

Laboratory Micro-Flat Datums Pvt. Ltd., Plot No. 25-28, Zone D-3, GIDC, Vitthal Udyognagar, Anand, Gujarat
Accreditation Standard ISO/IEC 17025: 2005
Certificate Number CC-2378 (in lieu of C-0346) **Page** 1 of 14
Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
<u>ELECTRO-TECHNICAL CALIBRATION</u>				
I.	SOURCE			
1.	DC Voltage [#]	1 mV to 33 mV 33 mV to 300 mV 300 mV to 30 V 30 V to 1000 V	0.36 % to 0.018 % 0.018 % to 0.008 % 0.008 % 0.008 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
2.	AC Voltage [#]	50 Hz to 1 kHz 3.3 mV to 165 mV 165 mV to 33 V 33 V to 1000 V	0.85 % to 0.05 % 0.05 % to 0.07 % 0.07 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
		10 μ A to 33 μ A 33 μ A to 33 mA 33 mA to 10 A 10 A to 20 A	0.26 % to 0.10 % 0.10 % to 0.022 % 0.022 % to 0.1 % 0.1 % to 0.12 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
		20 A to 1000 A	0.90 %	Using Multi Product Calibrator Fluke 5502A with 50 Turn Current Coil
		50 Hz to 1 kHz 30 μ A to 1.65 mA 1.65 mA to 1 A 1 A to 3 A 3 A to 20 A	0.6 % to 0.13 % 0.13 % to 0.1 % 0.1 % to 0.15 % 0.15 % to 0.2 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
		50 Hz 20 A to 1000 A	0.81 %	Using Multi Product Calibrator Fluke 5502A with 50 Turn Current Coil

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2378 (in lieu of C-0346) **Page** 2 of 14

Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

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5.	Resistance [#]	1 m Ω to 11 Ω 11 Ω to 110 Ω 110 Ω to 1.1 M Ω 1.1 M Ω to 11 M Ω 11 M Ω to 110 M Ω 110 M Ω to 1 G Ω	1.36 % to 0.2 % 0.2 % to 0.03 % 0.03 % to 0.034 % 0.034 % to 0.14 % 0.14 % to 0.7 % 0.7 % to 2.0 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
6.	Capacitance [#]	1 kHz 1 nF to 100 nF 100 nF to 10 μ F 10 μ F to 100 μ F 100 μ F to 1 mF	1.74 % to 0.42 % 0.42 % 0.42 % to 0.8 % 0.8 % to 1.4 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
7.	Frequency [#]	50 Hz to 1 kHz 1 kHz to 1 MHz	0.013 % to 0.031 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
8.	Insulation Resistance [#]	Upto 5 kV 100 k Ω to 100 M Ω 100 M Ω to 10 G Ω	0.6 % to 1.5 % 1.5 %	Using HV Decade Megohm Box by Direct Method
9.	AC Power/Energy [#] (560V/ 20A) (1 Phase)	50 Hz 100 mW to 1.2 kW 1.2 kW to 11.2 kW	0.2 %	Using Multi Product Calibrator Fluke 5502A by Direct Method
10.	Power Factor / Phase Angle [#]	50 Hz 0.2 lag – 1 – 0.2 lead	0.003PF	Using Multi Product Calibrator Fluke 5502A by Direct Method

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Accreditation Standard

ISO/IEC 17025: 2005

Certificate Number

CC-2378 (in lieu of C-0346)

