

Laboratory **Micro Small and Medium Enterprises – Testing Centre, 111/112, B.T. Road, Kolkata, West Bengal**

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

Certificate Number **CC-2964**

Page **1 of 9**

Validity **01.03.2019 to 28.02.2021**

Last Amended on **-**

“In view of the transition for ISO/IEC 17025:2017, the validity of this accreditation certificate will cease on 30.11.2020”

Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
<u>ELECTRO TECHNICAL CALIBRATION</u>			
I. SOURCE			
1. DC Voltage ^s	1mV to 329 mV 329 mV to 1 V 1 V to 32 V 32 V to 329 V 329 V to 1000 V	0.115% to 0.0035% 0.0035% to 0.0016% 0.0016% to 0.0017% 0.0017% to 0.00215% 0.00215% to 0.0024%	Using Multi Product Calibrator Fluke 5502A, USA
2. DC Current ^s	10.0 µA to 100.0 µA 100.0 µA to 3.29 mA 3.29 mA to 329.9 mA 329.9 mA to 1A 1 A to 10 A 10 A to 20 A	0.244% to 0.0412 % 0.0412% to 0.0141% 0.0141% to 0.0132% 0.0132% to 0.0273% 0.0273% to 0.0624% 0.0624% to 0.118%	Using Multi Product Calibrator Fluke 5502A, USA
3. AC Voltage ^s	50Hz 1m V to 299 mV 229 mV to 2.9 V 2.9V to 32 V 32V to 299 V 299 V to 1000 V	2.44% to 0.017 % 0.017% to 0.016 % 0.016% to 0.017 % 0.017% to 0.0215% 0.0215% to 0.082%	Using Multi Product Calibrator Fluke 5502A, USA
4. AC Current ^s	50Hz 33 µA to 100 µA 100 µA to 3.29 mA 3.29 mA to 329 mA 329 mA to 1 A 1 A to 10 A 10 A to 20 A 50 Hz 20 A to 50 A	0.485% to 0.247% 0.2247% to 0.118% 0.118% to 0.126% 0.126% to 0.0689% 0.0689% to 0.0725% 0.0725% to 0.216% 0.216% to 0.244%	Using Multi Product Calibrator Fluke 5502A, USA AC Voltage Current Standard Yokogawa, 2558

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

CC-2964

Page

2 of 9

Validity

01.03.2019 to 28.02.2021

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	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
5.	DC Resistance ^{\$} (Low 4 wire) DC Resistance ^{\$} (High 2 wire)	1 mΩ to 10mΩ 1Ω 1Ω to 100Ω 100Ω to 1kΩ 1kΩ to 100kΩ 100kΩ to 1MΩ 1MΩ to 2GΩ 2GΩ to 10 GΩ 10GΩ to 500 GΩ	0.135% to 0.12% 0.075% 0.012 % to 0.0035% 0.0035% to 0.05% 0.05% to 0.0041% 0.0041% to 0.0055% 0.0055% to 0.06% 0.06% to 0.24% 0.24% to 4.8%	Using Resistance Standard 4737B Standard Resistor, Vaiseshika Electron Devices, 9409D Multi Product Calibrator, Fluke 5502A,USA / Meg Ohm Decade Box, Tinsley, 4720,
6.	AC Power ^{\$} (AT UPF)	50Hz 1W to 100W 100W to 1000W 1000W to 6000W 6000W to 10000W	0.165% to 0.211% 0.211% to 0.153% 0.153% to 0.142% 0.142% to 0.168%	Using Multi Product Calibrator Fluke 5502A,USA
7.	DC Power ^{\$}	1W to 100W 100W to 1000W 1000W to 6000W 6000W to 12000W	0.097% to 0.12% 0.12% to 0.15% 0.15% to 0.13% 0.13% to 0.18%	Using Multi Product Calibrator Fluke 5502A,USA

