

Laboratory Autocal Systems, 83/526, Sant Tukaram Nagar, Pimpri, Pune, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2614 (In lieu of C-1346,C-1347 & C-1348) **Page** 1 of 12

Validity 10.03.2018 to 09.03.2020 **Last Amended on** 16.03.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
1.	SOURCE			
1.	DC Voltage [#]	20 mV to 900 V	0.174% to 0.13 %	Using Zeal ZS5.5 Multifunction Calibrator By Direct Method
2.	DC Current [#]	0.2 mA to 100 mA 100 mA to 9 A 10 A to 900 A	0.27% to 0.16% 0.16% to 0.28% 2.530% to 2.279%	Using Multifunction Calibrator with Current Coil By Direct Method
3.	AC Voltage [#]	50 Hz 20 mV to 100 mV 100 mV to 900 V	1.33% to 0.32% 0.32% to 0.24%	Using Multifunction Calibrator By Direct Method
4.	AC Current [#]	50 Hz 2 mA to 100 mA 100 mA to 9 A 10 A to 900 A	0.6% to 0.45% 0.45% to 0.33% 3.31% to 1.96%	Using Multifunction Calibrator with Current Coil By Direct Method
5.	Temperature Simulation [#] (Temperature Indicator) RTD K Type J Type T Type R Type S Type	(-)200 °C to 400 °C 0 °C to 1250 °C 0 °C to 700 °C (-)150 °C to 400 °C 100 °C to 1700 °C 100 °C to 1700 °C	1.00 °C 0.71 °C 0.70 °C 0.71 °C 1.90 °C 1.30 °C	Using Massibus Unical 3001 M Calibrator By Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
6.	Resistance [#]	1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 1 k Ω to 10 k Ω 10 k Ω to 100 k Ω 100 k Ω to 1 M Ω 1 M Ω to 10 M Ω 10 M Ω to 100 M Ω	0.91% to 0.58% 0.29% to 0.117% 0.117% to 0.117% 0.117% to 0.117% 0.117% to 0.117% 0.117% to 0.117% 0.117% to 0.117% 0.117% to 0.964%	Using Zeal Precision decade Resistance Box By Direct Method
II. MEASURE				
1.	DC Voltage [#]	1 mV to 1000 V	1.00 % to 0.01%	Using 6½ DMM Meco 65P By Direct Method
2.	DC Current [#]	1 mA to 20 mA 20 mA to 100 mA 100 mA to 10 A	0.50 % to 0.10 % 0.10% to 0.07% 0.07% to 0.50%	Using 6½ DMM Meco 65P By Direct Method
3.	AC Voltage [#]	50 Hz 1 mV to 10 mV	0.50 % to 0.10 % 0.10% to 0.07% 0.07% to 0.50%	Using 6½ DMM Meco 65P By Direct Method
4.	AC Current [#]	50 Hz 1 mA to 10 mA 1 A to 9 A	0.46 % to 0.16 % 0.16 % to 0.246 %	Using 6½ DMM Meco 65P By Direct Method
5.	Resistance [#]	1.2 Ω to 2 k Ω 2 k Ω to 100 k Ω 100 k Ω to 1 M Ω	0.50% to 0.050% 0.05% to 0.013% 0.013 % to 0.20 %	Using 6½ DMM Meco 65P By Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
6.	AC High Voltage*	50 Hz 1 kVAC to 10 kVAC 10 kVAC to 20 kVAC 20 kVAC to 40 kVAC	7.555% to 5.310% 5.310% to 5.293% 5.293 % to 5.000 %	Using HV Probe With DMM By Direct Method
7.	AC High Voltage ^s	50 Hz 1 kVAC to 5 kVAC	7.555% to 5.310%	Using HV Probe With DMM By Direct Method
8.	Time [#]	6 sec to 3600 Sec	1.17 Sec	Using Digital Timer Autonics CT6S By Comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>MECHANICAL CALIBRATION</u>				
I.	DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)			
1.	Micrometer setting Gauge ^s	Up to 100 mm 100 mm to 300 mm	3.4 μ m 3.6 μ m	Using Electronic dial Comparator with Probe & slip Gauges Length Bar by comparison Method
2.	Thickness Foils ^s	0.01 to 0.7 mm	3.09 μ m	Using Electronic dial Comparator with Probe & slip Gauge by comparison Method
3.	Feeler Gauge ^s	Up to 1.0 mm	1.37 μ m	Using Electronic dial Comparator with Probe & slip Gauges by comparison Method
