

**Laboratory** ICL Calibration And Testing Services, SCO - 37, Ground Floor, Sector-12, Panchkula , Haryana

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

**Discipline** Mechanical Calibration **Issue Date** 20.11.2016

**Certificate Number** C-0308 **Valid Until** 19.11.2018

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	Quantity Measured/ Instrument	Range / Frequency	*Calibration Measurement Capability ( $\pm$ )	Remarks
<b>I. DIMENSION (Basic Measuring Instrument, Gauge etc.)</b>				
1	<b>LENGTH GAUGE/SETTING ROD<sup>s</sup></b>	Up to 100 mm >100 mm to 500 mm	1.5 $\mu$ m 7.20 $\mu$ m	Using ULM, Gauge Block grade-0 & Electronic Comparator
3	<b>VERNIER CALIPER / DIAL / DIGIMATIC CALIPER<sup>s</sup></b> L.C.: 0.01 mm <sup><math>\phi</math></sup>	Up to 300 mm 300 mm to 450 mm 450 mm to 600 mm	15.5 $\mu$ m 18.0 $\mu$ m 20.0 $\mu$ m	Using Slip Gauge Grade-0 & Caliper Checker, Slip gauge accessories set
4	<b>INSIDE CALIPER<sup>s</sup></b> (Dial/Digital) L.C.:0.01 mm <sup><math>\phi</math></sup>	10 mm to 600 mm	12.0 $\mu$ m	Using Slip Gauge Grade-0 & Slip Gauge Accessories Set
5	<b>DEPTH CALIPER<sup>s</sup></b> (Vernier/Digital) L.C.:0.01 mm <sup><math>\phi</math></sup>	Up to 300 mm	7.0 $\mu$ m	Using Slip Gauge Grade-0 & Caliper Checker
6	<b>EXTERNAL MICROMETER<sup>s</sup></b> (Mech./Digital) L.C.:0.001 mm <sup><math>\phi</math></sup>	Up to 100 mm 100 mm to 200 mm	1.5 $\mu$ m 2.5 $\mu$ m	Using Slip Gauge Grade-0, length bar
7	<b>INTERNAL MICROMETER<sup>s</sup></b> L.C.:0.001 mm <sup><math>\phi</math></sup>	50 mm to 425 mm	7.40 $\mu$ m	Using ULM

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8	DEPTH MICROMETER <sup>\$</sup> L.C.:0.001 mm <sup>φ</sup>	0 to 200 mm	7.0 $\mu$ m	Using Slip Gauge Grade-0 & Length bar
9	HEIGHT GAUGE <sup>\$</sup> (Vernier/Dial/ Digital) L.C.:0.01 mm <sup>φ</sup>	Up to 300 mm 300mm to 600 mm	8.0 $\mu$ m 11.0 $\mu$ m	Using Slip Gauge Grade-0 , Caliper Checker
10	DIAL GAUGE <sup>\$</sup> (Dial/Digital/ Plunger type) L.C.:0.001 mm <sup>φ</sup>	Up to 100 mm	1.8 $\mu$ m	Using ULM
11	DIAL TEST INDICATOR <sup>\$</sup> (Lever Type) L.C.:0.001 mm <sup>φ</sup>	0 To 1.0 mm	1.1 $\mu$ m	Using ULM
12	DIAL BORE GAUGE <sup>\$</sup> (Only Transmission of Plunger)	1mm Travel	1.7 $\mu$ m	Using ULM
13	PLAIN PLUG GAUGE <sup>\$</sup>	3 mm to 100 mm 100 mm to 300 mm	3.0 $\mu$ m	Using ULM
14	SNAP GAUGE <sup>\$</sup>	3 to 150 mm	3.5 $\mu$ m	Using Slip Gauge & Slip Gauge Accessories
15	CYLINDRICAL MEASURING PIN <sup>\$</sup> (Three Wire Pin Gauge)	0.1 mm to 20 mm	1.5 $\mu$ m	Using ULM
16	FEELER GAUGE <sup>\$</sup>	0.03 to 1.0 mm	3.3 $\mu$ m	Using ULM
17	DIAL THICKNESS GAUGE <sup>\$</sup> L.C.: 0.001 mm <sup>φ</sup>	0 to 50 mm	1.5 $\mu$ m	Using Slip Gauge Block grade-0

