

Laboratory **Technical Calibration Services, No. 12/41, Rajamangalam 7th Street, Villivakkam, Chennai, Tamil nadu**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **CC-2873**

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Validity **26.10.2018 to 25.10.2020**

Last Amended on **19.11.2018**

	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	Temperature Simulation [#] (Indicator Controller/Recorder)			
	RTD (PT-100)	(-) 200 °C to 850 °C	0.36 °C	Using BEAMEX MC2 - TE Multifunction Calibrator By Direct Method
	Thermocouple			
	J Type	(-) 200 °C to 1200 °C	0.46 °C	
	K Type	(-) 100 °C to 1350 °C	0.46 °C	
	T Type	(-) 250 °C to 400 °C	0.38 °C	
	R Type	150 °C to 1750 °C	1.04 °C	
	S Type	150 °C to 1750 °C	1.04 °C	
	B Type	450 °C to 1800 °C	1.38 °C	
	E Type	(-) 200 °C to 1000 °C	0.40 °C	
	N Type	(-) 200 °C to 1300 °C	0.54 °C	
II.	MEASURE			
1.	DC Voltage [§]	1 mV to 200 mV 200 mV to 2 V 2V to 12V	0.91 % to 0.009 % 0.009 % to 0.0057 % 0.0057 % to 0.0055 %	Using 6 ½ DMM Rigol DM3068 By Direct Method
2.	DC Current [§]	100 µA to 200 µA 200 µA to 2 mA 2 mA to 25 mA	0.12 % to 0.082 % 0.082 % to 0.062 % 0.062 % to 0.076 %	Using 6 ½ DMM Rigol DM3068 By Direct Method
3.	DC Resistance [§]	1 Ω to 10 Ω 10 Ω to 200 Ω 200 Ω to 2 kΩ 2 kΩ to 4 kΩ	1.24 % to 0.13 % 0.13 % to 0.018 % 0.018 % to 0.013 % 0.013 %	Using 6 ½ DMM Rigol DM3068 By Direct Method
4.	Frequency [§]	10 Hz to 40 Hz 40 Hz to 10 kHz	0.021 % to 0.025 % 0.025 % to 0.0084 %	Using 6 ½ DMM Rigol DM3068 By Direct Method

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5.	Time interval ^s	1 s to 10 s 10 s to 3600 s 3600 s to 36000 s	0.24 sec 0.24 sec to 9 sec 9 sec to 30 sec	Using Digital Time Totalizer By Comparison Method
6.	Temperature Simulation [#] (Indicator/ Controller/Recorder)			
	RTD (PT-100)	(-) 200 °C to 850 °C	0.14 °C	Using BEAMEX MC2 - TE Multifunction Calibrator By Direct Method
	Thermocouple			
	J Type	(-) 200 °C to 1200 °C	0.46 °C	
	K Type	(-) 100 °C to 1350 °C	0.54 °C	
	T Type	(-) 250 °C to 400 °C	0.38 °C	
	R Type	150 °C to 1750 °C	0.76 °C	
	S Type	150 °C to 1750 °C	0.86 °C	
	B Type	450 °C to 1800 °C	1.20 °C	
	E Type	(-) 200 °C to 1000 °C	0.40 °C	
	N Type	(-) 200 °C to 1300 °C	0.54 °C	

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<u>MECHANICAL CALIBRATION</u>				
I.	DIMENSION (BASIC MEASURING INSTRUMENTS, GAUGES ETC.)			
1.	Calipers ^s L.C: 0.01mm	0 to 600 mm 600 mm to 1000 mm	8.2 μ m 11.0 μ m	Using Grade '0' Gauge Block, Caliper Checker
2.	Depth Calipers ^s L.C: 0.01mm	0 to 300 mm	11.4 μ m	Using Gauge Block, Length bar, Surface Plate
3.	Depth Micrometer ^s L.C: 0.01mm	0 to 200 mm 200 mm to 300 mm	5.8 μ m 7.0 μ m	Using Gauge Block, Length bar, Surface Plate
4.	Internal Micrometer/ Stick Micrometer ^s L.C: 0.01mm	0 to 600mm 600 mm to 1000mm	5.8 μ m 8.0 μ m	Using Grade '0' Gauge Block, Length bar
5.	Height Gauge ^s L.C: 0.01mm	0 to 600mm 600 mm to 1000mm	9.2 μ m 8.4 μ m	Using Length bar, Surface Plate, Comparator Stand
6.	Dial Thickness Gauge ^s L.C: 0.01mm	0 to 10mm	7.6 μ m	Using Grade '0' Gauge Block
7.	Pistol Caliper ^s L.C: 0.01mm	0 to 130mm	7.6 μ m	Using Grade '0' Gauge Block
8.	Ultrasonic Thickness Gauge ^s L.C.: 0.01mm	0 to 100mm	6.6 μ m	Using Grade '0' Gauge Block

