



National Accreditation Board for Testing and Calibration Laboratories

(A Constituent Board of Quality Council of India)



SCOPE OF ACCREDITATION

Laboratory **Sadbhav Calibration Services, 1st Floor, Arihant Super Market, Extension Building, Manjalpur, Vadodara, Gujarat**

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

Certificate Number **CC-2118 (in lieu of C-0533, C-0411, C-0534)** **Page** **1 of 19**

Validity **26.04.2017 to 25.04.2019** **Last Amended on** **-**

Sl.	Quantity Measured / Instrument	Range/Frequency	Calibration Measurement Capability (\pm)	Remarks
ELECTRO-TECHNICAL CALIBRATION				
I.	SOURCE			
1.	DC Voltage [#]	1 mV to 330 mV 330 mV to 33 V 33 V to 1000 V	1.31% to 0.027% 0.027% to 0.031% 0.031% to 0.016%	Using Multi-product Calibrator Fluke 5080A By Direct Method
2.	DC Current [#]	10 μ A to 100mA 100mA to 10A 10A to 20A 20A to 1000A	1.44% to 0.1% 0.1% to 0.51% 0.51% to 0.72% 1.09%	Using Multi-product Calibrator Fluke 5080A By Direct Method Using Multi-product Calibrator Fluke 5080A & Current coil by Direct Method
3.	Low Resistance [#] (For Micro-Ohm Meter)	50 $\mu\Omega$ 100 $\mu\Omega$ 1000 $\mu\Omega$ 10 m Ω 100 m Ω 1000 m Ω	1.31% 1.30% 0.64% 0.31% 0.61% 0.54%	Using Resistance Box discrete values by Direct Method
4.	Resistance [#]	1 Ω to 10 k Ω 10 k Ω to 190 M Ω (in steps of 1-9-10)	1.22 % to 0.033% 0.033 % to 1.2%	Using Multi-product Calibrator Fluke 5080A by Direct Method
5.	High Resistance [#]	10 M Ω to 1 T Ω	0.58 % to 2.41%	Using Resistance box by Direct Method
6.	AC Voltage [#]	50 Hz 1 mV to 10 mV 10 mV to 330 mV 330 mV to 1000 V	1.2 % to 1 % 1 % to 0.48 % 0.48 % to 0.2 %	Using Multi product Calibrator Fluke 5080 A by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
7.	AC Current [#]	50 Hz 30 μ A to 10A 10A to 20A 20A to 1000A	3.18% to 0.53% 0.53% to 0.7% 0.91%	Using Multi product Calibrator Fluke 5080 A by Direct Method Using Multi product Calibrator Fluke 5080 A with Current Coil
8.	DC Power [#]	10V to 600V 0.2A to 20A 2W to 12kW	0.27% to 0.66%	Using Multi product A Calibrator Fluke 5080 by Direct Method
9.	AC Power [#] at UPF, 1 ϕ	50 Hz 40V to 600V 0.05A to 20A 2W to 12kW	0.59% to 0.65%	Using Multi product Calibrator Fluke 5080 A by Direct Method
10.	Power Factor / Phase Angle [#] 1 ϕ	50 Hz 300V / 10 A 0.1PF to UPF	0.003 PF to 0.002 PF	Using Multi product Calibrator Fluke 5080 A by Direct Method
11.	Frequency [#]	10Hz to 10kHz	0.013 %	Using Beamex MCII Calibrator by Direct Method
12.	Temperature Simulation [#] (For Calibration of Indicator, Controller, Chart Recorders, Data Logger)			
	Thermocouple			Using Beamex -MCII Calibrator by Direct Method
	K Type	(-) 200 °C to 1370°C	0.43°C	
	R Type	200 °C to 1750°C	0.91°C	
	S Type	200°C to 1750°C	0.91°C	
	T Type	(-) 200°C to 400°C	0.35°C	
	N Type	(-) 200°C to 1200°C	0.45°C	
	RTD PT-100	(-) 200°C to 850°C	0.23°C	

