Laboratory	**Accurate Calibration & Testing Center, 168, B-Wing, 1st Floor, Jai Ganesh Vision, Akurdi, Pune, Maharashtra**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Discipline	**Mechanical Calibration**	**Issue Date**	**25.09.2014**
Certificate Number	**C-0503**	**Valid Until**	**24.09.2016**
Last Amended on	**29.09.2014**	**Page**	**1 of 16**

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
I. DIMENSION			
1. CALIPER$ (Vernier, Dial, Electronic)			
L. C.: 0.005 mmΦ	Upto 600 mm	13.0 µm	Using Caliper Checker& Length Bar
	Upto 1000 mm	15.0 µm	
Gear Tooth Caliper L.C.: 0.02 mmΦ	Upto 200 mm	18.0 µm	
2. HEIGHT GAUGE$ (Vernier, Dial , Electronic)			
L.C. 0.01 mmΦ	Upto 600 mm Upto 1000 mm	13.0 µm 15.0 µm	Using Caliper Checker & Length Bars
3. DEPTH GAUGE$ (Dial , Digital, Vernier)			
L.C. 0.01 mmΦ	Upto 300 mm	10.0 µm	Using Slip Gauge Set & Holding Fixture
4. EXTERNAL MICROMETER$			
L. C. : 0.001 mmΦ	0 to 150 mm	1.6 µm	Using Slip Gauge Set & Length Bars
L.C.: 0.01 mm	> 150 mm to 300 mm	5.0 µm	
	> 300 mm to 600 mm	8.0 µm	
	> 600 mm to 1000mm	11.0 µm	
5. V- ANVIL MICROMTER$			
L.C. 0.001 mmΦ	Upto 100 mm	6.5 µm	Using Cylindrical Setting Masters

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
6.	**INTERNAL MICROMETER-2 POINTS$**	25mm (Transverse of micrometer head)	8.9 µm	Using Slip Gauge Set Accessories & Caliper Checker
	L.C. : 0.001 mmΦ	Upto 2100 mm (With interchangeable setting rod not more than 400mm)	8.0 µm	
7.	**INSIDE DIAL CALIPER-2 POINTS$**			
	L.C. 0.001 mmΦ	Upto 150 mm	5.0 µm	Using Slip Gauge Set Accessories & Caliper Checker
8.	**GROOVE MICROMETER$**			
	L.C. 0.001 mmΦ	Upto 150 mm	5.0 µm	Using Slip Gauge Set Accessories & Caliper Checker
9.	**DEPTH MICROMETER$**			
	L.C. : 0.001 mmΦ	Upto 300 mm	7.0 µm	Using Slip Gauge Set & Holding Fixture
10.	**DIAL GAUGE - PLUNGER TYPE$**			
	L.C. 0.001 mm	Upto 2 mm	1.0 µm	Using Calibration Tester & Slip gauge set
	L.C.0.002 mm	Upto 5 mm	2.0 µm	
	L.C. 0.01 mmΦ	Upto 25 mm	3.0 µm	
	L.C. 0.001 mmΦ	Upto 50 mm	2.0 µm	Using Universal Length Measuring Machine SIP 302m

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
11. DIAL GAUGE – LEVER TYPE$			
L.C. 0.001 mmΦ	Upto 2 mm	1.1 µm	Using Dial Calibration Tester
12. BORE GAUGE$ (For transmission accuracy check only)	Upto 1 mm	3.0 µm	Using Dial Calibration Tester
13. THICKNESS GAUGE $ (Dial & Electronic)			
L.C. 0.001 mm	Upto 1 mm	1.0 µm	Using Slip Gauge Set
L.C. 0.01 mmΦ	Upto 10 mm	3.2 µm	
14. PISTOL CALIPER$			
L.C.0.01 mmΦ	Upto 65 mm	58.0 µm	Using Slip Gauge Set
15. DIAL SNAP GAUGE$	Upto 200 mm	3.0 µm	Using Slip Gauge Set & Optical Flat
16. COMPARATOR WITH STAND / COMPARATOR DIAL / ELECTRONIC PROBE WITH DRO$			
L.C. 0.00001 mmΦ	Upto 25 mm	0.4 µm	Using Slip Gauge Set

