Laboratory	**Nishitronics Instrumentation, Flat No. 1 & 5, Plot No. 113, Servey No. 635/642, Gurukrupa Building Mahesh Co. Op. Housing Soc. Bibwewadi, Pune, Maharashtra**
Accreditation Standard	**ISO/IEC 17025: 2005**
Certificate Number	**CC-2294** **Page 1 of 11**
Validity	**14.06.2018 to 13.06.2020** **Last Amended on -**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		ELECTRO-TECHNICAL CALIBRATION		
I.	**SOURCE**			
1.	DC Voltage #	1 mV to 20 mV 20 mV to 200 mV 200 mV to 1000 V	0.475 % to 0.029 % 0.029 % to 0.008 % 0.008 % to 0.10 %	Using Multifunction Calibrator By Direct Method
2.	DC Current#	20 µA to 200 µA 200 µA to 200 mA 200 mA to 20 A 20 A to 1000 A	0.166 % to 0.032 % 0.032 % to 0.019 % 0.019 % to 0.094 % 0.58 %	Using Multifunction Calibrator By Direct Method Using Multifunction Calibrator With Turn Coil
3.	AC Voltage#	**@50 Hz to 1 kHz** 10 mV to 200 mV 200 mV to 20 V 20 V to 1000 V	 1.22 % to 0.14 % 0.14 % to 0.089 % 0.089 % to 0.12 %	Using Multifunction Calibrator By Direct Method
4.	AC Current#	**@50 Hz to 1 kHz** 20 µA to 200 mA 200 mA to 20 A **@50 Hz to 500 Hz** 20 A to 1000 A	 1.84 % to 0.113 % 0.113 % to 0.267 % 0.64 %	Using Multifunction Calibrator By Direct Method Using Multifunction Calibrator with Turn Coil

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5.	Resistance[#] 2 Wire	10 Ω to 100 kΩ 100 kΩ to 100 MΩ (In Discrete Decade Values) 40 Ω to 40 kΩ	0.114 % to 0.0174 % 0.0174 % to 1.2 % 0.202 % to 0.038 %	Using Multifunction Calibrator By Direct Method
6.	Frequency[#]	10 Hz to 10 MHz	0.07 % to 0.0024 %	Using Multifunction Calibrator By Direct Method
7.	Capacitance[#]	**@ 1 kHz** 10 nF to 1 µF	0.58 % to 0.29 %	Using Multifunction Calibrator By Direct Method
8.	Period[#]	100 ns to 1s	0.0023 %	Using Multifunction Calibrator By Direct Method
9.	AC Power/ AC Energy[#] 1Ø & 3Ø Active / Reactive/ Apperent With CosØ ± 0.1 to 1	**@ 50 Hz** 0.2 W to 115.2 kW (40 to 320 V & 50 mA to 120 A) CosØ ± 0.1 to 1	0.31 % to 0.058 %	Using 3 Phase Reference Standard Calmet C300B By Direct Method
10.	Harmonics in Voltage & Current[#] Up to 39 Order	**@ 50 Hz** 250 V & 5 A (1 % to 40 %)	0.8 %	Using 3 Phase Reference Standard Calmet C300B By Direct Method
11.	CT Ratio[#]	1 A to 1000 A/ 5 mA to 5 A Ratio Phase	 0.33 % 0.12°	Using 3 Phase Reference Standard Calmet C300B By Direct Method

