



**National Accreditation Board for
Testing and Calibration Laboratories**

(A Constituent Board of Quality Council of India)



CERTIFICATE OF ACCREDITATION

**YOUNG ENGG. &
CALIBRATION SERVICES PVT. LTD.**

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

Kamardanga Road, Ichapur, Howrah, West Bengal

in the field of

CALIBRATION

Certificate Number CC-2221

Issue Date 20/03/2018

Valid Until 19/03/2020

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL



89076970200020000439

Anil Relia
Chief Executive Officer



National Accreditation Board for Testing and Calibration Laboratories

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SCOPE OF ACCREDITATION

Laboratory	Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2221	Page	1 of 26
Validity	20.03.2018 to 19.03.2020	Last Amended on	26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	DC Voltage [#]	100 μ V to 1000 mV 1000 mV to 1000 V	1.28 % to 0.0017 % 0.0017 % to 0.0023 %	Using Multifunction Calibrator MFC-5522A (Fluke) by Direct Method
2.	DC Current [#]	1 μ A to 1 mA 1 mA to 1 A 1 A to 20A	2.33 % to 0.017 % 0.017 % to 0.028 % 0.028 % to 0.12 %	Using Multifunction Calibrator MFC-5522A by Direct Method
	DC High Current [#]	>20 A to 1000 A	0.5 %	Using 50 Turn Coil With MFC 5522A (Fluke) by Direct Method
3.	Resistance [#]	1 Ω to 1000 Ω 1000 Ω to 1000 k Ω 1000 k Ω to 100 M Ω 100 M Ω to 1 G Ω	0.12 % to 0.003 % 0.003 % to 0.004 % 0.004 % to 0.06 % 0.06 % to 1.7 %	Using Multifunction Calibrator MFC-5522A (Fluke) by Direct Method
	Low Resistance [#]	10 $\mu\Omega$ 50 $\mu\Omega$ 100 $\mu\Omega$ 500 $\mu\Omega$ 1 m Ω 10 m Ω 100 m Ω 0.1 Ω to 1 Ω	0.73 % 0.33 % 0.17 % 0.16 % 0.13 % 0.13 % 0.13 % 1.3 % to 0.031 %	Using Decade Resistance Box by Direct Method
	High Resistance [#]	1 G Ω to 100 G Ω	1.7 % to 5.9 %	Using Decade Resistance Box by Direct Method

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Convenor

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Program Director



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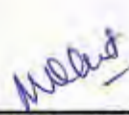
Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

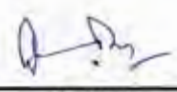
Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 2 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
4.	AC Voltage [#]	45 Hz to 10 kHz 1 mV to 1 V 1 V to 1000 V	0.71 % to 0.026 % 0.026 % to 0.038 %	Using Multifunction Calibrator MFC-5522A
5.	AC Current [#] AC High Current [#]	45 Hz to 1 kHz 30 μ A to 1000 μ A 1000 μ A to 1 A 1 A to 20 A 50 Hz/ 60 Hz >20 A to 1000A	0.52 % to 0.12 % 0.12 % to 0.063 % 0.063 % to 0.17 % 0.5 %	Using Multifunction MFC-5522A By Direct Method Using 50 Turn Coil by Direct Method
6.	Frequency [#]	3 Hz to 10 Hz 10 Hz to 1 MHz 1 MHz to 330 MHz	0.003 % to 0.0007 % 0.0007 % 0.0007 % to 0.0012 %	Using Multifunction Calibrator MFC-5522A By Direct Method
7.	Capacitance [#]	1 kHz 0.22 nF to 1.0 μ F 1.0 μ F to 330 μ F	5.8 % to 0.41 % 0.41 % to 0.66 %	Using Multifunction Calibrator MFC-5522A By Direct Method
8.	Inductance [#]	1 kHz 100 μ H to 1000 mH	3.0 %	Using Decade Inductance Box By Direct Method
9.	Power Factor [#]	0.2 PF to Unity PF (Lead & Lag)	0.002 PF to 0.0006 PF	Using Multifunction Calibrator MFC-5522A by Direct Method
10.	Phase Angle [#]	0° to 90°	0.15°	Using Multifunction Calibrator MFC-5522A by Direct Method


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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 3 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
11.	DC Power#	0.1 V to 1000 V 0.1A to 20 A	0.52 to 0.083%	Using Multifunction Calibrator MFC-5522A by Direct Method
12.	AC Power#	50 Hz 120V/240V 0.01A to 20 A 0.2 PF to Unity PF	1.01 % to 0.18 %	Using Multifunction MFC 5522A By Direct Method
13.	Oscilloscope# Amplitude Time Base Bandwidth	1 mV to 100 V DC 1 mV to 100 V AC 1 kHz 2 ns to 5 s $\leq$ 600 MHz	3.5 % to 0.07 % 3.5 % to 0.15 % 0.36 % to 0.66 % 5.02 %	Using Multifunction MFC 5502A with scope Option By Direct Method
14.	Temperature Simulation# (Temperature Indicator/ Controller/ Recorder/ Calibrator/ Transmitter) RTD J -Type K- Type T/ N -Type R/S/B - Type	 (-) 200 °C to 660 °C 0 °C to 1200 °C 0 °C to 1300 °C 0 °C to 1300 °C 0 °C to 1700 °C	 0.015 °C 0.04 °C 0.07 °C 0.06 °C 0.23 °C	Using Multifunction Calibrator MFC-5522A by Direct Method (mV & Ohms Input)

