



National Accreditation Board for Testing and Calibration Laboratories

(A Constituent Board of Quality Council of India)



SCOPE OF ACCREDITATION

Laboratory AVM Labs Pvt. Ltd., Door No 49, Moorthy Nagar, 3rd Street, Chettiar Agaram, Porur, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2088 **Page** 1 of 16

Validity 18.09.2017 to 19.10.2018 **Last Amended on** --

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO TECHNICAL CALIBRATION</u>				
I. SOURCE				
1.	DC Voltage [#]	10 mV to 30 mV 30 mV to 300 mV 300 mV to 1V 1 V to 500 V 500 V to 1000 V	0.47% to 0.011% 0.011% to 0.01% 0.01% 0.01% to 0.007% 0.007%	Using Multifunction Calibrator Wavetek 9000 By Direct Method
2.	AC Voltage [#]	10 Hz to 1 kHz 10 mV to 100 mV 100 mV to 300 mV 50 Hz to 1 kHz 300 mV to 3 V 3 V to 30 V 30 V to 300V 300 V to 500 V 500 V to 750 V 1 kHz to 30 kHz 10 mV to 300 mV 300 mV to 100 V 30 kHz to 100 kHz 10 mV to 100 mV 100 mV to 3 V	1.44% to 0.07% 0.07% to 0.08% 0.056% to 0.067% 0.067% to 0.11% 0.11% to 0.012% 0.012 % to 0.12 % 0.12% to 0.14% 3.0% to 0.09% 0.09% to 0.11% 15.0% to 0.52% 0.52% to 1.7%	Using Multifunction Calibrator Wavetek 9000 By Direct Method
3.	DC Current [#]	100 μ A to 300 μ A 300 μ A to 30 mA 30 mA to 300 mA 300 mA to 20 A	0.71% to 0.20% 0.20% to 0.035% 0.035% to 0.028% 0.028% to 0.083%	Using Multifunction Calibrator Wavetek 9000 by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
		20 A to 100 A	1.0%	Using MFC Wavetek 9000 with Current Coil Zeal By Direct Method
4.	AC Current [#]	10 Hz to 3 kHz 100 μ A to 300 μ A 110 Hz to 3 kHz 300 μ A to 3 mA 3 mA to 300 mA 3 kHz & 30 kHz 300 μ A to 300 mA 110 Hz to 3 kHz 300 mA to 20 A	0.73% to 0.31% 0.31% to 1.27% 1.27% to 0.2% 0.31% to 0.35% 0.2% to 0.66%	Using Multifunction Calibrator Wavetek 9000 by Direct Method Using MFC Wavetek 9000 with 100 Turns Current coil By Direct Method
5.	Resistance [#]	1 Ω to 30 Ω 30 Ω to 60 Ω 60 Ω to 600 Ω 600 Ω to 3 k Ω 3 k Ω to 300 k Ω 300 k Ω to 600 k Ω 600 k Ω to 3 M Ω 3 M Ω to 300 M Ω	1.2% to 0.07% 0.07% to 0.11% 0.11% to 0.03% 0.03% to 0.02% 0.02% to 0.03% 0.03% to 0.07% 0.07% to 0.04% 0.04% to 1.5%	Using Multifunction Calibrator Wavetek 9000 By Direct Method
6.	Capacitance [#]	1 kHz 100 pF to 900 pF 1 nF to 9 nF 10 nF to 99 nF 100 nF to 999 nF 1 μ F to 10 μ F	0.20% to 0.18% 0.06% to 4.3% 0.19% to 0.18% 0.19% to 0.18% 0.18% to 0.72%	Using Standard Capacitance Box by Direct Method