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12.	Temperature Simulation[#] (Temperature Indicator)			
	RTD K Type J Type T Type R Type S Type B Type E Type N Type	(-) 100 ºC to 800 ºC (-) 200 ºC to 1350 ºC (-) 200 ºC to 1200 ºC (-) 200 ºC to 400 ºC 50 ºC to 1700 ºC 50 ºC to 1700 ºC 600 ºC to 1800 ºC (-) 200 ºC to 1000 ºC (-) 200 ºC to 1200 ºC	0.29 ºC to 1.2 ºC 0.29 ºC 0.23 ºC 0.23 ºC 1.15 ºC 1.04 ºC 1.73 ºC 0.23 ºC 0.46 ºC	Using Multifunction Calibrator By Direct Method
II.	**MEASURE**			
1.	DC Voltage[#]	1 mV to 100 mV 100 mV to 10 V 10 V to 1000 V	0.093 % to 0.0025 % 0.0025 % to 0.006 % 0.006 % to 0.0025 %	Using Agilent 3458A By Direct/Comparison Method
2.	DC High Voltage[♣]	1 kV to 30 kV	3.0 %	Using H.V. Probe With DMM
3.	DC Current[#]	100 nA to 1 µA 1 µA to 100 µA 100 µA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 20 A	0.63 % to 0.7 % 0.7 % to 0.013 % 0.013 % to 0.007 % 0.007 % to 0.0088 % 0.0088 % to 0.019 % 0.25 %	Using Agilent 3458A with Current Shunt By Direct/Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
4.	AC Voltage#	**50 Hz to 10 kHz** 1 mV to 100 mV 100 mV to 10 V 10 V to 100 V 100 V to 700 V **10 kHz to 100 kHz** 1 mV to 100 mV 100 mV to 10 V	 0.37 % to 0.014 % 0.014 % 0.014 % to 0.027 % 0.027 % to 0.074 % 0.77 % to 0.097 % 0.097 %	Using Agilent 3458A By Direct/Comparison Method
5.	AC High Voltage♣	1 kV to 30 kV	3.0 %	Using HV Probe with DMM by Direct Method
6.	AC Current#	**50 Hz to 10 kHz** 10 µA to 100 µA 100 µA to 100 mA 100 mA to 1 A **50 Hz to 5 kHz** 1 A to 20 A	 0.43 % to 0.11 % 0.11 % to 0.099 % 0.099 % to 0.147 % 0.26 %	Using Agilent 3458A with current shunt By Direct/Comparison Method
7.	Resistance# (2 Wire)	100Ω to 1 MΩ 1 MΩ to 100 MΩ 100 MΩ to 1 GΩ	0.062 % to 0.004 % 0.004 % to 0.12 % 0.12 % to 1.34 %	Using Agilent 3458A By Direct/Comparison Method
8.	Frequency#	1 Hz to 10 MHz	0.074 % to 0.11 %	Using Agilent 3458A By Direct/Comparison Method
9.	Period#	10 ns to 1 s	0.012 % to 0.058 %	Using 8½ DMM By Direct/Comparison Method
10.	Time# (Stop Watch)	6 sec to 60 min	0.2 to 2s	Using Stop watch By Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
11.	Temperature Simulation# Process Calibrator/ Recorder/Controller			Using Agilent 3458A By Direct/Comparison Method
	RTD/PRT	(-) 200 °C to 850 °C	0.023 °C	
	K Type	(-) 200 °C to 1370 °C	0.048 °C	
	J Type	(-) 200 °C to 1200 °C	0.042 °C	
	T Type	(-) 200 °C to 400 °C	0.041 °C	
	R Type	150 °C to 1700 °C	0.13 °C	
	S Type	150 °C to 1700 °C	0.16 °C	
	B Type	600 °C to 1800 °C	0.14 °C	
	E Type	(-) 200 °C to 1000 °C	0.037 °C	
	N Type	(-) 200 °C to 1300 °C	0.058 °C	

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	MECHANICAL CALIBRATION			
I.	**PRESSURE INDICATING DEVICES**			
1.	Pressure Pneumatic (Pressure Gauges/ Indicators, Pressure Transmitter, Pressure Switch)#	0 to 2 bar 0 to 16 bar	0.0005 bar 0.0025 bar	Using Wika Process Calibrator CPH 6000, Digital Test Gauge & Test Comparator Pumps By Comparison Method
2.	Pressure Hydraulic (Pressure Gauges/ Indicators, Pressure Transmitter, Pressure Switch) #	0 to 40 bar 0 to 250 bar 0 to 1000 bar	0.0055 bar 0.03 bar 0.1 bar	Using Wika Process Calibrator CPH 6000, Digital Test Gauge & Test Comparator Pumps By Comparison Method
3.	Vacuum (Vacuum Gauges/ Indicators, Vacuum Transmitters, Switch)#	(-) 0.85 bar to 0 bar	0.00044 bar	Using Wika Process Calibrator & Vacuum Test Comparator Pumps By Comparison Method
4.	Speed # (Non Contact) RPM, Tachometer & Rpm Generator	100 RPM to 20000 RPM 20000 RPM to 40000 RPM 40000 RPM to 90000 RPM	4 rpm 30 rpm 120 rpm	Using Tachometer with Techo generator By Comparison Method
5.	Speed # (Contact) RPM, Tachometer & Rpm Generator	100 RPM to 5000 RPM	4.5 rpm	By Direct Using Tachometer with Techo Generator By Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
II.	**ACOUSTICS**			
1.	Sound Level Meter[$]	94 dB & 114 dB	0.5 dB	Using Sound Level Calibrator By Comparison Method
III.	**WEIGHTS**			
1.	Mass[$]	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	0.01 mg 0.01 mg 0.01 mg 0.01 mg 0.01 mg 0.02 mg 0.02 mg 0.02 mg 0.02 mg 0.03 mg 0.04 mg 0.05 mg 0.09 mg 0.09 mg 0.09 mg 0.13 mg 0.2 mg	Using E1 Class Standard Weights and Mass Comparator / Precision Weighing Balance Readability: 0.01mg Calibration of weights of Class F1 accuracy and coarser as per OIML R-111
		500 g 1 kg 2 kg	3 mg 5 mg 10 mg	Using E1 Class Standard Weights and Mass Comparator / Precision Weighing Balance Readability: 1mg & 10mg Calibration of weights of Class F2 accuracy and coarser as per OIML R-111