Page

3 of 14

Validity

26.09.2017 to 25.09.2019

Last Amended on 30.08.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
11.	Temperature Simulation#			
	K Type	(-) 200 °C to 0 °C 0 °C to 1370 °C	0.4 °C to 0.21 °C 0.21 °C to 0.5 °C	Using Multi Product Calibrator Fluke 5502A as per ITS-90 Scale by Simulation method
	J Type	(-) 200 °C to 0 °C 0 °C to 1200 °C	0.33 °C to 0.2 °C 0.2 °C to 0.3 °C	
	E Type	(-) 250 °C to 0 °C 0 °C to 1000 °C	0.7 °C to 0.31 °C 0.31 °C to 0.25 °C	
	N Type	(-) 250 °C to 0 °C 0 °C to 1300 °C	0.5 °C to 0.25 °C 0.25 °C to 0.33 °C	
	L Type	(-) 200 °C to 0 °C 0 °C to 900 °C	0.44 °C to 0.32 °C 0.32 °C to 0.22 °C	
	U Type	(-) 200 °C to 600 °C	0.7 °C to 0.33 °C	
	T Type	(-) 200 °C to 0 °C 0 °C to 400 °C	0.74 °C to 0.22 °C 0.22 °C to 0.2 °C	
	B Type	600 °C to 1000 °C 1000 °C to 1800 °C	0.53 °C to 0.4 °C 0.4 °C to 0.40 °C	
	R Type	0 °C to 1000 °C 1000°C to 1760 °C	0.7 °C to 0.42 °C 0.42 °C to 0.5 °C	
	S Type	0°C to 1000°C 1000°C to 1760°C	0.6°C to 0.45°C 0.45°C to 0.55°C	
	RTD	(-) 200°C to 0°C 0°C to 800°C	0.12°C to 0.11°C 0.11°C to 0.3°C	
II.	MEASURE			
1.	DC Voltage [§]	1 mV to 100 mV 100 m V to 10 V 10 V to 1000 V	0.42 % to 0.01 % 0.01 % to 0.004 % 0.004 % to 0.006 %	Using Fluke 6 ½ Digit DMM by direct method
2.	DC Current [§]	10 µA to 100 mA 100 mA to 1 A 1 A to 10 A	0.36 % to 0.064 % 0.064 % to 0.083 % 0.083 % to 0.2 %	Using Fluke 6 ½ Digit DMM by direct method

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Accreditation Standard ISO/IEC 17025: 2005
Certificate Number CC-2378 (in lieu of C-0346) **Page** 4 of 14
Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

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3.	AC Voltage [§]	50 Hz to 1 kHz 1 mV to 10 mV 10 mV to 100 mV 100 mV to 1000 V	5 % to 0.53 % 0.53 % to 0.12 % 0.12 %	Using Fluke 6½ Digit DMM by direct method
4.	AC High Voltage [#]	50 Hz 1 kV to 40 kV	5.34 % to 6.17 %	Using HV Voltage Divider Probe with Multimeter by Direct Method
5.	AC Current [§]	50 Hz to 1 kHz 50 μ A to 100 μ A 100 μ A to 1 A 1 A to 10 A	0.31% to 0.25 % 0.25 %	Using Fluke 6½ Digit DMM by direct method
6.	Resistance [§]	1 Ω to 100 Ω 100 Ω to 10 M Ω 10 M Ω to 100 M Ω	0.36 % to 0.02 % 0.02 % to 0.05 % 0.05 % to 1.0 %	Using Fluke 6½ Digit DMM by direct method
7.	Frequency [§]	10 Hz to 1 kHz 1 kHz to 1 MHz	0.04 % to 0.013 %	Using Fluke 6½ Digit DMM by direct method
	Temperature Measurement [§]			
	RTD	(-)200 °C to 0 °C 0 °C to 600 °C	0.10 °C to 0.25 °C	

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Accreditation Standard ISO/IEC 17025: 2005
Certificate Number CC-2378 (in lieu of C-0346) **Page** 5 of 14
Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

