

Laboratory

Universal Calibration Services Pvt. Ltd., Plot No. G 43/1 & 2, G 44/1 & 2, G Block, Ajanta Nagar, Chinchwad, Pune, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

CC-2412

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Validity

02.09.2018 to 01.09.2020

Last Amended on 13.12.2018

	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	DC Volt [#]	1 mV to 33 V 33V to 1000 V	1.25% to 0.0016% 0.0016% to 0.0025%	Using 5522A/9100 Calibrator (Fluke) By Direct Method
2.	DC Current [#]	10 μ A to 329 μ A 329 μ A to 329 mA 0.329 A to 20 A 20A to 1000 A	0.26 % to 0.024% 0.024% to 0.013% 0.013 % to 0.14 % 0.64%	Using 5522A/9100 Calibrator (Fluke) By Direct Method with CC
3.	Resistance [#]	1 Ω to 100 Ω 100 Ω to 10 M Ω 10 M Ω to 1G Ω 1 G Ω to 200G Ω	1.0% to 0.003% 0.003% to 0.02% 0.02% to 1.74% 1.74% to 3.50%	Using 5522A/9100 Calibrator (Fluke) /Std. Resistance Box By Direct Method
4.	AC Volt [#]	10 Hz to 10 kHz 10 mV to 330 mV 330 mV to 33 V 33 V to 1000 V 10 kHz to 50 kHz 3mV to 330 mV 330 mV to 300 V 50 kHz to 100 kHz 3 mV to 30 V	1.0% to 0.02% 0.02% to 0.03% 0.03% to 0.047% 0.9% to 0.043% 0.043% to 0.15 % 1.85% to 0.25%	Using 5522a/9100 Calibrator (Fluke) By Direct Method

Dheeraj Chawla
Convenor

Avijit Das
Program Manager

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5.	AC Current #	10 Hz to 1 kHz 30 μ A to 330 mA 330 mA to 10 A 10 A to 20 A 1 kHz to 5 kHz 33 μ A to 330 mA 330 mA to 10 A 50 to 60 Hz 20 A to 1000 A	0.67% to 0.055% 0.055% to 0.072% 0.072% to 0.21 % 1.0% to 0.14% 0.14% to 0.44% 0.4%	Using 5522a/9100 Calibrator (Fluke) By Direct Method With Current Coil By Direct Method
6.	Capacitance #	1 kHz 1 nF to 329 nF 100 Hz 329 nF to 30 mF	4.17% to 0.44% 0.44 % to 2.78%	Using 5522A/9100 Calibrator (Fluke) By Direct Method
7.	Inductance #	1 kHz 1mH to 10 H	2.9%	Using Inductance box(AGRONIC) By Direct Method

Dheeraj Chawla
Convenor

Avijit Das
Program Manager

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8.	Temperature Indicator/Controller/Recorder/Transmitter(Dti) # T-Type thermocouple E-Type thermocouple J -Type thermocouple K-Type thermocouple N-Type thermocouple R&S-TYPE thermocouple B -TYPE thermocouple RTD / PT-100	(-)200 °C to 400 °C (-)200 °C to 1000 °C (-)200 °C to 1000 °C (-)200 °C to 1200 °C (-)200 °C to 1300 °C 145 °C to 1700 °C 450 °C to 1820 °C (-)200 °C to 800 °C	0.15 °C to 0.11 °C 0.14 °C to 0.12 °C 0.6 °C to 0.11 °C 0.6 °C to 0.11 °C 0.6 °C to 0.27 °C 0.6 °C to 0.18 °C 0.6 °C to 0.8 °C 0.085 °C to 0.06°C	Using 5522A Calibrator (Fluke) By Direct Method
9.	AC Power #	50 Hz to 60 Hz 0.2 pF to 1 Pf (Lead & Lag) 30 V to 1000 V 10 mA to 20 A 60 mW to 20 Kw	1.8 % to 0.38 %	Using 5522A Calibrator (Fluke) By Direct Method
10.	Frequency #	10Hz to 10MHz	0.76% to 0.006%	Using Mpc -3050/ 9100 Calibrator & Function Generator By Direct Method
11.	Oscilloscope #	Amplitude (1mV to 130V) AC Time 2 ns to 5 s Bandwidth 50 kHz to 1.1 GHz	4.73 % to 0.3 % 0.58 % 4.7% to 8.0%	Using 5522a/3050 Calibrator By Direct Method

