



**National Accreditation Board for  
Testing and Calibration Laboratories**  
(A Constituent Board of Quality Council of India)



## **CERTIFICATE OF ACCREDITATION**

### **ELECTRONICS REGIONAL TEST LABORATORY (WEST)**

has been assessed and accredited in accordance with the standard

**ISO/IEC 17025:2005**

**"General Requirements for the Competence of Testing & Calibration Laboratories"**

for its facilities at

Plot No. F 7 & 8, MIDC Area, Andheri (East) Mumbai, Maharashtra

in the field of

**CALIBRATION**

**Certificate Number** CC-2031

**Issue Date** 02/01/2019

**Valid Until** 01/01/2021

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

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website [www.nabl-india.org](http://www.nabl-india.org))

Signed for and on behalf of NABL



89076970200020002694

Anil Relia  
Chief Executive Officer



# National Accreditation Board for Testing and Calibration Laboratories

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## SCOPE OF ACCREDITATION

**Laboratory** Electronics Regional Test Laboratory (West), Plot No. F 7 & 8, MIDC Area, Andheri (East) Mumbai, Maharashtra

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

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**Validity** 02.01.2019 to 01.01.2021 **Last Amended on** --

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b><u>ELECTRO TECHNICAL CALIBRATION</u></b>				
I.	<b>SOURCE</b>			
1.	DC Voltage <sup>s</sup>	10 $\mu$ V to 1mV 1 mV to 100 mV 100 mV to 1000 V 1V, 10 V	0.005% to 0.002% 0.002% to 0.0005% 0.0005% to 0.0003% 0.0002%, 0.0001%	Using DC Ref. STD. Fluke 7000/ MFC Fluke 5720A/Wavetek4808 Ref. div. Fluke 752/REF. Divider Esi Sr 1010/ Null Detector ESI/ by Direct Method
3.	DC Current <sup>s</sup>	100 pA to 1nA 1nA to 100 $\mu$ A 100 $\mu$ A to 1 A 1 A to 20 A 20 A to 100 A 100 A to 500 A  20 A to 1000 A	0.05% to 0.0045% 0.0045% to 0.002% 0.002% 0.002% to 0.006% 0.006% to 0.01% 0.01% to 0.04%  0.3%	Using V/R method/ MFC Wavetek 4808/Fluke 5720A/Trans cond Ampl. Ballantine 1620A/Fluke 5220A/ Std. R L&N 4030 / Direct /Ref. DMM 8508A/DMM 1281/HP3458 / Direct Std R Tinsley3111/1682 / MFC Wavetek 9100/Fluke5620/Current coil/ Direct Method

Vishal Shukla  
Convenor

Avijit Das  
Program Manager



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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
4	DC Resistance <sup>3</sup>	0.1 m $\Omega$ to 100 m $\Omega$ 100 m $\Omega$ to 1 $\Omega$ 1 $\Omega$ to 1 M $\Omega$ 1M $\Omega$ to 10 G $\Omega$ 10 G $\Omega$ to 1T $\Omega$	0.001% 0.001% to 0.0002% 0.0002% to 0.0005% 0.0005% to 0.0085% 0.0085% to 0.2%	Using Std R Tinsley 660/5576/3111/1682/ Direct/ Std R L&N 4030/Tinsley 5685/ Std R IETSRL-10M/100M, Fluke 8508A-7000k/ Std R Box Tinsley 4720 (discrete Values in step of 10)
5	AC Voltage <sup>3</sup>	10 Hz to 10 kHz 1 mV to 100 mV 100 mV to 10 V 10 V to 1000 V  10kHz to 30 kHz 1 mV to 100 mV 100 mV to 10 V 10 V to 1000V  30kHz to 100 kHz 1 mV to 100 mV 100 mV to 10 V 10 V to 200 V  100kHz to 1 MHz 1mV to 10 V	0.29% to 0.015% 0.015% to 0.004% 0.004% to 0.009%  0.24% to 0.009% 0.009% to 0.005% 0.005% to 0.013%  0.3% to 0.01% 0.01% to 0.0083% 0.0083% to 0.09%  1.3% to 0.21%	Using MFC Wavetek 4808/Fluke5720A / MTS Wavetek 4950 Direct/Comparison

