

Laboratory OPUS Precision Instruments Pte. Ltd., Office No. 5, First Floor,
"Dharma Tower", No. 150/88, Nelson Manickam Road, Chollaimedu,
Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Discipline Mechanical Calibration **Issue Date** 07.11.2014

Certificate Number C-0677 **Valid Until** 06.11.2016

Last Amended on 13.01.2015 **Page** 1 of 8

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
I. DIMENSION			
1. CALIPER^s (Vernier / Dial / Digital)			
LC: 0.01mm	0 to 300mm	9.0 μ m	Using Caliper Checker, Gauge Blocks '0' Grade
LC: 0.01mm	0 to 600mm	15.0 μ m	
2. DEPTH VERNIER^s (Vernier / Dial / Digital) ¹			
LC: 0.01mm	0 to 300mm	9.0 μ m	Using Caliper Checker, Gauge Blocks '0' Grade
LC: 0.01mm	0 to 600mm	16.0 μ m	
3. HEIGHT GAUGE^s (Vernier / Dial / Digital) ¹			
LC: 0.01mm	0 to 300mm	9.2 μ m	Using Caliper Checker, Gauge Blocks '0' Grade
LC: 0.01mm	0 to 600mm	12.0 μ m	
4. ELECTRONIC HEIGHT GAUGE^s (1D/2D) ³			
LC: 0.0001mm	Upto 400mm	4.0 μ m	Using Gauge Blocks '0' Grade
LC: 0.0001mm	Upto 700mm	8.0 μ m	
5. EXTERNAL MICROMETER^s (Mech/Electronic/ Digital) ¹			
LC: 0.001mm	0 to 100mm	2.0 μ m	Using Gauge Blocks '0' Grade/ Optical Flat/ Optical Parallels
	100 mm to 300mm	4.0 μ m	
	300mm to 600mm	8.2 μ m	

Naveen Jangra
Convenor

Avijit Das
Program Manager

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6. MICROMETER HEAD ^{\$} (Mech / Dial / Digital) ¹ LC: 0.001mm	0 to 50mm	1.6 μ m	Using Gauge Blocks '0' Grade
7. DEPTH MICROMETER ^{\$} LC: 0.001mm	Upto 150mm 150 mm to 300mm	2.0 μ m 4.0 μ m	Using Caliper Checker, Gauge Blocks '0' Grade
8. INTERNAL/STICK MICROMETER ^{\$} Travel: 25 mm LC: 0.001mm	0 to 25mm	2.95 μ m	Using Gauge Blocks '0' Grade
EXTENSION ROD ^{\$}	0 to 600mm	5.0 μ m	Using Comparator Gauge Blocks '0' Grade
9. CALIPER CHECKER ^{\$}	0 to 300mm 0 to 600mm	4.0 μ m 5.0 μ m	Using Gauge Blocks '0' Grade/ Dial Test Indicator
10. ELECTRONIC PROBE ^{\$} LC: 0.001mm	0 to 2 mm	1.5 μ m	Using ULM
11. DIAL GAUGE – PLUNGER TYPE ^{\$} (ANALOG/DIGITAL) ¹ LC: 0.001mm LC: 0.01mm LC: 0.01mm	0 to 25mm 0 to 50mm 0 to 100mm	1.5 μ m 5.9 μ m 6.0 μ m	Using ULM & Horizontal Measuring Bench

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12. DIAL GAUGE – LEVER TYPE ^{\$} LC: 0.001mm LC: 0.002mm LC: 0.01mm	0 to 0.14mm 0 to 0.2mm 0 to 1.6mm	1.8 μ m 2.0 μ m 5.9 μ m	Using ULM & Horizontal Measuring Bench
13. BORE DIAL GAUGE ^{\$} (Transmission only) ¹ LC: 0.001mm	0 to 600mm	2.4 μ m	Using ULM
14. GROOVE DIAL GAUGE/ DIAL CALIPER GAUGE – EXTERNAL ^{\$} LC: 0.01mm	0 to 50mm	6.0 μ m	Using Gauge Blocks '0' Grade
GROOVE DIAL GAUGE/ DIAL CALIPER GAUGE – INTERNAL ^{\$} LC: 0.005mm LC: 0.01mm LC: 0.05mm	0 to 10mm 10mm to 100mm 100mm to 125mm	4.0 μ m 6.0 μ m 29.0 μ m	Using Gauge Blocks '0' Grade
15. DIAL THICKNESS GAUGE ^{\$} LC: 0.001mm	0 to 30mm	2.8 μ m	Using Gauge Blocks '0' Grade
16. PISTOL CALIPER ^{\$} LC: 0.1mm	0 to 100mm	60.0 μ m	Using Gauge Blocks '0' Grade
17. COMPARATOR STAND ^{\$} (Flatness of Base)	Upto 200mmx200mm	5.0 μ m	Using 2D-Measuring Machine

