

**Laboratory** Calibration Laboratory, Altop Industries Ltd., 165, GIDC, Makarpura, Vadodara, Gujarat

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

**Certificate Number** CC-2607 (In lieu of C-1042, C-1043, C-1044) **Page** 1 of 6

**Validity** 03.03.2018 to 02.03.2020 **Last Amended on** 22.06.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b><u>ELECTRO TECHNICAL CALIBRATION</u></b>				
<b>I.</b>	<b>MEASURE</b>			
1.	DC Voltage #	(-)100 mV to 10 mV	0.015% to 0.09%	Using Processes Calibrator by Direct/Comparison Method
		10 mV to 1000 V	0.12% to 0.04%	Using 6½ DMM Fluke 8846A, by Direct/Comparison Method
2.	AC Voltage #	<b>60Hz</b> 10 mV to 1000 V	0.564% to 0.12%	Using 6½ DMM Fluke 8846A, by Direct/Comparison Method
3.	DC Current #	10 $\mu$ A to 100 mA 100 mA to 10 A	0.37% to 0.075% 0.075% to 0.2%	Using 6½ DMM Fluke 8846A, by Direct/Comparison Method
4.	AC Current #	<b>60Hz</b> 50 $\mu$ A to 10 A	0.22% to 0.27%	Using 6½ DMM Fluke 8846A, by Direct/Comparison Method.
5.	DC Resistance #	10 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 100 M $\Omega$ 100 M $\Omega$ to 900 M $\Omega$	1.2% to 0.12% 0.12% 0.12% to 0.943% 0.943% to 2.405%	Using 6½ DMM Fluke 8846A, by Direct/Comparison Method.
6.	Frequency #	50 Hz to 1000 Hz	0.062%	Using 6½ DMM Fluke 8846A, by Direct/Comparison Method.

**Vishal Shukla**  
Convenor

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Program Director

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
7.	Temperature Simulation # (Indicator/Controller/Recorder) T- Type Thermocouple E- Type Thermocouple K- Type Thermocouple R- Type Thermocouple J- Type Thermocouple S- Type Thermocouple B- Type Thermocouple N- Type Thermocouple RTD Type PT-100	(-) 150°C to 400°C (-) 200°C to 999°C (-) 180°C to 1350°C 100°C to 1700°C (-)100°C to 1195°C 160°C to 1750°C 750°C to 1800°C (-) 160°C to 1290°C (-) 180°C to 800°C	0.25°C 0.25°C to 0.36°C 0.48°C 0.81°C 0.25°C 0.81°C 0.93°C to 0.70°C 0.59°C to 0.36°C 0.12°C to 0.22°C	Using Processes Calibrator by Direct Method.
II.	<b>SOURCE</b>			
1.	DC Resistance #	1 $\Omega$ to 20 $\Omega$ 20 $\Omega$ to 4000 $\Omega$ 4000 $\Omega$ to 10 M $\Omega$ 10 M $\Omega$ to 100 M $\Omega$ 100 M $\Omega$ to 1000 M $\Omega$	0.77% to 0.35% 0.13% to 0.014% 0.13% 0.13% to 1.53% 1.53% to 3.21%	Using Decade Resistance Box by Direct Method Using Processes Calibrator by Direct Method Using Decade Resistance Box by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
2.	Temperature Simulation # (Indicator/Controller/Recorder) T- Type Thermocouple E- Type Thermocouple K- Type Thermocouple R- Type Thermocouple J- Type Thermocouple	 (-) 140°C to 400°C (-) 200°C to 775°C (-) 180°C to 1350°C 100°C to 1700 °C (-) 100°C to 1020°C	 0.25°C 0.25°C 0.36°C to 0.48°C 0.81°C 0.26°C to 0.40°C	 Using Processes Calibrator by Direct Method.

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<b><u>MECHANICAL CALIBRATION</u></b>				
<b>1.</b>	<b>PRESSURE INDICATING DEVICES</b>			
1.	Pneumatic Pressure Analog/Digital Pressure Gauge, Transmitter, Switch, Calibrator, Manometer <sup>#</sup>	0 bar to 2 bar 0 bar to 7 bar 0 bar to 30 bar	0.19% rdg 0.045% rdg 0.07% rdg	Using Pressure Calibrator by Comparison Method as per DKD R-6-1
2.	Negative Pressure Analog/Digital Pressure Gauge, Transmitter, Switch, Calibrator, Manometer <sup>#</sup>	0 bar to (-) 0.9 bar	0.22% rdg	Using Pressure Calibrator by Comparison Method as per DKD R-6-1
3.	Hydraulic Pressure Analog/Digital Pressure Gauge, Transmitter, Switch, Calibrator, Manometer <sup>#</sup>	0 bar to 300 bar 0 bar to 630 bar	0.6% rdg 0.05% rdg	Using Pressure Calibrator by Comparison Method as per DKD R-6-1
4.	Hydraulic Pressure Analog/Digital Pressure Gauge, Transmitter, Switch, Calibrator, Manometer <sup>\$</sup>	3.5 bar to 55 bar 50 bar to 1000 bar	0.04% rdg 0.03%rdg	Using Pressure Calibrator 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.	Glass Thermometer <sup>\$</sup>	(-) 30°C to 200°C	0.6°C	Using SPRT, 6½ DMM, Source Cryogenic Temperature Bath by Comparison Method
2.	RTDS, Thermocouples With Or Without Indicator/ Controller/ Recorder/ Data Logger, Transmitter, Switch, Dial Temp. Gauge <sup>#</sup>	(-) 38°C to 155°C	0.04°C	Using SPRT, 6½ DMM, Source Reference Temperature Calibrator by Comparison Method
3.	RTDS, Thermocouples With Or Without Indicator/ Controller/ Recorder/ Data Logger, Transmitter, Switch, Dial Temp. Gauge <sup>#</sup>	30°C to 400°C >400°C to 600°C	0.12°C 0.16°C	Using SPRT, 6½ DMM, Source Temperature Calibrator by Comparison Method

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4.	Thermocouples With Or Without Indicator/ Controller/ Recorder/Data Logger, Transmitter, Switch, Dial Temp. Gauge <sup>#</sup>	>600°C to 900°C	1.66°C	Using 'S' Type Thermocouple, Process Calibrator Source Fluidless Temperature Calibrator by Comparison Method
5.	Thermocouples With Or Without Indicator/ Controller/ Recorder/Data Logger, Transmitter, Switch, Dial Temp. Gauge <sup>\$</sup>	>900°C to 1150°C	2.53°C	Using 'S' Type Thermocouple, Process Calibrator Source Fluidness Temperature Calibrator by Comparison Method
6.	Temperature Controller/ Indicators Of Water Bath/ Oil Bath <sup>#</sup>	(-) 30°C to 200°C	0.09°C	Using SPRT, 6½ DMM, by Single Point Calibration Method
7.	Temperature Controller/ Indicators Of Freezer/ Incubator/ Oven/ Temp. Bath/ Furnace <sup>#</sup>	(-) 38°C to 155°C 30°C to 600°C 600°C to 900°C 900°C to 1150°C	0.04°C 0.08°C 1.7°C 2.4°C	Using SPRT, 6½ DMM, by Single Point Calibration Method Using 'S' Type Thermocouple & Process Calibrator by Single Point Calibration Method

\* Measurement Capability is expressed as an uncertainty ( $\pm$ ) at a confidence probability of 95%

<sup>\$</sup> Only in Permanent Laboratory

<sup>#</sup> 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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