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

Certificate Number **CC-2964**

Page **3 of 9**

Validity **01.03.2019 to 28.02.2021**

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8.	Frequency [§]	10 Hz to 50Hz 50Hz to 100Hz 100 Hz to 119Hz 119Hz to 1kHz 1kHz to 100kHz 100KHz to 1MHz	0.028 % to 0.023% 0.023% to 0.011% 0.011% to 0.004% 0.004% 0.004% to 0.028% 0.004% to 0.028%	Using Multi Product Calibrator Fluke 5502A,USA
9.	Capacitance [§]	220 pF to 300nF	1.867% to 0.567%	Using Multi Product Calibrator Fluke 5502A,USA
10.	Temperature Simulation Method without thermocouple/ RTD [§] (Indicator/ Controller/ Recorder) K-Type Thermocouple J-Type Thermocouple R-Type Thermocouple S-Type Thermocouple	(-)200°C to 1300°C (-)200°C to 1350°C (-)210°C to 1200°C 150°C to 1700°C 150°C to 1700°C	0.032°C 0.5°C 0.32°C 0.6°C 0.65°C	Using Multi Product Calibrator Fluke 5502A
II.	MEASURE			
1.	DC Voltage [§]	1.0mV to 1000V	0.051% to 0.006%	Using Reference Multi Meter Fluke , 8508A
2.	DC Current [§]	10.0 µA to 20A	0.0067% to 0.0025%	Using Reference Multi Meter Fluke , 8508A
3.	AC Voltage [§]	50Hz 10 mV to 1000V	0.06% to 0.04%	Using Reference Multi Meter Fluke , 8508A

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

Certificate Number **CC-2964**

Page **4 of 9**

Validity **01.03.2019 to 28.02.2021**

Last Amended on -

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	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
4.	AC Current [§]	50Hz 29 µA to 20 A 20A to 800 A	0.3% to 0.15% 0.15% to 1.5%	Using Reference Multi Meter Fluke , 8508A Current Transformer with Power meter
5.	DC Resistance [§]	1Ω to 20 GΩ	0.005% to 2.28%	Using Reference Multi Meter Fluke , 8508A
6.	AC High Voltage [§]	50Hz 1kV to 90 kV	5.8% to 1.73%	Using AC/DC High Voltage. Divider kVM-100-B Hipotronics
7.	DC High Voltage [§]	1kV to 90kV	2.7% to 1.73%	Using AC/DC High Voltage. Divider kVM-100-B Hipotronics USA
8.	Voltage/Turn Ratio Measurement of Transformer winding [§]	Ratio 5 to 700	0.23%	Using 2 Stage Voltage Ratio Transformer, Make Tinsley
9.	Frequency [§]	50 Hz to 1 MHz	0.023% to 0.28%	Using Reference Multi Meter Fluke , 8508A
10.	Time [§]	5 s to 90 min	0.14 s to 0.163 min	Using Programmable Time Totalizer , TIM-T, Prestige

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

CC-2964

Page

5 of 9

Validity

01.03.2019 to 28.02.2021

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	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
11.	Burden [§] (VA & P.F.) (Upto 63.5V & Upto 5A)	2.5VA to 100VA (PF 0.8, 1.0)	0.15% to 0.18%	Using Digital Power Meter WT230, Yokogawa, AC Voltage Current Standard, 2558, Yokogawa, 2001, Japan
12.	AC Current Ratio [§]	5A/5A to 50 A/5A 50A/5A to 800 A/ 5A	0.15% to 0.18% 0.18% to 1.53%	Using AC Voltage Current Standard, 2558, Yokogawa, Digital Power Meter, WT230, Yokogawa Using CT with Digital Power Meter, WT230, Yokogawa, by comparison method
13.	Power Factor [§]	0.2 to unity (Lag, Lead)	0.002 PF	Using Digital Power Meter WT 230
14.	AC High Voltage [*]	50Hz 1 kV to 90 kV	5.85% to 1.73%	Using AC/DC High Voltage Divider, kVM-100-B Hipotronics
15.	DC High Voltage [*]	1 kV to 90 kV	2.7% to 1.70%	Using AC/DC High Voltage. Divider kVM-100-B Hipotronics