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7.	Inductance [#]	1 kHz 100 μ H to 100 mH 100 mH to 1H	0.33% to 1.11% 1.11% to 1.12%	Using Standard Inductance Box by Direct Method
8.	Frequency [#]	1 Hz to 1 kHz 1 kHz to 10 MHz	0.14% to 0.007% 0.007% to 0.012%	Using Multifunction Calibrator Wavetek 9000 By Direct Method
9.	Temperature Simulation [#] (Indicator, Controller and Recorder)			
	RTD PT-100 J-Type Thermocouple T-Type Thermocouple K-Type Thermocouple R-Type Thermocouple S-Type Thermocouple E-Type Thermocouple N-Type Thermocouple B-Type Thermocouple	(-) 200 °C to 800 °C (-) 180 °C to 750 °C (-) 200 °C to 400 °C (-) 200 °C to 1340 °C 50 °C to 1700 °C 50 °C to 1700 °C 0 °C to 800 °C (-) 200 °C to 1300 °C 800 °C to 1800 °C	0.34 °C 0.60 °C 0.71 °C 0.92 °C 2.41 °C 2.51 °C 0.50 °C 0.88 °C 2.09 °C	Using MFC Unomat TRX By Direct Method
II.	MEASURE			
1.	DC Voltage [#]	10 mV to 100 mV 100 mV to 1000 V	0.41% to 0.01% 0.01% to 0.06%	Using 6 $\frac{1}{2}$ DMM Agilent 34401A by Direct Method
2.	AC Voltage [#]	1 kHz 2 mV to 100 mV 40 Hz to 1 kHz 100 mV to 1V 1 V to 750 V	0.65% to 0.07% 0.53% to 0.11% 0.11% to 0.07%	Using 6 $\frac{1}{2}$ DMM Agilent 34401A by Direct Method

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3.	DC Current [#]	1 mA to 10 mA 10 mA to 3 A 3 A to 20 A	0.29% to 0.08% 0.08% to 0.16% 0.16% to 0.14%	Using 6½ DMM Agilent 34401A & current shunt Agilent 34330A by Direct Method
4.	AC Current [#]	40 Hz to 1 kHz 1mA to 1 A 1 A to 3 A 3 A to 30 A	0.55% to 0.19% 0.19% to 0.25% 0.19% to 0.67%	Using 6½ DMM Agilent 34401A & Current Shunt Agilent 34330A By Direct Method
5.	Resistance [#]	10 Ω to 100 Ω 100 Ω to 100 M Ω	0.054% to 0.018% 0.018% to 0.94%	Using 6½ DMM Agilent 34401A by Direct Method
6.	Frequency [#]	3 Hz to 100 Hz 100 Hz to 100 kHz 100 kHz to 20 MHz	0.12% to 0.01% 0.01% 0.07%	Using 6½ DMM & Frequency Counter Goodwill GFC 8055G By Direct Method
7.	Timer [#]	10 s to 7200 s	0.58%	Using Standard Timer By Direct Method
8.	Temperature Simulation [#] (Indicator, Controller and Recorder)			
	RTD PT-100	(-) 200 °C to 800 °C	0.32 °C	Using MFC Unomat TRX by Direct Method
	J-Type Thermocouple	(-)180 °C to 750 °C	0.49 °C	
	T-Type Thermocouple	(-)200 °C to 400 °C	0.60 °C	
	K-Type Thermocouple	(-)200 °C to 1340 °C	0.72 °C	
	R-Type Thermocouple	50 °C to 1700 °C	2.40 °C	
	S-Type Thermocouple	100 °C to 1700 °C	2.41 °C	
	E-Type Thermocouple	(-)200 °C to 1000 °C	0.39 °C	
	N-Type Thermocouple	(-)200 °C to 1300 °C	0.75 °C	
	B-Type Thermocouple	600 °C to 1800 °C	2.00 °C	

