

**Laboratory** Calibration Laboratory- Trivedi & Associates Technical Services Pvt. Ltd., 108, SID CUP Tower, Race Course Circle, Vadodara, Gujarat

**Accreditation Standard** ISO/IEC 17025: 2005

**Certificate Number** CC-2269 (in lieu of C-0998,C-0999,C1000) **Page** 1 of 9

**Validity** 26.11.2017 to 25.11.2019 **Last Amended on** 10.02.2017

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b><u>ELECTRO-TECHNICAL CALIBRATION</u></b>				
<b>1.</b>	<b>MEASURE</b>			
1.	DC Voltage <sup>§</sup>	1 mV to 100 mV 100 mV to 1000 V	0.40% to 0.008% 0.008% to 0.006%	Using 6½ Digit Multimeter Fluke 8846A by Direct Method
2.	DC Voltage <sup>*</sup>	1 mV to 100 mV 100 mV to 1000 V	0.53% to 0.014% 0.014% to 0.03%	Using 6½ Digit Multimeter Kusam meco M3510A by Direct Method
3.	DC Current <sup>§</sup>	1 $\mu$ A to 100 mA 100 mA to 10 A	2.97% to 0.064% 0.06% to 0.18%	Using 6½ Digit Multimeter Fluke 8846A by Direct Method
4.	DC Current <sup>*</sup>	1 mA to 10 A	0.28% to 0.34%	Using 6½ Digit Multimeter Kusam meco M3510A by Direct Method
5.	DC Resistance <sup>§</sup> (2 & 4 Wire)	1 $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 100 M $\Omega$ 100 M $\Omega$ to 1000 M $\Omega$	0.073% to 0.013% 0.013% to 0.92% 0.92% to 2.28%	Using 6½ Digit Multimeter Fluke 8846A by Direct Method
6.	DC Resistance <sup>*</sup> (2 & 4 Wire)	1 $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 100 M $\Omega$	0.62% to 0.03% 0.03% to 1.71%	Using 6½ Digit Multimeter Kusam meco M3510A by Direct Method
7.	AC Voltage <sup>§</sup>	<b>50 Hz to 1 kHz</b> 1 mV to 1000 V	4.63% to 0.1%	Using 6½ Digit Multimeter Fluke 8846A by Direct Method

**Vishal Shukla**  
Convenor

**Avijit Das**  
Program Director

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
8.	AC Voltage*	50 Hz to 1 kHz 1 mV to 750 V	6.21% to 0.19%	Using 6½ Digit Multimeter Kusam meco M3510A by Direct Method
9.	AC Current <sup>s</sup>	50 Hz to 5 kHz 100 $\mu$ A to 1 A 1 A to 10 A	0.24% to 0.16% 0.16% to 0.24%	Using 6½ Digit Multimeter Fluke 8846A by Direct Method
10.	AC Current*	50 Hz to 1 kHz 100 mA to 10 A	0.23% to 0.7%	Using 6½ Digit Multimeter Kusam meco M3510A by Direct Method
11.	DC Capacitance <sup>s</sup>	10 nF to 1 $\mu$ F 1 $\mu$ F to 100 $\mu$ F	1.70%	Using 6½ Digit Multimeter Fluke 8846A by Direct Method
12.	DC Capacitance*	10 nF to 1 mF	1.70%	Using 6½ Digit Multimeter Kusam meco M3510A by Direct Method
13.	Frequency <sup>s</sup>	3 V 10 Hz to 100 Hz 100 Hz to 1 MHz	0.08% to 0.013% 0.013% to 0.058%	Using 6½ Digit Multimeter Fluke 8846A by Direct Method
14.	Frequency*	1 V 10 Hz to 300 kHz	0.066% to 0.03%	Using 6½ Digit Multimeter Kusam meco M3510A by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
15.	Temperature Indicator/ Controller / Recorder <sup>s</sup> RTD	(-) 200 °C to 800 °C	0.26°C	Using 6½ Digit Multimeter Fluke 8846A Direct by Simulation Method
	N Type Thermocouple	(-)200 °C to 1300 °C	0.46°C	Using Multiproduct Calibrator Fluke 5502E Direct by Simulation Method
	K Type Thermocouple	(-)200 °C to 1370 °C	0.48°C	
	J Type Thermocouple	(-)200 °C to 1200 °C	0.31°C	
	E Type Thermocouple	(-)250°C to 1000°C	0.58°C	
	T Type Thermocouple	(-)200°C to 400°C	0.71°C	
	S Type Thermocouple	0°C to 1750°C	0.62°C	
	R Type Thermocouple	0°C to 1750°C	0.66°C	
	B Type Thermocouple	600°C to 1800°C	0.52°C	
16.	Temperature Indicator/ Controller / Recorder <sup>a</sup> RTD	(-)200°C to 800°C	0.65°C	Using Multiproduct Calibrator Fluke 5502E Direct by Simulation Method
	N Type Thermocouple	(-)200°C to 1300°C	0.46°C	
	K Type Thermocouple	(-)200°C to 1370°C	0.48°C	
	J Type Thermocouple	(-)200°C to 1200°C	0.31°C	
	E Type Thermocouple	(-)250°C to 1000°C	0.58°C	
	T Type Thermocouple	(-)200°C to 400°C	0.71°C	
	S Type Thermocouple	0°C to 1750°C	0.62°C	
	R Type Thermocouple	0°C to 1750°C	0.66°C	
	B Type Thermocouple	600°C to 1800°C	0.52°C	

