Laboratory	**Nashik Engineering Cluster, "Sahashtrarashmi"C-10, MIDC, Ambad, Nashik 422010**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**CC-2248** ***(In lieu of C-0745,C-0746,C-0747)***	**Page**	**1 of 22**
Validity	**23.09.2017 to 22.09.2019**	**Last Amended on**	**06.12.2017**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		ELECTRO TECHNICAL CALIBRATION		
I.	**SOURCE**			
1.	DC Voltage[$]	1 mV to 10 mV 10 mV to 100 mV 100 mV to 10V 10 V to 1000 V	0.0011% to 0.0011% 0.0011% to 0.0011% 0.0011% to 0.0005% 0.0005% to 0.0008%	Using Fluke 5720A MFC By Direct/ Comparison Method
2.	DC Current[$]	10 µA to 200 µA 200 µA to 20 mA 20 mA to 2 A 2 A to 20 A 50 A to 1000 A	0.0078% to 0.0078% 0.0078% to 0.0044% 0.0044% to 0.01% 0.01% to 0.102% 0.303% to 0.331%	Using Fluke 5720A MFC By Direct/ Comparison Method Using Fluke 9100A MFC By Direct/ Comparison Method With CC by direct Method
3.	AC Voltage[$]	**20 Hz** 2 mV to 20 mV 20 mV to 200 V **40 Hz to 20 kHz** 2 mV to 20 mV 20 mV to 200 mV 200 mV to 200 V **50 Hz to 1 kHz** 200 V to 1000 V **50 KHz to 100 kHz** 2 mV to 20 V	 0.235% to 0.03% 0.03% to 0.013% 0.247% to 0.033% 0.033% to 0.016% 0.016% to 0.008% 0.009% to 0.012% 0.264 % to 0.015%	Using Fluke 5720A MFC By Direct/ Comparison Method

