

Laboratory **Bhilai Calibration Laboratory, Plot No. 110, Model Town, Bhilai Nagar, Distt Durg CG,**

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

Certificate Number **CC-2684**

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Validity **16.05.2018 to 15.05.2020**

Last Amended on **18.05.2018**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	DC Voltage ^s	1 mV to 10 mV 10 mV to 330 mV 330 mV to 1000 V	0.37 % to 0.042 % 0.042 % to 0.008 % 0.008 % to 0.0097 %	Using Fluke 5502 E Fluke MPC
2.	AC Voltage ^s	50 Hz 2mV to 33 mv 33 mV to 330 mv 330 V to 330 V 330 V to 1000 V	2.43 % to 0.18 % 0.18 % to 0.075 % 0.075 % to 0.066 % 0.066 % to 0.09 %	Using Fluke 5502 E Fluke MPC
3.	DC Current ^s	1 μ A to 33 mA 33 mA to 10 A 25 A to 1000 A	2.4 % to 0.021 % 0.021 % to 0.09 % 1.26 % to 1.28 %	Fluke 5502 E Fluke MPC
4.	DC Resistance ^s	1 Ω to 1 M Ω 1 M Ω to 1 G Ω	0.07 % to 0.06 % 0.06 % to 1.73 %	Using Fluke 5502 E Fluke MPC
5.	AC Current ^s	50 Hz 33 μ A to 3.3 mA 3.3 mA to 330 mA 330 mA to 10 A 50 Hz 25 A to 1000 A	0.63 % to 0.23 % 0.23 % to 0.19 % 0.19 % to 0.15 % 1.82 % to 0.77 %	Using Fluke 5502 E Fluke MPC Wirth Current Coil
6.	Resistance ^s	0.001 Ω 0.02 Ω 0.5 Ω	1.90 % 0.16 % 0.94 %	Using Micro Ohm Calibrator

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7.	Temperature Simulation [#] K-Type Thermocouple J-Type Thermocouple R-Type Thermocouple RTD PT-100	(-)200 °C to 1372 °C (-)200 °C to 1200 °C 50 °C to 1750 °C (-)200 °C to 800 °C	0.66 °C 0.48 °C 1.00 °C 0.38 °C	Using MC-5 MFC Beamex
8.	DC Voltage [*]	1 mV to 500 mV 500 mV to 12 V	1.04 % to 0.028 % 0.028 % to 0.093 %	Using MC-5 MFC Beamex
9.	DC Current [*]	4 mA to 25 mA	0.30 % to 0.061 %	Using MC-5 MFC Beamex
10.	DC Resistance [*]	5 Ω to 4000 Ω	2.42 % to 0.06 %	Using MC-5 MFC Beamex
II.	MEASURE			
1.	DC Voltage [§]	1 mV to 10 mV 10 mV to 1.0 V 1.0 V to 1000 V	0.75 % to 0.012 % 0.012 % to 0.08 % 1.08 % to 0.009 %	Using 8846A High Precision
2.	DC Current [§]	1 μ A to 100 mA 100 mA to 10 A	3.13 % to 0.064 % 0.064 % to 0.19 %	Using 8846A High Precision DMM
3.	DC Resistance [§]	1 Ω to 100 Ω 100 Ω to 1 m Ω 1 m Ω to 1 G Ω	0.75 % to 0.012 % 0.012 % to 0.08 % 1.08 % to 0.009 %	Using 8846A High Precision DMM
4.	AC Voltage [§]	50 Hz 1.0 mV to 100 mv 100 mV to 1.0 V 1.0 V to 100 V 100 V to 1000 V	4.74 % to 0.19 % 0.19 % 0.19 % 0.19 %	Using 8846A High Precision DMM

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5.	AC Current ^b	50 Hz 30 μ A to 1.0 mA 1.0mA to 10 mA 10.0 mA to 100 mA 100 mA to 1.0 A 1.0 A to 10.0 A	0.30 % to 0.23 % 0.23 % to 0.17 % 0.17 % 0.17 % to 0.18 % 0.18 % to 0.25 %	Using 8846A High Precession DMM
6.	Temperature Simulation [#] K-Type Thermocouple J-Type Thermocouple R-Type Thermocouple RTD PT-100	(-)200 °C to 1372 °C (-)200 °C to 1200 °C 50 °C to 1750 °C (-)200 °C to 800 °C	0.66 °C 0.48 °C 1.10 °C 0.41 °C	Using MC-5 MFC Beamex
7.	DC Voltage [*]	1 mV to 500 mV 500 mV to 1 V 1 V to 30 V	1.38 % to 0.03 % 0.03 % to 0.05 % 0.05 % to 0.032 %	Using MC-5 MFC Beamex
8.	DC Current [*]	4 mA to 25 mA	0.72 % to 0.12 %	Using MC-5 MFC Beamex
9.	DC Resistance [*]	1 Ω to 4000 Ω	4.03 % to 0.025 %	Using MC-5 MFC Beamex