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2964

Page 6 of 9

Validity 01.03.2019 to 28.02.2021

Last Amended on -

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	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
16.	AC Current*	50Hz 5 mA to 1A 1 A to 10 A 10 A to 20 A 20 A to 400 A	0.026% to 0.019% 0.019% to 0.023% 0.023% to 0.053% 0.053% to 4.62%	Using Digital Power Meter, WT230, Yokogawa Using Current Transformer with Digital Power Meter, WT230
17.	Voltage/Trun Ratio Measurement of Transformer winding*	5 to 700	0.23%	Using 2 Stage Voltage Ratio Transformer, Make Tinsley
18.	DC Current*	5mA to 1A 1A to 10A 10A to 20A	0.022% to 0.016% 0.016% to 0.022% 0.022% to 0.025%	Using Digital Power Meter, WT230, Yokogawa
19.	DC Voltage *	10mv to 100mV 100mV to 1V 1V to 100V 100V to 300V	0.014% to 0.029% 0.029% to 0.011% 0.011% to 0.017% 0.017% to 0.024%	Using Digital Multimeter, H.P.,34401A

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

CC-2964

Page

7 of 9

Validity

01.03.2019 to 28.02.2021

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<u>MECHANICAL CALIBRATION</u>				
I. DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)				
1.	Calipers Of All Types L.C. 0.01 mm [§]	Upto 600 mm	8.04 μ m	Using Gauge Blocks / Length bars
2.	External Micrometer [§] L.C. 0.01 mm	Upto 200 mm	6.0 μ m	Using Gauge Blocks / Length bars
3.	Vernier / Digital Height Gauge [§] L.C. 0.01 mm	Upto 600 mm	9.0 μ m	Using Gauge Blocks / Length bars
4.	Scale [§] L.C. 0.5 mm / 1 mm	0 to 1000 mm	284 μ m	Using Scale & tape Calibration unit
5.	Tape [§] L.C. 0.5 mm	0-25 m	587 \sqrt{L} μ m (L in m)	Using Scale & tape Calibration unit
6.	Slip Gauge [§]	Upto 100 mm	0.81 μ m	Using Gauge Blocks / Slip Gauge Comparator
7.	Dial Indicator [§] L.C. 0.01 mm	0 to 25 mm	9.00 μ m	Using Digital Dial Gauge Calibrator

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

CC-2964

Page

8 of 9

Validity

01.03.2019 to 28.02.2021

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II.	PRESSURE INDICATING DEVICES			
1.	Pressure Pneumatic Pressure Dial Pressure Gauge , Pressure Indicator ^s	0 to 20 bar	0.30 bar	Using Digital Pressure Calibrator
2.	Hydraulic Pressure Dial Pressure Gauge , Pressure Indicator ^s	9.8 to 53.9 bar 68.7 to 88.3 bar 98.1 to 686.7 bar	0.30 bar 0.30 bar 1.20 bar	Using Dead Weight Tester
III.	UTM, TENSION CREEP AND TORSION TESTING MACHINE			
1.	Verification of Force Testing Machine Compression* (Class 1 &2)	10 kN to 2000 kN	0.93%	Using Force Proving Instrument Load Cell/Bow Dynamometer
IV.	HARDNESS TESTING MACHINES			
1.	Hardness* Brinell*	HRW 2.5/187.5 HBW 5/750 HBW 10/3000	1.1 % 2.48 % 2.52 %	Using Standard Hardness Block
	Rockwell*	HRC	0.6 HRC	Using Standard Hardness Block
	Vickers*	HV 30 HV 5	5.98 % 6.55 %	Using Standard Hardness Block

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2964

Page 9 of 9

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<u>THERMAL CALIBRATION</u>				
I.	TEMPERATURE			
1.	RTD Temperature Indicator / controllers / Digital Thermometer/ Recorder with sensors [#] (Type K, R, J, S & Pt-100)	50 °C to 200°C 300°C to 500°C >500°C to 1200°C	1.8 °C 2.0 °C 3.7 °C	Using Digital Temperature Indicator with Sensor (SPRT) Multifunction Calibrator R- Type Thermocouple
2.	Liquid in Glass Thermometer ^{\$}	0 °C to 30°C 30°C to 90°C 90°C to 230°C	1.34°C 1.19°C 1.23°C	Digital Temperature Indicator with Sensor (PRT) 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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