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<u>MECHANICAL CALIBRATION</u>				
1.	DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)			
1.	Calipers [§] L.C.: 0.01 mm L.C.: 0.02 mm	0 to 1000 mm 0 to 2000 mm	11.0 μ m 21.0 μ m	Using Slip Gauge Set, Caliper Checker, Length Bar Set & Granite Block by Comparison Method
2.	Height Gauge [§] L.C.: 0.1 μ m L.C.: 0.01 mm L.C.: 0.02 mm	0 to 600 mm 0 to 1000 mm 0 to 1500 mm	5.4 μ m 11.0 μ m 17.0 μ m	Using Slip Gauge Set, Length Bar Set & Granite Surface Plate by Comparison Method
3.	Depth Gauge [§] L.C.: 0.01 mm	0 to 1000 mm	11.5 μ m	Using Slip Gauge Set, Depth Micro-checker & Length Bar Set by Comparison Method
4.	External Micrometer [§] (with Setting Stick) L.C.: 0.001 mm L.C.: 0.01 mm	0 to 300 mm 300 to 600 mm 0 to 600 mm 600 mm to 1000 mm 1000 mm to 1500 mm 1500 mm to 2000 mm	2.4 μ m 6.5 μ m 6.0 μ m 7.3 μ m 9.3 μ m 15.6 μ m	Using Slip Gauge Set, Length Bar Set, Granite Comparator & Electronic Probe with DRO by Comparison Method
5.	Micrometer Setting Stick [§]	600 mm to 2000 mm	15.7 μ m	Using Slip Gauge Set, Length Bar Set & Granite Block by Comparison Method

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Accreditation Standard

ISO/IEC 17025: 2005

Certificate Number

CC-2378 (in lieu of C-0346)

Page

6 of 14

Validity

26.09.2017 to 25.09.2019

Last Amended on 30.08.2018

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6.	Inside Micrometer ^s L.C.: 0.01 mm	5 mm to 250 mm 250 mm to 1500 mm 1500 mm to 3000 mm	6.8 μ m 17.0 μ m 24.0 μ m	Using Slip Gauge Set, Slip Gauge Accessories, Length Bar Set & Granite Block by Comparison Method
7.	Depth Micrometer ^s L.C.: 0.001 mm	0 to 300 mm	4.5 μ m	Using Depth Micro-Checker by Comparison Method
8.	Plunger Type Dial Gauge ^s L.C.: 0.5 μ m L.C.: 1.0 μ m L.C.: 0.01 mm Half Round Dial L.C.: 0.5 μ m	Upto 1 mm Upto 25 mm Upto 100 mm Upto \pm 1 mm	0.98 μ m 1.1 μ m 6.1 μ m 0.98 μ m	Using ULM by Comparison Method
9.	Plunger Type Dial Gauge ^s L.C.: 0.5 μ m ^o L.C.: 0.01 mm Half Round Dial L.C.: 0.5 μ m	Upto 1 mm Upto 10 mm Upto \pm 1 mm	2.5 μ m 6.5 μ m 2.5 μ m	Using Electronic Dial Calibration Tester by Comparison Method
10.	Lever Type Dial Gauge ^s L.C.: 0.001 mm L.C.: 0.01 mm	Upto 1 mm Upto 2 mm	1.8 μ m 5.9 μ m	Using ULM by Comparison Method
11.	Lever Type Dial Gauge ^s L.C.: 0.001 mm L.C.: 0.01 mm	Upto 1 mm Upto 2 mm	2.5 μ m 6.5 μ m	Using Electronic Dial Calibration Tester by Comparison Method

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2378 (in lieu of C-0346) **Page** 7 of 14

Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

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12.	Bore Dial Gauge [§] (Transmission Accuracy Check) L.C.: 0.1 μ m	Upto 2 mm	2.8 μ m	Using Dial Calibration Tester & Electronic Probe with DRO by Comparison Method
13.	Electronic Probe with DRO [§] L.C.: 0.1 μ m	Upto 25 mm	1.7 μ m	Using Slip Gauge Set & Granite Comparator by Comparison Method
14.	Dial Calibration Tester [§] L.C.: 0.1 μ m	Upto 10 mm	0.75 μ m	Using Electronic Probe with DRO by Comparison Method
15.	Dial Thickness Gauge [§] L.C.: 0.01 mm	0 to 30 mm	7.6 μ m	Using Slip Gauge Set by Comparison Method
16.	Pistol Caliper [§] L.C.: 0.1 mm	Upto 100 mm	76.0 μ m	Using Slip Gauge Set by Comparison Method
17.	Dial Caliper Gauge [§] (Internal/External) L.C.: 0.01 mm	Upto 100 mm	8.0 μ m	Using Slip Gauge Set & Slip Gauge Accessories by Comparison Method
18.	Tape & Scale Calibrator [§] L.C.: 0.005 mm	Upto 1000 mm	19.0 μ m	Using Slip Gauge Set & Length Bar Set by Comparison Method
19.	Measuring Tape [§]	Upto 100 meter	$146 \times \sqrt{\frac{L}{1000}} \mu\text{m}$ (where, L in mm)	Using Tape & Scale Calibrator by Comparison Method
20.	Steel Scale [§]	Upto 1000 mm	146.0 μ m	Using Tape & Scale Calibrator by Comparison Method

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2378 (in lieu of C-0346) **Page** 8 of 14

Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
21.	Feeler Gauge [§]	Upto 2 mm	1.0 μ m	Using ULM by Comparison Method
		Upto 2 mm	3.9 μ m	Using Digital External Micrometer by Comparison Method
22.	Thread Pitch Gauge [§]	0.25 mm to 7.0 mm	9.0 μ m	Using Profile Projector by Comparison Method
23.	Radius Gauge [§]	Upto 25 mm	22.80 μ m	Using Profile Projector by Comparison Method
		Upto 100 mm	1.1 μ m	Using ULM & Length Bar set by Comparison Method
		100 mm to 200 mm	1.6 μ m	
		200 mm to 300 mm	2.0 μ m	
		Upto 300 mm	2.5 μ m	Using Slip Gauge Set, Length Bar set, Granite Comparator & Probe by Comparison Method
25.	Plain Ring Gauge [§]	3 mm to 150 mm 150 mm to 300 mm	1.9 μ m 2.3 μ m	Using ULM & Master Plain Ring Gauge by Comparison Method
26.	Plain Snap Gauge [§]	3 mm to 150 mm 150 mm to 300 mm	1.9 μ m 2.3 μ m	Using ULM & Master Plain Ring Gauge by Comparison Method
27.	Thread Plug Gauge [§] (Effective & Major Dia)	Upto 300 mm	2.5 μ m	Using ULM, Thread Measuring wire & Length Bar set by Comparison Method

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Certificate Number CC-2378 (in lieu of C-0346) **Page** 9 of 14

Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
28.	Taper Thread Plug Gauge (Effective & Major Dia) [§]	Upto 300 mm	3.5 μ m	Using ULM, Thread Measuring Wire & Length Bar Set by Comparison Method
29.	Thread Ring Gauge [§] (Effective Dia only)	3 mm to 100 mm	2.0 μ m	Using ULM & Master Plain Ring Gauge by Comparison Method
30.	Measuring Pin/ Thread Measuring Wire [§]	Upto 20 mm	1.0 μ m	Using ULM by Comparison Method
31.	Cylindrical Setting Master (Diameter Measurement & Concentricity) [§]	Upto 100 mm	1.0 μ m	Using ULM, Electronic Probe with DRO by Comparison Method
32.	Bevel Protractor / Combination Set [§] L.C.: 1 minute	0° to 90°	0.6'	Using Angle Gauge set by Comparison Method
33.	Engineer's Square [§] Straightness Squareness Parallelism	Upto 600 mm	2.3 μ m 7.8 μ m 2.4 μ m	Using Granite Square, Slip Gauge Set, Granite Surface Plate & Probe by Comparison Method
34.	Cylindrical Square / Master Cylinder (Squareness Measurement) [§]	Upto 600 mm	3.7 μ m	Using Granite Square Column & Slip Gauge Set by Comparison Method
35.	Granite Square Column [§] Straightness Squareness Parallelism	Upto 1000 mm	3.2 μ m 2.6 μ m 3.2 μ m	Using Plunger Dial, Granite Surface Plate, Electronic Level & Probe by Comparison Method

