Laboratory	**Central Mechanical Engineering Research Institute, Mahatma Gandhi Avenue, Durgapur, West Bengal**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Discipline	**Mechanical Calibration**	**Issue Date**	**22.05.2014**
Certificate Number	**C-0237**	**Valid Until**	**21.05.2016**
Last Amended on	**23.09.2014**	**Page**	**1 of 9**

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
I.	**DIMENSION**			
1.	**GAUGE BLOCKS[$]**	0.5 mm to 25 mm 25 mm to 50 mm 50 mm to 75 mm 75 mm to 100 mm	0.11µm 0.14 µm 0.18 µm 0.22 µm	Using Slip Gauge Set, Slip Gauge Calibrator
2.	**LENGTH BAR[$]**	Upto 300 mm 300 mm to 600 mm 300 mm to 1000 mm	1.1 µm 1.6 µm 2.6 µm	Using Horizontal length Measuring Machine
3.	**PLAIN PLUG GAUGE[$]**	Upto 600 mm	1.5 µm	Using Electrolimit comparator, CMM, Universal length Measuring Machine
4.	**PLAIN RING GAUGE[$]**	Upto 600 mm	1.5 µm	Using Horizontal length Measuring Machine, Universal length Measuring Machine
5.	**PLAIN GAP GAUGE/ SNAP GAUGE[$]**	Upto 600 mm	1.8 µm	Using Horizontal length Measuring Machine, CMM
6.	**EXTERNAL MICROMETER[$]**			
	L.C.0.001mm	0 to 25 mm	1.2 µm	Using Slip Gauge Set & Length Bar Set
	L.C.0.01 mm	0 to 100 mm 100 mm to 600 mm 600 mm to 1000 mm	2.5 µm 4.0 µm 4.0 µm	

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7.	**INTERNAL MICROMETER[$]**			
	L.C.0.01mm	0 to 100 mm 100 mm to 600 mm 600 mm to 1000 mm	2.5 µm 4.0 µm 7.0 µm	Using Slip Gauge Set, Length Bar Set & Electrolimit Comparator
8.	**HEIGHT GAUGE[$]**			
	L.C.0.02 mm	0 to 300 mm 0 to 600 mm	2.0 µm 2.5 µm	Using Slip Gauge Set
	L.C.0.001 mm	0 to1000 mm	4.0 µm	Using Length Bar Set
9.	**VERNIER CALIPER/DIAL VERNIER CALIPER[$]**			
	L.C.0.01 mm	0 to 300 mm 0 to 600 mm 0 to1000 mm	4.0 µm 4.0 µm 6.0 µm	Using Slip Gauge Set, Length Bar Set & Coordinate Measuring Machine
10.	**STEEL SCALE[$]**			
	L.C.0.5 mm	0 to 300 mm 0 to 600 mm 0 to1000 mm	5 µm 7 µm 10 µm	Using Universal length Measuring Machine (SIP)
11.	**SPIRIT LEVEL[$]**			
	sensitivity: 0.005 mm/m	0.02 mm/m	0.003 µm /m	Using Tilting Table
12.	**ANGLE GAUGES[$]**	0 -90º - 0º	2.0sec of arc	Using Angle Gauge Set, Micro Optic Angle Dekkor
13.	**BEVEL PROTECTOR[$]**			
	L.C.5'	0 to 360º	2 min of arc	Using Universal Profile Projector

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
14.	**COMBINATION SET[$]** **L.C.30'**	0 to 360º	2 min of arc	Using Universal Profile Projector
15.	**FEELER GAUGE[$]**	0.05mm to 1 mm	4.0 µm	Using Floating Carriage Diameter Measuring Machine
16.	**DIAL GAUGE[$]** **(PLUNGER TYPE)** **L.C.0.01 mm** **L.C.0.001 mm**	 0 to 10 mm 0 to 50 mm 0 to 10 mm 0 to 10 mm	 2 µm 4 µm 1 µm 0.7 µm	Using Mic. Head Dial calibrator, H LM
17.	**DIAL GAUGE[$]** **(LEVER TYPE)** **L.C.0.0001 mm**	 0 to 1.0 mm 0 to 0.2 mm	 1.0 µm 0.2 µm	Using Mic. Head for Dial calibrator
18.	**RADIUS GAUGE[$]**	0 to 25 mm	3.2 µm	Using Coordinate Measuring Machine
19.	**DIAL BORE GAUGE / DIAL GAUGE CALIBRATOR[$]**	0 to 75 mm	5.0 µm	Using Mic. Head for Dial calibrator, HLM
20.	**SINE BAR[$]**	Upto 300 mm	5"	Using Coordinator Measuring Machine
21.	**CLINOMETER [$]** **L.C. 10"**	 0 to 90º	 5"	 Using Slip Gauge (Inch) Set, Angle Gauge Set, Sine Table