Dheeraj Chawla
Convenor

Avijit Das
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II.	MEASURE			
1.	DC Volt ^{\$}	1.0 mV to 200 mV 200 mV to 20 V 20 V to 1000 V	0.6% to 0.007% 0.007% 0.007%	Using 8 ½ DMM Fluke By Direct Method/ Comparison
2.	DC Current ^{\$}	10 μ A to 200 mA 200mA to 20 A	0.016 % to 0.01% 0.01% to 0.05%	Using 8 ½ DMM Fluke By Direct Method/ Comparison
3.	AC Voltage ^{\$}	10 Hz to 10 kHz 100 mV to 100 V 100 V to 1000 V 10 KHz to 100 kHz 10 mV to 100 V	1.64% to 0.014% 0.01 % to 0.05% 0.8%	Using 8 ½ DMM Fluke By Direct Method/ Comparison
4.	AC Current ^{\$}	10Hz to 5kHz 10 μ A to 200 μ A 200 μ A to 1mA 1mA to 200 mA 200 mA to 1A 1A to 20 A	0.28% to 0.15% 0.15% to 0.06% 0.06% to 0.13% 0.13% to 0.1% 0.1% to 0.11%	Using 8 ½ DMM Fluke By Direct Method/ Comparison
5.	Resistance ^{\$}	1 m Ω to 1 Ω 1.0 Ω to 100 Ω 100 Ω to 100 M Ω 100 M Ω to 20 G Ω	0.021% to 0.006% 0.05% to 0.001% 0.001% to 0.025% 0.025% to 5.0 %	Using 8 ½ DMM Fluke By Direct Method/ Comparison
6.	Frequency ^{\$}	20 Hz to 100kHz 100 kHz to 1 MHz	0.07 % to 0.002% 0.002% to 0.06%	Using 8 ½ Dmm Fluke/Frequency Counter By Direct Method/ Comparison
7.	DC Voltage [#]	1.0 mV to 1000 V	0.425 % to 0.006%	Using 6 ½ DMM Fluke By Direct/Comparison Method

Dheeraj Chawla
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Avijit Das
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8.	DC Current #	100 μ A to 0.1 A 0.1 A to 10 A 10 A to 100 A	0.2 % to 0.07% 0.07% to 0.2% 0.5 %	Using 6 ½ DMM Fluke Shunt By Direct/Comparison Method
9.	AC Voltage #	50 Hz to 10 kHz 10 mV to 100 V 100 V to 1000 V 10 KHz to 50 kHz 10 mV to 100 V 50 KHz to 100 kHz 100 mV to 10 V	0.525 % to 0.117% 0.117 % to 0.33 % 0.75% to 0.2% 0.80%	Using 6 ½ DMM Fluke By Direct/Comparison Method
10.	AC Current #	10Hz to 1kHz 100 μ A to 10A 50Hz 20 A to 2000 A	0.4% to 0.28% 2.1% to 2.4%	Using 6 ½ DMM Fluke By Direct/Comparison Method Using DMM + C.T. By Direct/Comparison Method
11.	Resistance #	1.0 Ω to 100 Ω 10 M Ω to 1 G Ω	0.7% to 0.015% 0.015% to 2.6%	Using 6 ½ DMM By Direct/Comparison Method
12.	Capacitance #	1 kHz 5 nF to 100 mF	2.6% to 4.7%	Using 6 ½ DMM By Direct/Comparison Method
13.	Frequency #	10 Hz to 10MHz	0.08 % to 0.012%	Using 6 ½ DMM Fluke/ Frequency Counter By Direct/Comparison Method