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 4 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
II. MEASURE				
1.	DC Voltage ^s	100 μ V to 100 mV 100 mV to 1 V 1 V to 1000 V	0.58 % to 0.001 % 0.001 % to 0.0007 % 0.0007 % to 0.0008 %	Using 8 ½ DMM (8508 A) by Direct Method
2.	DC Current ^s	1 μ A to 100 mA 100 mA to 20 A	0.076 % to 0.0053 % 0.005 % to 0.046 %	Using 8 ½ DMM (8508 A) by Direct Method
	DC High Current ^s	20 A to 750 A	1.75 %	Using V/I Method
3.	Resistance ^s	1 Ω to 1 k Ω 1 k Ω to 1 M Ω 1 M Ω to 20 G Ω	0.006 % to 0.001 % 0.001 % to 0.0015 % 0.0015 % to 0.15 %	Using 8 ½ DMM (8508 A) / 5522A by Direct Method
	Low Resistance ^s	10 $\mu\Omega$ to 100 m Ω	0.14 % to 0.046 %	Using 8 ½ DMM (8508 A) by V/I Method
4.	AC Voltage ^s	45 Hz to 10 kHz 1 mV to 1 V 1 V to 1000 V	0.48 % to 0.012 % 0.012 % to 0.014 %	Using 8 ½ DMM (8508 A) by Direct Method
5.	AC Current ^s	45 Hz to 1 kHz 10 μ A to 1 mA 1 mA to 1 A 1 A to 20 A	0.27 % to 0.05 % 0.05 % to 0.09 % 0.09 % to 0.11 %	Using 8 ½ DMM (8508 A) by Direct Method
6.	Frequency ^s	10 Hz to 1 MHz	0.058 % to 0.001 %	Using 8 ½ DMM (8508 A) by Direct Method

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 5 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

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7.	Temperature Simulation ^s (Controller/Indicator/Calibrator/Recorder) RTD J/K/N/T-Type R/S/B-Type	(-) 200 °C to 800 °C 0 °C to 1200 °C 0 °C to 1700 °C	0.016 °C 0.018 °C 0.042 °C	8 ½ DMM (8508 A) Fluke , ITS-90 (mV & Ω Method) by Direct Method
8.	Time ^a	5 s to 2.5 hr 2.5 hr to 24 hr	0.1 s to 1.5 s 1.5 s to 6.1 s	Using Digital Time Calibrator by Comparison Method
9.	Energy ^a 1 Phase & 3 Phase	50 Hz 240 V/ 415 V 5 A, UPF	0.65 %	Using Accucheck LT+ by Comparison Method
9.	Energy ^a 3 Phase	50 Hz 110V / 5A UPF	0.26 %	Using Accucheck HT+ by Comparison Method
10.	DC Voltage [*]	1 mV to 10 mV 10 mV to 100 mV 100 mV to 1V 1 V to 1000 V	0.65 % to 0.06 % 0.06 % to 0.01 % 0.01 % to 0.007 % 0.007 % to 0.008 %	Using 6 ½ DMM (8846 A) Fluke by Direct Method
	DC High Voltage [*]	1 kV to 10 kV 10 kV to 50 kV	2.5 % 2.4 %	Using High Voltage Divider with DMM By Direct Method
11.	DC Current [*]	10 μ A to 100 μ A 100 μ A to 100 mA 100 mA to 1A 1 A to 10 A	0.36 % to 0.015 % 0.015 % to 0.08 % 0.08 % 0.08 % to 0.2 %	Using 6 ½ DMM (8846 A) Fluke by Direct Method
	DC High Current [*]	>10 A to 750 A	1.75 %	Using V/I Method

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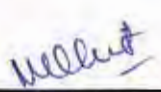
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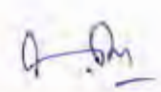
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Certificate Number CC-2221 **Page** 6 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

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12.	Resistance*	1 Ω to 10 Ω 10 Ω to 1 M Ω 1 M Ω to 100 M Ω 100 M Ω to 1 G Ω	0.7 % to 0.1 % 0.1 % to 0.02 % 0.02 % to 1 % 1 % to 3 %	Using 6 1/2 DMM (8846 A) Fluke by Direct Method
13.	AC Voltage*	45 Hz to 10 kHz 1 mV to 100 mV 100 mV to 1000 V	5 % to 0.5 % 0.5 % to 0.2 %	Using 6 1/2 DMM (8846 A) Fluke by Direct Method
14.	AC High Voltage*	50 Hz 1 kV to 100 kV	2.4 %	Using High Voltage Divider with DMM By Direct Method
15.	AC Current*	50 Hz to 1 kHz 10 μ A to 100 μ A 100 μ A to 10 mA 10 mA to 1 A 1 A to 10 A	2.7 % to 0.3 % 0.3 % 0.3 % to 0.2 % 0.2 % to 0.3 %	Using 6 1/2 DMM (8846 A) Fluke by Direct Method
16.	Frequency*	10 Hz to 1 MHz	0.082 % to 0.02 %	Using 6 1/2 DMM (8846 A) Fluke by Direct Method
17.	Temperature Simulation* Simulation Indicator / Controller/ Recorder RTD/J / K / R / S / N / T / B-Type	(-) 200 $^{\circ}$ C to 800 $^{\circ}$ C 20 $^{\circ}$ C to 1700 $^{\circ}$ C	0.3 $^{\circ}$ C 0.6 $^{\circ}$ C	Using 6 1/2 DMM (8846 A) Fluke + ITS-90 (mV & Ω Method) by Direct Method