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
7.	AC Current <sup>2</sup>	10 Hz to 1 kHz 10 $\mu$ A to 100 mA 100 mA to 10 A 10 A to 100 A  1kHz to 5 kHz 10 $\mu$ A to 100 $\mu$ A 100 $\mu$ A to 100 mA 100 mA to 20 A  50/60 Hz 20 A to 1000 A	0.018% 0.018% to 0.032% 0.032% to 0.1% 0.2% to 0.05%  0.05% to 0.03% 0.03% to 0.09%  0.30%	Using Direct/ MFC Wavetek 4808/ Fluke 5720A/ Tran Cond Ampl. Ballantine 1620A/Fluke 5220A /fluke8508/Wavetek 4950/ Std R Tinsley 5685/ HP3548/Std R Tinsley 5686/ Fluke 5220/5620/Std R tinsley 3111/  Using 10 & X 50 turn coil with MFC Fluke 5620A/Wavetek 9100
8.	AC Resistance <sup>3</sup>	.1kHz 1 m $\Omega$ 10 m $\Omega$ , 100 m $\Omega$ 1 $\Omega$ , 10 $\Omega$ , 100 $\Omega$ , 1k $\Omega$ , 10 k $\Omega$	0.017% 0.008% to 0.012% 0.0008% to 0.003%	Using Direct Std. Resistor Tinsley 5576/660/1682/3111/5685 series (Discrete values)
9.	Capacitance	1kHz 1pF 10 pF to 1000 pF 1000 pF to 1 $\mu$ F 1 $\mu$ F to 10 mF  100Hz 10 mF to 1000 mF	0.042% 0.002% to 0.001% 0.001% to 0.011% 0.011% to 0.1%  0.13%	Using Direct / Std Capacitors GR 1404/ Std Capacitors GR 1409/ (Discrete Values)/ Std cap. IET/HAC 4 Terminal Capacitor GR 1417

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
10.	Inductance <sup>3</sup>	1kHz 100 $\mu$ H to 10 H	0.02% to 0.052%	Using Std Inductor GR 1482 series /Direct Method
11.	Temperature Simulation <sup>5</sup> Thermocouple type K Thermocouple type J Thermocouple type E Thermocouple type T Thermocouple type N Thermocouple type R Thermocouple type S Thermocouple type B Thermocouple type C Thermocouple type L Thermocouple type U RTD - Pt 385, 100ohm RTD - Pt 385, 1000 ohm	(-)270 °C to 1372°C (-)210 °C to 1200° (-)270 °C to 1000°C (-)270 °C to 400 °C (-)270 to 1300°C (-)50 to 1768°C (-)50 °C to 1768°C 0 °C to 1820°C 0 °C to 2320°C (-)200 °C to 900°C (-)200 °C to 600°C (-)199 °C to 650°C (-)199 °C to 650°C	0.11°C 0.08°C 0.11 °C 0.09 °C 0.06 °C 0.2 °C 0.2°C 0.07°C 0.09°C 0.02°C 0.02°C 0.042 °C 0.042 °C	Using For Calibration of Temp. Indicator/Controller/Indicator/Process Calibrator) MFC FLUKE 5720A/WAVETEK 4808 /Direct Method
12.	Frequency <sup>3</sup>	1mHz to 18GHz	4E-10 to 7E-11	Using Direct / CNT 85R Rubidium clock/Frequency counter with R&S SMT06/ Gigatronics 9000S synthesized signal generators

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13.	Time- Period <sup>s</sup> ( Interval)	3.3 ns to 1000 s	1.3 E-10 to 4.5 E-10	Using Direct/ CNT 85R Rubidium clock/Frequency counter with R&S SMT06/ /Gigatronics 9000S synthesized signal generators Direct Method
14.	RF Level/Power <sup>s</sup>	10 kHz to 3 GHz (-)50 dBm to +13 dBm 3 GHz to 18 GHz (-) 50 dBm to +13 dBm	0.16 dB to 0.25 dB  0.25dB	Using Synthesized signal generators R&S SMT 06/Gigatronics 9000s Direct With RF Level Meter URV-35 RF Power Meter Gigatronics 8541 & power sensors
15.	Power/Energy <sup>s</sup> 1 $\phi$	20V to 600 V / 10mA to 100A 40 Hz to 70 Hz Power factor 0.1 to 1 Lead/Lag 20 mW to 60 kW	0.2% to 0.021%	Using Direct/ Rotek 8100 Power Energy calibration Calibrator
	3 $\phi$	20V to 300 V / 10mA to 20A 40 Hz to 70 Hz Power factor 0.1 to 1 Lead/Lag 60 mW to 6 kW	0.2% to 0.027%	Using Rotek 8100 Power Energy calibration Calibrator