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II.	MEASURE			
1.	DC Voltage ^s	1mV to 100mV 100mV to 10V 10V to 1000V 1kV to 10 kV	0.43 % to 0.008% 0.008 % to 0.034% 0.034 % to 0.007% 3.41%	Using 6 ½ Digit Multimeter Fluke 8846 A by Direct/Comparison Method Using 6 ½ Digit Multimeter Fluke 8846 & High Voltage Probe by Direct/ Comparison Method
2.	DC Voltage*	100 mV to 1000 V	0.023 to 0.021%	Using 5 ½ DMM Fluke 8808A by Direct/ Comparison Method
	DC High Voltage*	1kV to 10 kV	3.4%	Using 5 ½ DMM Fluke 8808A and HV Probe by Direct/ Comparison Method
3.	DC Current ^s	100 μ A to 100mA 100mA to 1 A 1 A to 10A	0.094% to 0.064% 0.064% to 0.088% 0.088% to 0.19%	Using 6 ½ Digit Multimeter Fluke 8846 A by Direct/ Comparison Method
	DC Current*	100 μ A to 100mA 100mA to 1 A 1 A to 10A	0.059 % 0.059 % to 0.1 % 0.1 % to 0.25 %	Using 6 ½ Digit Multimeter Fluke 8808 A by Direct/ Comparison Method
4.	Resistance ^s	1 Ω to 100k Ω 100k Ω to 100M Ω 100M Ω to 1G Ω	0.016 % to 0.013 % 0.013 % to 0.94 % 0.94 % to 0.4 %	Using 6 ½ Digit Multimeter Fluke 8846 A by Direct Method
	Resistance*	1 Ω to 100 Ω 100 Ω to 100k Ω 100k to 100M Ω	0.96% to 0.04% 0.04% to 0.03% 0.03% to 1.8%	Using 6 ½ Digit Multimeter Fluke 8808 A by Direct/ Comparison Method

50 μ - 10m - 2.2% to 0.58%
10m - 2 - 1 - 2.58% to 0.3%

V/I Method
A. Das

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
5.	AC Voltage ^s	50 Hz 1 mV to 1000 V	0.81% to 0.1 %	Using 6 1/2 Digit Multimeter Fluke 8846 A by Direct Method
		1 kV to 10 kV	4.9 %	Using 6 1/2 Digit Multimeter Fluke 8846 High Voltage Probe by Direct Method
	AC Voltage*	50 Hz 100 mV to 750 V	0.25 %	Using 5 1/2 DMM Fluke 8808A by Direct/ Comparison Method
	AC High Voltage*	50 Hz 1000 V to 25 kV	6.1 %	Using 5 1/2 DMM Fluke 8808A and High Voltage Probe by Direct/ Comparison Method
6.	AC Current ^s	50 Hz 30 μ A to 100mA 100mA to 1A 1A to 10A	0.51% to 0.16% 0.16% to 0.17% 0.17% to 0.25%	Using 6 1/2 Digit Multimeter Fluke 8846 A by Direct/ Comparison Method
		AC Current*	50 Hz 1 mA to 100 mA 100 mA to 1 A 1 A to 10 A	0.93% to 0.4% 0.4% to 0.42% 0.42% to 0.72%
7.	Frequency ^s	10 Hz to 1 MHz	0.036% to 0.009%	Using 6 1/2 digit Multimeter Fluke 8846 A by Direct/ Comparison Method
		Frequency*	20 Hz to 1 MHz	0.03 % to 0.012 %

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8.	Temperature Simulation [#] (For calibration of Test Kit, Process Calibrators)			
	Thermocouple			Using Beamax - MFC - MC2 Thermocouples by Direct Method
	J Type	(-) 210°C to 800°C	0.43°C	
	K Type	(-) 200°C to 1370°C	0.43°C	
	R Type	200°C to 1750°C	0.91°C	
	S Type	200°C to 1750°C	0.91°C	
	T Type	(-) 200°C to 400°C	0.35°C	
	N Type	(-) 200°C to 1200°C	0.45°C	
	RTD – Pt 100	(-) 200°C to 850°C	0.23°C	
9.	Time Interval [#]	1 sec to 10 sec	0.0036 sec to 0.012Sec	Using Preset Timer and Time Interval Meter by Comparison Method
10.	Stop Watch/ Timer [#]	10 sec to 120 sec 120 sec to 3600 sec 3600 sec to 24 hr	0.12 sec to 0.18 sec 0.18 sec to 4.2 sec 4.2 sec to 7.7 sec	Using Preset Timer and Time Interval Meter by Comparison Method