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
17. COMPARATOR STAND$ (FLATNESS OF WORK (Flatness of Work Table)	Upto Dia.100mm	0.3 µm	Using Optical Flat
	Upto 200 mm X 200 mm	1.0 µm	Using Electronic Comparator
	Upto 300 mm X 300 mm	4.5 µm	
18. DIAL CALIBRATION TESTER$ L.C 0.0001 mmΦ	0 to 25 mm	0.75 µm	Using Electronic Comparator
19. MEASURING SCALE$	Upto 1000 mm	144 µm	Using Scale & Tape Calibrator
	1000 mm to 2000 mm	204 µm	
20. MEASURING TAPE $	Upto 1 m	144 µm	Using Scale & Tape Calibrator
	>1 m to 50 m with step of 1 m	$144\sqrt{\frac{L}{1000}}$ µm Where L is in mm	
21. PI TAPE$	>1 m to 50 m with step of 1 m	$58\sqrt{\frac{L}{1000}}$ µm Where L is in mm	Using Scale & Tape Calibrator
22. MICROMETER HEAD$ L.C.: 0.0002 mmΦ	0 to 25 mm	0.7 µm	Using Electronic Comparator

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
23.	**VERTICAL SINGLE AXIS MEASURING MACHINE / ELECTRONIC HEIGHT GAUGE$ L.C.: 0.0001mmΦ**	Upto 1000 mm	$2.5 + \frac{L}{1000}$ µm Where L is in mm	Using Length Bars
24.	**COATING THICKNESS METER$**	Upto 2 mm	4.5 µm	Using Master Foils
25.	**ULTRASONIC THICKNESS GAUGE$**	Upto 200 mm	8.3 µm	Using Step Master
26.	**WELDING FILLET GAUGES$**	Length parameters Angle parameters	5.6 µm 186 as	Using Vision Measuring Machine
27.	**FLOATING CARRIAGE DIA. MEASURING MACHINE$ L.C. 0.0001 mmΦ**	0 to 200 mm	1.6 µm	Using Cylindrical Setting Master, Electronic Comparator, Optical Flat, Measuring Pin and Slip Gauges
28.	**HEIGHT MICROMETER / HEIGHT MASTER$ L.C.0.0005 mmΦ**	0 to 350 mm	4.5 µm	Using Slip gauge blocks
29.	**LINEAR GLASS SCALE (GRATICULE) / GLASS GRID$ L.C. 0.001mmΦ**	Upto 200 mm	4.4 µm	Using Vision Measuring Machine (based on edge detection)

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
30.	**TAPER SCALE / TAPER BORE GAUGE$**	Upto 60 mm	5.6 µm	Using Vision Measuring Machine
31.	**HEGMAN GAUGE$**	Upto 1 mm	6.5 µm	Using 2 D Height Gauge
32.	**LENGTH MEASURING MACHINE$ (Horizontal) L.C 0.0001 mmΦ**	Upto 300 mm	1.4 µm	Using Slip Gauge Blocks
33.	**SURFACE ROUGHNESS TESTER$**	Ra Rz Rmax	7.50% 7.50% 7.50%	Using Surface Roughness Masters
34.	**WET FILM THICKNESS GAUGE$**	Upto 5 mm	7.1 µm	Using Vision Measuring Machine
35.	**SCALE & TAPE CALIBRATION MACHINE$ L.C.0.0001 mmΦ**	Upto 1000 mm	6.0 µm	Using Slip Gauge Blocks & Length Bars
36.	**ORIFICE DIAMETER & MAJOR DIAMETER OF VISCOSITY CUP$**	Upto 50 mm	9.5 µm	Using Linear Height Direct Gauge
37.	**STRAIGHT EDGE$**	Upto 5000 mm	$2.9\sqrt{\frac{L}{120}}$ Where L is in mm	Using Electronic Level