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
16.	Phase angle <sup>1</sup> (V-V/V-I)	40-70Hz +180° to -180° (20 V to 600 V) (10 mA to 100 A)	0.017 deg	Using Direct/ Power energy calibration system Rotek 8100
17.	Power Factor <sup>2</sup> lag/lead	40-70Hz 0.1PF to 1PF (20 V to 600 V) (10 mA to 100 A)	0.013 deg	Using Direct/ Power energy calibration system Rotek 8100/ MSB 100
18.	DC Power <sup>3</sup>	(1 V to 1000 V) (100 mA to 20 A) 100 mW to 20 kW	0.07%	Using Direct / MFC FLUKE 5520A
19	Oscilloscope <sup>4</sup> parameters			Using DIRECT/ MFC FLUKE 5520A/ WAVETEK 9100/ MFC 5520A/R&S SIG. GEN. SMT-06
	Amplitude ( Vertical Deflection Factor	1mV to 130V(1M $\Omega$ ) 1mV to 6.6 V (50 $\Omega$ )	1.04% To 0.1%	
	Time base	2ns to 20ms 20ms to 5s	0.00025% to 0.0025%	
	Bandwidth	Up to 3GHz	2% to 5%	

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
II.	<b>MEASURE</b>			
1.	DC Voltage <sup>s</sup>	10 $\mu$ V to 1mV 1mV to 100 mV 100 mV to 1000 V	0.015% to 0.007% 0.007% to 0.0005% 0.0005% to 0.0003%	Using Direct/Nullmethod/ Nanovoltmeter Agilent 34420A /MTS 4950/ Nanovoltmeter Agilent 34420A /MTS 4950/ Ref DMM Fluke 8508A/ Ref Divider fluke 752/DC Ref Std fluke 7000/Null Detector ESI
2.	DC High Voltage <sup>s</sup>	1 kV to 10kV 10kV to 50kV	0.016% to 0.2% 0.2% to 0.5%	Using Direct/ HV divider fluke 80E/DMMFLUKE 87III Direct/ HVdivider process Instruments- 100 /DMM Agilent US1253B.
3.	DC Current <sup>s</sup>	100 pA to 1nA 1nA to 100 $\mu$ A 100 $\mu$ A to 100 mA 100 mA to 1A 1A to 20 A 20 A to 100 A 100 A to 500 A	0.05% to 0.0034% 0.0034% to 0.002% 0.002% to 0.001% 0.001% to 0.002% 0.002% to 0.006% 0.006% to 0.01% 0.01% to 0.02%	Using V/R method Std R Fluke/L&N 4030 series /5685 series/DMM8508/HP3458/ /AC/DC STD R Tinsley 3111/660/5576/ V/I Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
4.	DC Resistance <sup>2</sup>	0.1 m $\Omega$ to 100 m $\Omega$ 100 m $\Omega$ to 1 $\Omega$ 1 $\Omega$ to 1M $\Omega$ 1M $\Omega$ to 1G $\Omega$ 1G $\Omega$ to 1T $\Omega$	0.001% 0.001% to 0.0003% 0.0003% 0.0003% to 0.001% 0.001% to 0.05%	Using Guldline 6622A DCC Bridge/Std R tinsley 5685 series/1650/ 1682/ 3111/660/5576/ DIRECT/Divider /Null Std R L&N 4030 series / DMM8508A/ Keithley high R meter/ MFC 4808/5520/ Null detector
5.	AC Voltage <sup>2</sup>	10 Hz to 10 kHz 1 mV to 100 mV 100 mV to 10 V 10 V to 1000 V  10kHz to 30 kHz 1 mV to 100 mV 100 mV to 10 V 10 V to 1000 V  30kHz to 100 kHz 1 mV to 100 mV 100 mV to 10 V 10 V to 200 V  100kHz to 1 MHz 1mV to 10 V	0.20 % to 0.015% 0.015% to 0.004% 0.004% to 0.013%  0.24% to 0.009% 0.009% to 0.005% 0.005% to 0.013%  0.3% to 0.009% 0.009% to 0.005% 0.005% to 0.09%  1.4% to 0.21%	Using DMM fluke8508/MTS Wavetek 4950/ HP3458A Comparison
6.	AC High Voltage <sup>2</sup>	50Hz 1kV to 35kV 35kV to 50kV	0.1% to 0.5% 0.5% to 1%	Using Direct/ HVdivider process 100E /DMM Agilent US1253B