Dheeraj Chawla
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14.	Dc High Voltage #	1 kV to 20 kV	1.96 % to 2.03%	Using H.V Probe + DMM By Direct/Comparison Method
15.	DC High Voltage *	20 kV to 100 kV	2.03% to 3.06%	Using H.V Divider with kV Meter By Direct/Comparison Method
16.	AC High Voltage #	1 kV to 20 kV	2.32 % to 2.54%	Using H.V Probe + DMM By Direct/Comparison Method
17.	AC High Voltage*	20 kV to 100 kV	2.54% to 4.05%	Using H.V Divider with kV Meter By Direct/Comparison Method
18.	Time #	10 sec to 6 Hrs 6 Hrs to 24 Hrs	0.42 Sec to 56 Sec 56 Sec	Using STOP WATCH By Direct/Comparison Method
19.	Capacitance #	1 kHz 1 nF to 10 mF	5.515% to 2.365%	Using 6 1/2 DMM By Direct/Comparison Method
20.	1 ϕ & 3 ϕ #	50 Hz 240 A / A	1.18%	Using Accucheck by Direct/comparison Method

Dheeraj Chawla
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Avijit Das
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MECHANICAL CALIBRATION

I.	DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)			
1.	Vernier Caliper-Plain, Dial & Digital [§] (External, Internal, Depth) L.C.-0.01mm L.C.-0.02mm	0 to1000mm 0 to1000mm	17 μ m 30 μ m	Using Slip gauge & Accessories as per IS 3651
2.	Depth Vernier [§] L.C.-0.01mm L.C.-0.02mm	0 to 300mm 0 to 600mm	15 μ m 25 μ m	Using Slip gauge set as per IS 3651
3.	Height Gauge/ Miro Height [§] (Vernier/Dial/Digital) L.C.-0.1 μ m	0 to1000mm	10 μ m	Using Slip gauge set as per IS 2921
4.	External Micrometer [§] L.C.-0.001mm L.C.-0.01mm	0 to100mm 0 to300 mm 300 mm to1000mm	2 μ m 8 μ m 15 μ m	Using Slip gauge set as per IS 2967
5.	Depth Micrometer [§] L.C.-0.001mm	0 to 300mm	7 μ m	Using Slip gauge set by Comparison Method

Dheeraj Chawla
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Avijit Das
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6.	Internal Micrometer [§] L.C.-0.01mm	0.01mm to 300mm 300 mm to 1000mm	8 μ m 13 μ m	Using Slip gauge set & sylvac probe with DRO as per IS 2966
7.	Plunger Dial [§] L.C.-0.001 mm L.C.-0.001 mm	0 to 25mm 0 to 50mm	3 μ m 6 μ m	Using Dial calibration tester And sylvac probe with DRO as per IS 2092
8.	Lever Dial [§] L.C.-0.001 mm	0 to 2mm	2 μ m	Using Dial calibration tester And sylvac probe with DRO as per IS 11498
9.	Bore Gauge With Or Without Dial [§] (All ranges) L.C.-0.0001 mm	2mm Stroke	3 μ m	Using Dial calibration tester And sylvac probe with DRO by Comparison Method
10.	Dial Thickness Gauge [§] L.C.-0.001 mm L.C.-0.01 mm	0 to1 mm 0 to25 mm	2 μ m 7.6 μ m	Using Slip gauge set by Comparison Method
11.	Pistol Caliper [§] L.C 0.01 mm	0 to 150 mm	60 μ m	Using Slip gauge set by Comparison Method
12.	Plain /Paddle Plug Master / Keyway Gauges [§]	0.5mm to100mm 100mm to175mm	2.3 μ m 4 μ m	Using Slip gauge & sylvac probe with DRO as per IS 3455
13.	Measuring Pin Gauge [§]	0.1mm to 20 mm	2 μ m	Using sylvac probe with DRO as per IS 11103
14.	Micrometer Setting Rod / Height Master [§]	2 mm to 275mm 275 mm to 1000 mm	3.5 μ m 9.15 μ m	Using Slip gauge & sylvac probe with DRO by Comparison Method