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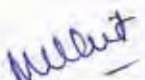
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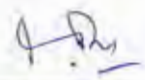


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Laboratory	Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2221	Page	7 of 26
Validity	20.03.2018 to 19.03.2020	Last Amended on	26.04.2018

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<u>MECHANICAL CALIBRATION</u>				
I. DIMENSION (BASIC MEASURING INSTRUMENT GAUGE ETC.)				
1.	External Micrometer ^s L.C.: 0.001 mm ^Φ	Up to 25 mm >25 mm to 150 mm >150 mm to 300 mm >300 mm to 600 mm	1.3 μ m 2.4 μ m 4.5 μ m 8.8 μ m	Using Gauge Block Set, Long Slip Gauge
2.	Internal Micrometer ^s L.C.: 0.001 mm ^Φ	5 mm to 50 mm >50 mm to 350 mm	2.0 μ m 5.4 μ m	Using Gauge Block & Electronic Comparator / ULM
3.	Depth Micrometer ^s L.C.: 0.001 mm ^Φ	Up to 150 mm >150 mm to 300 mm	2.4 μ m 4.5 μ m	Using Gauge Block, Long Slip Gauge
4.	Three Anvil Internal Micrometer ^s L.C.: 0.001mm ^Φ	Up to 100 mm	4.0 μ m	Using ULM, Cylindrical Setting Master
5.	Vernier/Dial/ Digimatic Caliper ^s L.C.: 0.01 mm ^Φ	Up to 300 mm >300 mm to 600 mm >600 mm to 1000 mm	8.0 μ m 11.0 μ m 16.0 μ m	Using Gauge Block/ Length Bars
6.	Groove Micrometer ^s L.C.: 0.01 mm ^Φ	Up to 100 mm	8.0 μ m	Using Gauge Block


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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 8 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
7.	Depth Gauge ^s L.C.: 0.01 mm ^o	Up to 300 mm >300 mm to 600 mm	9.0 μ m 11.0 μ m	Using Gauge Block Set, Length Bars
8.	Height Gauge ^s L.C.: 0.01 mm ^o	Up to 300 mm >300 mm to 600 mm >600 mm to 1000 mm	8.3 μ m 11.0 μ m 16.0 μ m	Using Gauge Block Long Slip Gauge
9.	Dial/ Digimatic Indicator ^s (Plunger Type) L.C.: 0.001 mm ^o L.C.: 0.0005 mm	Up to 25 mm >25 mm to 50 mm Up to 1 mm	1.4 μ m 2.0 μ m 1.22 μ m	Using Dial Calibration Tester/ ULM
10.	Dial/ Digimatic Indicator ^s (Lever Type) L.C.: 0.001 mm ^o	Up to 2 mm	1.6 μ m	Using Dial Calibration Tester/ ULM
11.	Dial/ Digimatic Bore Gauge ^s (Transmission Movement) L.C.: 0.001 mm ^o	Up to 2 mm	1.6 μ m	Using Dial Calibration Tester/ULM
12.	Micrometer Setting Rod ^s	Up to 275 mm >275 mm to 600 mm	4.0 μ m 8.5 μ m	Using Gauge Blocks & Electronic Comparator / ULM

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Certificate Number CC-2221 **Page** 9 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
13.	Cylindrical Measuring Pin ^s	Φ 0.1 mm to Φ 20 mm	1.0 μ m	Using Gauge Blocks & Electronic Comparator/ULM
14.	Thread Measuring Wire ^s	Φ 0.17 mm to Φ 6.35mm	0.7 μ m	Using Gauge Blocks & Electronic Comparator/ULM
15.	Cylindrical Setting Master ^s Diameter Run Out	Φ 3 mm to Φ 100 mm	1.5 μ m	Using Gauge Blocks & Electronic Comparator/ULM
16.	Coating Thickness Gauge ^s L.C.: 0.001 mm ^Φ L.C.: 0.1 μ m	Up to 660 μ m >660 μ m to 2000 μ m Up to 100 μ m	2.5 μ m 3.2 μ m 2.5 μ m	Using Foil
17.	Dial / Digimatic Thickness Gauge ^s L.C.: 0.001 mm ^Φ	Up to 10 mm >10 mm to 50 mm	1.0 μ m 1.1 μ m	Using Gauge Blocks
18.	Pistol Caliper ^s L.C.: 0.1 mm ^Φ	Up to 100 mm	57.8 μ m	Using Gauge Blocks
19.	Measuring Scale ^s	Up to 1000 mm	246 $\sqrt{L}$ μ m Where 'L' is Length in m	Using Scale & Tape Calibration Unit
20.	Contraction Scale ^s	Up to 1000 mm	246 $\sqrt{L}$ μ m Where 'L' is Length in m	Using Scale & Tape Calibration Unit