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
7.	AC Current <sup>2</sup>	10 Hz to 1 kHz 10 µA to 100 mA 100 mA to 10 A 10 A to 100 A  1kHz to 5 kHz 10 µA to 100 µ A 100 µA to 100 mA 100 mA to 20 A  50/60 Hz 1A to 3200 A	0.01 to 0.023% 0.01% to 0.043% 0.043 % to 0.05%  0.2% to 0.05% 0.05% to 0.03% 0.03% to 0.09%  0.2%	Using Direct/ Ref DMM Fluke 8508A/MTS Wavelek 4950/ HP3548/Std R Tinsley 5685/ /Std R tinsley 3111/1682/1659/ & Std R tinsley 5576/660/DMM 1281  Using CT
8.	AC Resistance <sup>2</sup>	1kHz 1mΩ to 100 mΩ 100 mΩ to 1Ω 1Ω to 10 kΩ	0.02% to 0.01% 0.01% to 0.004% 0.004%	Using AC/DC Std. Resistor Tinsley 3111/1682/5576/5685 series Ref multimeter Fluke 8508A / MTS 4950/ LCR Bridge Wavelek 4808/ HP3458 /Precision Component Analyser waykerr 6430/Video bridge ESI2160/ Direct/Comparison

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
9.	Capacitance <sup>†</sup>	1kHz 1pF to 10 pF 10 pF to 1000 pF 1000 pF to 1 $\mu$ F 1 $\mu$ F to 10 mF  100Hz 10 mF to 1000 mF	0.02% to 0.005% 0.005% 0.005% to 0.011% 0.011% to 0.05%  0.05%	Using Capacitance Measuring Assembly Gr 1620A / Std Capacitors GR 1404/ Std Capacitors GR 1409/IET 4 Terminal Capacitor GR 1417/ MFC Wavetek 4808/MTS Wavetek 4950 /Direct/Comparison
10.	Inductance <sup>†</sup>	1kHz 100 $\mu$ H to 100 H	0.02% to 0.055%	Using Video Bridge ESI 2160 / Component Analyser waykerr 6430B/ STD Inductor GR 1482 series Direct/comparison

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
11.	Temperature Simulation <sup>5</sup> Thermocouple type K Thermocouple type J Thermocouple type E Thermocouple type T Thermocouple type N Thermocouple type R Thermocouple type S Thermocouple type B Thermocouple type C Thermocouple type L Thermocouple type U RTD Pt 385, 100 ohm, RTD Pt 385, 1000 ohm	(-270 °C to 1372°C (-210 °C to 1200° (-270 °C to 1000°C (-270 °C to 400 °C (-270 to 1300°C (-50 to 1768°C (-50 °C to 1768°C 0 °C to 1800°C 0 °C to 2320°C (-200 °C to 900°C (-200 °C to 800°C (-200 °C to 650°C (-200 °C to 650°C	0.094 °C 0.088 °C 0.055 °C 0.038 °C 0.076 °C 0.12 °C 0.12 °C 0.076 °C to 0.9 °C 0.25 °C 0.04 °C 0.03 °C 0.01 °C 0.01 °C	Using For Calibration of Temp. Indicator/Controller/Indicator/Process Calibrator)  Using DMM Datron 1281/ Nonovoltmeter Agilent 34420A Direct
12.	Frequency <sup>6</sup>	1mHz to 18 GHz	2.1E-10 to 7E-11	Using Rubidium Frequency counter cnt 85R /Frequency counter HP//aplab1148/anritsu MF 1602/Direct
13.	Time-period/ Time-Interval <sup>5</sup>	3.3 ns to 1000 s 100 ms to 1000 s	3.2E-10 to 7.8E-11 2E-3 to 2.4E-7	Using Rubidium Frequency counter cnt 85R /Frequency counter HP//aplab1148/anritsu MF 1602/ Direct/Comparison Freq. counter PM 6672/