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b>II.</b>	<b>SOURCE</b>			
1.	DC Voltage <sup>#</sup>	1mV to 100mV 100mV to 1000V	0.82% to 0.01% 0.01%	Using Multiproduct Calibrator Fluke 5502E by Direct Method
2.	DC Current <sup>#</sup>	10 $\mu$ A to 1mA 1mA to 100mA 100mA to 10A 10A to 1000A	0.76% to 0.12% 0.12% to 0.02% 0.02% to 0.09% 0.09% to 0.61%	Using Multiproduct Calibrator Fluke 5502E with Coil by Direct Method
3.	DC Resistance <sup>#</sup> (2 & 4 Wire)	1 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 100M $\Omega$ 100M $\Omega$ to 1000M $\Omega$	0.75% to 0.021% 0.021% to 2.19% 2.19% to 1.78%	Using Multiproduct Calibrator Fluke 5502E by Direct Method
4.	AC Voltage <sup>#</sup>	<b>50Hz to 10 kHz</b> 1mV to 1V 1V to 1000V	2.53% to 0.11% 0.11%	Using Multiproduct Calibrator Fluke 5502E by Direct Method
5.	AC Current <sup>#</sup>	<b>50Hz to 1kHz</b> 30 $\mu$ A to 1A 1A to 10A 10A to 1000A	0.53% to 0.14% 0.14% 0.14% to 0.68%	Using Multiproduct Calibrator Fluke 5502E with Coil by Direct Method
6.	DC Capacitance <sup>#</sup>	1nF to 1 $\mu$ F 1 $\mu$ F to 100mF	1.83% to 0.41% 0.41% to 0.63%	Using Multiproduct Calibrator Fluke 5502E by Direct Method
7.	Frequency <sup>#</sup>	10Hz to 100Hz 100Hz to 1MHz	0.076% to 0.009% 0.009% to 0.057%	Using Multiproduct Calibrator Fluke 5502E by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
8.	Temperature Indicator/ Controller/ Recorder#	(-)200°C to 800°C	0.28°C	Using Multiproduct Calibrator Fluke 5502E Direct by Simulation Method
	RTD	(-)200°C to 1370°C	0.49°C	
	K Type Thermocouple	(-)200°C to 1200°C	0.40°C	
	J Type Thermocouple	0°C to 1760°C	0.98°C	
	R Type Thermocouple	(-)200°C to 400°C	0.74°C	
	T Type Thermocouple	0°C to 1760°C	1.02°C	
	S Type Thermocouple			

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b><u>MECHANICAL CALIBRATION</u></b>				
<b>1.</b>	<b>PRESSURE INDICATING DEVICES</b>			
<b>1.</b>	Pneumatic Pressure-Vacuum Digital and Analog Gauges, Transmitter <sup>#</sup>	(-)0.9 bar to 0 bar (g)	0.0007 bar	Using Digital Vacuum Gauge by Comparison Method as per DKD-R-6-1/2
<b>2.</b>	Pneumatic Pressure-Digital and Analog Pressure Gauges, Transmitter <sup>#</sup>	2 bar to 20 bar (g)	0.007 bar	Using Digital Pressure Gauge by Comparison Method as per DKD-R-6-1
<b>3.</b>	Pneumatic Pressure-Digital and Analog Pressure Gauges, Transmitter <sup>#</sup>	3.5 bar to 35 bar (g)	0.009 bar	Using Digital Pressure Gauge by Comparison Method as per DKD-R-6-1
<b>4.</b>	Hydraulic Pressure-Digital and Analog Pressure Gauges, Transmitter <sup>#</sup>	7 bar to 70 bar (g)	0.02 bar	Using Digital Pressure Gauge by Comparison Method as per DKD-R-6-1
<b>5.</b>	Hydraulic Pressure-Digital and Analog Pressure Gauges, Transmitter <sup>#</sup>	20 bar to 350 bar (g)	0.072 bar	Using Digital Pressure Gauge by Comparison Method as per DKD-R-6-1

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6.	Hydraulic Pressure-Digital and Analog Pressure Gauges, Transmitter <sup>#</sup>	70 bar to 700 bar (g)	0.10 bar	Using Digital Pressure Gauge by Comparison Method as per DKD-R-6-1

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<b><u>THERMAL CALIBRATION</u></b>				
<b>I.</b>	<b>TEMPERATURE</b>			
1.	RTDs Sensor/ Thermocouples with or Without Indicator/ Data Logger/Recorder/ Temperature Transmitter with Sensor/Temperature Dial Gauges #	(-)25°C to 150°C	0.05°C	Using Standard PRT Sensor & 6½ Digit Multimeter Source: Dry Temperature Bath by Comparison Method
2.	RTDs Sensor/ Thermocouples with or Without Indicator/ Data Logger/Recorder/ Temperature Transmitter with Sensor/ Temperature Dial Gauges/ #	150°C to 400°C	0.37°C	Using Standard PRT Sensor & 6½ Digit Multimeter Source: Dry Temperature Bath by Comparison Method
3.	Glass Thermometer #	30°C to 250°C	0.21°C	Using Standard PRT Sensor & 6½ Digit Multimeter Source: Oil Temperature Bath by Comparison Method

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4.	RTDs Sensor/ Thermocouples with or Without Indicator/ Data Logger/Recorder/ Temperature Transmitter with Sensor/ Temperature Dial Gauges #	400°C to 600°C	0.41°C	Using Standard 'S' Type Thermocouple & 6½ Digit Multimeter Source: Dry Temperature Bath by Comparison Method
5.	Thermocouples with or Without Indicator #	600°C to 1200°C	2.4°C	Using Standard 'S' Type Thermocouple & 6½ Digit Multimeter Source: Dry Temperature Bath 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.

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