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
38.	**ENGINEER'S PARALLEL$ (PARALLELISM)**	Upto 350 mm	3.5 µm	Using Electronic Comparator
39.	**ENGINEER'S SQUARE$**	Upto 600 mm	8.6 µm (For Squareness)	Using Comparator & Granite-L square
40.	**MASTER CYLINDER / GRANITE L-SQUARE$**	Upto 600 mm	3.5 µm (For Squareness)	Using Master Granite L-Square
41.	**ANGLE PLATE / BOX ANGLE PLATE$ (Parallelism / Flatness / Squareness)**	Upto 300mm	8.6 µm (For Parallelism / Flatness) 8.6 µm (For Squareness)	Using Master Granite L-Square & Comparator For Angle plate
42.	**V-BLOCK$ (Parallelism / Symetricity/ Squareness)**	Upto 150mm	6.8 µm (For Parallelism / Symmetricity) 8.3 µm (For Squareness)	Using Master Cylinders/ Master Granite L-Square & Comparator
43.	**GAUGE BLOCK$**	0.5 mm to 25 mm > 25 mm to 50 mm > 50 mm to 75 mm > 75 mm to 100 mm	0.10 µm 0.11 µm 0.13 µm 0.15 µm	Using Gauge Block Comparator & Reference "K" Grade Gauge Block Set

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
44.	**MICROMETER SETTING STANDARD / LENGTH BAR (Inspection & Work Shop Grade) / LONG GAUGE BLOCK$**	0 to 150 mm > 150 mm to 300 mm > 300 mm to 400 mm > 400 mm to 700 mm > 700 mm to 1000 mm	0.8 µm 1.42 µm 1.5 µm 3.0 µm 3.5 µm	Using Slip Gauge Set & Elec. Comparator
45.	**FEELER GAUGE / SHIMS (FOILS) OF COATING THICKNESS GAUGE / THICKNESS STANDARD$**	Upto 2 mm	1.5 µm	Using Electronic Comparator with stand
46.	**MEASURING PINS / THREAD MEASURING WIRES / THREE WIRE UNIT$**	0.17 mm to 20 mm	0.8 µm	Using Electronic Comparator with stand
47.	**THREAD MEASURING PRISMS$**	A/B/C/D	1.0 µm	Using Electronic Comparator
48.	**CYLINDRICAL SETTING MASTER$**	Upto 100 mm > 100 mm to 200 mm	1.6 µm 2.2 µm	Using Slip Gauge Set & Electronic Comparator
49.	**PLAIN RING GAUGES / SETTING RING GAUGE$**	Upto 100 mm > 100 mm to 200 mm >200 mm to 300mm > 300 mm to 400mm	2.3 µm 2.5 µm 5.0 µm 6.7 µm	Using Universal Length Measuring Machine Using Linear Height Gauge

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
50.	**CALIPER CHECKER / STEP GAUGE / INTERNAL MICRO CHECKER$**	0 to 370 mm 0 to 1000 mm	4.5 µm 6.1 µm	Using Linear Height Gauge & Length Bars
50.	**DEPTH MICRO CHECKER$**	0 to 300 mm	3.5 µm	Using Linear Height & Length Bars
51.	**RISER BLOCK**	Upto 300 mm	3.0 µm	Using Electronic Comparator & Slip Gauge
52.	**RADIUS GAUGE SET / RADIUS $**	Upto 200 mm	5.6 µm	Using Vision Measuring Machine
53.	**STANDARD WIRE GAUGE$**	Upto 100 mm	7.2 µm	Using Vision Measuring Machine
54.	**THREAD PITCH GAUGE / THREAD PITCH$**	55 º, 60º Flank angle 0.3 mm to 8.0 mm Pitch	9 as 5.6 µm	Using Vision Measuring Machine
	FLANK ANGLE / HELIX ANGLE OF THREADS$	Upto 90º	9 as	
55.	**FORM GAUGES / TEMPLATES$**	Linear upto 200 mm Angle upto 360º	4.1 µm 45 as	Using Vision Measuring Machine Direct Comparison Method
56.	**PLAIN PLUG GAUGE / SETTING PLUG GAUGE / WIDTH GAUGE$**	0 to 100 mm > 100 mm to 200 mm > 200 mm to 300 mm	1.6 µm 2.2 µm 3.0 µm	Using Slip Gauge Set & Electronic Comparator
57.	**PLAIN SNAP GAUGE$**	Upto 300 mm	3.0 µm	Using Slip Gauge Set