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18. CYLINDRICAL MEASURING PIN^{\$}	0 to 25mm	1.7 μ m	Using ULM & Horizontal Measuring Machine
19. THREAD MEASURING WIRES^{\$}	0.17mm to 6.35mm	1.6 μ m	Using ULM
20. THICKNESS PLATE/ FOIL^{\$}	Upto 1000 μ m 1000 μ m to 2000 μ m	1.7 μ m	Using ULM
21. FEELER GAUGE^{\$}	Upto 1mm	2.0 μ m	Using Horizontal Measuring Bench/ Dig Mircometer
22. SNAP GAUGE/ GAP GAUGE^{\$}	Upto 50mm 50mm to 100mm 100mm to 300mm	2.0 μ m 3.0 μ m 6.6 μ m	Using Gauge Blocks '0' Grade
23. PLAIN PLUG GAUGE^{\$}	Upto 50mm 50mm to 100mm 100mm to 300mm	2.4 μ m 2.5 μ m 2.5 μ m	Using ULM
24. PLAIN RING GAUGE^{\$}	Upto 50mm 50mm to 100mm 100mm to 200mm	2.3 μ m 2.4 μ m 3.5 μ m	Using ULM
25. THREAD PLUG GAUGE^{\$}	Upto 50mm 50 mm to 100mm 100mm to 300mm	2.3 μ m 2.3 μ m 4.5 μ m	Using ULM
26. THREAD RING GAUGE^{\$}	15mm to 50mm 50mm to 100mm 100mm to 200mm	2.2 μ m 2.5 μ m 3.5 μ m	Using ULM

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27. THREAD PITCH GAUGE ^{\$}	0.35mm to 7mm	7.0 μ m	Using Profile Projector
28. RADIUS GAUGE ^{\$}	0.4mm to 25mm	7.0 μ m	Using Profile Projector
29. TAPER SCALE ^{\$}	0 to 45mm	6.5 μ m	Using Profile Projector
30. TEST SIEVES ^{\$}	Upto 50 mm	6.5 μ m	Using Profile Projector
31. V-BLOCK ^{\$} Parallel Block Flatness Parallelism Angle	300x300x300mm	6.5 μ m 15"	Using 2D-Height Gauge
32. ENGINEERS PARALLELS ^{\$}	300mmx60mm	7.4 μ m	Using 2D-Height Gauge
33. ENGINEERS SQUARE ^{\$}	300mmx300mm	7.4 μ m	Using 2D-Height Gauge
34. BEVEL PROTRACTOR ^{\$} LC: 5 Min LC: 1°	0 to 90° 0 to 180°	7.0 Min 10 Min	Using Profile Projector
35. FLUSH PIN GAUGE/ DEPTH GAUGE HEIGHT GAUGE ^{\$}	Upto 300 mm	7.0 μ m	Using Micro Height Gauge
36. TAPER PLUG GAUGE MINOR & MAJOR DIA ANGLE ^{\$}	2mm to 50mm 50mm to 100mm	6.0 μ m 6.2 μ m 15"	Using Co-ordinate Measuring Machine

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Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
37. TAPER RING GAUGE MINOR & MAJOR DIA ANGLE ^s	2mm to 50mm 50mm to 100mm	6.5 µm 6.7 µm 15"	Using Co-ordinate Measuring Machine
38. CMM MEASUREMENT LENGTH, DIAMETER ANGLE ^s	Upto 400 mm Upto 180 mm	6.5 µm 15"	Using Co-ordinate Measuring Machine
39. FORD CUP ORIFICE/ INNER DIA ^s	Orifice Dia upto 5mm Inner Dia upto 100mm	8.0µm 8.0µm	Using Profile Projector Using CMM
40. STEEL RULE ^s	Upto 1000mm in step of 200mm	760.0 µm	Using Profile Projector
41. SURFACE PLATE [*]	5 m x 5 m	$2.7 \sqrt{\frac{L+W}{100}} \mu\text{m}$ L & W in mm	Using Spirit Level
42. HEIGHT GAUGE [*] (VERNIER/DIAL/ DIGITAL) LC: 0.01mm LC: 0.01mm LC: 0.02mm LC: 0.02mm	Upto 300mm Upto 600mm Upto 300mm Upto 600mm	15.0 µm 18.0 µm 18.0 µm 23.0 µm	Using Gauge Blocks

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43. ELECTRONIC HEIGHT GAUGE* (1D/2D) LC: 0.001mm LC: 0.001mm	Upto 400mm Upto 700mm	4.0 μ m 8.0 μ m	Using Gauge Blocks
44. PROFILE PROJECTOR/ TOOL MAKERS MICROSCOPE/ VIDEO MEASURING SYSTEM * (Linear) LC:0.001mm	200mmx200mm 300 mm x 300mm	2.8 μ m 5.6 μ m	Using Precision Glass Scale
45. ULM/ HORIZONTAL MEASURING MACHINE*	0 to 100mm	1.5 μ m	Using Gauge Block K Grade
46. CO-ORDINATE MEASURING MACHINE*	500x500x500mm 600x600x600mm	(0.7+12 L/1000) μ m (1.6+14L/1000) μ m L & W in mm	Using Gauge Blocks
II. FORCE			
1. PUSH PULL GAUGE\$	Upto 2 kg Upto 50 kg	1.13 % 1.5 %	Using F2 Class Standard Weights / Load Cell
III. TORQUE			
1. HAND TORQUE TOOLS TYPE A CLASS A,B,C,D,E\$	0 to 25 Nm 25 Nm to 150 Nm 150 Nm to 1500 Nm	1.18 % 1.56 % 1.1 %	Using Norbar Torque Transducers DRO

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IV. MASS

1. ELECTRONIC WEIGHING BALANCE*	Upto 2 kg	0.1g	Using F2 Class Standard Weights
	2 kg to 20 kg	2.2g	
	20 kg to 50 kg	8.3g	

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

\$Only in Permanent Laboratory

*Only for Site Calibration

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