4.	V Block Symmetry & Parallelism ^s	Up to 100 mm	11.26 μ m 11.26 μ m	Using Straight Mandrel & Plunger Dial by direct Method
5.	Plain Gap Gauge ^s	Up to 100 mm 100mm to 250 mm	3.2 μ m 4.3 μ m	Using Slip Gauge by comparison Method
6.	Plain Plug / Width Gauge ^s	Up to 100 mm 100mm to 250 mm	3.4 μ m 5.3 μ m	Using Electronic dial Comparator with Probe & slip Gauges by comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
7.	Caliper Vernier / Dial / Electronic ^s L.C :- 0.01mm L.C :- 0.02mm	0 to 600 mm 0 to 1000 mm	15.93 μ m 16.85 μ m	Using Caliper checker, Length Bar & Slip Gauge Set by direct Method
8.	Height Gauge Vernier/ Dial / Electronic ^s L.C :- 0.01mm L.C :- 0.01mm	0 to 600 mm 0 to 1000 mm	13.0 μ m 16.20 μ m	Using Caliper checker & Surface Plate Length Bar & Surface Plate by direct Method
9.	Depth Gauge / Vernier / Dial / Electronic ^s L.C :- 0.01mm	0 to 300 mm	12.20 μ m	Using Depth Micrometer Checker by direct Method
10	External Micrometer ^s L.C :- 0.01 mm L.C :- 0.01 mm	0 to 100 mm 100mm to 300 mm	6.96 μ m 5.90 μ m	Using Slip Gauge set ,length Bar by comparison Method
11.	Internal Micrometer ^s (Two Point) L.C :- 0.01 mm	Up to 300 mm	8.30 μ m	Using Slip Gauge set , Electronic Dial Comparator with Probe by comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
12.	Two Pin Dial Caliper ^s L.C :- 0.05 mm	Up to 50 mm	23.91 μ m	Using Slip Gauge set , Electronic Dial Comparator with Probe by direct Method
13.	Depth Micrometer ^s L.C :- 0.01 mm	0 to 300 mm	9.0 μ m	Using Depth Micrometer Checker by direct Method
14.	Plunger Type Dial Gauge ^s L.C :- 0.001 mm	Up to 25 mm	2.6 μ m	Using Dial Calibration Tester by direct Method
15.	Lever Type Dial Gauge ^s L.C :- 0.001 mm	Up to 2 mm	2.6 μ m	Using Dial Calibration Tester by direct Method
16.	Dial Bore Gauge ^s (for Transmission Mechanism)	Up to 1 mm	4.70 μ m	Using Dial Caliper Tester, Master Plunger Type Dial Gauge by direct Method
17.	Dial Snap Gauge ^s L.C :- 0.001 mm	Up to 250 mm	4.60 μ m	Using Gauge Block Set by comparison Method
18.	Dial Thickness Gauge ^s L.C :- 0.01 mm	Up to 25 mm	5.80 μ m	Using Gauge Block Set by comparison Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
19.	Bevel Protector ^s L.C :- 5min	0° -90° -0°	5min of arc	Using Angle Gauge Block Set by comparison Method
20.	Combination Set/Angle Protector ^s L.C :- 1°	0-180°	35min of arc	Using Angle Gauge Block Set by comparison Method
21.	Surface Plate*	3000mm X 2000mm	$2.6 \times \sqrt{L+W}/100$ Where L= Length & W= Width in mm	Using Spirit Level by direct Method
II.	PRESSURE INDICATING DEVICES			
1.	Pressure Pneumatic Dial and Digital Pressure Gauge Pressure Transmitter [#]	0 to 1 Bar 1 to 30 Bar 0 to 2000 Pa	0.006 Bar 0.1 Bar 6.6 Pa	Using Digital Pressure Gauge & DMM Source :- Pressure Comparator by Comparison Method based on DKD-R-6-1
2.	Pressure Hydraulic Dial and Digital Pressure Gauge Pressure Transmitter [#]	0 to 300 Bar 0 to 700 Bar	0.74 Bar 1.4 Bar	Using Digital Pressure Gauge & DMM Source :- Pressure Comparator by Comparison Method based on DKD-R-6
3.	Vacuum Gauge Dial and Digital Pressure Gauge Pressure Transmitter [#]	(-)0.85 to 0 Bar	0.0085 Bar	Using Digital Pressure Gauge & DMM Source :- Pressure Comparator by Comparison Method based on DKD-R-6-1