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 10 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
21.	Measuring Tape ^s	Up to 200 m	246 $\sqrt{L}$ μ m Where 'L' is Length in m	Using Scale & Tape Calibration Unit
22.	Circumference Tape ^s (Pi Tape)	Up to Φ 2000 mm	300 μ m	Using Scale & Tape Calibration Unit
23.	Feeler Gauge ^s	0.03 mm to 1 mm	2.3 μ m	Using Electronic Comparator
24.	Foils ^s	Up to 2 mm >2 mm to 5 mm	2.3 μ m 5.3 μ m	Using Electronic Comparator
25.	Hegman Gauge ^s (Steps Height)/ Film Applicator ^s	Up to 1 mm	2.3 μ m	Using Electronic Comparator
26.	Electronic Comparator ^s L.C.: 0.0001mm ^Φ	Up to 10 mm	0.5 μ m	Using Gauge Blocks
27.	External/ Internal Dial / Digimatic Caliper ^s L.C.: 0.01mm ^Φ	Up to 100 mm	5.0 μ m	Using Gauge Blocks
28.	Gear Tooth Vernier ^s L.C.: 0.02 mm ^Φ	Up to 50 mm	13.0 μ m	Using Gauge Blocks
29.	Brinell Microscope ^s L.C: 0.01 mm ^Φ	Up to 10 mm	2 μ m	Using Glass Scale

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Certificate Number CC-2221 **Page** 11 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
30.	Snap Gauge / Dial Snap Gauge / Adjustable Snap Gauge ^s	3 mm to 100 mm >100 mm to 300 mm	2.0 μ m 3.0 μ m	Using ULM
31.	Plain Plug Gauge ^s	Φ 1 mm to Φ 25 mm > Φ 25 mm to Φ 100 mm > Φ 100 mm to Φ 200 mm > Φ 200 mm to Φ 400 mm	1.2 μ m 1.7 μ m 3.0 μ m 4.0 μ m	Using Gauge Block & Electronic Comparator
32.	Plain/ Master Setting Ring Gauge ^s	Φ 3 mm to Φ 25 mm > Φ 25 mm to Φ 200 mm > Φ 200 mm to Φ 300 mm > Φ 300 mm to Φ 400 mm	1.0 μ m 1.5 μ m 2.0 μ m 3.0 μ m	Using ULM, Setting Ring
33.	Dial Calibration Tester ^s L.C.: 0.0001 mm ^Φ	Up to 25 mm	1.0 μ m	Using Gauge Block & Electronic Comparator
34.	Scale & Tape Measuring Unit ^s L.C.: 0.02 mm	Up to 1000 mm	20.0 μ m	Using Gauge Block
35.	Micrometer Head/ Drum ^s L.C.: 0.0001 mm ^Φ	Up to 25 mm	1.0 μ m	Using Gauge Block & Electronic Comparator
36.	Sine Bar ^s c/c: 200 mm	Up to 45 °	10 sec of Arc	Using Gauge Block, Electronic Comparator & Angle Gauge Block

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Certificate Number CC-2221 **Page** 12 of 26

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37.	Spirit Level ^s L.C.: 10 μ m/m ^o	Up to 10 mm/m	8 μ m/m	Using Electronic Level, Tilting Table
38.	Clinometer ^s L.C.: 1 min of arc ^o	0° - 180° - 0°	1 min of Arc	Using Sine Bar, Gauge Block & Master Cylinder
39.	V - Block ^s (Flatness, Parallelism, Squareness, Symmetry) Angle	Up to 200 mm Up to 90°	4.0 μ m 1 min of arc	Using Electronic Comparator, Gauge Block & Mandrel, Profile Projector
40.	Angle Plate ^s (Flatness, Parallelism, Squareness)	Up to 200 mm	6.0 μ m	Using Master Cylinder & Electronic Comparator
41.	Engineer's Square ^s	Up to 200 mm	6 μ m	Using Master Cylinder & Electronic Comparator
42.	Comparator Stand ^s (Flatness of Base)	Up to 300 mm	5.2 μ m	Using Electronic Comparator & Electronic Level, Tilting Table
43.	Test Sieve ^s	32 μ m to 4 mm >4 mm to 125 mm	6.0 μ m 9.0 μ m	Using Profile Projector Using Vernier Caliper
44.	Surface Plate [#]	4000 mm X 2000 mm	$0.5 \sqrt{\frac{L+W}{125}} \mu$ m Where 'L' is Length in mm & 'W' is Width in mm	Using Electronic Precision Level 1 μ m/m

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Certificate Number CC-2221 **Page** 13 of 26