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MECHANICAL CALIBRATION				
I. DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)				
1.	Calipers ^s (Digital/Dial/Vernier) L.C.: 0.01mm ^Φ	Up to 600mm > 600 mm to 1000 mm >1000 mm to 2000 mm	14 μ m 19 μ m 34 μ m	Using Standard Length Bars / Caliper Checker / "0" Grade Slip Gauges By Comparison Method
	L.C.: 0.05mm	Up to 500mm	37 μ m	Using Standard Length Bars, "0" Grade Slip Gauges By Comparison Method
2.	Inside Dial Caliper ^s (Digital/Dia/Vernier) L.C.: 0.01mm L.C.: 0.05mm	10 mm to 35mm 10 mm to 120mm	6 μ m 15 μ m	Using Standard Length Bars, Slip Gauges and Accessory Set By Comparison Method
3.	Pistol Caliper ^s L.C.: 0.1mm	Up to 300mm	58 μ m	Using Standard Length Bars, Slip Gauges and Accessory Set By Comparison Method
4.	Height Gauge ^s (Digital/Dial/Vernier) L.C.: 0.01mm ^Φ	Up to 600mm > 600 mm to 1000mm	14 μ m 18 μ m	Using Standard Length Bars, Caliper Checker, "0" Grade Slip Gauges, Surface Plate By Comparison Method
5.	Depth Caliper ^s (Digital/Dial/Vernier) L.C.: 0.01mm	Up to 600mm	17.5 μ m	Using Standard Length Bars, Caliper Checker, Gauge Blocks

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
6.	External Micrometer ^s L.C.: 0.001mm ^Φ L.C.: 0.01mm	Up to 100mm >100 mm to 300 mm >300 mm to 1000mm >1000 mm to 2000mm	1.9 μ m 5.1 μ m 12.56 μ m 21.17 μ m	Using Standard Length Bars, Slip Gauge Set
7.	Internal Micrometer ^s L.C.: 0.001 mm ^Φ Extension rod up to 2000mm	5 mm to 1000 mm >1000 mm to 2000 mm	17.5 μ m 34 μ m	Using Standard Length Bars / Caliper Checker / "0" Grade Slip Gauges /Inside Accessory
8.	Depth Micrometer ^s L.C.: 0.001 mm ^Φ	Up to 300 mm	8.2 μ m	Using Standard Length Bars /Caliper Checker /Gauge Blocks/ Surface Plate
9.	Micrometer Head ^s L.C.: 0.001 mm ^Φ	Up to 50 mm	3.5 μ m	Using "0" Grade Slip Gauge Set & Electronic Probe
10.	Dial Indicator ^s (Plunger Type) L.C.: 0.0005 mm ^Φ L.C.: 0.001 mm	Up to 25 mm Up to 100mm	4.2 μ m 6.84 μ m	Using Dial Calibration Tester, Gauge Blocks, Comparator Stand
11.	Dial Indicator ^s (Lever Type) L.C.: 0.0001 mm ^Φ	Up to 2mm	3.3 μ m	Using Dial Calibration Tester, Comparator Stand
12.	Dial Calibration Tester ^s (Mechanical/Electronic) L.C.: 0.0002 mm ^Φ	Up to 25 mm	1 μ m	Using "0" Grade Slip Gauge Set & Electronic Probe

