Laboratory	**MSIR India Private Limited, #40, 2nd Floor, 2nd Street, Padmavathi Nagar, Chromepet, Chennai, Tamilnadu**
Accreditation Standard	**ISO/IEC 17025: 2005**
Certificate Number	**CC-2788** **Page** **1 of 9**
Validity	**06.08.2018 to 05.08.2020** **Last Amended on** **-**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		ELECTRO TECHNICAL CALIBRATION		
I.	**SOURCE**			
1.	DC Voltage#	1 mV to 100 mV 100 mV to 100 V 100 V to1000 V	0.71 % to 0.04 % 0.04 % to 0.05 % 0.05 % to 0.004 %	Using Transmille 3041A Multifunction Calibrator by Direct Method
2.	DC Current#	100 µA to 1 A 1 A to 30 A 20 A to 1000 A	0.047% to 0.022% 0.022% to 0.23% 0.7% to 0.31%	Using Transmille 3041A Multifunction Calibrator by Direct Method Using Transmille 3041A Multifunction Calibrator with AC/DC Clamp Coil Adaptor by Direct Method
3.	DC Resistance#	100 mΩ to 1 Ω 1 Ω to10 Ω 10 Ω to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ	5.9 % to 0.60 % 0.60 % to 0.07 % 0.07 % to 0.01 % 0.01 % to 0.06 % 0.06 % to 0.45 %	Using Transmille 3041A Multifunction Calibrator by Direct Method
4.	AC Voltage#	**50 Hz** 20 mV to 100 mV 100 mV to 1000 V **10 kHz** 200 mV to 100 V 100 V to 700 V	 0.2 % to 0.1 % 0.1 % to 0.074 % 0.13 % to 0.22 % 0.22 % to 0.25 %	Using Transmille 3041A Multifunction Calibrator by Direct Method

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Convenor

Anuja Anand
Program Manager

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
5.	AC Current#	**50 Hz** 25 µA to 1 A 1 A to 30 A **1 kHz** 200 µA to 1 A 1 A to 20 A **50 Hz** 20 A to 1000 A	 1.26 % to 0.23 % 0.23 % to 0.22 % 1.09 % to 0.8 % 0.8 % to 0.56% 0.69 % to 0.31 %	Using Transmille 3041A Multifunction Calibrator by Direct Method Using Transmille 3041A Multifunction Calibrator & AC/DC Clamp Coil Adaptor by Direct Method
6.	Frequency#	100Hz to 1 MHz	0.0006% to 0.00062%	Using Transmill 3041A Multifunction Calibrator by Direct Method
7.	DC Power#	**10 V to 600 V** **1 mA to 20 A** 0.01 W to 1 W 1W to 12 kW	 5.7 % to 0.13 % 0.13 % to 0.05 %	Using Transmille 3041A Multifunction Calibrator by Direct Method
8.	AC Power# UPF	**50 Hz** **100 V to 300 V** **0.3 A to 20 A** 30 W to 6 kW	 0.2%	Using Transmille 3041A Multifunction Calibrator by Direct Method
9.	Power Factor#	0.1 - 1 -0.1 PF Lead/Lag	0.0036 PF	Using Transmille 3041A Multifunction Calibrator by Direct Method
10.	Capacitance#	**1 kHz**		Using Transmille 3041A