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45.	Ultrasonic Thickness Gauge ^s L.C.: 0.0001 mm ^Φ	Up to 100 mm	9.5 μ m	Using Gauge Block
46.	Extensometer ^s L.C.: 0.001 mm ^Φ	Up to 150 mm	7.0 μ m	Using Gauge Block
47.	Travelling Microscope ^s L.C.: 0.01 mm ^Φ	Up to 220 mm	7.2 μ m	Using Glass Scale
48.	Thread Plug Gauge ^s (Metric, G Thread & UNC Thread) Major Dia & Effective Dia	4 mm to 100 mm >100 mm to 200 mm	3.0 μ m 4.5 μ m	Using ULM, Thread Measuring Wire, Gauge Block
49.	Thread Ring Gauge ^s (Metric, G Thread & UNC Thread) Minor Dia & Effective Dia	6 mm to 100 mm > 100 mm to 200 mm	3.0 μ m 4.5 μ m	Using ULM, Ruby Probe & Setting Ring Gauge
50.	Taper Thread Plug Gauge ^s	3 mm to 100 mm >100 mm to 150 mm	3.0 μ m 4.5 μ m	Using ULM, Thread Measuring wire, Gauge Block
51.	Taper Plain Plug Gauge ^s Position of Gauge & Half Taper Angle	Up to Φ 200 mm	1.5 μ m	Using ULM, Gauge Block set & Standard Pin

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SCOPE OF ACCREDITATION

Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 14 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
52.	Taper Plain Ring Gauge ^s	$\Phi 6$ mm to $\Phi 200$ mm	1.5 μ m	Using ULM, Gauge Block Set & Ruby Balls
53.	Step Gauge ^s	0.5 mm to 100 mm	1.7 μ m	Using Gauge Block & Electronic Comparator
54.	Thread Pitch Gauge ^s Pitch Angle	0.2 mm to 7 mm 55 ° & 60 °	9.0 μ m 90 sec of Arc	Using Profile Projector
55.	Radius Gauge ^s / Profile Gauge ^s	0.5 mm to 40 mm	57.0 μ m	Using Profile Projector
56.	Wire Gauge ^s	0.19 mm to 10 mm	9.0 μ m	Using Profile Projector
57.	Welding Gauge ^s Linear Scale L.C.: 0.001 mm ^o Angular Scale L.C.: 30 sec of arc ^o	Up to 50 mm Up to 90 °	9 μ m 1 min of arc	Using Profile Projector
58.	Wet Film Thickness Gauge ^s	Up to 2 mm	9.0 μ m	Using Profile Projector
59.	Angle Graticule / Angular Template ^s	0 ° to 360 °	90 sec of Arc	Using Profile Projector
60.	Taper Scale ^s	Up to 15 mm	30 μ m	Using Profile Projector
61.	Straight Edge ^s (Straightness)	Length Up to 3000 mm	1.6 μ m/m	Using Precision Electronic Level
62.	Angular Scale ^s L.C.: 30 min of arc ^o	0 to 360 °	7 min of arc	Using Profile Projector

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SCOPE OF ACCREDITATION

Laboratory

Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard

ISO/IEC 17025: 2005

Certificate Number

CC-2221

Page

15 of 26

Validity

20.03.2018 to 19.03.2020

Last Amended on

26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
63.	Angle Protractor / Bevel Protractor / Combination Set ^s L.C: 5 min of arc $^{\circ}$	0 $^{\circ}$ - 180 $^{\circ}$ - 0 $^{\circ}$	4 min of arc	Using Angle Gauge Block / Profile Projector
II.	DIMENSION (PRECISION INSTRUMENTS)			
1.	Universal Length Measuring Machine [#] Linear Scale L.C.: 0.0001 mm $^{\circ}$	Up to 100 mm >100 mm to 200 mm >200 mm to 600 mm	0.85 μ m 1.25 μ m 3.0 μ m	Using Slip Gauge, Long Slip Gauge & Setting Ring
2.	Profile Projector [#] Linear Scale L.C: 0.001 mm $^{\circ}$ Angular Scale L.C: 1 sec of Arc $^{\circ}$ Magnification	Up to 300 mm 0 to 360 $^{\circ}$ 10X to 100 X	3 μ m 1 min. of Arc 0.20%	Using Glass Scale Using Angle Gauge Block Using Digimatic Caliper
III.	ACOUSTIC			
1.	Sound Level Meter ^s	1 kHz 94 dB & 114 dB	0.21 dB	Using Sound Calibrator as per IEC 61672

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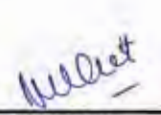
Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