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
58.	**THREAD PLUG GAUGE$ (Effective Diameter Only)**	Upto 100 mm > 100 mm to 200 mm > 200 mm to 300 mm	3.6 µm 2.5 µm 3.0 µm	Using FCDM, Cylindrical Setting Masters & Thread Measuring Wires Using Universal Length Measuring Machine & thread measuring wires
59.	**TAPER THREAD PLUG GAUGE$ (Effective Diameter Only)**	Upto 100 mm	4.0 µm	Using FCDM, Cylindrical Setting Masters & Thread Measuring Wires
		> 100 mm to 200 mm	2.5 µm	Using Universal Length Measuring Machine & thread measuring wires
60.	**THREAD RING GAUGE$ (Effective Diameter Only)**	3 mm to 100 mm >100 mm to 200 mm	2.2 µm 2.8 µm	Using Universal Length Measuring Machine
61.	**TAPER THREAD RING GAUGE$ (Effective Diameter Only)**	Upto 110 mm	2.3 µm	Using Universal Length Measuring Machine
62.	**PLAIN TAPER PLUG GAUGE$**	Diameter upto 150 mm	2.6 µm	Using Universal Length Measuring Machine
		Half include Angle Upto 60°	9 as	
63.	**PLAIN TAPER RING GAUGE$**	Diameter upto 150 mm	2.6 µm	Using Universal Length Measuring Machine
		Half include Angle Upto 60°	40.8 as	

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
64.	**SPLINE GAUGE$ (INTERNAL)**	Upto 200mm	2.1 µm	Using Slip Gauges & Measuring Pins
65.	**SPLINE GAUGE $ (EXTERNAL)**	Upto 100mm	3.8 µm	Using F.C.D.M. & Measuring Pins
		> 100mm to 200mm	3.8 µm	Using Universal Length Measuring Machine & Measuring Pins
66.	**ANGLE MEASUREMENT$**	0° to 360°	6.4 as	Using Vision Measuring Machine
67.	**BEVEL PROTRACTOR$ L.C:1′Φ**	0° -90°-0°-90°	4 a min	Using Angle Gauge Blocks
68.	**DEGREE PROTRACTOR$ L.C. 1°**	0° to 360°	43 a min	Using Angle Gauge Blocks
69.	**COMBINATION SET$ L.C. 1°**	0° -90°-0°	43 a min	Using Angle Gauge Blocks
70.	**SPIRIT LEVEL / FRAME LEVEL$ L.C.0.01mm**	Base Length Upto 300 mm	2.9 µm/m	Using Electronic Comparator
	ELECTRONIC LEVEL L.C.: 0.001 mm/m Φ			

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
71.	**SINE BAR / SINE CENTER$**	100 mm/200mm/300 mm		Using Vertical measuring machine, Slip Gauge Blocks Grade-0, Angle Gauges & electronic comparator
	Linear		4.2 µm	
	Angular		11.2 as	
72.	**ANGLE GAUGES$**	Upto 90°	18.3 as	Using Slip Gauge Blocks Grade-0, Sine Bar, Electronic Comparator
73.	**ANGULAR GRATICULE$ (Scale)**	0° to 360°	8.5 as	Using Vision Measuring Machine
74.	**VICKERS INDENTOR, KNOOP INDENTOR, ROCKWELL DIAMOND CONE INDENTOR$**	Angle 136°, 130°, 172°-30', 120°	76 as	Using Vision Measuring Machine
		Radius 0.2 mm	4.5 µm	
75.	**SURFACE ROUGHNESS SPECIMEN$**	Ra Rz Rmax	6.4% 6.5% 6.5%	Using Surface Roughness Tester
76.	**OPTICAL FLAT / OPTICAL PARALLE$**			
	- FLATNESS	Upto 100 mm	0.25 µm	Using Optical Flat
	- PARALLELISM	Upto 100 mm	0.9 µm	Using Electronic Comparator
77.	**TEST SIEVES$**	32µm to 50mm	5.6 µm	Using Vision Measuring Machine & Digital Caliper
		> 50 mm to 125mm	37.5 µm	