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
13.	Bore Gauge ^s (With or w/o Dial)	Up to 1 mm travel	6.2 μ m	Using Dial Calibration Tester
14.	Dial Thickness Gauge ^s L.C.: 0.001mm ^Φ	0 to 50mm	1.0 μ m	Using Grade "0" Gauge Blocks
15.	Steel Scale ^s L.C: 0.5mm	Up to 3000 mm	$\left(78\sqrt{\frac{L}{1000}}\right) \mu$ m L in mm	Using Scale and Tape Calibrator
16.	Measuring Tape/ Circumference Tape/Pie Tape ^s L.C.: 1 mm ^Φ	0 to 100 m	$\left(78\sqrt{\frac{L}{1000}}\right) \mu$ m L in mm	Using Scale and Tape Calibrator
17.	Tape & Scale Calibrator [#] LC: 0.001 mm ^Φ	0 to 1000mm	17.0 μ m	Using Standard Length Bars
18.	Thickness Foils ^s	0.03 mm to 5 mm	1.3 μ m	Using Dial Gauge (Plunger), Electronic Probe, Micrometer
19.	Coating Thickness Gauge ^s L.C.:0.001mm	0 to 5mm	1.8 μ m	Using Thickness Foils
20.	Linear Setting Standards/Length Bar ^s	Up to 300mm >300 mm to 1000mm	1.6 μ m 9.8 μ m	Using Electronic Probe with Comparator Stand
21.	Linear Probe ^s L.C.:0.0001mm	0 to 25mm	3.54 μ m	Using Grade "0" Gauge Blocks

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
22.	Comparator Stand ^s Flatness	300 mm X 300 mm	1.0 μ m	Using Electronic Probe and Slip Gauge
23.	Feeler Gauge ^s	0.01mm to 3 mm	3.0 μ m	Using Digital Micrometer
24.	Straight Edge [#] Width \leq 50mm Width \geq 50mm	0 to 2000mm 0 to 2000mm	3.39 μ m $\left(1.1 \sqrt{\frac{L}{125}}\right) \mu\text{m}$ L in mm	Using "0" Grade Slip Gauge Set, Granite Surface Plate Using Electronic Probe, Granite Surface Plate
25.	Plain Snap Gauge/ Gap Gauge ^s	3 mm to 200mm	3.5 μ m	Using "0" Grade Gauge Blocks
26.	Plain Plug Gauge	1 mm to 100mm >100 mm to 200mm >200 mm to 300mm	2.5 μ m 3.5 μ m 5.1 μ m	Using Electronic Comparator, Slip Gauge Blocks, Micrometer
27.	Pin Gauge/ Measuring Pin/Setting Master/Thread Measuring Wire ^s	0.17 mm to 20mm	4.4 μ m	Using Electronic Comparator with Probe & Slip Gauge
28.	Pin Gauge/ Welding Gauge ^s	Up to 50mm	231 μ m	Using Slip Gauge Blocks
29.	Bead Height Gauge ^s Length Angle	Up to 20mm 0-180°	4.0 μ m 11' of arc	Using Slip Gauge Blocks
30.	Radius Gauge ^s	Up to 25mm	5.9 μ m	Using Profile Projector
31.	Bevel Protractor ^s L.C: 1' Φ	0° - 90° - 0°	3.5 min. of arc	Using Angle Gauge Set

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
32.	Combination Set ^s L.C: 1°	0° - 90° - 0°	35 min. of arc	Using Angle Gauge Set
33.	Angle Protractor ^s	0° - 180°	35 min. of arc	Using Profile Projector
34.	Master Block For Ultrasonic Thickness Gauge ^s	Up to 10mm > 10 mm to 100 mm	3.7 μ m 2.6 μ m	Using External Micrometer/ Slip Gauge/ Comparator/ Probe
35.	Ultrasonic Thickness Gauge ^s L.C.0.1mm ^Φ	0 to 100mm	42 μ m	Using Step Gauge
36.	Test Sieves ^s	Up to 10mm >10mm to 125mm	6.0 μ m 28 μ m	Using Profile Projector/ Vernier Caliper
37.	Sine Bar / Sine Table ^s (Angle Only)	Up to 300mm base	29 sec. of arc	Using Angle Gauge Set, Slip Gauges, Electronic Probe
38.	Thread Pitch Gauge ^s	Angle 55° to 60° Pitch 0.3mm to 7.0mm	2.5 min 6.14 μ m	Using Profile Projector
39.	Spirit Level ^s (Electronic/ Square frame) L.C: 0.005 mm/mtr ^Φ	Up to 200mm Base	7 μ m/mtr	Using Electronic Level, Slip Gauges, Tilting table
40.	Surface Plate [#]	6000 mm X 6000 mm	$\left(1.5\sqrt{\frac{L+W}{100}}\right)$ L & W in mm	Using Electronic Level