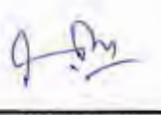
Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 16 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
IV. HARDNESS TESTING MACHINE				
1.	Rubber Hardness Tester ^s Shore-A Hardness Tester Shore-D Hardness Tester)	0 to 100 Shore-A 0 to 100 Shore-D	0.76 Shore-A 0.76 Shore-D	Using Digital Balance and fixture as per ASTM D2240/ ISO 18898
2.	Rockwell Hardness Testing Machine* (Indirect Verification)	HRA HRBW HRC	1.5 HRA 1.5 HRBW 1.5 HRC	Using Standard Hardness Block as per IS 1586-2 / ISO 6508-2
3.	Superficial Rockwell Hardness Testing Machine (Indirect Verification)*	HR 15N HR 30N HR 45N HR 15TW HR 30TW HR 45TW	1.5 HR 15N 1.5 HR 30N 1.5 HR 45N 1.5 HR 15TW 1.5 HR 30TW 1.5 HR 45TW	
4.	Brinell Hardness Testing Machine* (Indirect Verification)	HBW 2.5/187.5 HBW 5.0/ 750 HBW 10.0/3000	2.0 % 2.0 % 2.0 %	Using Hardness Block as per IS 1500-2 / ISO 6506-2
5.	Vickers Hardness Testing Machine* (Indirect Verification)	HV 5 HV 10 HV 30 HV 50	1.6 % 1.5 % 1.5 % 2.0 %	Using Hardness Block as per IS 1501-2 / ISO 6507-2


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(A Constituent Board of Quality Council of India)



SCOPE OF ACCREDITATION

Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 17 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
V. UTM, TENSION CREEP AND TORSION TESTING MACHINE				
1.	Uniaxial Testing Machine* (Compression) (Tension)	200 N to 2000 kN 20 N to 250 kN	0.54 % 0.53 %	Using Force Proving Instrument of Class 1 or better as per IS 1828 -1 / ISO 7500 - 1 / ASTM E4
2.	Travel Speed Of UTM*	10 mm/min to 300 mm/min	0.2 %	Using Stopwatch & Digimatic Caliper
VI. IMPACT TESTING MACHINE				
1.	Impact Testing Machine* (Direct Verification) Charpy Izod	Up to 450 J Up to 168 J	0.5 % 0.5 %	Using Load Cell, Clinometer, Steel Tape and other Gauges & Instruments as per ISO 148-2 / ASTM E23/ IS 3766 / BS 131 - IV
VII. PRESSURE INDICATING DEVICES				
1.	Barometer/ Absolute Pressure Indicator*	750 mbar (abs) to 1150 mbar (abs)	0.026 % rdg	Using Digital Barometer as per Direct Comparison Method

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SCOPE OF ACCREDITATION

Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 18 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
2.	Pneumatic Pressure Gauge/ Pressure Switch /Pressure Transducer, Pressure Transmitter/ Pressure Calibrator [#]	0 to 2 bar 0 to 20 bar	(0.00036+0.00052xP) bar (0.024+ 0.003xP) bar	Using Pressure Calibrator as per Direct Comparison Method DKD R-6-1
3.	Vacuum Gauge/ Vacuum Switch/ Vacuum Transducer/ Vacuum Transmitter/ Vacuum Calibrator [#]	0 to (-) 0.95 bar	(0.535+0.00071xP) mbar	Using Pressure Calibrator as per Direct Comparison Method
4.	Manometer/ Sphygmo Manometer [#]	0 to 1.013 bar	(0.000066 + 0.0007x P) bar	Using Pressure Calibrator as per Direct Comparison Method
5.	Magnehellic Gauge, Manometer, Transmeter, Transducer [#]	0 to 7 kPa	(0.00066 + 0.000376x P) kPa	Using Pressure Calibrator as per Direct Comparison Method
6.	Hydraulic Pressure Gauge, Pressure Switch/ Pressure Transducer/ Pressure Transmitter/ Pressure Calibrator [#]	0 to 70 bar 0 to 700 bar	(0.0013 + 0.0014x P) bar (0.0084 + 0.0014x P) bar	Using Pressure Calibrator as per Direct Comparison Method DKD R-6-1

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SCOPE OF ACCREDITATION

Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 19 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
7.	Hydraulic Pressure Pressure Gauge, Pressure Switch/ Pressure Transducer/ Pressure Transmitter/ Pressure Calibrator ^{\$}	1 bar to 20 bar > 20 bar to 700 bar	(0.001+70x10E ⁻⁶ xP) bar (0.005+115x10E ⁻⁶ xP) bar	Using Dead Weight Tester as per Direct Comparison Method DKD R-6-1
8.	Dead Weight Tester ^{\$}	1 bar to 20 bar > 20 bar to 1200 bar	(0.001+50X10E ⁻⁶ xP) bar (0.0018+110x10E ⁻⁶ xP) bar	Using Dead Weight Tester by Cross Float Method
VIII. WEIGHING SCALE AND BALANCE				
1.	Moisture Balance [#]	0 to 100 %	0.14 %	Using Standard Weight as per OIML R 76-1, OIML R47
2.	Electronic Weighing Balance [#] Readability : 0.001 mg ^Φ	1 mg to 6.1 g	0.007 mg	Using E1 Class Weights and for calibration of Class I Weighing Balances and coarser as per OIML R 76
	Readability : 0.01 mg ^Φ	> 6.1 g to 220 g	0.13 mg	
	Readability : 1 mg ^Φ	>220 g to 5 kg	0.008 g	Using F1 Class Weight and for calibration of Class II Weighing Balances and coarser
	Readability : 0.1 g ^Φ Readability : 1 g ^Φ	> 5 kg to 20 kg >20 kg to 30 kg	0.015 g 0.6 g	Using F1 Class Weight and for calibration of Class III Weighing Balances and coarser as per OIML R-76