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MECHANICAL CALIBRATION				
I. PRESSURE INDICATING DEVICES				
1.	Vacuum [#] (Digital/Dial Gauge/ Transmitter/Transducers)	(-)0.9 bar to 0 bar	0.35 % rdg	Using Digital Pressure Gauge By Comparison Method As per DKD-R-6-1
2.	Pneumatic pressure [#] (Digital/dial Gauge/ Manometer/Differential Pressure/Transmitter/ Transducers)	0 to 1 bar 1 bar to 40 bar	0.5 % rdg 0.22 % rdg	Using Digital Pressure Calibrator & Digital Pressure Gauge By Comparison Method As per DKD-R-6-1
3.	Hydraulic Pressure [#] (Digital/Dial Gauge/ Transmitter/Transducers)	0 to 70 bar 70 bar to 700 bar	0.14 % rdg 0.13 % rdg	Using Digital Pressure Gauge By Comparison Method As per DKD-R-6-1
4.	Hydraulic Pressure [#] (Digital/Dial Gauge/ Transmitter/Transducers)	6.2 bar to 55 bar 55 bar to 551bar	0.14 % rdg 0.023 % rdg	Using Dead Weight Tester By Comparison Method As per DKD-R-6-1
II. WEIGHTS				
1.	F2 Class and Coarser ^s	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg	0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.03 mg	Using Weights of accuracy class F1 & Digital Balance (upto 60g/ 200g readability 0.01 mg/ 0.1mg) By Substitution method & ABBA Weighing Cycle procedure As per OIML-R-111

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		1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g	0.03 mg 0.04 mg 0.05 mg 0.06 mg 0.07 mg 0.09 mg 0.17 mg 0.30 mg	
	M1 Class and Coarser	500 g 1 kg 2 kg	9 mg 13 mg 20 mg	Using Weights of accuracy class F2 & Electronic Balance up to 4kg readability 0.01g by Substitution method & ABBA Weighing Cycle procedure. As per OIML-R-111
III.	WEIGHING SCALE AND BALANCE			
1.	Calibration Of Weighing Balance*			
	d= 0.01 mg and Coarser	0 to 60 g	0.03 mg	Using Standard Weights Accuracy Class F1 as per OIML-R-76-1:2006
	d= 0.1 mg and Coarser	> 60 g to 200 g	0.07 mg	
	d= 10 mg and Coarser	> 200 g to 4 kg	0.03 g	Using Standard Weights Accuracy Class F2 As per OIML-R-76-1:2006
	d= 1 g and Coarser d= 10 g and Coarser d= 100 g and Coarser	> 4 kg to 100 kg > 100 kg to 300 kg > 300 kg to 1000 kg	20 g 80 g 500 g	Using Standard Weights Accuracy Class M1 As per OIML-R-76-1:2006

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IV. VOLUME				
1.	Piston Pipette ^s	10 μ l to 100 μ l >100 μ l to 1000 μ l	0.13 μ l 0.13 μ l	Using Digital Balance up to 60g/200 g readability 0.01mg/ 0.1 mg & Distilled water of known density & Calibration of Micropipette as per ISO 8655-6, ISO/TR 20461
2.	Glass Pipette ^s (Graduated/Non-Graduated) ^s	1 ml to 25 ml > 25 ml to 100 ml	0.06 ml 0.07 ml	Using Digital precision Balances & Distilled water of known density as per ISO 4787, ISO/TR 20461
	Glass Burette ^s	1 ml to 25 ml > 25 ml to 100 ml	0.06 ml 0.07 ml	Using and Digital precision Balances & Distilled water of known density as per ISO 4787, ISO/TR 20461
	Measuring Cylinder / Volumetric Flask / Conical Flask / Dispenser / Beaker ^s	5 ml to 100 ml > 100 ml to 2000 ml	0.06 ml 0.25 ml	Using Digital precision Balances & Distilled water of known density as per ISO 4787, ISO/TR 20461
V. ACOUSTICS				
1.	Sound Level Meter ^s	94 dB & 114 dB	0.52 dB	Using Sound Level Calibrator As per IS 15575 / OIML-R-58, BL-WI-M15

