

Laboratory **S. M. Engineers, 1210/B, Sadashiv Peth, Indira Apartment, Pune, Maharashtra**

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

Discipline **Mechanical Calibration** Issue Date **05.02.2016**

Certificate Number **C-0114** Valid Until **04.02.2018**

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Quantity Measured / Instrument	Range/ Frequency	* Calibration Measurement Capability (\pm)	Remarks
I. DIMENSION (Basic Measuring Instrument, Gauge etc.)			
1. VERNIER CALIPER[§] (Dial/Digital) L.C.: 0.01 mm^Φ			
	0 to 300 mm	8.0 μ m	Using Slip Gauges & Length Measuring Machine by Comparison Method
	0 to 450 mm	10.0 μ m	
	0 to 600 mm	12.0 μ m	
	0 to 1000 mm	15.0 μ m	
	0 to 1500 mm	20.0 μ m	
L.C.: 0.02 mm	0 to 2000 mm	25.0 μ m	Using Slip Gauges & Length bar by Comparison Method
2. DEPTH VERNIER[§] L.C.: 0.01 mm^Φ			
	0 to 300 mm	10.0 μ m	Using Slip Gauge & Length Measuring Machine by Comparison Method
	0 to 600 mm	12.0 μ m	
3. OUTSIDE MICROMETER[§] L.C.: 0.001 mm^Φ			
	0 to 25 mm	1.5 μ m	Using Micrometer Checking Set & Length bar by Comparison Method
	25 mm to 100 mm	2.0 μ m	
	100 mm to 200 mm	3.0 μ m	
	200 mm to 600 mm	4.0 μ m	Using Micrometer Checking Set Length bar by Comparison Method
	600 mm to 1000 mm	6.0 μ m	
4. HOLE TEST MICROMETER[§] L.C.: 0.001 mm^Φ			
	3 mm to 200 mm	2.0 μ m	Using Plain Ring Gauge Set by Comparison Method

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5. INSIDE MICROMETER^{\$} L.C.: 0.001 mm^Φ	Upto 50 mm Upto 250 mm (Micrometer Head)	2.0 μ m 3.0 μ m	Using Length Measuring Machine by Comparison Method
L.C.: 0.01 mm	Upto 300 mm (Extension Rod)	3.5 μ m	Using Length Measuring Machine by Comparison Method
	Upto 1000 mm (Extension Rod)	6.0 μ m	Using Length Measuring Machine Length Bar, Comparator Stand & Micrometer Checking Set by Comparison Method
6. DIAL GAUGE^{\$} (Plunger Type) L.C.: 0.0005 mm^Φ	0 to 1 mm 0 to 10 mm 0 to 25 mm 0 to 50 mm/ 100 mm	1.0 μ m 1.5 μ m 2.0 μ m 3.0 μ m	Using Electronic Dial Tester by Comparison Method Using Length Measuring Machine by Comparison Method
7. DIAL GAUGE^{\$} (Lever Type) L.C.: 0.001 mm^Φ	0 to 0.2 mm	1.5 μ m	Using Electronic Dial Tester by Comparison Method
L.C.: 0.01 mm	0 to 2 mm	3.0 μ m	
8. MICROMETER SETTING BAR / SETTING MASTERS^{\$}	Upto 100 mm 100 mm to 300 mm 300 mm to 1000 mm	1.2 μ m 3.0 μ m 7.0 μ m	Using Slip Gauges, Electronic Comparator, Profile Projector & Long Gauge Block by Length Measuring Machine