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9.	External Micrometer/ Ball Micrometer/ Blade Micrometer/ Disc Micrometer/ Flange Micrometer/ Groove Micrometer/ Spline Micrometer/ Sheet Metal Micrometer/ Point Micrometer/ Pitch Micrometer [§] L.C.:0.001mm L.C.:0.01mm	0 to 300 mm 300 mm to 600 mm 600 mm to 700 mm 0 to 300mm 300 to 600 mm 600 to 1000 mm	3.2 μ m 3.4 μ m 4.4 μ m 7.0 μ m 7.0 μ m 8.0 μ m	Using Grade '0' Gauge Block, Length bar,
10.	Snap Gauge / Gap Gauge [§]	0 to 200 mm	2.0 μ m	Using Slip Gauge Set Grade '0'
11.	Plain Plug Gauge [§]	0 to 100mm 100 mm to 200mm	1.0 μ m 2.0 μ m	Using Slip Gauge Set Grade '0'
12.	Cylindrical Setting Master [§]	0 to 100mm 100 mm to 200mm	1.0 μ m 2.0 μ m	Using Slip Gauge Set Grade '0'
13.	Limit Gauges [§] (Flush Pin Gauges, Width Gauge)	0 to 100mm 100 mm to 200mm	1.0 μ m 2.0 μ m	Using Slip Gauge Set Grade '0'
14.	Cylindrical Measuring Pin [§]	0.5 mm to 20 mm	1.0 μ m	Using Grade '0' Gauge Block & Dial Gauge
15.	Thread Measuring Wires [§]	0.5 mm to 20 mm	1.0 μ m	Using Grade '0' Gauge Block & Dial Gauge

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15.	Plunger Type Dial Indicator [§] L.C: 0.001mm	0 to 25mm	2.4 μ m	Using Dial Calibration Tester
16.	Lever Type Dial Indicators [§] L.C: 0.001mm L.C: 0.01mm	0 to 0.14 mm 0 to 1.6 mm	2.2 μ m 6.2 μ m	Using Dial Calibration Tester
17.	Bore Dial Gauge [§] (Only Transmission)	Up to 2mm	2.2 μ m	Using Dial Calibration Tester
18.	Feeler Gauge [§]	0.03 mm to 1.0mm	0.8 μ m	Using Digital Micrometer
19.	Micrometer Setting Rod [§]	25 mm to 1000 mm	4.4 μ m	Using Gauge Block, Length bar & Dial Gauge
20.	Coating Thickness Gauge [§]	0 to 2mm	2.84 μ m	Using Standard Foils
21.	Comparator Stand [§] (Flatness of Base)	Up to 300 mm	1.0 μ m	Using Surface Plate & Dial Gauge
23.	Height Gauge* L.C: 0.01mm	0 to 1000 mm	8.4 μ m	Using Length bar, Caliper Checker, Surface Plate
24.	Electronic Height Gauge * L.C: 0.0001mm	0 to 1000mm	4.6 μ m	Using Slip Gauge, Length bar
25.	Surface plate*	200 mm X 200 mm to 3000 mm X 3000 mm	$1.3 \frac{\sqrt{L+W}}{100} \mu$ m L,W in mm	Using Spirit level (L.C.: 0.01 mm)
26.	Bench Centre Co-axiality Parallelism*	150 mm X 500 mm	10.4 μ m	Using Mandrel, Dial Gauge

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II.	PRESSURE INDICATING DEVICES			
1.	Vacuum [#] (Vacuum Gauges, Compound Gauges Vacuum Transducer, Vacuum Transmitter, Vacuum Switches, Vacuum Modules, Vacuum Sensors)	(-) 0.9 bar to 0 bar	0.009 bar	Using Standard Pressure Calibrator By Comparison Method based on DKD-R6-1
2.	Pressure Pneumatic [#] (Dial, Digital Pressure Gauges/Indicators, Pressure Transducers With Indicator, Pressure Modules ,Oil Free Gauges, Manometer Pressure Switches, Pressure Transmitter)	1 bar to 36 bar	0.015 bar	Using Standard Pressure Calibrator By Comparison Method based on DKD-R6-1
3.	Pressure Hydraulic [#] (Dial, Digital Pressure Gauges/ Indicators, Pressure Transducers with indicator, Pressure modules ,Oil free gauges, Manometers, Pressure switches Pressure Transmitter)	20 bar to 700 bar	0.53 bar	Using Standard Pressure Calibrator By Comparison Method based on DKD-R6-1