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VI. TORQUE GENERATING DEVICES				
1.	Torque Wrench / Torque Screw Driver ^s (Type-I Class-A,B,C,D,E Type-II Class-A,B,C,D,E,F,G)	0.1 Nm to 2 Nm 20 Nm to 1000 Nm	1% rdg 0.8% rdg	Using Digital Torque Calibration System by Comparison Method As per ISO 6789:2003
VII. MOBILE FORCE MEASURING SYSTEM				
1.	Push Pull Gauge / Force Gauge ^s	5 N to 50 N 50 N to 500 N	0.9 N 3 N	Using Standard Weights As Per ASTM E4-16
VIII. ACCELERATION & SPEED				
1.	Non Contact Type - Tachometer & Rpm indicator ^s	60 rpm to 96000 rpm	0.6 % rdg	Using Digital Tachometer By Comparison Method
2.	RPM Indicators [*]	60 rpm to 24000 rpm	0.6 % rdg	Using Digital Tachometer By Comparison Method
IX. DIMENSION (Basic Measuring Instruments, Gauge etc.)				
1.	Caliper ^s (Vernier/Dial/Digital) L.C.: 0.01 mm ^o	0 to 300 mm 0 to 600 mm 0 to 1000 mm 0 to 1500 mm	8.5 μ m 9.0 μ m 9.2 μ m 12.8 μ m	Using Gauge Block, Length Bars and Caliper Checker By Comparison Method
	L.C.: 0.02 mm ^o	0 to 2000 mm	19.7 μ m	
2.	Inside Caliper ^s (Dial/Digital) L.C.: 0.01 mm ^o	0 to 600 mm	8.4 μ m	Using Caliper Checker By Comparison Method

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3.	Height Gauge ^s (Dial/Digital) L.C.: 0.01 mm ^φ	0 to 600 mm 0 to 1000 mm	8.4 μ m 12.9 μ m	Using Gauge Block, Length Bars and Caliper Checker By Comparison Method
4.	Electronic Height Gauge ^s L.C.: 0.0001mm ^φ	0 to 600 mm	4.1 μ m	Using Gauge Block, Length Bars by Comparison Method
5.	External Micrometer ^s L.C.: 0.001mm ^φ L.C.: 0.01mm ^φ	0 to 100 mm >100 mm to 300 mm 0 to 2000 mm	1.0 μ m 1.8 μ m 19.3 μ m	Using Gauge Block, Length Bars By Comparison Method
6.	Internal Micrometer ^s (Caliper Type) Digital L.C.: 0.001 mm ^φ	5 mm to 100mm	1.1 μ m	Using Gauge Block By Comparison Method
7.	Internal Micrometer ^s (Stick/Tubular Type) L.C.: 0.001 mm ^φ	13 mm to 2100 mm	6.9 μ m	Using Gauge Block, Length Bar & Dial Test Indicator By Comparison Method
8.	Depth Micrometer ^s Digital L.C.: 0.001mm ^φ	0 to 300 mm	2.2 μ m	Using Gauge Block, Long Gauge Block By Comparison Method

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9.	Depth Gauge ^s (Dial/Digital) L.C.: 0.01mm ϕ	0 to 300 mm	7.5 μ m	Using Gauge Block, Caliper Checker, Long Gauge Block By Comparison Method
10.	Depth Caliper ^s (Dial/Digital) L.C.: 0.01mm ϕ	0 to 600 mm	15.1 μ m	Using Gauge Block, Caliper Checker, Long Gauge Block By Comparison Method
11.	Plunger Dial Indicator ^s (Dial/Digital) L.C.: 0.001 mm ϕ	0 to 50 mm	5.8 μ m	Using Gauge Block / Dial Calibration Tester By Comparison Method
12.	Dial Test Indicator ^s (Dial/Digital) L.C.: 0.001 mm L.C.: 0.01 mm	0 to 0.14 mm 0 to 1.6 mm	0.7 μ m 5.8 μ m	Using Gauge Block / Dial Calibration Tester By Comparison Method
13.	Dial Caliper Gauge ^s L.C.: 0.001mm ϕ	0 to 100 mm	6.1 μ m	Using Gauge Block by Comparison Method
14.	Cylindrical Setting Master ^s	5 mm to 100 mm	2.4 μ m	Using Gauge Block, Electronic Comparator By Comparison Method