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		1 nF to 10 µF	0.36 % to 0.74%	Multifunction Calibrator by Direct Method
11.	Temperature Simulation (Indicator Controller/Recorder) #			
	RTD Thermocouple B Type R Type S Type N Type T Type K Type E Type J Type	(-) 100 °C to 800 °C 600 °C to 1200 °C 800 °C to 1820 °C 0 °C to 250 °C 250 °C to 1700 °C 0°C to 100 °C 100 to 1700 °C (-) 190 °C to 0 °C 0 °C to 1300 °C (-) 240 °C to 0 °C 0 °C to 400 °C (-) 190 °C to 0 °C 0 °C to 1370 °C (-) 240°C to 1000 °C (-) 200°C to 1200 °C	0.10 °C 0.98 °C 0.73 °C 0.99 °C 0.62 °C 1°C 0.62 °C 0.66 °C 0.46 °C 0.75 °C 0.14 °C 0.43 °C 0.32 °C 0.63°C 0.36°C	Using Transmille 3041A Multifunction Calibrator & TC Measure/Source Adaptor by Direct Method
II.	**MEASURE**			
1.	DC Voltage$	30 mV to 100 mV 100 mV to 1000 V	1.3 % to 0.45 % 0.45 % to 0.15 %	Using Rishabh Multi20 5.5 DMM By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
2.	DC Current[$]	100 µA to 1 mA 1 mA to 10 A	0.6 % to 0.5 % 0.5 % to 0.7 %	Using Rishabh Multi20 5.5 DMM By Direct Method
3.	Temperature Simulation[#]			Using Eurotherm & TC measure/Source Adaptor with Multi product Calibrator Temperature Recorder by Direct Method
	RTD Thermocouple B Type	(-)200 °C to 850 °C 600 °C to 800 °C 800 °C to 1800 °C	0.12 °C 0.96 °C 0.81°C	
	R Type	0 °C to 150 °C 150 °C to 1700 °C	1.09 °C 0.99 °C	
	S Type	0 °C to 100 °C 100 °C to 1700 °C	1.09 °C 1.09°C	
	N Type	(-)200 °C to 0 °C 0 °C to 1300 °C	0.58 °C 0.30 °C	
	T Type	(-)200 °C to 0 °C 0 °C to 400 °C	0.8 °C 0.17 °C	
	K Type	(-)200 °C to 0 °C 0 °C to 1300 °C	0.41 °C 0.32 °C	
	E Type	(-)200°C to 1000 °C	0.67°C	
	J Type	(-)200°C to 1200 °C	0.35°C	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
4.	DC Resistance[$]	1 Ω to 1 kΩ 1 kΩ to 1 MΩ 1 MΩ to 10 MΩ	1.02 % to 0.14 % 0.14 % to 0.32 % 0.32 % to 1.64 %	Using Rishabh Multi20 5.5 DMM By Direct Method
5.	Frequency[$]	10 Hz to 300 kHz	0.47 % to 0.1%	Using Rishabh Multi20 5.5 DMM By Direct Method
6.	Time[#]	5s to 60 s 60 s to 24 hr	0.12 s to 0.23 s 0.23 s to 1.6 s	Using Digital Timer By Comparison Method
7.	DC High Voltage[♣]	1 kV to 10 kV	1.60 % to 2.41 %	Using DMM with HV Probe By Direct Method
8.	AC High Voltage[♣]	**50 Hz** 1 kV to 10 kV	6.2%	Using DMM with HV Probe By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	MECHANICAL CALIBRATION			
I.	**WEIGHING SCALE AND BALANCE**			
1.	Electronic Weighing Balance of Accuracy Class I & Coarser ♣			
	d ≥ 0.1mg	1 mg to 220 g	0.315 mg	Using F1Class Weights
	d ≥ 1mg	>220 g to 600 g	2.56 mg	based on OIML-R-76-1
	d ≥ 100mg	>600 g to 20 kg	200 mg	
	d ≥ 1g	>20 kg to 50 kg	2 g	Using M1 Class Weights
	d ≥ 10g	>50 kg to 300 kg	27.03 g	based on OIML-R-76-1
II.	**PRESSURE INDICATING DEVICES**			
1.	Pressure-Hydraulic Dial/ Digital Pressure Gauges/ Indicators, Pressure Transducers and Pressure Transmitter #	1 bar to 700 bar	0.035% rgd.	Using Digital Pressure Gauge and Hydraulic Pump by Comparison method As per (DKD-R-6-1)
2.	Pressure-Pneumatic Dial/ Digital	0 to 20 bar	0.017% rgd.	Using Digital Pressure Gauge and Pneumatic

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Pressure Gauges/ Indicators, Pressure Transducers and Pressure Transmitter#			Pump by Comparison method As per (DKD-R-6-1)
3.	**Pneumatic Low Pressure** Dial/Digital Pressure Gauges, Magnehelic Gauge$	(-)200mmH_2O to 200 mmH_2O *((-) 0.0196 bar to 0.0196bar)*	0.355% rgd.	Using Digital Pressure Gauge and Pneumatic Pump by Comparison method As per (DKD-R-6-1)
4.	Vacuum Dial/Digital Vacuum Gauges/Indicators and calibrators#	(-) 0.9 bar to 0 bar	0.017% rgd.	Using Calibrated DPG and Digital Vacuum Gauge by Comparison method As per (DKD-R-6-1)

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	THERMAL CALIBRATION			
1.	**TEMPERATURE**			
1.	Glass Thermometer[$]	(-) 35 °C to 30 °C 50 °C to 200 °C	0.50 °C 0.90 °C	Using Master RTD Pt-100, Recorder and Liquid Bath by Comparison Method
2.	Thermometer, RTD, Thermocouple, Temperature Indicator/ Controller/ Transmitter/ Recorder with sensor & Temperature Gauge[#]	(-) 35 °C to 200 °C 250 °C to 1200 °C	0.50 °C 4.5 °C	Using Master RTD Pt-100, Thermocouple Type S, Recorder, Liquid / Dry well by Comparison Method
3.	Temperature Bath, Dry Block Calibrator[#]	(-) 35 °C to 200 °C 250 °C to 1200 °C	0.50 °C 4.5 °C	Using Master RTD Pt-100, Thermocouple Type S, Recorder by Comparison Method
4.	Temperature Indicator of Deep Freezer, Freezer, Incubator (For Non-Medical Applications),	(-)30°C to 200°C 200°C to 500°C 500°C to 1200°C	0.4°C 1.3°C 5.6°C	Using Master RTD Pt-100, Thermocouple Type S, Recorder by Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	Water Bath, Refrigerator Autoclave(For Non-Medical Applications), Chamber, Hot Air Oven & Muffle Furnace♣			Single Point Calibration
5.	Deep Freezer, Freezer, Incubator (for Non-Medical Applications), Water Bath, Refrigerator, Autoclave, Chamber, Hot Air Oven & Furnace ♣	(-)30°C to 200°C 200°C to 1200°C	1.1°C 4.6°C	Using Master RTD Pt-100, Thermocouple Type N, Multi Channel data Logger by Direct Method Multi Point Calibration
II.	**SPECIFIC HEAT AND HUMIDITY**			
1.	Humidity Indicator, Humidity Transmitter, Thermo Hygrometer, Humidity Sensor/ Probe$	25 %RH to 85 %RH @ 25 °C 25 °C to 60 °C @ 50% RH	2.5% RH 2.35 °C	Using Master Hygrometer and humidity Chamber by Comparison Method
2.	Humidity Chamber ♣	15 %RH to 90%RH @5 °C to 60°C	4.3% RH 2°C	Using Temperature and humidity Data Logger by Comparison Method Multi Point Calibration

*** 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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