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9. PLAIN PLUG GAUGES/TAPER PLUG GAUGES^{\$}	0 to 25 mm 25 mm to 100 mm 100 mm to 300 mm Half Indulged angle Upto 60 °C	1.1 μ m 1.0 μ m 1.5 μ m 20.0 s of Arch	Using Slip Gauges, Electronic Comparator, Length Measuring Machine by Comparison Method
10. SNAP GAUGE^{\$}	Upto 25 mm Upto 100 mm 100 mm to 750 mm	0.8 μ m 1.4 μ m 4.1 μ m	Using Slip Gauge Set & Length Measuring Machine by Comparison Method
11. PLAIN RING GAUGE/ TAPER RING GAUGE^{\$}	Upto 25 mm Upto 100 mm 100 mm to 300 mm Half Indulged angle Upto 60 °C	1.5 μ m 2.0 μ m 2.5 μ m 30.0 s of Arch	Using Setting Ring Gauge & Length Measuring Machine by Comparison Method
12. PIN GAUGE/ THREAD MEASURING WIRE^{\$}	Upto 20 mm	0.9 μ m	Using Slip Gauge Set & Electronics Comparator by Comparison Method
13. FEELER GAUGE^{\$}	Upto 2.0 mm	0.85 μ m	Using Slip Gauge Set & Electronics Comparator by Comparison Method
14. THICKNESS GAUGE^{\$} L.C.: 0.01 mm	0 to 50 mm	3.0 μ m	Using Slip Gauge Set by Comparison Method
15. PISTOL CALIPER^{\$} L.C.: 0.1 mm	Upto 100 mm	7.0 μ m	Using Slip Gauge Set by Comparison Method

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16. THICKNESS FOILS ^{\$}	Upto 2 mm	1.2 μ m	Using Slip Gauge Set & Electronics Comparator by Comparison Method
17. COATING THICKNESS GAUGE ^{\$}	Upto 2mm	6.0 μ m	Using Thickness Foils by Comparison Method
18. MEASURING SCALE ^{\$}	Upto 2 m	150 $\sqrt{2}$ L L in meters	Using Length Measuring Machine by Comparison Method
19. MEASURING TAPE/ PI TAPE ^{\$}	0 to 50 m	150.0 μ m (for any length L in Meters or first 0.5 m) 150 $\sqrt{2}$ L	Using Length Measuring Machine by Comparison Method
20. VERNIER HEIGHT GAUGE ^{\$} L.C.: 0.02 mm	0 to 300 mm 0 to 600 mm 0 to 1000 mm	13.0 μ m 15.0 μ m 20.0 μ m	Using Slip Gauge Set & Length Bar by Comparison Method
21. HEIGHT GAUGE ^{\$} (Dial/Digimatic Type) L.C.: 0.01 mm	0 to 300 mm 0 to 600 mm 0 to 1000 mm	8.0 μ m 10.0 μ m 15.0 μ m	Using Slip Gauge Set & Length Bar by Comparison Method
22. THREAD PLUG GAUGE ^{\$} Taper Thread Plug Gauge	Upto 300 mm Half Included angle Upto 60°	8 μ m 8 $\sqrt{2}$ μ m	Using Length Measuring Machine by Comparison Method
23. THREAD RING GAUGE ^{\$} Taper Thread Ring Gauge	Upto 300 mm Half Included angle Upto 60°	5 μ m 7 μ m	Using Length Measuring Machine by Comparison Method

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24. BORE GAUGE[§] L.C.: 0.001 mm^Φ	0 to 25 mm (Transmission Mechanism only)	2.0 μ m	Using Length Measuring Machine by Comparison Method
25. DIAL CALIBRATION TESTER[§] L.C.: 0.0010 mm L.C.: 0.0001 mm	0 to 25 mm	2.0 μ m	Using Electronic Probe by Comparison Method
26. BEVEL PROTRACTOR[§]	0°-90°-0°	3.0 min	Using Sine Setting Device & Angle Gauge Block
27. ANGLE / SETTING GAUGE[§]	Upto 90°	20.0 s	Using Sine Setting Device & Slip Gauge Set & Profile Projector
28. COMBINATION SET/ANGLE PROTRACTOR[§]	0 to 360°	35.0 min	Using Slip Gauge Set & Profile Projector
29. RADIUS ANGLE[§]	Upto 25 mm	41.0 μ m	Using Profile Projector by Comparison Method
30. THREAD PITCH GAUGE[§]	55, 60° Pitch 0.3 mm to 6.0 mm	10 min 10 μ m	Using Profile Projector by Comparison Method
31. COMPARATOR STAND[§]	Upto 300 mm	5.0 μ m	Using Plunger Dial by Comparison Method
32. RIGHT ANGLE ENGINEER'S SQUARE	0 to 300 mm 0 to 600 mm	11.4 μ m	Using V-Block Plunger Dial & Surface Plate & Height Master by Comparison Method