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15.	Dial Thickness Gauge ^s L.C.: 0.001 mm ^φ	0 to 25mm	0.9 μ m	Using Gauge Block By Comparison Method
16.	Dial Bore Gauge ^s Span dia. (6 mm to 400 mm) L.C.:0.001 mm ^φ	1 mm (Transmission Error)	2.2 μ m	Using Gauge Block / Dial Calibration Tester By Comparison Method
17.	LVDT / Electronic Probe With Dro ^s L.C.:0.001mm ^φ	0 to 100 mm	0.81 μ m	Using Gauge Block By Comparison Method
18.	Dial Calibration Tester ^s L.C.:0.0001mm ^φ	0 to 25mm	0.7 μ m	Using Gauge Block, Electronic Comparator By Comparison Method
19.	Micrometer Head ^s L.C.:0.001mm ^φ	0 to 50 mm	1.0 μ m	Using Gauge Block, Electronic Comparator By Comparison Method
20.	Caliper Checker ^s	0 to 600 mm	5.0 μ m	Using Gauge Block, Electronic Comparator By Comparison Method
21.	Height Master ^s L.C.:0.002 mm ^φ	0 to 600 mm	5.0 μ m	Using Gauge Block, Electronic Comparator By Comparison Method

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22.	Feeler Gauge ^s	0.005 mm to 2 mm	1.8 μ m	Using Digimatic Micrometer By Comparison Method
23.	Standard Foils ^s	0.01 mm to 2 mm	1.6 μ m	Using Digimatic Micrometer By Comparison Method
24.	Comparator Stand ^s	300 mm X 300 mm	2.0 μ m	Using Surface Plate With Dial Test Indicator
25.	Straight Edges ^s	Up to 1000 mm	9.6 μ m	Using Surface Plate With Dial Test Indicator
26.	Engineer's Parallels ^s	Up to 1000 mm	9.6 μ m	Using Surface Plate With Dial Test Indicator
27.	Engineer's Square ^s	Up to 450 mm	2.0 μ m	Using Surface Plate With Dial Test Indicator
28.	V-Block ^s Squareness Parallelism Symmetricity	Up to 200 mm	2.8 μ m 2.8 μ m 8.6 μ m	Using Granite Square, Surface Plate with Dial Test Indicator
29.	Cylindrical Measuring Pins ^s	0.1 mm to 20mm	1.8 μ m	Using Gauge Block, Electronic Comparator By Comparison Method
30.	Length Bar ^s	25 mm to 600 mm	3.8 μ m	Using Gauge Block, Electronic Comparator By Comparison Method

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31.	Micrometer Setting Rod ^s	25 mm to 600 mm	7.31 μ m	Using Gauge Block, Electronic Comparator By Comparison Method
32.	Coating Thickness Gauge ^s L.C.: 0.1 μ m ^o	10 mm to 2000 μ m	4.6 μ m	Using Standard Foil By Comparison Method
33.	Ultra Sonic Thickness Gauge ^s L.C.: 0.1mm	5 mm to 100 mm	37 μ m	Using Gauge Block
34.	Plain Plug Gauge ^s	6 mm to 200 mm	1.5 μ m	Using Gauge Block, Long Gauge Block, Electronic Comparator By Comparison Method
35.	Snap Gauge ^s	3 mm to 500 mm	3.8 μ m	Using Gauge Block, Long Gauge Block
36.	Thread Plug Gauge ^s (effective dia. only)	2 mm to 100 mm	4.7 μ m	Using F.C.D.M. / Thread Measuring Wire Set
37.	Height Gauge* (Dial/Digital) L.C.: 0.01 mm ^o	0 to 600 mm 0 to 1000 mm	8.4 μ m 12.9 μ m	Using Gauge Block, Length Bars and Caliper Checker By Comparison Method
38..	Electronic Height Gauge* L.C.: 0.0001mm ^o	0 to 1000 mm	4.1 μ m	Using Gauge Block, Length Bars By Comparison Method