Ram Ashray
Convenor

Avijit Das
Program Director

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
4.	AC Current[$]	**50 Hz to 1 kHz**		Using Fluke 5720A MFC
		10 µA to 200 µA	0.018% to 0.019%	By Direct/ Comparison
		200 µA to 100 mA	0.019% to 0.018%	Method
		100 mA to 2 A	0.018% to 0.037%	
		1 kHz to 5 kHz		
		200 µA to 200 mA	0.019% to 0.018%	Using Fluke 9100A MFC
		200 mA to 2 A	0.018% to 0.037%	By Direct/ Comparison Method
		50Hz		
		2A to 20A	0.193% to 0.296%	With CC by direct Method
		50Hz		
		50 A to 1000A	0.273% to 0.676%	
5.	DC Resistance[$]	1 Ω	0.011%	Using Fluke 5720A MFC
		2 Ω	0.011%	(Discrete values)
		10 Ω	0.0029%	By Direct Method
		20 Ω	0.0029%	
		100 Ω	0.0013%	
		200 Ω	0.0025%	
		1 kΩ	0.0011%	
		2 kΩ	0.0011%	
		10 kΩ	0.0011%	
		20 kΩ	0.0007%	
		100 kΩ	0.0014%	
		200 kΩ	0.0014%	
		1 MΩ	0.002%	
		2 MΩ	0.002%	
		10 MΩ	0.004%	
		20 MΩ	0.006%	
		100 MΩ	0.014%	
		1 mΩ to 330 MΩ	0.685% to 0.012%	Using Fluke 5500A MPC By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
6.	High Resistance[$]	10 kΩ to 9 GΩ 10 GΩ to 300GΩ 1TΩ to 10TΩ	0.236% to 1.66% 0.75% to 8.05% 8.06%	Using Electrical Safety Tester Fluke 5320A By Direct Method Using Decade Resistance Box Vaiseshika 8400 HV
7.	Capacitance[$]	**1 kHz** 10 nF to 1 mF	2.896% to 1.939%	Using Fluke 5500A MPC By Direct Method
8.	Inductance[$]	**1 kHz** 100 µH to 10 H	0.359% to 0.222%	Using Decade Inductance Box By Direct Method
9.	Frequency[$]	10 Hz to 330 MHz	0.007% to 0.01%	Using Fluke 5500A MPC By Direct Method
10.	Period[$]	5 ns to 0.1ms	0.008%	Using Fluke 5500A MPC By Direct Method
11.	Oscilloscope[$] Amplitude Time Marker Bandwidth	 20 mV to 20 V 5 nS to 100 µS 50 kHz to 300 MHz	 0.65% 0.2% 6.35%	Using Fluke 5500A MPC By Direct/ Comparison Method
12.	AC Power (1 Phase)	**50Hz** @ Lag to UPF & Lead to UPF 50V to 600V 1A to 10A	0.34% to 1.6%	Using Fluke 5500A MPC By Direct/ Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
13.	Temperature Simulation[$] (Indicator/ Recorder/ Controller) RTD PT-100 Thermocouple K Type Thermocouple J Type Thermocouple T Type Thermocouple E Type Thermocouple R Type Thermocouple S Type Thermocouple B Type Thermocouple	 (-)200°C to 850°C (-)200°C to 1300°C (-)200°C to 1100°C (-)200°C to 400°C (-)100°C to 1000°C 300°C to 1750°C 300°C to 1750°C 600°C to 1750°C	 0.27°C 0.71°C 0.32°C 0.32°C 0.32°C 0.6°C 0.6°C 0.6°C	 Using Fluke 5500A MPC & using Standard Chart Ω to °C and mV to °C Chart By Direct/ Comparison Method
14.	DC Voltage[♣]	1 mV to 100 mV 100 mV to 10 V 10 V to 1000 V	0.063% to 0.008% 0.008% to 0.006% 0.006% to 0.007%	Using Fluke 5500A MPC By Direct/ Comparison Method
15.	DC Current[♣]	10 µA to 100mA 100 mA to 1 A 1A to 10 A 50A to 500A	0.018% to 0.015% 0.015% to 0.042% 0.042% to 0.08% 0.42% to 0.72%	Using Fluke 5500A MPC By Direct / Comparison Method With CC
16.	AC Voltage[♣]	50 Hz to 10 kHz 1 mV to 10 mV 10 mV to 100 mV 100 mV to 10 V 10 V to 1000 V	 0.327% to 0.246% 0.246% to 0.07% 0.07% to 0.049% 0.049% to 0.057%	Using Fluke 5500A MPC By Direct/ Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
17.	AC Current♣	**50 Hz to 1 kHz** 100 µA to 100 mA 100 mA to 1 A 1 A to 10 A **50 Hz** 50 A to 500 A	 0.46% to 0.134% 0.134% to 0.2% 0.2% to 0.16% 0.43% to 0.71%	Using Fluke 5500A MPC By Direct / Comparison Method With CC
18.	DC Resistance♣	1 mΩ to 330 MΩ	0.086% to 0.012%	Using Fluke 5500A MPC By Direct / Comparison Method
19.	Frequency♣	1 Hz to 330 MHz	0.007% to 0.01%	Using Fluke 5500A MPC By Direct / Comparison Method
20.	Capacitance♣	**1 kHz** 0.33 nF to 1.1 mF	 2.896% to 1.555%	Using Fluke 5500A MPC By Direct / Comparison Method
21.	Inductance♣	**1 kHz** 100 µH to 10 H	 0.359% to 0.222%	Using Fluke 5500A MPC By Direct / Comparison Method
22.	Oscilloscope♣ Amplitude Time Marker Bandwidth	 20 mV to 20 V 5 nS to 5S Upto 300 MHz	 0.65% 0.25% 6.4%	Using Fluke 5500A MPC By Direct / Comparison Method
23.	Harmonics Order♣	1st to 50th Order	0.5%	Using Fluke 5500A MPC By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
24.	AC Power♣ (1 Phase)	**50Hz** @ lag to UPF & Lead to UPF 50V-600V 1A to 10A	0.34% to 1.6%	Using Fluke 5500A MPC By Direct Method
25.	DC Power♣ (1 Phase)	50V to 600V 1A to 10A	0.25% to 1.6%	Using Fluke 5500A MPC By Direct Method
26.	Temperature Simulation♣ (Indicator/ Recorder/ Controller) RTD PT-100 TYPE K Thermocouple TYPE J Thermocouple TYPE T Thermocouple TYPE E Thermocouple TYPE R Thermocouple TYPE S Thermocouple TYPE B Thermocouple	(-)200°C to 850°C (-)200°C to 1300°C (-)200°C to 1100°C (-)200°C to 400°C (-)100 °C to 1000 °C 300 °C to 1750 °C 300 °C to 1750 °C 600 °C to 1750 °C	0.30 °C 0.40 °C 0.40 °C 0.40 °C 0.40 °C 0.65°C 0.65°C 0.65 °C	Using Fluke 5500A MPC & using standard chart Ω to °C and mV to °C chart By Direct Method
II.	**MEASURE**			
1.	DC Voltage$	100µV to 1 mV 1 mV to 100mV 100 mV to 1 V 1 V to 10 V 10 V to 1000 V	0.0014% to 0.012% 0.012% to 0.0007% 0.0007% to 0.0005% 0.0005% to 0.0005% 0.0005% to 0.0009%	Using 8 ½ DMM Fluke 8508A By Direct/ Comparison Method
2.	DC Current$	10 µA to100 µA 100 µA to 100 mA 100 mA to 1 A 1 A to 20 A	0.007% to 0.0025% 0.0025% to 0.006% 0.006% to 0.022% 0.022% to 0.047%	Using 8 ½ DMM Fluke 8508A By Direct/ Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
3.	AC Voltage[$]	**20 Hz** 1 mV to 200 mV 200 mV to 200 V **40Hz to 20 kHz** 1 mV to 20 mV 20 mV to 20 V 20 V to 200 V **40Hz to 1 kHz** 200 V to 1000 V **50kHz to 100kHz** 1 mV to 20 mV 20 mV to 200 V	 0.037% to 0.019% 0.019% to 0.015% 0.016% to 0.016% 0.016% to 0.039% 0.039% to 0.013% 0.013% to 0.02% 0.1% to 0.1% 0.1% to 0.077%	Using Fluke 5790 DMM By Direct/ Comparison Method
4.	AC Current[$]	**50 Hz to 1 kHz** 10 µA to 100 µA 100 µA to 10 mA 10 mA to 20 A **50Hz** 0.005 A to 120 A	 0.1% to 0.1% 0.1% to 0.036% 0.036% to 0.11% 0.028% to 0.017%	Using 8 ½ DMM Fluke 8508A By Direct/ Comparison Method Using COM 3003 ZERA By Direct/ Comparison Method
5.	DC Resistance[$]	10 mΩ to 1 Ω 1 Ω to 10 Ω 10 Ω to 10 MΩ	0.0022% to 0.0022% 0.0022% to 0.0012% 0.0012% to 0.003%	Using 8 ½ DMM Fluke 8508A By Direct/ Comparison