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
22.	**DEPTH MICROMETER$**			
	L.C.0.01 mm	0 to 200 mm 0 to 600 mm	6.0 µm 8.0 µm	Using Slip Gauge, Set Length Bar Set
23.	**TEST SIEVES$**	38 µm x 38 µm 100 mm x 100 mm	3.0 µm 50 µm	Using Universal Profile Projector & Vernier Caliper
24.	**V BLOCK$ (Flatness/Parallelism/ Symmetricity & Angle)**	Upto 600 mm (L) 90º (A)	4.0 µm 1.5”	Using Coordinate Measuring Machine
25.	**SURFACE ROUGHNESS$**	Ra 0.100 mm	0.01 µm	Using Perthometer (S6R)
26.	**SURFACE PLATE#**	1000 mm x1000mm	0.8√ (L+W)/100 L&W in mm	Using Micro Optic Auto Collimator/Laser
27.	**PROFILE PROJECTOR/ TOOL MICROSCOPE#**	0 to 250 mm 0 to 360º	1 µm 2 min of arc	Using Slip Gauge Set Angle Gauge Set, Glass Scale/Laser
28.	**FCD MEASURING MACHINE/ MICROMETER DRUM$**			
	L.C.0.0002 mm	0 to 100 mm 0 to 25 mm	0.25 µm 0.25 µm	Using Slip Gauge Set, Coordinate Measuring Machine
29.	**CMM#**	Upto 1000mm	3.4 µm	Using Check Master Length Bar (mm) Set /Laser

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
30.	**UNIVERSAL / HORIZONTAL LENGTH MEASURING MACHINE/TAPE CALIBRATION UNIT$^{\sharp}$ L.C.0.00001 mm$^{\Phi}$**	0 to 1000 mm	0.15+(L/1100) µm	Using Slip Gauge (mm) Set, Length Bar (mm) Set, Laser Interferometer
31.	**COMPARATOR STAND FLATNESS OF BASE PLATE$^{\$}$**	Upto 500 mm	3.0 µm	Using Coordinate Measuring Machine
32.	**ELECTRONIC INDICATOR WITH LVDT PROBE$^{\$}$ L.C. : 0.1 µm**	0 to 10 mm	0.12 µm	Using Slip Gauge (mm) Set,HLM
33.	**AUTO-COLLIMATOR$^{\$}$ L.C.:.0.2 sec**	Mes. Range ±5 min.	3.9 sec of arc	Using Laser Interferometer, Tilting Table
34.	**STEEL TAPE$^{\$}$**	Upto 300 mm 300 mm to 600 mm 600 mm to 1000 mm	10 µm 17 µm 20 µm	Using Tape & Scale Calibrator Unit
35.	**MEASURING PIN$^{\$}$**	Upto 50 mm	1.5 µm	Using Floating Carriage Diameter Measuring Machine
36.	**THREAD PLUG$^{\$}$ GAUGE**	Upto 100 mm	0.54 µm	Using HLM

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
37.	**ENGINEER SQUARE$**	Upto 600 mm	1.9 sec of arc	Using Coordinate Measuring Machine
38.	**SLIP GAUGE MEASURING UNIT♯**	0.5 mm to 170 mm	0.03L + (0.3L /1000) µm L is in mm	Using Slip Gauge K Grade
39.	**HEIGHT MASTER$** **L.C.0.001mm**	Upto 300 mm	2.0 µm	Using Coordinate Measuring Machine
40.	**SLIP GAUGE ACCESSORIES$**	Upto 25 mm	1.0 µm	Using Slip Gauge Calibrator
41.	**CALIPER CHECKER/DEPTH MICROMETER$ CHECKER** **L.C. 2.5 µm**	Upto 600 mm	4.5 µm	Using Coordinate Measuring Machine
42.	**MICROMETER CHECK SET$**	2.5 mm to 25 mm	0.14 µm	Using Slip Gauge Calibrator
43.	**VERNIER DEPTH GAUGE$** **L.C.0.01 mm**	0 to 300 mm 300 mm to 600 mm 600 mm to 1000mm	4.0 µm 4.0 µm 6.0 µm	Using Slip Gauge Set & Length Bar
44.	**MASTER CYLINDER$**	Upto 600 mm	1.9 sec of arc	Using Coordinate Measuring Machine
45.	**LONG SLIP GAUGE$**	Upto 300 mm 300 mm to 600 mm 60 mm to 1000 mm	1.1 µm 1.6 µm 2.6 µm	Using Horizontal length Measuring Machine