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number CC-2378 (in lieu of C-0346) **Page** 10 of 14

Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
36.	Granite /Cast Iron Square [§] (Right Angle) Squareness Measurement	Upto 630 mm	5.4 μ m	Using Slip Gauge Set, Granite Surface Plate, Master Cylinder & Plunger Dial by Comparison Method
37.	Granite / Cast Iron Square / Cube [§] Straightness Flatness Squareness Parallelism	Upto 630 mm	2.7 μ m 2.8 μ m 5.4 μ m 2.8 μ m	Using Electronic Level, Granite Surface Plate, Master Cylinder, Slip Gauge Set & Plunger Dial by Comparison Method
38.	Sine Bar Angular Error Parallelism [§]	Upto 300 mm	7.2 " 2.2 μ m	Using Slip Gauge Set, Angle Gauge Set, Electronic Probe by Comparison Method
39.	Bench Center [§] (Co-axiality of Centers)	Upto 1000 mm	5.6 μ m	Using Master Mandrels, Dial Gauges by Comparison Method
40.	Sine Center Angular Error Co-axiality of Centers [§]	Upto 600 mm	7.2" 5.6 μ m	Using Slip Gauge Set, Length Bar Set, Angle Gauge, Master Mandrels, Electronic Probe by Comparison Method
41.	Sine Table Angular Error Parallelism [§]	Upto 200 mm	7.2 " 2.2 μ m	Using Slip Gauge Set, Angle Gauge, Electronic Probe by Comparison Method

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Certificate Number CC-2378 (in lieu of C-0346) **Page** 11 of 14

Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (\pm)	Remarks
42.	Parallel Mandrel [§] Variation in Diameter Run-out Taper Mandrel Variation in Diameter Run-out Taper Angle	Upto 1000 mm Upto 500 mm	5.9 μ m 9.5 μ m 6.1 μ m 10.5 μ m 7.2"	Using Slip Gauge Set, Granite Surface Plate, Bench Center, Sine Center, Electronic Probe by Comparison Method
43.	Spirit Level / Square Frame Type Spirit Level [§] L.C.: 10 μ m/meter (Base Upto 300 mm)	Upto \pm 1 mm/m	8.5 μ m/m	Using Slip Gauge Set, Granite Square Column, Granite Surface Plate, Electronic Level & Probe by Comparison Method
44.	Angle Plate [§] Flatness Squareness Parallelism	Upto 600 mm	3.8 μ m 3.8 μ m 4.8 μ m	Using Slip Gauge Set, Granite Square Column, Granite Surface Plate, Electronic Level & Probe by Comparison Method
45.	V-Blocks [§] Parallelism Squareness Symmetricity	Upto 300 mm	6.6 μ m 5.5 μ m 6.5 μ m	Using Granite Surface Plate, Cylindrical Mandrel, Electronic Probe by Comparison Method
46.	Engineer's Parallel [§]	Upto 300 mm	6.6 μ m	Using Slip Gauge Set, Granite Surface Plate, Electronic Probe by Comparison Method
47.	Straight Edge [§] (width < 30 mm) Straightness Parallelism	Upto 1200 mm	3.2 μ m 3.2 μ m	Using Slip Gauge Set, Electronic Probe, Granite Surface Plate, Plunger Dial by Comparison Method

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Accreditation Standard

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Certificate Number

CC-2378 (in lieu of C-0346)