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		10 MΩ to 100MΩ 100 MΩ to 1 GΩ 1 GΩ to 10 GΩ	0.003% to 0.009% 0.009% to 0.05% 0.05% to 0.23%	Method

6.	Frequency[$]	1 Hz to 300 MHz	0.001% to 0.0065%	Using Timer/Counter (PM 6690) By Direct/ Comparison Method
7.	Period[$]	10 ms to 1s	0.0235%	Using Timer/Counter (PM 6690) By Direct/ Comparison Method
8.	Capacitance[$]	**1 kHz** 100 pF to 1 mF	0.9882% to 1.7%	Using RLC Meter(PM 6304) By Direct/ Comparison Method
9.	Inductance[$]	**1 kHz** 100 µH to 10 H	0.3% to 0.144%	Using RLC Meter(PM 6304) By Direct/ Comparison Method
10.	Ac Power & Energy[$] Active Cosφ:± 0.2 To 1 Single Phase Three Phase Reactive Sinφ:± 0.2 To 1 Single Phase Three Phase	**40 Hz to 70 Hz** 30 V to 320 V 1 mA to 120 A 0.2 W to 38.4 kW 0.6 W to 115.2 kW 0.2 Var to 38.4 kVar 0.6 Var to 115.2 kVar	 0.04% to 0.02%	Using ZERA Meter Test System MTS 310 with COM 3003 By Direct/ Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Phase Angle (Power Factor)	0.25 Lead/Lag to UPF	0.002 PF	
11.	Harmonics Order$	1st to 50th Order	0.6%	Using ZERA Meter Test System MTS 310 with COM 3003 By Direct/ Comparison Method
12.	Dc High Voltage$	1 kV to 40kV	2.2%	Using HV Divider with kV Meter By Direct/ Comparison Method
13.	AC High Voltage$	**50Hz** 1 kV to 100kV	1.48% to 2.28%	Using HV Divider with kV Meter By Direct/ Comparison Method
14.	Current Transformer$	**50Hz** 5A to 3200A//1A-5A 120% to 1%	R.E. 0.014% to 0.02% PAE 0.85 Min to 3.15 Min	Using Std CT & AITTS-98 ELTEL set up By Direct/ Comparison Method
15.	Potential Transformer$	**50 Hz** 11kV to 33kV // 110V-63.5V	R.E. 0.09% P.A.E 3.9 Min	Using EPD & AITTS-98 ELTEL set up. By Direct/ Comparison Method
16.	Ratio Error & Phase Angle Error Of	CT MODE 1A & 5A	R.E. 0.008% & P.A.E. 0.4 to 0.8 Min	Using STD CT, EPD with STD Capacitor &