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Sr.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
14.	RF Level/Power <sup>3</sup>	100kHz to 3 GHz -50 dBm to +13 dBm 3 GHz to 18 GHz -50 dBm to +13 dBm	0.23 db 0.24 dB	Using RF Level Meter URV-35/ RF Power Meter Gigatronics 8541 Direct
15.	Power/Energy <sup>3</sup>  1 $\phi$  3 $\phi$	40 Hz to 70 Hz 20 V to 600 V 10mA to 100A 0.1 PF to UPF 20 mW to 60 kW  20 V to 600 V 10 mA to 100 A 0.1 PF to 1 UPF 60 mW to 60 kW	0.2% to 0.02%  0.2% to 0.032%	Using Direct/comparison Rotek 8100 source with MSB 100
16.	Phase angle <sup>3</sup> (V-V/V-I)	40 to 70 Hz +180° to -180° (20 V to 600 V) (10 mA to 100 A)	0.007 deg to 0.013deg	Using Rotek 8100 source with MSB 100 / Direct/Comparison
17.	Power Factor <sup>3</sup>	40 to 70 Hz 0.05PF to 1PF lag/lead(20V to 600V,10mA to 100A)	0.006deg to 0.007 deg	Using Rotek 8100 source with MSB 100/ Direct/Comparison
18.	Potential Transformer(PT) <sup>3</sup> Ratio Error  Phase angle Error	50 Hz 220 V /110 V,63.5 V to 33 kV/110 V,63.5 V  0 to 360 min	0.2%  3 min.	Using CT-PT Test Bench Amber IXR-2000 & std Potential Transformers/ Direct/Comparison

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
19.	Current Transformer (CT) <sup>5</sup> Ratio Error Phase angle Error	50 Hz 1A to 3200A /1A or 5A 0-360min	0.2% 3min.	Using CT-PT Test Bench Amber IXR-2000 & std Current Transformers/ Direct/Comparison

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
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### MECHANICAL CALIBRATION

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
1.	<b>WEIGHTS*</b>			
1.	Weights Calibration of F1 Class weights and Coarser as per OIML R-111-1	1mg 2 mg 5 mg 10 mg 20 mg 50 mg	0.004 mg 0.004 mg 0.004 mg 0.004 mg 0.004 mg 0.005 mg	Using E1 class standard weights 1mg - 200 g and Balances of 22g/0.002mg & 205 g/ 0.01mg By Substitution Method based on ABBA Cycles
	Calibration of E2 Class weights and Coarser as per OIML R-111-1	100 mg 200 mg 500 mg 1g 2 g 5 g 10 g 20 g 50 g 100 g 200 g	0.006 mg 0.007 mg 0.009 mg 0.012 mg 0.014 mg 0.02 mg 0.025 mg 0.03 mg 0.038 mg 0.06 mg 0.12 mg	
	Calibration of M2 Class weights and Coarser as per OIML R-111-1	500 g 1kg 2 kg 5 kg 10 kg	120 mg 120 mg 120 mg 120 mg 120 mg	Using E 2 class weights and weighing balance of 12kg / 0.1 g By Substitution Method based on ABBA Cycles

Vishal Shukla  
Convener

Avijit Das  
Program Manager





# National Accreditation Board for Testing and Calibration Laboratories

(A Constituent Board of Quality Council of India)



## SCOPE OF ACCREDITATION

**Laboratory** Electronics Regional Test Laboratory (West), Plot No. F 7 & 8, MIDC Area, Andheri (East) Mumbai, Maharashtra

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**Certificate Number** CC-2031

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b>II. WEIGHING SCALE AND BALANCE</b>				
1.	Electronic Weighing Balance <sup>5</sup> $d \geq 0.002$ mg $d \geq 0.01$ mg	1 mg to 20 g 1 mg to 200 g	0.03 mg 0.14 mg	Calibration of Class 1 weighing balances and coarser as per OIML R-76-1 E1 Class Standard Weights 1 mg - 200g
	$d \geq 0.1$ g	50 g to 12 kg	61 mg	Calibration of Class 2 weighing balances and coarser as per OIML R-76-1 E 1 class Standard weights 1mg - 200 g & E 2 class standard weights 500 g - 10 kg
<b>III. VOLUME</b>				
1.	Glassware Pipette, Burette, Measuring Cylinder, Volumetric Flask <sup>5</sup>	$1\text{ml} \leq V < 200$ ml	60 $\mu$ l	Using weighing balance with:0.01 mg/0.02 mg/0.05 mg, distilled water & standard weights Calibration of Glassware based on Gravimetric method as per ISO 4787
2.	Micro pipettes <sup>5</sup>	$10 \mu\text{l} \leq V < 50 \mu\text{l}$ $50 \mu\text{l} < V < 1$ ml $1$ ml $< V < 5$ ml	0.5 $\mu$ l 10 $\mu$ l 50 $\mu$ l	Using weighing balance with:0.01mg, distilled water & standard weights Calibration of Micro Pipettes based on Gravimetric method as per ISO 8655