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		5 kg 10 kg 20 kg	100 mg 200 mg 200 mg	Using F1 Class Standard Weights and Mass Comparator / Precision Weighing Balance Readability: 100mg Calibration of weights of Class M1 accuracy and coarser as per OIML R-111
2.	Mass – Analogue / Electronic Weighing Balance # Readability: 0.001 mg, 0.01mg , 0.1 mg	 Up to 60 g Up to 500 g	 0.02 mg 0.2 mg	Using Weights of Accuracy class E1 Calibration of Electronic / Analytical Weighing Balance of Class I and coarser As per OIML R-76-1
3.	Mass – Analogue / Electronic Weighing Balance # Readability: 0.001 g 0.01 g 1.0 g	 Up to 1kg Up to 5 kg Up to 50 kg	 10 mg 15 mg 5 g	Using Weights of Accuracy class F1 Calibration of Electronic/ Analytical Weighing Balance of Class II and coarser As per OIML R-76-1
IV.	**VOLUME**			
1.	Volume$ Pipette (@ 27° C)	10 µl to 1000 µl	0.1 µl	Using standard weights E1 class ,Precision Balances L.C 0.01mg,Triple filter distilled ISO 8655 part 6

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
2.	Glass ware[$] (Volumetric Apparatus Flasks, Burette, Pipette, Measuring Cylinder) (@ 27°C)	@27°C 1 ml to 100 ml > 100 ml to 1000 ml > 1000 ml to 2 l > 2000 ml to 5 l	 0.006 µl 0.035 µl 5.0 µl 6 ml	Using standard weights E-1&F1 class, Precision Balances L.C 0.01mg,0.1 mg & 1mg, Triple filter distilled water Gravimetric Method based on ISO 4787

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		THERMAL CALIBRATION		
I.	**TEMPERATURE**			
1.	RTD / T/C with & without Indicator, Temperature Measuring Device with probe, Temp Gauge, Dig. Thermometer, Temp. Transmitter#	(-) 38 ºC to 60 ºC 60 ºC to 650 ºC 650 ºC to 1000 ºC 1000 ºC to 1200 ºC	0.05 ºC 0.08 ºC 2.43 ºC 2.72 ºC	Using Standard SSPRT, R Type T/C with 6½ DMM, Fluke DAQ STAQ, Liquid Baths, Dry Well Baths & dry well Furnace By Comparison Method
2.	Infrared/Pyrometers#	150 ºC to 1200 ºC	3 ºC	Using Standard R Type T/C with 6 ½ DMM, Blackbody Furnace By Comparison Method
3.	Glass Thermometer# L.C.: 0.1 ºC	(-) 38 ºC to 60 ºC 60 ºC to 250 ºC	0.12 ºC	Using Standard SSPRT, 6 ½ DMM , Fluke DAQ STAQ & Liquid Bath By Comparison Method
	L.C.: 1 ºC	(-) 38 ºC to 60 ºC 60 ºC to 250 ºC	0.6 ºC	
4.	Liquid Baths#	(-) 30 ºC to 250 ºC	0.12 ºC	Using Standard SSPRT with 6½ DMM By Mapping Method Based on Euramet cg13 & TRMH
5.	Dry Well Baths#	(-) 30 ºC to 650 ºC 650 ºC to 1000 ºC	0.2 ºC 2.43 ºC	Using Standard SSPRT, R Type T/C With 6½ DMM & Fluke DAQ STAQ By Mapping Method Based On Euramet CG13

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6.	Furnace[♣]	300 ºC to 1000 ºC	4.0 ºC	Using Single & Multipoint Standard SSPRT, T/C, 6½ DMM (Data Logger) & Fluke DAQ STAQ By Spatial Mapping Method
7.	Thermal/ Climatic Chambers, Hot Air Ovens, Autoclave, Indicators[♣]	(-) 38 ºC to 60 ºC 60 ºC to 300 ºC	0.5 º C 1.5 º C	Using Single & Multi Point SSPRT, T/C With Fluke DAQ STAQ & 6½ DMM (Data Logger) By Mapping Method
II.	**SPECIFIC HEAT & HUMIDITY**			
1.	Relative Humidity Meters, Digital & Analog Hygrometers RH Sensors, Temp/RH Data Logger[#]	5 ºC to 50 ºC 20 % RH to 95 % RH @ 25 ± 4 ºC	0.3 ºC 1.8 % RH	Using Standard SSPRT With 6½ DMM, Fluke DAQ STAQ & Thermal Chamber Using Standard RH Sensor with Indicator and Humidity Generator By Comparison Method
2.	Thermal/ Climatic Chambers[♣]	15 % RH to 95 % RH	3.25 % RH	Using Single & Multipoint Standard RH Sensor with Data Logger & RH Data Logger By Spatial Mapping Method

*** 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.

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