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Instrument Transformer Test Setup[$] **50 Hz**	200% TO 1% PT MODE 110V & 63.5V 200% to 2%	 R.E. 0.008% & P.A.E 0.4 to 0.8 Min	AITTS-98 ELTEL set up. By Direct/ Comparison Method
17.	Current Transformer Burden[$] (1A & 5A)	1 VA to 70 VA @1PF to 0.8PF	0.86% to 0.46%	Using Zera Meter Test System MTS 310 with COM 3003 By Direct/ Comparison Method
18.	Voltage Transformer Burden[$] (110V & 63.5V)	2.5 VA to 130 VA @ 0.8PF	0.43%	Using Zera Meter Test System MTS 310 with COM 3003 By Direct/ Comparison Method
19.	Temperature Simulation[$] (Process Calibrator) RTD PT-100 K Type Thermocouple J Type Thermocouple T Type Thermocouple E Type Thermocouple R Type Thermocouple S Type Thermocouple B Type Thermocouple	 (-)200°C to 850°C (-)200°C to 1300°C (-)200°C to 1100°C (-)200°C to 350°C (-)100°C to 700°C 300°C to 1750°C 300°C to 1750°C 600°C to 1750°C	 0.27°C 0.32°C 0.32°C 0.32°C 0.32°C 0.6°C 0.6°C 0.6°C	Using Fluke 5500A MPC, Universal Calibrator 9100A & using Standard Chart Ω to °C and mV to °C Chart By Direct/ Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
20.	Stop Watch[$]	10 Sec to 2.5 Hrs	2.502 Sec	Using Digital Stop Watch By Comparison Method
21.	DC Voltage[♣]	1 mV to 100 mV 100 mV to 10 V 10 V to 1000 V	0.408% to 0.013% 0.013% to 0.003% 0.003% to 0.006%	Using 6 ½ DMM Tektronix 4050 By Direct / Comparison Method
22.	DCCurrent[♣]	10 µA to 100 µA 100 µA to 100 mA 100 mA to 1 A 1 A to 10 A	0.36% to 0.12% 0.12% to 0.08% 0.08% to 0.08% 0.08 %to 0.20%	Using 6 ½ DMM Tektronix 4050 By Direct / Comparison Method
23.	AC Voltage[♣]	**50 Hz to 10 kHz** 10 mV to 100 mV 100 mV to 1 V 1 V to 1000 V	 0.532% to 0.12% 0.12% to 0.106% 0.106% to 0.096%	Using 6 ½ DMM Tektronix 4050 By Direct / Comparison Method
24.	AC Current[♣]	**50 Hz to 1 kHz** 10 µA to 100 µA 100 µA to 10 mA 10 mA to 1 A 1 A to 10 A	 0.94% to 0.43% 0.43% to 0.244% 0.244% to 0.17% 0.17% to 0.39%	Using 6 ½ DMM Tektronix 4050 By Direct / Comparison Method
25.	DC Resistance[♣]	1 mΩ to 1 Ω 1 Ω to 100 Ω 100 Ω to 100 kΩ 100 kΩ to 10 MΩ	0.3% to 0.36% 0.36% to 0.03% 0.03% to 0.013% 0.013% to 0.049%	Using 6 ½ DMM Tektronix 4050 By Direct / Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
26.	Frequency♣	1 Hz to 300 MHz	0.001% to 0.007%	Using 6 ½ DMM Tektronix 4050 By Direct / Comparison Method
27.	Inductance♣	**1 kHz** 100µH TO 10H	0.3% TO 0.144%	Using RLC Meter Fluke PM 6304 By Direct / Comparison Method
28.	Capacitance♣	**1 kHz** 100 pF to 1 mF	1.7% to 0.988%	Using RLC Meter Fluke PM 6304 By Direct / Comparison Method
29.	DC High Voltage♣	1 kV to 40 kV	1.43% to 1.59%	Using HV Divider Udeyaraj with kV Meter By Direct / Comparison Method
30.	AC High Voltage♣	**50Hz** 1 kV to 100 kV	1.48% to 2.28%	Using HV Divider Udeyaraj with kV Meter By Direct / Comparison Method
31.	Temperature Simulation♣ (Process Calibrator)			
	RTD PT-100	(-)200°C to 850°C	0.27 °C	Using Fluke 5500A & Fluke 9100A & using Standard Chart Ω to °C and mV to °C Chart
	TYPE K Thermocouple	(-)200°C to 1300°C	0.32 °C	
	TYPE J Thermocouple	(-)200°C to 1100°C	0.32 °C	
	TYPE T Thermocouple	(-)200°C to 400°C	0.32 °C	
	TYPE E Thermocouple	(-)100 °C to 1000 °C	0.32 °C	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	TYPE R Thermocouple TYPE S Thermocouple TYPE B Thermocouple	300 °C to 1750 °C 300 °C to 1750 °C 600 °C to 1750 °C	0.6°C 0.6°C 0.6 °C	
32.	Stop Watch♣	10 Sec to 24Hr	0.1 to 0.06 Sec	Using Digital Stop Watch By Comparison Method
33.	AC Power & Energy♣ (Active Reactive) 1Phase & 3 Phase @50Hz	1V to 1000V 5mA to 300A Lag, Lead to UPF	0.4%	Using Precision Power Analyser Kigg Make By Comparison Method
	MECHANICAL CALIBRATION			
I.	**DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)**			
1.	Caliper$ L.C. 0.01 mm	Up to 600 mm	17 µm	Using Caliper Checker & External Micrometer By Comparison Method
2.	Height Gauge$ L.C. 0.01 mm	Up to 600 mm	13 µm	Using Caliper Checker & Surface Plate By Comparison Method
3.	Electronic Height Gauge$ L.C. 0.0001 mm	Up to 600 mm	6.5 µm	Using Long Slip Gauges & Surface Plate By Comparison Method
4.	External Micrometer$ L.C. 0.001mm	0 to 100 mm	1.4 µm	Using slip gauge set