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IV.	<b>ACCELERATION AND SPEED</b>			
1.	Tachometer (RPM Meter) (Contact) (Non Contact) *	50 rpm to 10000 rpm 30 rpm to 100000 rpm	0.28% to 0.18% 0.5% to 0.05%	Using Digital Tachometer Monarch & RPM generator(AC/DC Motor) By Direct/Comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
<b><u>THERMAL CALIBRATION</u></b>				
<b>I.</b>	<b>TEMPERATURE</b>			
1.	Temperature (Fixed Point Calibration) SPRT, RTD <sup>s</sup>	Triple Point of water 0.01 °C  Melting Point of Ga 29.4646 °C  Melting Point of Sn 231.928 °C  Melting Point of Zn 419.527 °C  Melting Point of Al (660.323 °C)  Triple Point of Hg (-)38.8344 °C  Boiling Point of LN <sub>2</sub> (-) 196 °C	5.82 m °C  5.0 m °C  5.5 m °C  6.32 m °C  9.78 m °C  5.90 m °C  7.04 m °C	Using Fixed Point Cells (Mini), SPRT & AC Thermometry Bridge Using Liquid Nitrogen apparatus by Fixed Point Calibration Method
2.	Liquid-in-glass Thermometer <sup>s</sup>	(-)80 °C to 250 °C	0.14 °C	Using Oil bath, Cold bath (Methanol), PRT & DTI by Comparison Calibration Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
3.	RTD with or without indicator, Data logger, Scanners <sup>†</sup>	(-)80 °C to 250 °C 250 °C to 600 °C	0.07 °C 0.16 °C	Using Oil bath, Cold bath (Methanol), PRT & DTI Comparison Calibration Method
4.	Digital Temperature Indicator of chambers, freezers, Bath <sup>†</sup>	(-)80 °C to 250 °C 250 °C to 600 °C	0.05 °C 0.10 °C	Using PRT / 'S' type thermocouple, Dry block furnace. & Black stack. Single point Calibration Method
5.	Thermocouples with or without indicator, Data logger, Scanner <sup>†</sup>	50 °C to 600 °C 300 °C to 1100 °C	0.16 °C 1.36 °C	Using PRT / 'S' type thermocouple, Dry block furnace. & Black stack Comparison Calibration Method
6.	RTD, Temperature Indicator with Sensors <sup>†</sup>	(-) 25 °C to 600 °C	0.2 °C	Using PRT with Black Stack, Dry Block Calibrator by Single Position Calibration
7.	Temperature Indicators of Ovens, Baths, Deep Freezers & Chambers etc <sup>†</sup>	(-) 25 °C to 600 °C 200 °C to 1100 °C	0.2 °C 1.36 °C	Using PRT with Black Stack, Dry Block Calibrator by Single Position Calibration

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
B.	Temperature Indicator with Sensor of Oven, Deep Freezer & Chamber*	(-) 80°C to 200°C	0.50°C	Using Five, Nine, Fifteen Class A, Pt-100 Sensors, PRT & DTI by Multi Position Calibration
<b>II. SPECIFIC HEAT AND HUMIDITY</b>				
1.	Specific Heat & Humidity. RH & Temperature Indicators with Inbuilt Or External sensors, Thermohygrometer <sup>2</sup>	20% RH – 95% RH @25 °C (25 °C to 55 °C) @ 50% RH	1.0 % RH 0.2 °C	RH / Temperature Indicator with Sensor & Chamber.
2.	RH and Temperature Indicator of Chambers*	20% RH – 95% RH @25 °C (25 °C to 55 °C) @ 50% RH	1.5% RH 0.3 °C	RH / Temperature Indicator with Sensor & Chamber.

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

<sup>1</sup>Only in Permanent Laboratory

<sup>2</sup>Only for Site Calibration

  
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