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Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 20 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
	Readability 10 g ^Φ	>30 kg to 100 kg	20.4 g	Using F1 & F2 Class Weight and for calibration of Class III Weighing Balances and coarser as per OIML R-76
	Readability 50 g ^Φ Readability 100 g ^Φ	>100 kg to 500 kg >500 kg to 2000 kg	30 g 100 g	Using M2 Class Weight and for calibration of Class IV Weighing Balances and coarser as per OIML R-76
IX.	WEIGHTS			
1.	Mass ^S	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	0.001 mg 0.001 mg 0.001 mg 0.001 mg 0.002 mg 0.002 mg 0.002 mg 0.002 mg 0.003 mg 0.003 mg 0.005 mg 0.006 mg 0.012 mg 0.013 mg	Using E1 Class Standard Weights with Digital Weighing Balance up to 6 g of d = 0.001 mg ABBA method (as per OIML R-111)
	Weights of E1 & Coarser	50 g 100 g 200 g	0.025 mg 0.050 mg 0.090 mg	Using E1 Class Standard Weights with Digital Weighing Balance up to 200 g of d = 0.01 mg ABBA method (as per OIML R-111)

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Laboratory

Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221

Page

21 of 26

Validity 20.03.2018 to 19.03.2020

Last Amended on 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
	Weights of M1 & Coarser	500 g 1000 g	8.5 mg 8.5 mg	
	Weights of F2 & Coarser	2000 g	8.8 mg	Using F1 Class standard weights with Digital Weighing Balance up to 3 kg of $d = 0.01$ g ABBA method as per OIML R-111
	Weights of M2 & Coarser	5000 g 10000 g 20000 g	0.82 g 0.82 g 0.85 g	Using F1 Class standard weight with Digital Weighing Balance up to 30 kg of $d = 1$ g ABBA method as per OIML R-111
X.	DENSITY AND VISCOSITY			
1.	Specific Gravity Hydrometer ^s	1.000 sp.gr. to 2.000 sp.gr.	0.0013 sp. gr	As per comparison method procedure based on IS 3104 (Part 1)
2.	Density Hydrometer ^s	0.600 g/ml to 1.000 g/ml	0.0008 g/ml	As per comparison method procedure based on IS 3104 (Part 1)
3.	Glass Capillary Viscometer ^s (Direct/ Reverse Flow) Measurement of Viscometer Constant	0.002 cSt/s to 0.01 cSt/s >0.01 cSt/s to 0.1 cSt/s >0.1 cSt/s to 2.0 cSt/s >2.0 cSt/s to 20 cSt/s	0.25 % 0.35 % 0.40 % 0.45 %	Using Standard Viscometer Tube & Standard Newtonian Liquid (Direct & Reverse Flow procedure) as per ASTM D446

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SCOPE OF ACCREDITATION

Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 22 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
4.	Ford/ Flow Cup ^s	Size B1 to B6	0.71 %	Using standard Newtonian Liquid viscometer oil as per ASTM 1200D
5.	Rotational Viscometer ^s	10 cP to 10000 cP	1.10 %	Using Standard Newtonian Liquid as per ASTM D4016/ISO 2555
6.	Kinematic Viscosity Of Newtonian Liquid ^s	1 cSt to 10 cSt 10 cSt to 100 cSt 100 cSt to 1000 cSt 1000 cSt to 10000 cSt	0.30 % 0.35 % 0.41 % 0.45 %	Using Glass Capillary Viscometer/CRM ASTM D446/ISO 3104 Viscosity bath (-) 20 °C to 120 °C
XI.	VOLUME			
1.	Content Type Volumetric Measure ^s	1 ml to 100 ml >100 ml to 2000 ml	0.15 μ l 10.0 μ l	As per ISO 4787 & ISO/TR 20461
2.	Burette ^s	1 ml to 100 ml	0.15 μ l	As per ISO 4787 & ISO/TR 20461
3.	Pipette ^s (Graduated / Non Graduated)	0.5 ml to 100 ml	0.15 μ l	As per ISO 4787 & ISO/TR 20461
4.	Micro Pipette/Micro Syringe/Dispenser ^s	1 μ l to 1000 μ l >1000 μ l to 5000 μ l >5000 μ l to 10000 μ l	0.009 μ l to 0.011 μ l 0.014 μ l 0.02 μ l	As per IS 8655-6 & ISO/TR 20461
XII.	ACCELERATION & SPEED			