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	L.C. 0.01mm	100 to 400 mm	12 µm	Long slip gauge set, Gauge block set By Comparison Method
5.	Depth Micrometer[$] L.C. 0.01 mm	Up to 300 mm	13 µm	Using Depth Checker By Comparison Method
6.	Micrometer Setting Rod/ Length Bar[$]	Up to 400 mm	5.7 µm	Using Lab Concept By Comparison Method
7.	Dial Gauge[$] (Plunger Type) L.C. 0.001mm	0 to 25 mm	2 µm	Using Electronic Dial Calibration Tester By Comparison Method
8.	Dial Gauge[$] (Lever Type) L.C. 0.001mm	0 to1 mm	2 µm	Using Electronic Dial Calibration Tester/Lab Concept By Comparison Method
9.	Plain Plug Gauge/ OD Gauge/ Paddle Gauge[$]	1 mm to 250 mm	6.1 µm	Using Lab Concept By Comparison Method
10.	Plain Ring Gauge/ID Gauge/ Setting Ring Gauge[$]	4mm to 250 mm	6.5 µm	Using Lab Concept / Master Ring Gauge By Comparison Method
11.	Snap Gauge / Gap	Up to 50 mm 50 mm to 100 mm	1.5 µm 2.0 µm	Using Gauge Block Set By Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Gauge[$]	100mm to 300 mm	4.8 µm	
12.	Thread Plug Gauge[$]	3 mm to 250 mm	4.9 µm	Using Lab Concept & Thread Measuring Wire By Comparison Method
13.	Thread Ring Gauge[$]	4 mm to 250 mm	5.1 µm	Using Lab Concept & Master Ring Gauge By Comparison Method
14.	Feeler Gauge[$] / Coating Foils[$]	Up to 2.5 mm	0.9 µm	Using Lab Concept By Comparison Method
15.	Gauge Block Set[$]	Up to 20 mm 20mm to 50 mm 50mm to 100 mm	0.21 µm 0.31 µm 0.59 µm	Using Gauge Block Calibrator & Gauge Block Comparison By Comparison Method
16.	Depth Gauge[$] L.C. 0.01 mm	0 to 300 mm	11.5 µm	Using Depth Checker By Comparison Method
17.	Dial Snap Gauge[$] L.C. 0.001mm Parallelism of Anvil faces	2 mm to 100 mm	2.8 µm	Using Gauge Block Set By Comparison Method
18.	Dial Thickness Gauge[$] L.C. 0.01 mm	Up to 10 mm	7.0 µm	Using Gauge Block Set By Comparison Method
19.	Bore Gauge with	Up to 1 mm	2.7 µm	Using Electronic Dial

