

Laboratory

TIPL Calibration Laboratory-Toshniwal Industries Pvt. Ltd, Industrial Estate, Makhupura, Ajmer, Rajasthan

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

CC-2546

Page

1 of 4

Validity

18.01.2018 to 17.01.2020

Last Amended on -

Sl.	Quantity Measured / Instrument	Range / Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b><u>ELECTRO-TECHNICAL CALIBRATION</u></b>				
<b>I.</b>	<b>SOURCE</b>			
1.	DC Voltage <sup>§</sup>	1 mV to 10 mV 10 mV to 90 mV 90 mV to 10 V 10 V to 20 V	1.39 % to 0.15 % 0.15 % to 0.026 % 0.026 % to 0.06 % 0.06 % to 0.042 %	Using Multifunction Calibrator by Direct Method
2.	DC Current <sup>§</sup>	1 mA to 10 mA 10 mA to 24 mA	0.49 % to 0.07 % 0.07 % to 0.025 %	Using Multifunction Calibrator by Direct Method
3.	Resistance <sup>§</sup>	0.001 $\Omega$ 0.01 $\Omega$ 0.1 $\Omega$ 1 $\Omega$ 10 $\Omega$ 10 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 10 k $\Omega$ 10 k $\Omega$ to 100 k $\Omega$	0.03 % 0.024 % 0.023 % 0.016 % 0.018 % 0.023 % to 0.013 % 0.013 % 0.013 % 0.016 %	Using Standard Resistance upto 10 $\Omega$ & Precision Bridge by Direct Method
4.	Temperature Simulation <sup>§</sup> RTD-Pt100 T-Type J-Type K-Type N-Type E-Type R-Type S-Type B-Type	(-)200 $^{\circ}$ C to 800 $^{\circ}$ C (-)200 $^{\circ}$ C to 400 $^{\circ}$ C (-)200 $^{\circ}$ C to 1000 $^{\circ}$ C (-)200 $^{\circ}$ C to 1300 $^{\circ}$ C (-)200 $^{\circ}$ C to 1300 $^{\circ}$ C (-)200 $^{\circ}$ C to 1000 $^{\circ}$ C 0 $^{\circ}$ C to 1700 $^{\circ}$ C 0 $^{\circ}$ C to 1700 $^{\circ}$ C 600 $^{\circ}$ C to 1800 $^{\circ}$ C	0.4 $^{\circ}$ C 0.7 $^{\circ}$ C 0.7 $^{\circ}$ C 1.0 $^{\circ}$ C 1.0 $^{\circ}$ C 0.7 $^{\circ}$ C 1.45 $^{\circ}$ C 1.45 $^{\circ}$ C 2.6 $^{\circ}$ C	Using Multifunction Calibrator by Direct Method

Mohit Kaushik  
Convenor

Avijit Das  
Program Director

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Page

2 of 4

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II.	<b>MEASURE</b>			
1.	DC Voltage <sup>§</sup>	1 mV to 10 mV 10 mV to 100 mV 100 mV to 10 V 10 V to 20 V	0.42 % to 0.047 % 0.047 % to 0.01 % 0.01 % to 0.0041% 0.0041 % to 0.027 %	Using 6½ digit Digital Multimeter by Direct Method
2.	DC Current <sup>§</sup>	1 mA to 10 mA 10 mA to 24 mA	0.16 % to 0.067 % 0.067% to 0.45 %	Using 6½ digit Digital Multimeter by Direct Method
3.	Resistance <sup>§</sup>	1 $\Omega$ to 100 $\Omega$ 100 $\Omega$ to 1 k $\Omega$ 1 k $\Omega$ to 10 k $\Omega$ 10 k $\Omega$ to 100 k $\Omega$ 100 k $\Omega$ to 1 M $\Omega$ 1 M $\Omega$ to 10 M $\Omega$	0.48 % to 0.017 % 0.017% to 0.013 % 0.013 % 0.013 % 0.013 % to 0.014 % 0.014 % to 0.05 %	Using 6½ digit Digital Multimeter by Direct Method
4.	Temperature Simulation <sup>§</sup> RTD-Pt100 Thermocouple T-Type J-Type K-Type N-Type E-Type R-Type S-Type B-Type	(-)200 °C to 800 °C  (-)200 °C to 400 °C (-)200 °C to 1000 °C (-)200 °C to 1300 °C (-)200 °C to 1300 °C (-)200 °C to 1000 °C 0 °C to 1700 °C 0 °C to 1700 °C 600 °C to 1800 °C	0.6 °C  0.7 °C 0.7 °C 1.0 °C 1.0 °C 0.7 °C 1.3 °C 1.3 °C 2.6 °C	Using Multifunction Calibrator by Direct Method

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Page

3 of 4

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<b><u>THERMAL CALIBRATION</u></b>				
<b>I.</b>	<b>TEMPERATURE</b>			
1.	Contact Type Thermocouple & RTD Sensor With & Without Indicator <sup>s</sup>	0 °C 50 °C to 500 °C	0.31 °C 0.49 °C	Using 4-wire PRT, 6½ digit Digital Multimeter, Dry Ice Bath & Dry Block Calibrator by Comparison Method
2.	Thermocouple With & Without Indicator <sup>s</sup>	500 °C to 1200 °C	1.8 °C	Using R type Thermocouple, 6½ digit Digital Multimeter & Dry Block Calibrator by Comparison Method
3.	Non-Contact Type Portable/ On Line IR Radiation Thermometer <sup>s</sup>	50 °C to 400 °C	2.8 °C	Using 4-wire PRT, 6½ digit Digital Multimeter & Black Body Furnace by Comparison Method
4.	Portable/ On Line IR Radiation Thermometer <sup>s</sup>	500 °C to 1400 °C	3.4 °C	Using R type Thermocouple, 6½ digit Digital Multimeter & Black Body Furnace by Comparison Method

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Page **4 of 4**

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5.	Optical Pyrometer <sup>§</sup>	800 °C to 1500 °C 1600 °C to 2000 °C	9 °C 15 °C	Using Tungsten Strip Lamp, 0.001 $\Omega$ Resistance & 6½ digit Digital Multimeter by Comparison Method

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

<sup>§</sup>Only in Permanent Laboratory

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