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39.	Surface Plate* (Grade 1 and coarser)	3500 mm X 2600 mm	$3.1\sqrt{(L+W / 150)} \mu\text{m}$ Where L & W in mm	Using Spirit Level (0.02 mm/m)
II. DIMENSION (PRECISION INSTRUMENTS)				
1.	Microscope* (Axis Movement)	0 to 50 mm 0 to 300 mm	1.22 μm 5.74 μm	Using Glass Scale By Comparison Method
2.	Profile Projector / Video Measuring Machine* Linear Angular Magnification	300 mm X 200 mm 360° 100X	14.0 μm 30 arc sec 0.13%	Using Glass Scale & Angular Graticule By Comparison Method

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THERMAL CALIBRATION				
I.	TEMPERATURE			
1.	Liquid-In-Glass Thermometers*	(-) 10 °C to 50 °C 50 °C to 250 °C	0.76 °C 0.66 °C	Using RTD (PT 100), 6½ DMM with Cryostatic Circulator & Oil Bath by Comparison Method
2.	RTD'S, Thermocouple With & Without Controllers, Temperature Indicator With Sensor, Recorders With Probes, Data Logger, Digital Thermometers with Sensor, Temperature Gauges, Temperature Transmitter, Temperature Transducer*	(-) 80 °C to 50 °C 50 °C to 250 °C 250 °C to 400 °C 400 °C to 600 °C 600 °C to 800 °C 800 °C to 1200 °C	0.16 °C 0.28 °C 0.31 °C 1.29 °C 1.58 °C 1.91 °C	Using RTD (PT 100), S-type Thermocouple, 6½ DMM with Cryostatic Circulator & Dry Block Temperature Calibrators by Comparison Method
3.	Thermal Chambers/ furnaces/ ovens Incubators/water bath/ deep freezers*	50 °C to 600 °C 800 °C to 1200 °C	1.9 °C 3.3 °C	Using (Min. 9 sensor) Thermocouple Type-K, Multi Channel Temperature Recorder By Multi Position Calibration
4.	Temperature Indicator With Sensor of Equipment E.G Thermal Chambers/Furnaces/Ovens/Incubators/Dry Block Furnace/Water Bath/ Deep Freezers, Autoclaves*	(-) 80 °C to 50 °C 50 °C to 250 °C 250 °C to 400 °C	0.24 °C 0.18 °C 0.31 °C	Using Temperature Calibrator With RTD Sensor Single Position Calibration

Shally Sharma
Convenor

Avijit Das
Program Director



National Accreditation Board for Testing and Calibration Laboratories

(A Constituent Board of Quality Council of India)



SCOPE OF ACCREDITATION

Laboratory AVM Labs Pvt. Ltd., Door No 49, Moorthy Nagar, 3rd Street, Chettiar Agaram, Porur, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2088 **Page** 16 of 16

Validity 18.09.2017 to 19.10.2018 **Last Amended on** --

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
5.	Non-Contact Type Thermometer* (Infrared Thermometer / Digital Pyrometer)	50 °C to 200 °C 200 °C to 400 °C 400 °C to 900 °C	2.9 °C 3.22 °C 4.0 °C	Using Infrared Thermometer & Black Body Source By comparison method
6.	Thermal Chambers/ Furnaces/Ovens/Incubators/Dry Block Furnace/ Water Bath/ Deep Freezers, Autoclaves*	400 °C to 600 °C 600 °C to 1000 °C 1000 °C to 1200 °C	1.95 °C 1.95 °C 2.89 °C	Using Temperature Calibrator With S-type Sensor Single Position Calibration
II. SPECIFIC HEAT AND HUMIDITY				
1.	Humidity & Temperature Indicator of Environmental Chamber/Temperature & Humidity Indicators (Digital / Analog)/ Humidity Sensor with Indicator/Controller/ Data Logger/Recorder#	12% RH to 95% RH @ 25 °C 15 °C to 50 °C @ 50% RH	0.92% RH 0.68°C	Using Digital RH Indicator with Sensor & Humidity Generator Bt 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.

° 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.

Shally Sharma
Convenor

Avijit Das
Program Director