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Dial[$] (Transmission Accuracy)			Calibration Tester/Plunger Dial By Comparison Method
20.	Digimatic Indicator[$]	Up to 25 mm	2.0 µm	Using Electronic Dial Calibration Tester By Comparison Method
21.	Cylindrical Measuring Pin[$]	Up to 20 mm	0.9 µm	Using Lab Concept By Comparison Method
22.	Thread Measuring Wire[$]	0.17 mm to 6.35 mm	0.9 µm	Using Lab Concept By Comparison Method
23.	Pistol Caliper[$] L.C. 0.10 mm	Up to 50 mm	80 µm	Using Gauge Block Set By Comparison Method
24.	Radius Gauge[$]	Up to 25 mm	67 µm	Using Rapid-I (VMM) By Comparison Method
25.	Measuring Scale[$]	0 to 1000 mm	165 µm	Using Electronic Tape & Scale Calibrator By Comparison Method
26.	Measuring Tape[$]	Up to 5000 mm	165 √L/1000 (L is in mm)	Using Electronic Tape & Scale Calibrator By Comparison Method
27.	Thread Pitch Gauge[$]	0.605 mm to 6.350 mm	12 µm	Using Rapid-I (VMM) By Comparison Method
28.	Test Sieve[$]	0.10mm to 0.40 mm	10.3 µm	Using Rapid-I (VMM)

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
				By Comparison Method
29.	Electronic Height Gauge♣	Up to 600 mm	6.5 µm	Using Long Slip Gauges & Surface Plate By Comparison Method
II.	**PRESSURE INDICATING DEVICES**			
1.	Pressure Hydraulic Dial and Digital Pressure Gauges$	0.3bar to 100bar 0.03 MPa to 10 MPa 100 bar to 1000bar 10 MPa to 100 MPa	0.034bar 0.003MPa 0.018bar 0.0018MPa	Using Hydraulic Dead Wt. Tester CPB 5000 By Direct Method UUC to standard based on DKD-R-6-1
2.	Hydraulic, Pneumatic Pressure Gauges$	0 to 35 bar 0 to 3.5 MPa	0.032bar 0.003MPa	Using Digital Pressure Gauge with Hand Pump by comparison Method as per DKD R6-1 By Comparison Method Digital Pressure Gauge with Hand Pump standard based on DKD-R-6-1
3.	Dial and digital Vacuum Gauges$	(-)0.8 bar to 0.1 bar (-)0.08 MPa to 0.01 MPa	0.001bar 0.0001MPa	Using Digital Vacuum Gauge with Hand Pump by comparison Method as per DKD Standard By Direct Comparison Method Digital Pressure Gauge with Pneumatic Pump standard based on DKD-R-6-1