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15.	Plain Ring Gauge ^b	3 mm to 100 mm 100mm to 300mm	2 μ m 4 μ m	Using LMM 300, Master Ring Gauge as per IS 3455
16.	Snap Gauge ^b	0.5mm to 100 mm 100mm to 300 mm	3 μ m 5 μ m	Using Slip gauge set as per IS 3455
17.	Thread Plug Gauge ^b (Parameter Effective Minor, Major)	2 mm to 100mm 100 mm to 300 mm	4 μ m 4 μ m	Using FCDM m/c as per IS 2334
18.	Thread Ring Gauge ^b (For Effective Dia)	3 mm to 100 mm 100 mm to 300mm	2 μ m 5 μ m	Using LMM300, Master Ring Gauge as per IS 2334
19.	Electronic Probe With DRO Comparator ^b L.C.-0.0001 mm	0 to 25 mm	1 μ m	Using Slip gauge set by Comparison Method
20.	Feeler Gauge ^b	0 to 1 mm	2.5 μ m	Using sylvac probe with DRO
21.	Bevel Protector ^b L.C.-5 Min	0-90°-0	6.5 min of arc	Using Angle Slip Gauge as per IS 5812
22.	Combination Set ^b L.C.-1 °	0-90°-0	35 min of arc	Using Angle Slip Gauge as per IS 5812
23.	Dial Calibration Tester ^b L.C.0.1 μ m	0 to 25 mm	1.45 μ m	Using sylvac probe with DRO by Comparison Method
24.	Micrometer Head/Drum ^b L.C. -0.001mm	0 to 25 mm	1.5 μ m	Using sylvac probe with DRO as per IS 9483

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Convenor

Avijit Das
Program Manager

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25.	Paint Thickness Gauge Foils ^s	0.005 mm to 10 mm	1.5 μ m	Using sylvac probe with DRO by Comparison Method
26.	Coating Thickness Gauge ^s L.C. -1 Mm	0 to 1.2 mm	10 μ m	Using Coating thickness foil with DRO by Comparison Method
27.	V-Block ^s Symetricity & Parallelism	200 mm	10 μ m 13 μ m	Using Surface Plate, Test Mandrels & sylvac probe with DRO as per IS 2949
28.	Measuring Scale ^s L.C-0.5 Mm	Up to 1000 mm	117 μ m	Using Tape & Scale by Comparison Method
29.	Measuring Tape ^s L.C-1 Mm	Up to 100 m	117 \sqrt{L} μ m L is in m	Using Tape & Scale by Comparison Method
30.	Engineering Square ^s	Up to 600 mm	15 μ m	Using Master Square Cylinder, Slip Gauges by Comparison Method
31.	Precision Spirit Level ^s L.C-0.02 mm/m	Base Length 300 mm	25 μ m/m	Using Electronics Level by Comparison Method

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Avijit Das
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II. DIMENSION (PRECISION INSTRUMENTS)				
1.	Profile Projector* Linear –L.C.: -0.001 mm	0 to 300 mm	13 μ m	Using Glass Scale, Slip Gauge & Angle Slip Gauge By Comparison Method
	Angular Measurement L.C.: -1 Sec	0-360°	100 sec of arc	
	Magnification L.C.: - 0.001mm		1 %	
2.	Height Gauge/ Micro Height (Vernier/Dial/Digital)* L.C.-0.1 μ m	0 to 1000 mm	10 μ m	Using Slip Gauge Set As Per IS 2921
3.	Surface Plate Flatness*	4000 mmX4000 mm	$2.5\sqrt{(L+W)}/125 \mu\text{m}$, L&W is in mm	Using Electronics Level by Comparison Method
III. PRESSURE INDICATING DEVICES				
1.	Hydraulic Pressure-Dial/Digital Pressure Gauges and Calibrators, Pressure Transmitter#	0 to 400 bar	0.72 bar	Using Digital Pressure Gauge / Calibrator as per DKD-R 6-1 by Comparison method
		>400 bar to 700 bar	0.83 bar	
2.	Pneumatic Pressure-Dial/Digital Low Pressure Gauges and Manometers, Pressure Transmitter#	0 to 1 bar	0.005 bar	Using Digital Pressure Gauge / Calibrator as per DKD-R 6-1 by Comparison method
		>1 bar to 30 bar	0.053 bar	