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
78. SHORE-A Hardness Tester			
INDENTOR EXTENSION & SHAPE$			
(0 to 100 shore A)			
i) Shaft Diameter of indentor d2	1.25 mm	5.6 µm	Using Vision Measuring Machine for d2, α & d1
ii) Cone angle of indentor α	35°	5 as	
iii) Hole diameter of pressure foot d1	3 mm	5.6 µm	
iv) Diameter of pressure foot D	18 mm	27.1 µm	Using Digital Caliper
v) Depth of indentor-L	Upto 2.5 mm	2.6 µm	Using Digital Dial Gauge
79. SHORE-D Hardness Tester			
INDENTOR EXTENSION & SHAPE$			
(0 to 100 Shore D)			
i) Shaft Diameter of indentor d2	1.25 mm	5.6 µm	Using Vision Measuring Machine for d2, α & d1
ii) Cone angle of indentor α	30°	5 as	
iii) Hole diameter of pressure foot d1	3 mm	5.6 µm	
iv) Diameter of pressure foot D	18 mm	27.4 µm	Using Digital Caliper
v) Depth of indentor-L	Upto 2.5 mm	2.6 µm	Using Digital Dial Gauge

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
80.	**SURFACE PLATE♣** **- GRANITE** **- CAST IRON**	Upto 4000 mm X 4000 mm	$1.0\sqrt{\frac{L+W}{120}}$ where L is in mm, W is in mm	Using Electronic Level
81.	**PROFILE PROJECTOR / OPTICAL MICROSCOPE / TOOL MAKERS MICROSCOPE / BRINELL MICROSCOPE / VISION MEASURING MACHINE♣**			
	a) Linear X,Y Axis **L.C. 0.0001 mmΦ**	0 to 200 mm	2.7 µm	Using Linear Glass Scale
	b) Angular	0° to 360°	5 as	Using Angle Gauges
		0° to 360°	8.9 as	Using Angular Graticule
	c) Magnification	upto 1000X	0.45 %	Using Linear Glass scale & Digital Caliper
82.	**LENGTH MEASURING MACHINE♣** **(Horizontal)** **L.C 0.0001 mmΦ**	Upto 300 mm	1.4 µm	Using Slip Gauge Blocks
83.	**VERTICAL SINGLE AXIS MEASURING MACHINE / ELECTRONIC HEIGHT GAUGE♣** **L.C. 0.0001mmΦ**	Upto 1000 mm	2.5+(L/1000) Where L in mm	Using Length Bars

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
84.	**STRAIGHT EDGE♣**	Upto 5000 mm	$2.9\sqrt{\frac{L}{120}}$ Where L is in mm	Using Electronic Level
II.	**HARDNESS**			
1.	**CALIBRATION OF SHORE 'A' AND SHORE 'D' HARDNESS TESTER$**	0 to 100 Shore Unit 0 to100 Shore Unit	0.9 Shore 'A' 0.7 Shore 'D'	Using Shore Hardness Tester Calibrator as per ASTM D 2240
2.	**VERIFICATION OF FORCE OF SHORE 'A' AND SHORE 'D' HARDNESS TESTER AND SHORE ' A' , SHORE 'D' HARDNESS TESTER CALIBRATOR$**	0-100 Shore 'A' 0-100 Shore 'D'	0.15 Shore Unit	Using Load Cell with Indicator as per ASTM D 2240
3.	**VERIFICATION OF ROCKWELL HARDNESS TESTER BY INDIRECT METHOD♣**	HRA HRB HRC	1.9 HRA 1.0 HRB 1.9 HRC	Using Standard Hardness Test Blocks as per IS 1586 (Part 2); 2012
4.	**VERIFICATION OF BRINELL HARDNESS TESTER BY INDIRECT METHOD♣**	10/3000 HBW 5/750 HBW	2.0 % 2.0 %	Using Standard Hardness Test Blocks as per IS 2281:2005
III.	**ACOUSTIC**			
1.	**SOUND LEVEL METER$**	94 dB & 114 dB	0.51 dB	Using Sound Level Meter

Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
IV. ACCELEARATION AND SPEED			
TACHOMETER / RPM METER / SPEED INDICATORS $ (Non-Contact)	10 rpm to 100 rpm > 100 rpm to 1000 rpm > 1000 rpm to 10000 rpm > 10000 rpm to 99900 rpm	1.3 % 0.1 % 0.017 % 0.020 %	Using RPM Tester
V. TORQUE			
1. TORQUE WRENCHES$			Using Digital Torque Calibration System with four torque transducers As per ISO 6789:2003
Type – I Class A,B,C,D,E	0 to 1000 Nm	1.20 %	
Type- II Class A,B,C,D,E,F,G		1.29 %	

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

$Only in Permanent Laboratory

♣Only for Site Calibration

Φ 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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