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
4.	Hydraulic, Pneumatic Pressure Gauges♣	0 to 35 bar 0 to 3.5 MPa	0.032bar (0.003MPa)	Using Digital Pressure Gauge with Hand Pump by comparison Method as per DKD R6-1 By Comparison Method Digital Pressure Gauge with Hand Pump standard based on DKD-R-6-1
5.	Dial and digital Vacuum Gauges♣	(-)0.8 to 0.1 bar (-)0.08 MPa to 0.01 MPa)	0.001bar (0.0001MPa)	Using Digital Vacuum Gauge with Hand Pump by comparison Method as per DKD Standard By Comparison Method Digital Pressure Gauge with Hand Pump standard based on DKD-R-6-1
III.	**WEIGHTS**			
		1mg 2mg 5mg 10mg 20mg 50mg 100mg 200mg 500mg	0.03mg 0.03mg 0.03mg 0.03mg 0.03mg 0.03mg 0.03mg 0.03mg 0.03mg	Using 'E1' Class Weight Set and semi micro weighing balance of 0.01mg & 0.1mg Readability Direct comparison using ABBA weighing cycle as per OIML R111-1 for weights of F2 class and coarser
		1g 2g 5g 10g	0.03mg 0.03mg 0.04mg 0.04mg	Using 'E1' Class Weight Set and semi micro weighing balance of 0.01mg & 0.1mg

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		20g 50g 100g 200g	0.04mg 0.04mg 0.10mg 0.10mg	Readability Direct comparison using ABBA weighing cycle as per OIML R111-1 for weights of E2 class and coarser
IV.	**WEIGHING SCALE AND BALANCE**			
1.	Digital Weighing Balance# Readability ≥0.01mg & Readability ≥0.1mg	Up to 82g Up to 200g	0.03mg 0.14 mg	Using 'E1' Class Weights Calibration of Weighing balance of accuracy class I & coarser as per OIML R-76-1
V.	**TORQUE GENERATING DEVICES**			
1.	Torque Wrench & Torque Meter$ (Type II Class-A)	100 Nm to 1000 Nm	1.38% of rdg	Using Electronic Torque Wrench Tester By Comparison method
VI.	**ACOUSTIC**			
1.	Sound Level Meter$	94 dB & 114 dB	0.61dB	Using Sound Level Calibrator By Direct method
VII.	**ACCELERATION & SPEED**			
1.	Speed♣	150 rpm to 8000 rpm	1.9% to 0.2%	Using Tachometer

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	(Centrifuge)			By Direct method

THERMAL CALIBRATION				
I.	**TEMPERATURE**			
1.	RTD, PRT Sensor with or without Indicator, Digital Thermometer, Data Logger, Recorder, Temperature Transmitter with Sensor[$]	(-)80 °C to 400 °C	0.16°C	Using Platinum Resistance Thermometer Sensor With Std Indicator (Fluke Chub E4) by Comparison method By Comparison Method UUC to standard

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
2.	Thermocouple Sensor with or without Indicator, Digital Thermometer, Data Logger, Recorder, Temperature Transmitter with Sensor[$]	400 °C to 900 °C 900 °C to 1200°C	1.31°C 2.58°C	Using 'S' Type Thermocouple with Std Indicator (Fluke Chub E4) by Comparison method By Comparison Method UUC to standard
3.	Glass Thermometer[$]	(-)50 °C to 250°C	0.59°C	Using PRT and Indicator with Liquid Well Bath By Comparison Method UUC to standard
4	Freezers, Oven, Environmental Chamber, Liquid Bath, Incubator, BOD[$]	(-)80 °C to 400 °C	0.11°C	Using PRT PT-100 Sensor With Std Indicator (Fluke Chub E4) by Comparison/ Single Positioning
5.	Incubator[#] Dry Block Furnace, Muffle Furnace[#]	400 °C to 900 °C 900 °C to 1200 °C	1.31°C 2.65°C	Using Calibration Using 'S' Type Sensor With Std Indicator (Fluke Chub E4) by Comparison/ Single Positioning Calibration By Comparison Single Positioning Calibration
6.	Freezers, Oven, Environmental Chamber, Liquid Bath, Incubator, BOD	(-)50 °C to 400 °C	4.75°C	Using Multipoint Standard RTD(09) min, and HIOKI(Data Logger) By Multi Position method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Incubator at Multiple position♣			
7.	Furnace♣	400 °C to 1200 °C	8.21°C	Using Multipoint Standard TC(09) min, and HIOKI(Data Logger) By Multi Position method
III.	**SPECIFIC HEAT AND HUMIDITY**			
1.	RH Sensor with Indicator and Thermo Hygrometer$	10 % RH to 95 %RH @ 25 °C 20 °C to 40 °C @ 50 % RH	1.12%RH 0.42°C	Using Humidity Generator By Comparison Method UUC to standard

*** Measurement Capability is expressed as an uncertainty (±) 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.