Dheeraj Chawla
Convenor

Avijit Das
Program Manager

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3.	Pneumatic Low Pressure-Dial/Digital Low Pressure Gauges and Manometers, Magnehelic Gauge [#]	0 to 20 mbar >20 to 200 mbar	0.010 mbar 0.13 mbar	Using Digital Pressure Gauge / Calibrator as per DKD-R 6-1 by Comparison method
4.	Vacuum-Dial/Digital Vacuum Gauges/indicators and calibrators [#]	(-)0.90 to 0 bar	0.0016 bar	Using Digital Pressure Gauge / Calibrator as per DKD-R 6-1 by Comparison method
IV.	ACCOUSTICS			
1.	Sound Level Meter [#]	30dB to 130dB	1.8dB	Using Sound Level Calibrator & Sound Level Meter by Comparison Method
V.	ACCELERATION & SPEED			
1.	Speed-Rpm Tachometer (Non-Contact Type)/ Stirrer [#]	10 RPM TO 100000 RPM	4.0 to 0.12%	Using Dig. Tachometer by Comparison Method
2.	Contact Type Tachometer ^{\$}	10 RPM TO 4000 RPM	4.0 to 0.12%	Using Dig. Tachometer by Comparison Method
VI.	TORQUE GENERATING DEVICES			
1.	Torque Wrenches Type I & II all Classes ^{\$}	2 Nm to 20 Nm 0 to 200 Nm 0 to 2000 Nm	2.05 %rdg 1.58 %rdg 1.75 %rdg	Using Digital Torque Wrench Calibrator As per ISO 6789

Dheeraj Chawla
Convenor

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VII.	MOBILE FORCE MEASURING SYSTEM			
1.	Push-Pull meter/Force Gauge ^s	0 to 500 N	0.3 %	Using Slotted Dead Weights With hanger & Frame As per VDI/VDE 2624
VIII.	WEIGHTS			
1.	Mass/Weights ^s For Calibration of F1 Class Weights and 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	0.009 mg 0.009 mg 0.0092 mg 0.0092 mg 0.0092 mg 0.0096 mg 0.0096 mg 0.0096 mg 0.010 mg 0.01 mg 0.02 mg 0.02 mg 0.03 mg 0.03 mg 0.0927 mg 0.131 mg	Using Standard Weights of Accuracy Class E1 & Precision Balance of 0.001, 0.01 & 0.1 mg Procedure: ABBA Method as per OIML R-111
	For Calibration of F2 Class Weights and coarser	500 g 1 kg 2 kg	3.0 mg 5.0 mg 10.0 mg	Using Standard Weights of Accuracy Class F1 & Precision Balance of 0.001, 0.01 & 0.1 g Procedure: ABBA Method as per OIML R-111
	For Calibration of M1 Class Weights and coarser	5 kg 10 kg 20 kg	100.0 mg 100.0 mg 100.00 mg	

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XI. WEIGHING SCALE AND BALANCE				
1.	Calibration of Electronic Weighing Balance of Class I and Coarser [#] d \geq 0.01 mg d \geq 0.1 mg Weighing Balance of Class II and Coarser d \geq 1 mg d \geq 10 mg d \geq 100 mg Weighing Balance of Class III and Coarser d \geq 50 g	1 mg to 82 g > 82 g to 220 g > 220 g to 1.02 kg > 1.02 kg to 2.2 kg > 2.2 kg to 32.2 kg > 32.2 kg to 200 kg	0.018 mg 0.22 mg 3.0 mg 30 mg 250 mg 30.0 g	Using standard Weights Based on OIML R-76-1
X.	VOLUME			
1.	Calibration of Piston Pipette ^s (Micro pipettes)	>10 μ l to 100 μ l > 100 μ l to 1000 μ l	0.5 μ l 0.5 μ l to 2.54 μ l	Using Digital Balance up to 82 g / 220 g readability 0.01/0.1 mg and with distilled water of known density & Micropipette as per IS 8655-6 & ISO/TR 20461
2.	Glass Pipettes ^s (Graduated/ non graduated)	1 ml to 100 ml	0.35 ml to 0.502 ml	Using Digital Balances up to 82 g / 220 g & Glass ware as per ISO 4787 & ISO/TR 20461