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41.	Extensometer* (Electronic/ Mechanical) L.C: 0.001 mm ϕ Gauge Length for above	0 to 25 mm Traverse 0 to 300 mm	3 μ m 19.3 μ m	Using Electronic Level, Slip Gauges, Tilting taDial Calibration Tester, Dig. Caliper as per IS 12872/ ISO 9513/ ASTM-E 83
42.	Shore Hardness Tester-A,D ^s L.C.: 1 Div	Up to 100 div.	1.5%	Using Slip gauge blocks
II.	DIMENSION (PRECISION INSTRUMENTS)			
1.	Profile Projector [#] Linear scale L.C:0.001mm Magnification Angular scale L.C. 1'	0 to 50 mm (X-Y travel) 0 to 300 mm (X-Y travel) Up to 100X 0 to 360°	3.74 μ m 3.74 μ m 1.96 % 2.4 min of arc	Using Glass scale/ Angle Gauges/ Digital Caliper
2.	Objectives For Microscope Linear Scale Of Eyepiece [#]	Up to 2000X	0.83 %	Using Glass Scale and Micrometer Eyepiece
III.	ACCELERATION AND SPEED			
1.	Tachometer/ RPM Meter/ Speed Indicator [#]	60 RPM to 61000 RPM	0.25%	Using Digital Tachometer

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IV.	ACOUSTIC			
1.	Sound Level Meter	1 kHz 94 dB & 114 dB	1.2 dB	Using Sound Level Calibrator
V.	WEIGHTS			
1.	Calibration Of Weights ^s (Conventional Mass) F1 Class or Coarser	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	0.010 mg 0.010 mg 0.010 mg 0.010 mg 0.010 mg 0.020 mg 0.020 mg 0.020 mg 0.030 mg 0.030 mg 0.030 mg 0.030 mg 0.040 mg 0.12 mg 0.15 mg 0.15 mg	Using Weights of Accuracy Class E2 & Precision Balances Readability 0.01mg as per OIML R 111 (2004)
	M1 Class or Coarser	500 g 1 kg 2 kg 5 kg 10 kg	91.0 mg 85.0 mg 88.0 mg 90.0 mg 90.0 mg	Using Weights of Accuracy Class E2 & F1 & Precision Balances Readability 0.1g As per OIML R 111

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VI.	WEIGHING SCALE AND BALANCE			
1.	Calibration of Balances*			
	Readability 0.01 mg	Up to 200g	0.10 mg	Using Weights of Class E2 as per OIML R 76-1
	0.1 mg	Up to 200g	0.12 mg	
	1mg	Up to 200g	0.64 mg	
	Readability 10mg	Up to 1000g	50 mg	Using Weights of Class E2 & F1 as per OIML R 76-1
	100 mg	Up to 1000g	200 mg	
	Readability 0.1 g	Up to 10 kg	0.07 g	Using Weights of Class E2 & F1 as per OIML R 76-1
	1 g	Up to 10 kg	0.60 g	
	Readability 0.1 g	Up to 20 kg	0.1 g	Using Weights of Class E2 & F1 as per OIML R 76-1
	1 g	Up to 20 kg	1.5 g	
	Readability 5 g	Up to 50 kg	3.30 g	Using Weights of Class F1 as per OIML R 76-1
VII.	VOLUME			
1.	Micropipettes ^s	10 μ l to 100 μ l >100 μ l to 1000 μ l >1 ml to 10 ml	2.7 μ l 3.4 μ l 5.0 μ l	Using Weighing Balance with Readability 0.01/0.1 mg by Gravimetric Method Procedure based ISO 8655-6