Page

12 of 14

Validity

26.09.2017 to 25.09.2019

Last Amended on 30.08.2018

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	Straightness Parallelism	Upto 2500 mm	10.0 μ m 10.0 μ m	
48.	Straight Edge [§] (width > 30 mm) Straightness Parallelism Parallelism	Upto 2500 mm Upto 1200 mm Upto 2500 mm	$1.1 \times \sqrt{\frac{L}{100}} \mu\text{m}$ (where L in mm) 3.2 μ m 10.0 μ m	Using Electronic Level, Granite Surface Plate, Electronic Probe & Plunger Dial by Comparison Method
49.	Surface Plate [§] (For Flatness Measurement)	Upto 2400 mm x 1100 mm	$1.1 \times \sqrt{\frac{L+W}{100}} \mu\text{m}$ (where L & W in mm)	Using Electronic Level by Comparison Method
50.	Surface Plate* (Flatness Measurement)	Upto 6000 mm x 6000 mm	$1.25 \times \sqrt{\frac{L+W}{100}} \mu\text{m}$ (where L & W in mm)	Using Electronic Level by Comparison Method
51.	Straight Edge* (width > 30 mm) for Straightness Measurement	Upto 6000 mm	$1.25 \times \sqrt{\frac{L}{100}} \mu\text{m}$ (where, L in mm)	Using Electronic Level, Spirit Level (Temperature Upto 40°C) by Comparison Method
52.	Bench Center* (Co-axiality of Centers)	Upto 1000 mm	5.6 μ m	Using Master Mandrels, Dial Gauges by Comparison Method
53.	Electronic Height Gauge* L.C.: 0.1 μ m L.C.: 1.0 μ m	Upto 600 mm	5.4 μ m	Using Slip Gauge set, Length Bar set by Comparison Method

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Page 13 of 14

Validity 26.09.2017 to 25.09.2019

Last Amended on 30.08.2018

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II.	DIMENSION (PRECISION INSTRUMENTS)			
1.	Gauges Blocks / Slip Gauges [§] (Carbide material) (Steel material)	Upto 25 mm > 25 mm to 50 mm > 50 mm to 75 mm > 75 mm to 100 mm Upto 25 mm > 25 mm to 50 mm > 50 mm to 75 mm > 75 mm to 100 mm	0.12 μ m 0.21 μ m 0.28 μ m 0.33 μ m 0.30 μ m 0.57 μ m 0.85 μ m 1.13 μ m	Using Slip Gauge Calibrator & Slip Gauge Set Grade-K (Carbide Material) by Comparison Method
2.	Length Bar /Long Slip Gauge/ Micrometer Setting Stick [§]	Upto 600 mm	5.7 μ m	Using Slip Gauge Set, Granite Comparator, Length Bar Set, Electronic Probe with DRO by Comparison Method
3.	Electronic Level [§] L.C.: >1.0 μ m/m (Base Upto 300 mm)	Upto \pm 2 mm/m	6.9 μ m/m	Using Electronic Level by Comparison Method
4.	Profile Projector [#] X-Y Travel L.C.: 0.005 mm Magnification Angle L.C.: 1'	Upto 100 mm Upto 100 x 0° to 360°	7.3 μ m 0.13 % 7.2'	Using Glass Scale & Glass Angle Graticule by Comparison Method

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Accreditation Standard ISO/IEC 17025: 2005
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Validity 26.09.2017 to 25.09.2019 **Last Amended on** 30.08.2018

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III.	PRESSURE INDICATING DEVICE			
1.	Hydraulic Pressure# (Analog / Digital Pressure Gauge)	0 to 4 bar 0 to 10 bar 0 to 40 bar 0 to 250 bar 0 to 700 bar	0.005 bar 0.012 bar 0.05 bar 0.27 bar 0.74 bar	Using Master Digital Pressure Gauge with Pressure Comparator by Comparison Method

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

^sOnly in Permanent Laboratory

^aOnly 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.

^o 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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