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Laboratory

Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard

ISO/IEC 17025: 2005

Certificate Number

CC-2221

Page

23 of 26

Validity

20.03.2018 to 19.03.2020

Last Amended on

26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
1.	Tachometer (Non Contact Type) ^S	40 rpm to 500 rpm >500 rpm to 40000 rpm	0.53 rpm 32.0 rpm	Using Digital Tachometer (SANAS TR 54-01)
2.	RPM Of Centrifuge Etc [*]	10 rpm to 500 rpm >500 rpm to 40000 rpm	0.53 rpm 32.0 rpm	Using Digital Tachometer (SANAS TR 54-01)
XIII	TORQUE GENERATING DEVICES			
1.	Torque Wrench ^S (Type I / Class B,C) (Type II / Class A,B)	2 Nm to 200 Nm 200 Nm to 2000 Nm	1.65 % 1 %	Using Torque Transducer & Indicator with Torque wrench Calibrator as per ISO 6789 (Clockwise Direction Only)

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National Accreditation Board for Testing and Calibration Laboratories

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SCOPE OF ACCREDITATION

Laboratory	Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.		
Accreditation Standard	ISO/IEC 17025: 2005		
Certificate Number	CC-2221	Page	24 of 26
Validity	20.03.2018 to 19.03.2020	Last Amended on	26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
<u>THERMAL CALIBRATION</u>				
I.	TEMPERATURE			
1.	Glass Thermometer ^s	(-) 80 °C to 250 °C >250 °C to 450 °C >450 °C to 600 °C	0.15 °C 0.25 °C 0.70 °C	Using Standard SSPRT with DRO / DMM by Comparison Method
2.	Glass Thermometer [*]	(-) 10 °C to 250 °C	0.32 °C	Using Standard SSPRT with DRO / DMM by Comparison Method
3.	RTD/ Thermocouple With Or Without Temperature Indicator / Controller / Recorder / Temperature Gauge / Temperature Controller Switch / Digital Thermometer With Sensor / Temperature Controller/ Indicator / Recorder With Sensor Of Block Furnace / Bath / Oven ^s	(-) 196 °C (-) 80 °C to 100 °C >100 °C to 300 °C >300 °C to 600 °C >600 °C to 1200 °C	0.70 °C 0.15 °C 0.31 °C 0.36 °C 3.56 °C	Using Std. SSPRT/Std. R-Type Thermocouple with Std. DRO/DMM, by Comparison Method, Single Point & Mapping

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Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 25 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
4.	RTD / Thermocouple With Or Without Temperature Indicator / Controller / Recorder / Temperature Gauge / Temperature Controller Switch / Digital Thermometer With Sensor / Temperature Controller/ Indicator / Recorder With Sensor Of Block Furnace / Bath / Oven*	(-) 196 °C (-) 80 °C to 100 °C >100 °C to 300 °C >300 °C to 600 °C >600 °C to 1200 °C >1200 °C to 1500 °C	0.70 °C 0.15 °C 0.31 °C 0.40 °C 2.82 °C 4.41 °C	Using Std. SSPRT/Std. R-Type Thermocouple with Std. DRO/DMM, by Comparison Method, Single Location & Mapping Using Std. SSPRT/Std. R Type Thermocouple with Std. DRO/DMM, by Comparison Method, Single Location
5.	Thermal Chamber ^s (Deep Freezer, Refrigerator, Incubator, Autoclave, Air Oven, Furnace, Temperature Bath)	(-) 196 °C (-) 80 °C to 100 °C >100 °C to 350 °C >350 °C to 1200 °C >1200 °C to 1500 °C	0.70 °C 0.15 °C 0.40 °C 2.82 °C 4.41 °C	Using Std. SSPRT, RTD Thermocouple, Standard Data Acquisition System, by Comparison Method / Mapping
6.	Thermal Chamber* (Deep Freezer, Refrigerator, Incubator, Autoclave, Air Oven, Furnace, Temperature Bath, Room)	(-) 196 °C to (-) 80°C (-) 80 °C to 100 °C >100 °C to 350 °C >350 °C to 1200 °C >1200 °C to 1500 °C	0.70 °C 0.15 °C 0.40 °C 2.82 °C 4.41 °C	Using Std. SSPRT, RTD Thermocouple, Standard Data Acquisition System, by Comparison Method / Mapping

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Laboratory Young Engg. & Calibration Services Pvt. Ltd., Kamardanga Road, Ichapur, Howrah, West Bengal.

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2221 **Page** 26 of 26

Validity 20.03.2018 to 19.03.2020 **Last Amended on** 26.04.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
7.	Non Contact Type Temperature Indicator / Controller / Recorder [#]	50 °C to 300 °C >300 °C to 600 °C >600 °C to 1200 °C	2.2 °C 3.5 °C 5.4 °C	Using Standard Non-Contact Thermometer by Comparison Method
II.	SPECIFIC HEAT & HUMIDITY			
1.	Relative Humidity / Digital & Analogue Humidity Indicator / Sensor / Humidity Chamber [§]	15 % RH to 95 % RH @ 25 °C	2.12 % RH	Using Standard Humidity Indicator by Comparisons Method
9.	Relative Humidity / Digital & Analogue Humidity Indicator / Humidity Chamber [*]	15 % RH to 95 % RH @ 25 °C	2.12 % RH	Using Standard Humidity Indicator by Comparisons 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.

° Laboratory can also calibrate instruments/devices of coarser resolution / least count within the accredited range using same reference standard/ master equipment under the scope of accreditation.

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