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2.	Pipette/Burette ^s	0.1ml to 1 ml 0.1 ml to 2 ml 0.1 ml to 5 ml 0.1 ml to 10 ml 0.1 ml to 25 ml 0.1 ml to 50 ml 0.1 ml to 100 ml 0.1 ml to 200 ml	4.0 μ l 4.0 μ l 4.0 μ l 5.7 μ l 5.7 μ l 5.7 μ l 9.0 μ l 30.0 μ l	Using Weighing Balance with Readability 0.01/0.1mg by Gravimetric Method Procedure based ISO 4787
3.	Measuring Cylinder ^s	0.1 ml to 5 ml 0.1 ml to 25 ml 0.1 ml to 50 ml 0.1 ml to 100 ml 0.1 ml to 250 ml 0.1 ml to 500 ml 0.1 ml to 1000 ml 0.1 ml to 2000 ml 0.1 ml to 5000 ml	0.02ml 0.02ml 0.02ml 0.06 ml 0.20ml 0.40ml 0.60ml 1.26ml 1.29ml	Using Weighing Balance with Readability 0.01/0.1mg by Gravimetric Method Procedure based ISO 4787
4.	Measuring Flask ^s	0.1 ml to 5 ml 0.1 ml to 25 ml 0.1 ml to 50 ml 0.1 ml to 100 ml 0.1 ml to 250 ml 0.1 ml to 500ml 0.1 to 1000 ml 0.1 to 2000 ml 0.1 to 5000 ml	0.004ml 0.013ml 0.02ml 0.03ml 0.15ml 0.4ml 0.4ml 1.0ml 2.0ml	Using Weighing Balance with Readability 0.01/0.1mg by Gravimetric Method Procedure based ISO 4787
VIII. DENSITY AND VISCOSITY				
1.	Hydrometer ^s	0.700 g/cm ³ to 1.100 g/cm ³ >1.100 g/cm ³ to 2.000 g/cm ³	0.002g/ml 0.012g/ml	Using Standard Hydrometers & liquids of known densities by Comparison Method based on IS 3104

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
IX.	PRESSURE INDICATING DEVICES			
1.	Hydraulic Pressure [#] (Digital / Dial Gauges, Transmitters, Switches & Recorders)	0 to 60 bar 0 to 150 bar 0 to 400 bar 0 to 700 bar	0.019 bar 0.066 bar 0.073 bar 0.280 bar	Using Digital Pressure Gauges & Calibrator by Comparison Method
2.	Pneumatic Pressure [#] (Digital / Dial Gauges, Transmitters, Switches & Recorders)	0 to 9807 Pa 0 to 2 bar 0 to 20 bar	2.9 Pa 0.0015 bar 0.0100 bar	Using Digital Pressure Gauges & Calibrator by Comparison Method
3.	Negative Pneumatic Pressure [#] (Digital / Dial Gauges, Transmitters, Switches & Recorders)	(-) 0.97 to 0 bar	0.0014 bar	Using Digital Pressure Gauges & Vacuum Pump by Comparison Method
X.	TORQUE GENERATING DEVICES			
1.	Torque Wrenches ^{\$} Type 1 Class B/C Type 2 Class A/B	2 Nm to 50 Nm 50 Nm to 200 Nm 200 Nm to 2000 Nm	1.58% 1.14% 1.56%	Using Digital Torque Wrench Calibrator as per ISO 6789 Clock wise direction only
XI.	UTM, TENSION CREEP AND TORSION TESTING MACHINE			
1.	UTM/TTM/CTM* Compression	5 kN to 2000 kN	0.40 %	Using Digital Load Cell and Proving Ring as per ASTM E4