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III.	WEIGHTS			
1.	Calibration of F2 Class Weights and coarser ^s	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg	0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.03 mg 0.03 mg 0.03 mg 0.03 mg	Using Standard Weights of Class E2 and Balance of d: 0.01 mg By Substitution Method Through ABBA Cycles As per OIML R -111
	Calibration of F1 Class Weights and coarser ^s	1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g	0.03 mg 0.03 mg 0.03 mg 0.03 mg 0.03 mg 0.04 mg 0.2 mg 0.2 mg	Using Standard Weights of Class E2 and Balance of d: 0.01 mg (Up to 80 g) & d: 0.1 mg (Up to 200g) By Substitution Method Through ABBA Cycles As per OIML R -111
	Calibration of M1 Class Weights and coarser ^s	500 g 1 kg 2 kg 5 kg 10 kg 20 kg	2 mg 5 mg 20 mg 0.2 g 0.2g 0.2 g	Using Standard Weights of Class F2 and Balance of d: 0.1 mg (Up to 200 g), d: 1 mg (1 kg), d: 10 mg (3 kg), d: 0.1 g (20 kg) By Substitution Method Through ABBA Cycles As per OIML R -111

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IV.	WEIGHING SCALE AND BALANCE			
1.	Electronic Weighing Balance [*] Calibration of Class1 and coarser d \geq 0.01 mg d \geq 0.1 mg Calibration of Class2 and coarser d \geq 1 mg d \geq 10 mg d \geq 0.1 g Calibration of Class3 and coarser d \geq 1g d \geq 10 g d \geq 50 g	1 mg to 80 g 10 mg to 200 g 50 mg to 1 kg 0.5 g to 3 kg 20 g to 20 kg 100 g to 30 kg 200 g to 150 kg 1 kg to 300 kg	0.04 mg 0.2 mg 6 mg 20 mg 200 mg 2g 10 g 50 g	Using Standard weights of E2 Class as per OIML R - 76 Using Standard weights of F2 Class as per OIML R - 76 Using Standard weights of M1 Class as per OIML R - 76
V.	VOLUME			
1.	Micro Pipettes [§]	10 μ l to 100 μ l 100 μ l to 1000 μ l	0.22 μ l 1.7 μ l	Using weighing Balance of d: 0.01 mg & 0.1 mg and Distilled Water Based on Gravimetric Method As per ISO 8655 Part 6

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2.	Glassware ^s (Pipettes, Standard Flask, Conical Flask, Beaker, Burettes, Dispensers, Graduated jars)	1 ml to 100 ml 100 ml to 1000 ml 1000 ml to 10000 ml	0.1 ml 0.1 ml 0.7 ml	Using weighing Balance of d: 0.1 mg, d: 1 mg, d: 0.1 g and Distilled Water Based on Gravimetric Method As per ISO 4787
VI.	ACCELERATION & SPEED			
1.	Digital Tachometer ^s Non Contact Type Contact Type	100 RPM to 90000 RPM 100 RPM to 90000 RPM	1.56% to 0.13% 2.32% to 0.13%	Using Digital Tachometer By Comparison Method
VII.	ACOUSTICS			
1.	Sound Level Meter ^s	1 kHz 94 dB & 114 dB	0.44 dB	Using Sound Level Calibrator
VIII.	UTM, TENSION CREEP AND TORSION TESTING MACHINE			
1.	Universal Testing Machine/ Tensile Testing Machine/ Compression Testing Machine/ Spring Testing Machine*	Compression Mode 20 N to 10kN 10 kN to 100kN 100 kN to 500kN Tension Mode 20 N to 100kN 100 kN to 500kN	1.20 % 0.81% 0.44% 0.81% 0.61%	Using Master Load Cell As per IS 1828(Part -1)/ ISO 7500

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<u>THERMAL CALIBRATION</u>				
I.	TEMPERATURE			
1.	RTD 's/ Thermocouple With & Without I Indicator , Data logger with Sensors, Probe Thermometers, BI-metal Thermometers, Capillary Thermometers, Thermometers, Temperature Indicator with sensors, Recorders with sensors, Temperature Transmitter, Indicator of Temperature Switches [#]	(-) 35°C to 100 °C 100°C to 250°C 250°C to 1200°C	0.45 °C 0.45 °C 2.02 °C	Using RTD Sensor, MFC and Low Temperature Calibrator, Oil Bath by Comparison Method Using RTD/ S Type T/C with Dry Block Furnace by Comparison Method
2.	Temperature Indicator of Cryostatic bath Oil Bath, Temperature Baths, Furnace ^{\$}	(-) 40°C to 100 °C 100°C to 400°C 400°C to 1200°C	0.45 °C 0.45 °C 2.02 °C	Using Multifunction Calibrator with RTD/ S-Type Thermocouple By Comparison Method

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3.	Temperature Gauges, Glass Thermometer [§]	50°C to 250°C	0.50 °C	Using Multifunction Calibrator with RTD and Oil Bath By Comparison Method

* Measurement Capability is expressed as an uncertainty (\pm) at a confidence probability of 95%

§ Only in Permanent Laboratory

* Only for Site Calibration

The laboratory is also capable for site calibration however, the uncertainty at site depends on the prevailing actual environmental conditions and master equipment used.

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