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
46.	**GLASS SCALE LINEAR$**			
	L.C:0.01 mm	0 to 25 mm	2.8 µm	Using Universal Profile Projector
	ANGLE	0 to 360º	1.1 min of arc	
47.	**OPTICAL FLAT**	Upto 100 mm	(0.03 + 0.7L) µm L in mm	Using Slip Gauge Calibrator & Reference Optical Flat
II.	**PRESSURE AND VACUUM**			
1.	**PRESSURE (PRESSURE GAUGE, CALIBRTOR, PRESSURE SWITCH)**	0 to 1200 bar	0.016% rdg	Using Digital Pressure Gauge. By Comparison Method
2.	**VACUUM GAUGE**	-0.9 bar to -0.1 bar	2 % rdg	Using Digital Pressure Gauge. By Comparison Method As per DKD R6-1
III.	**MASS**			
1.	**WEIGHTS**	1 mg	0.03 mg	Using E1Class of Weights & Precision Balances. As per OIML R-II
		2 mg	0.03 mg	
		5 mg	0.03 mg	
		10 mg	0.03 mg	
		20 mg	0.03 mg	
		50 mg	0.03 mg	
		100 mg	0.03 mg	
		200 mg	0.03 mg	
		500 mg	0.03 mg	
		1 g	0.03 mg	
		2 g	0.06 mg	
		5 g	0.06 mg	
		10 g	0.06 mg	
		20 g	0.06 mg	

	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
		50 g	0.06 mg	
		100 g	0.06 mg	
		200g	0.08 mg	
		500 g	3.0 mg	
		1 kg	3.0 mg	
		2 kg	4.0 mg	
		3 kg	11 mg	
		5 kg	46 mg	
		10 kg	50 mg	
		20 kg	300 mg	
2.	**CALIBRATION OF BALANCES[#]**			
	Readability 0.01 mg	0 to 200 g	0.04 mg	Using Standard and Weights (E1 class). Procedure based on OIML R 76 (2006)
	Readability 1 mg	0 to 3 kg	3.0 mg	
	Readability 10 mg	0 to 3 kg	30 mg	
	Readability 100 mg	0 to 20 kg	60.0 mg	
	Readability 1g	0 to 20 kg	3.0 g	
	Readability 10 g	0 to 20 kg	52.4 g	
IV.	**VOLUME**			
1.	**Pipette[$]**	0.1 ml to 1 ml	0.01 ml	Using Precision Balances, known Standard Weights and density of Pure distilled water Procedure based on ISO 4787 & ISO 8655-6
		0.1 ml to 10 ml	0.01 ml	
		0.1 ml to 25 ml	0.01 ml	
2.	**Burette[$]**	0.1 ml to 10 ml	0.01 ml	
		0.1 ml to 50 ml	0.01 ml	
		0.1 ml to 100 ml	0.01 ml	
3.	**Volumetric Flask[$]**	> 1 ml to 10 ml	0.0010 ml	
		> 10 ml to 50 ml	0.0015 ml	
		> 50 ml to 100 ml	0.0020 ml	
		> 100 ml to 200 ml	0.0024 ml	
		> 200 ml to 2000 ml	0.0030 ml	
4.	**Measuring Cylinder**	> 1 ml to 10 ml	0.0010 ml	

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability (±)	Remarks
	Beakers & other glass wares	>10 ml to 50 ml > 50 ml to 100 ml > 100 ml to 200 ml > 200 ml to 2000 ml	0.0015 ml 0.0020 ml 0.0025 ml 0.0030 ml	
V.	**DENSITY**			
1.	**DENSITY HYDROMETERS**	0.65 g/cm^3 to 1g/cm^3 1 g/cm^3 to 2 g/cm^3	0.0008 g/cm^3 0.0058 g/cm^3	Using Density Hydrometer

*** Measurement Capability is expressed as an uncertainty (±) 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.

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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