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<u>MECHANICAL CALIBRATION</u>				
I. DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)				
1.	Vernier Caliper L.C. 0.01 mm	0 to 600 mm	12.0 μ m	Using Caliper Checker
2.	External Micrometer L.C. 0.001 mm L.C. 0.01 mm	0 to 25 mm 0 to 600 mm	1.2 μ m 13.1 μ m	Using Micrometer Checker Caliper Checker
3.	Dial Gauges (Plunger Type) L.C. 0.001 mm	0 to 25 mm	2.4 μ m	Using Dial Calibration Tester
4.	Inside Micrometer Stick Type L.C. 0.01 mm	50 to 600 mm	12.3 μ m	Using Slip Gauge And Caliper Checker
5.	Height Gauge L.C. 0.01 mm	0 to 600 mm	11.7 μ m	Using Surface Plate And Caliper Checker
6.	Steel Tape	Up to 50 meters	181 \sqrt{L} L in Meter	Using Tape And Scale Calibrator
7.	Steel Scale	0 to 1000 mm	181 μ m	Using Tape And Scale Calibrator
8.	Bevel Protector/ Angle Gauge/ Combination Gauge	0° - 90° - 0°	6 sec	Using Angle Gauges

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9.	Depth Vernier Caliper L.C. 0.01 mm	0 to 300 mm	9.4 μ m	Using Depth Checker
10.	Coating Thickness Gauge	0 to 1500 μ m	10 μ m	Using Master Foils
11.	Feeler Gauge	0 to 1 mm	2 μ m	Using Digmatic Micrometer
II. ACCELERATION AND SPEED				
1.	Tachometer ^s (Non Contact Type)	3000 rpm to 30000 rpm	0.28 % of rdg.	Using Digital Tachometer
III. WEIGHING SCALE AND BALANCE				
1.	Mass [*] Electronic Weighing Balance Readability 0.01 mg Readability 0.1 mg Readability 1.0 g Readability 10.0 g	Up to 82 gram 82 g to 200 g Up to 30 kg 30 kg to 100 kg	0.07 mg 0.12 mg 0.80 g 6.0 g	Using E 2 Class Standard Weights Using F1 Class Standard Weights Using F1 & M1 Class Standard Weights

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IV. WEIGHTS				
1.	Mass ^s (Weights)	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g	0.014 mg 0.014 mg 0.014 mg 0.014 mg 0.014 mg 0.014 mg 0.014 mg 0.014 mg 0.014 mg 0.014 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.04 mg 0.08 mg 0.13 mg	Using E2 Class Standard Weights And Electronic Weighing Balance With Readability of 0.01 mg / 0.1 mg
V. PRESSURE INDICATING DEVICES				
1.	Pressure - Hydraulic Digital/Analog Pressure Gauge & Pressure Transmitters [#]	0 to 250 bar 250 to 600 bar	0.09 bar 0.15 bar	Using Beamex Multifunction Calibrator With External Pressure Modules (MC-2) With Uncertainty of 0.025 bar Uncertainty of 0.06 bar
2.	Pressure Pneumatic Digital Pressure Gauge & Pressure Transmitters [#]	0 to 2 bar	0.6 mbar	Using Beamex Multifunction Calibrator With External Pressure Modules (MC-5) With Uncertainty of 0.36 mbar

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3.	Vacuum Vacuum Gauge & Pressure Transmitters [#]	0 to (-) 0.9 bar	0.9 mbar	Using Beamex Multifunction Calibrator With External Pressure Modules (MC-5) With Uncertainty of 0.72 mbar
4.	Pressure Absolute Barometer [#]	650 to 760 mmHg	0.8 mmHg	Using Multifunction Calibrator MC-2 Beamex EXT-B Module With Uncertainty of 0.05 mmHg

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<u>THERMAL CALIBRATION</u>				
I.	TEMPERATURE			
1.	RTD/Thermocouple With & Without Indicator, Liquid-In-Glass Thermometer, Digital Thermometer, Temperature Gauge [#]	(-)35 °C to 45 °C >50 °C to 600 °C	0.51 °C 0.40 °C	Using 4 Wire RPRT (PT 400) With Beamex MC-5
2.	RTD/Thermocouple With & Without Indicator, Digital Thermometer, Temperature [#]	>600 °C to 1175 °C	2.56 °C	Using S-Type Thermocouple With MC-2
II.	SPECIFIC HEAT AND HUMIDITY			
1.	RH% Meter / Without Temperature [*]	30 to 80 %	2.00 %	Using Humidity Sensor With Indicator

* 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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