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
III. ACOUSTICS				
1.	Sound Level Meter ^s	1kHz 94 dB 114 dB	1.02 dB 1.17 Db	Using Sound Level Calibrator By Direct Method
IV. WEIGHTS				
1.	Mass ^s Weight of E2 class (1mg to 200 g)	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	0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.05 mg 0.05 mg 0.05 mg 0.05 mg 0.05 mg 0.05 mg 0.07 mg 0.07 mg 0.07 mg 0.17 mg 0.17 mg	Using E2 Class Standard Weights of 1 mg to 200 g & Balance of d : 0.01 mg up to 82 g and 0.1 mg up to 200 g Calibration Of M1 Class Weights & Coarser as per OIML R-111 :2004 Based on uncertainty and repeatability of Balance. By Substitution Method through ABBA Cycle

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
	Weight of F1 class 10 to 20 kg)	10 kg 20 kg	371 mg 546 mg	Using F1 Class Standard Weights and balance of 30 kg and d: 0.1 g & Calibration Of M2 Class Weights & Coarser as per OIML R-111 :2004 Based on uncertainty and repeatability of Balance By Substitution Method through ABBA Cycle
V.	WEIGHING SCALE AND BALANCE			
1.	Electronic Weighing Balance [#] d : 1 mg d : 1 g	10 mg to 200 g 1 g to 6 kg	7.3 mg 0.82 g	Using E2 Class Standard Weights of 1 mg to 200 g. & Calibration of class 2 Weighing balances & Coarser as per OIML R-76
	d : 1 g d : 5 g	10 g to 30 kg 100 g to 100 kg	3.18 g 26.4 g	Using F1 and M1 Class Standard Weights of 500g to 20 kg.& Calibration of class 3 Weighing balances & Coarser as per OIML R-76

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VI. VOLUME				
1.	Micro Pipette ^s	100 μ l to 1000 μ l	5.31 μ l	Using Weighing Balance With d: 0.01 mg and 0.1 mg & Distilled Water & E2 Class Standard Weights & Calibration of Micro Pipette. Based on Gravimetric Method as per ISO 8655-6
2.	Glassware ^s (Glass Pipettes, Burettes, Conical Flask, Beakers, Measuring Cylinder)	1 ml to 5 ml 5 ml to 10 ml 10 ml to 100 ml	0.017 ml 0.059 ml 0.21 ml	Using Weighing balance with 200 g & d:0.01/0.1 mg & Distilled Water & E2 Class Standard weights Calibration of Glassware Based on Gravimetric Method as per ISO 4787

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>THERMAL CALIBRATION</u>				
I.	TEMPERATURE			
1.	RTD/TC With & Without Indicator, Temperature Measuring Device with Probe/ Data logger Recorder/ Temp.Transmitter [#]	(-)30 °C to 50 °C 50 °C to 250 °C 250 °C to 1100 °C	0.37 °C 0.62 °C 2.43 °C	Using Standard PRT , R Type T/C With 6 ½ DMM, Liquid Baths, Dry Well Baths & Dry Well Furnace. By Comparison Method
2.	Glass Thermometer ^s	(-)10 °C to 250 °C	0.68 °C	Using Standard PRT, 6 ½ DMM & Liquid Bath By Comparison Method
3.	Dial Thermometer ^s	0 °C to 250 °C	0.68 °C	Using Standard PRT, 6 ½ DMM & Liquid Bath By Comparison Method
4.	Temperature indicator with sensor of Freezer, oven, Furnace, Bath, Dry Block furnace [#]	(-)30 °C to 50 °C 50 °C to 250 °C 250 °C to 1100 °C	0.37 °C 0.63 °C 2.43 °C	Using Standard PRT, 6 ½ DMM & Liquid Bath By single position calibration (At Measuring Location in DUC)

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
5.	Calibration of Oven, Chamber, Freezer,cold Room*	(-)-70 °C to 250 °C	4.1 °C	Using Standard RTD Sensors (Minimum Nine) with Data Logger By 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.

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