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33. "V" BLOCK FOR PARALLELISM SQUARENESS & SYMMETRICITY ^{\$}	150 mm 150 mm 150 mm	5.7 μ m 5.6 μ m 5.8 μ m	Using Plunger Dial & Mandrel by Comparison Method
34. STRAIGHT EDGE ^{\$}	Upto 5 meter	6.4 μ m	Using Digital Level Meter / Slip Gauge by Comparison Method
35. ANGLE PLATE ^{\$}	Upto 500 mm	8.0 μ m	Using Plunger Dial & Surface Plate by Comparison Method
36. GLASS SCALE ^{\$} L.C. 0.1 mm	0 to 300 mm	28 μ m	Using Profile Projector & LMM by Comparison Method
37. TEST SIEVES ^{\$}	20 μ m to 100 mm	11.3 μ m	Using Profile Projector by Comparison Method
38. ELECTRONIC COMPARATOR WITH PROBE ^{\$} L.C.: 0.0001 mm	0 to 25 mm	0.52 μ m	Using Slip Gauge by Comparison Method
39. DIGITAL HEIGHT MASTER [#] L.C : 0.001 mm L.C : 0.0001 / 0.0005 mm	0 to 600 mm. 0 to 1000 mm	4.00 μ m 7.60 μ m	Using Length Bar & Gauge Blocks. by Comparison Method

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40. SURFACE PLATE # (Flatness) (Grade 0/ I/ II)	Upto 3 mm x 3 mm	$3.6 \times \left(\sqrt{\frac{L+W}{100}} \right) \mu\text{m}$ L & W in mm	Using Electronic Level by Comparison Method
DIMENSION (Precision Instrument)			
41. PROFILE PROJECTOR# X/Y/Z Axis L.C.: 0.001 mm Angular scale L.C.: 15 Magnification	Upto 25 mm 25 mm to 300 mm 0 to 360 ° Upto 100X	2.0 μm 4.0 μm 5.0 Min 0.5 %	Using Slip Gauge, Angle Gauge Block & Glass Scale by Comparison Method
OPTICAL MICROSCOPE# X/Y/Z Axis Magnification	Upto 25 mm 25 mm to 300 mm Upto 1000 X	2 μm 4 μm 0.5 %	
II. TORQUE GENERATING DEVICES			
1. TORQUE TOOLS\$ (Torque Wrenches/Screw Driver) (Type I – Class B,C,D,E & Type II Class A, B,C,D,E)	2 Nm to 20 Nm 20 Nm to 200 Nm 200 Nm to 2000 Nm	2.68 % 2.42 % 2.42 %	Torque Transducer with Indicator & Torque Wrench Calibration System as per IS/ISO 6789:2003
III. HARDNESS TESTING MACHINES			
1. HARDNESS SPRING CALIBRATION OF RUBBER HARDNESS TESTERS\$	0 to 100 Shore-A 0 to 100 Shore-D	1.0 Shore-A 1.0 Shore-D	Using Rubber Hardness Tester Calibrator Based on ASTM D 2240 : 2005, Clause 7.4 to 7.7

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IV. ACCELERATION & SPEED			
1. TACHOMETER ^{\$} (Non Contact Type) (Contact Type)	500 rpm to 10000 rpm 500 rpm to 5000 rpm	15 rpm 10 rpm	Using Digital Tachometer and Electric Motor with Rotating Disc
2. VIBRATION ACCELERATION VELOCITY DISPLACEMENT ^{\$}	Upto 200 m/s ² (Peak) Upto 200 mm/s (RMS) Upto 1500 μ m (Peak to Peak)	6.4 % 6.0 % 2.6 %	Using Vibration Calibrator by Comparison Method
V. ACCOUSTICS			
1. SOUND LEVEL METER ^{\$}	94 dB and 114 dB	0.75 dB	Using Sound Level Calibrator by Comparison Method
VI. PRESSURE INDICATING DEVICES			
1. HYDRAULIC PRESSURE [#] Analog/Digital Pressure Gauge	0 to 40 kg/cm ² >30 to 700 kg/cm ²	0.064 kg/cm ² 2.8 kg/cm ²	Using Digital Pressure Gauge (DPG) with reference to Calibrated DPG by Comparison Method as per DKD-R6-1

* 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.

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