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
	Tension	1 kN to 1000 kN 50 N to 50 kN	0.39 % 0.22 %	Using Digital Load Cell and Proving Ring as per IS 1828 (Part 1) Using Digital Load Cell and Proving Ring as per IS 1828 (Part 1)
XII.	HARDNESS TESTING MACHINES			
1.	Verification of Rockwell Hardness Tester by Indirect Method*	HRA HRBW HRC	0.94 HRA 1.24 HRBW 0.88 HRC	Using Standard Test Blocks as per IS 1586 (Part 1,2) & ASTM E18-15
2.	Verification of Brinell Hardness Tester by Indirect Method*	HRW 10/3000 HRW 5/750 HRW 2.5/187.5	1.63 % 1.40 % 1.50 %	Using Standard Test Blocks as per IS 1500 (Part 1,2) & ASTM E10-14
3.	Verification of Vicker Hardness Tester by Indirect Method*	HV 1 HV5 HV10 HV30 HV0.1	2.44 % 2.04 % 2.28 % 1.45 % 3.10 %	Using Standard Test Blocks as per IS 1501 (Part 1,2) & ASTM E384-16
XIII.	IMPACT TESTING MACHINE			
1.	Verification of Impact Testing Machine*			Using Clinometers Load Cell Length Bars and Other Measuring Instruments as per ISO 148-2, ASTM E23, IS 3766
	Charpy	0 to 350 J	0.31 %	

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
THERMAL CALIBRATION				
I.	TEMPERATURE			
1.	Dial / Digital Thermometer, RTD sensor with / without Indicator or Controller [§]	(-) 196° C	0.68°C	Using RTD Sensor (4 wire) with Indicator & liquid Nitrogen Source (Single Point) Beamex MC2 by Comparison Method
2.	Glass Thermometer (Indicator/Controller with RTD, Thermocouple / Gauge/ Thermocouple / Sensors/ Digital Thermometer/ Deep Freezers / Refrigerators [§]	(-) 80° to 50°C	0.82°C	Using RTD Sensor (4 wire) with Indicator & Liquid Temperature bath as a source, Beamex MC2 by Comparison Method
3.	Indicator/Controller with RTD, Thermocouple / Gauge/ Thermocouple / Sensors/ Digital Thermometer/ Portable Oven / Portable Furnace [§]	50° to 400°C	0.83°C	Using RTD Sensor (4 wire) with Indicator, Beamex MC2 by Comparison Method
		400° to 1200° C	1.65°C	Using "S" Type Thermocouple with Indicator, Beamex MC2 by Comparison Method
3.	Non Contact [#] (IR Thermometers, Pyrometers)	50°C to 500°C	1.64°C	Using Infrared Thermometer with Black Body Source/ IR Calibrator by Comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
4.	Indicator/Controller with RTD, Thermocouple / Gauge/ Thermocouple / Sensors/ Digital Thermometer/ Transmitter / Oven / Furnace*	25° to 250°C 250° to 400° C 400° to 800° C 800° to 1200° C	0.82°C 0.84°C 1.65°C 1.90°C	Using RTD probe with Indicator & Standard "S" type T/C with Indicator with Dry Well baths by Comparison Method
5.	Deep Freezers/ Refrigerators/ Climatic Chambers*	(-80°C to 50°C	2.66°C	Using Digital Data Logger with sensor (RTD) Multi Point Calibration
6.	Oven / Furnace* <1m X 1m X 1m	50°C to 200°C 200 to 1200°C	2.66°C 5.0°C	Using Digital Data Logger with sensor (RTD & K Type) Multi Point Calibration
7.	Oven / Furnace* >1m X 1m X 1m	50°C to 1200°C	15.54°C	Using Digital Data Logger with sensor (RTD & K Type) Multi Point Calibration
II. SPECIFIC HEAT AND HUMIDITY				
1.	Humidity Indicator Analog/Digital Thermo-hygrometer/ Data Loggers / Chambers#	30 %RH to 95%RH @ 25 °C 5 °C to 45 °C @ 50%RH	3.4% RH 2.17°C	Using Humidity Sensor with Indicator & Humidity Chamber as source by Comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
2.	Humidity Chamber / Environment Chambers / Climatic Chambers*	30 %RH to 95%RH @ 25 °C 5 °C to 45 °C @ 50%RH	5.77% RH 1.38°C	Using Digital Data Logger with Sensors by Comparison Method Multi Position Calibration

* 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.

Ⓞ Laboratory can also calibrate instruments/devices of coarser resolution / least count within the accredited range using same reference standard/ master equipment under the scope of accreditation.

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