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3.	Glass Burette ^s	1 ml to 100 ml	0.507 ml	Using readability 0.01/0.1 mg and up to 1.02 kg with d=1 mg and with distilled water of known density.
4.	Measuring Cylinder/	1 ml to 10 ml	0.192 ml	
	Volumetric	> 10 ml to 200 ml	2.1 ml	
	Flask/Conical	> 200 ml to 500 ml	2.2 ml	
Flask/Beaker ^s	> 500 ml to 1000 ml	2.6 ml		

Dheeraj Chawla
Convenor

Avijit Das
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THERMAL CALIBRATION

I.	TEMPERATURE			
1.	Liquid In Glass Thermometer/ Dial Thermometer #	(-) 40 °C to 140 °C	0.43 °C	Using RTD (Pt-100), 6½ DMM and Bath with liquid bath insert By Comparison Method
2.	RTD/Thermocouple / Sensor With Or Without Temperature Indicator/ Data Logger / Recorder / Thermostat/ Temperature Indicator Of Bath #	(-) 40 °C to 140 °C >140 °C to 600 °C	0.20 °C 0.46 °C	Using RTD (Pt-100), 6½ DMM and Bath with liquid/Dry Block insert By Comparison Method
3.	Thermocouple / Sensor With Or Without Indicator/ Data Logger/Recorder / Thermostat / Temperature Indicator Of Bath #	>600°C to 1200°C	1.90 °C	Using R-Type Thermocouple, 6½ DMM and Dry Block Calibrator By Comparison Method
4.	Freezer, cold Chamber Oven, Furnace, etc. * (by Spatial Mapping Using Multi sensor & Data Logger)	(-) 40 °C to 400 °C 400 °C to 1200 °C	2.6 °C 3.80 °C	Using PT-100 Sensor & Thermocouple with multi channel Data logger Multi Position Calibration
5.	Temperature indicator of Freezer, cold chamber Oven, Furnace at single	(-)65 °C to 600 °C 600 °C to 1200 °C	1.6 °C 2.92 °C	Using PT-100 Sensor , R - type Thermocouple& 6½ DMM By Comparison Method

Dheeraj Chawla
Convenor

Avijit Das
Program Manager

Laboratory

Universal Calibration Services Pvt. Ltd., Plot No. G 43/1 & 2, G 44/1 & 2, G Block, Ajanta Nagar, Chinchwad, Pune, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

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Validity

02.09.2018 to 01.09.2020

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	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
	specified Position etc. #			
6.	IR Pyrometer #	0 °C to 200 °C 200 °C to 500 °C	3.5 °C 3.94 °C	Using RTD (Pt-100) ^ & 61/2 DMM & Black Body Calibrator by Comparison Method
II.	SPECIFIC HEAT & HUMIDITY			
1.	Humidity Sensor With Indicator Digital Thermo Hygrometer #	15 %RH to 95 %RH @25 \pm 5 °C	3 % RH	Using By Using Standard Temp. / Humidity Meter with probe & humidity Chamber By Comparison Method
2.	Indicator of Relative Humidity At A Specified Single Position In Environmental, Climatic ,Humidity Chamber Etc. *	15 %RH to 95 %RH @25 \pm 5 °C	3% RH	Using By Using Standard Temp. / Humidity Meter with probe 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.

Dheeraj Chawla
Convenor

Avijit Das
Program Manager