 50 kV	0.5 %	
DC Current – Generate ³	10 µA to 20 A / 20 A to 1000 A	0.8 %	Comparison method by using master calibrator and multimeter (RE-TM-074)
Measure ⁴	10 µA to 20 A / 20 A to 1000 A	0.8 %	
AC Current (50/60Hz) – Generate ³	10 µA to 20 A / 20 A to 1000 A	0.8 %	
Measure ⁴	10 µA to 20 A / 20 A to 1000 A	0.8 %	
DC Resistance– Generate ³	1 mΩ to 100 MΩ	0.8 %	Comparison method by using master standard resistor and multimeter (RE-TM-075)
DC Resistance- Measure ⁴	1 mΩ to 100 MΩ	0.8 %	
Frequency – Generate ³	50 Hz to 300 MHz	0.2 %	Comparison method by using calibrator and multimeter (RE-TM-076)
Frequency – Measure ⁴	50 Hz to 300 MHz	0.2 %	
Power Factor (50/60 Hz) – Generate ³	0.01 to 1.00	0.02	Comparison method by using master calibrator and power meter (RE-TM-077)
Measure ⁴	0.01 to 1.00	0.02	

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Ultrasonic Flaw Detector	BS EN 12668-1 Group 2 Tests / BS EN ISO 22232-1 Group 2 Tests	5.0 %	Comparison method by using master signal generator, multifunction calibrator & multimeter (RE-TM-078 / BS EN 12668-1 / BS EN ISO 22232-1)
<i>Time and Frequency</i>			
Time – Generate ³ & Measure ⁴	5 s to 1 day	0.1 s	Comparison method by using master timer (RE-TM-072)
Tachometer Contact	20 rpm to 5000 rpm	0.5 %	Comparison method by using master tachometer and various speed motor (RE-TM-047)
Non-contact	20 rpm to 40000 rpm	0.5 %	
Rotation speed	1 rpm to 40000 rpm	1.0 %	

¹The 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.

²When 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.

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

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