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18	THREAD PLUG GAUGE <sup>\$</sup> (Effective Diameter Only) <sup>1</sup>	2.5 to 100 mm	3.5 $\mu$ m	Using ULM
19	THREAD RING GAUGE <sup>\$</sup> (Effective Diameter Only) <sup>1</sup>	3 mm to 180 mm	3.0 $\mu$ m	Using ULM
20	THREE POINT MICROMETER <sup>\$</sup> L.C.:0.005 mm	6 mm to 100 mm	----	Using Master Ring Gauge
21	MICROMETER HEAD <sup>\$</sup> L.C.: 0.001 mm <sup>1</sup>	0 to 25mm	----	Using ULM
22	PLAIN RING GAUGE <sup>\$</sup>	3 mm to 6 mm 6 mm to 100 mm 100 mm to 300 mm	2.0 $\mu$ m 2.5 $\mu$ m --	using ULM
23	DIAL CALIBRATION TESTER <sup>\$</sup> L.C.:0.001 mm	Up to 25 mm	1.5 $\mu$ m	Using Slip Gauge Grade-0 & Electronic Probe
24	STEEL SCALE <sup>\$</sup>	0 to 1000 mm	120.0/m	Using Scale and tape Calibration Unit
25	METRIC/ WOVEN METALLIC / GLASS FIBER/MEASURING TAPE & PIE-TAPE <sup>\$</sup>	Up to 50 mtr	150/m	Using Scale and Tape Calibration System
26	BEVEL PROTECTOR/ COMBINATION SET/ANGLE PROTECTOR <sup>\$</sup>	0°-180°- 0°	3.0min of arc	using A Set of Angle gauge
27	THICKNESS FOILS <sup>\$</sup>	0 to 1 mm	4.0 $\mu$ m	using Digital Micrometer/ULM
28	SPIRIT LEVEL <sup>\$</sup> (Sensitivity 0.001 mm/m) (Sensitivity 0.01 mm/m) (Sensitivity 0.02 mm/m)	2 mm/m 20 mm/m 100 mm/m	4.0 $\mu$ m 7.0 $\mu$ m 12.0 $\mu$ m	Using Electronic Precession Level

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29	SURFACE PLATE <sup>#</sup> (Flatness)	6000 mm*4000 mm	$0.87\sqrt{(L+W)}/125$ Where "L" and "W" is in mm	using Electronic Level
30	ELECTRONIC PROBE <sup>\$</sup> L.C.: 0.1 $\mu$ m	0 to 10 mm	0.6 $\mu$ m	using Slip Gauge Grade-0
31	ENGINEERING SQUARE/ RIGHT ANGLE <sup>\$</sup> FLATNESS PERPENDICULARITY	Up to 300 mm	7 $\mu$ m	Using Dial test indicator and Surface plate using slip Gauge Grade -0 & Master cylinder
32	MAGNETIC "V" BLOCK <sup>\$</sup> A) Flatness( $t_1$ ) B) Parallelism(v axis) C) Parallelism(side face) D) Symmetricity error( $t_4$ ) E) Perpendicularity Squarer( $t_6$ )	Up to 150 mm	1.44 $\mu$ m 14.10 $\mu$ m 1.42 $\mu$ m 14.10 $\mu$ m 6.55 $\mu$ m	Using Slip Gauge set, Dial test indicator, Surface plate, Test mandrel & Master cylinder
33	BENCH CENTRE <sup>#</sup> CO-AXIALLY RUN-OUT	Up to 300 mm	10.0 $\mu$ m 10.0 $\mu$ m	using Mandrel & Dial Indicator
34	COATING THICKNESS GAUGE <sup>\$</sup> L.C.: 0.1 $\mu$ m <sup><math>\phi</math></sup>	0 to 1000 $\mu$ m	12.30 $\mu$ m	Using Thickness Foil
35.	2D HEIGHT GAUGE <sup>*</sup> L.C: 0.0001 mm	0 to 300 mm 300 mm to 600 mm	11.0 $\mu$ m 11.0 $\mu$ m	Using Slip Gauge & Length Gauge

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<b>II. TORQUE GENERATING DEVICES</b>				
1	<b>TORQUE TOOLS<sup>§</sup></b> (Torque Wrench/ Screw Driver) Type I: Class B,C,D,E) Type II: Class A,B,D,E	0.4 Nm to 2 Nm 2 Nm to 10 Nm 10 Nm to 50 Nm 50 Nm to 200 Nm 200 Nm to 1000 Nm	2.07 % 2.53 % 1.79 % 1.18 % 1.14 %	Using Torque Sensor With indicator using Torque Wrench Calibration System & with screw driver
<b>III. DUROMETER</b>				
2	<b>RUBBER HARDNESS TESTER FOR SPRING CALIBRATION ONLY<sup>§</sup></b>	Shore A	1.3 Shore A	Using Rubber Hardness Tester Calibration
<b>IV. ACOUSTICS</b>				
1	<b>SOUND LEVEL METER<sup>§</sup></b>	94 dB 114 dB	1.6dB 1.6dB	Using Acoustic Calibrator
<b>V. ACCELERATION &amp; SPEED</b>				
2	<b>ACCELERATION &amp; SPEED/ ANALOG/ DIGITAL TACHOMETER<sup>§</sup></b> (Digital/Analog Contact Type)	60 rpm to 25,00 rpm	1%	Using Digital tachometer With RPM Generator
3	<b>ANALOG/ DIGITAL TACHOMETER/ PULSE ENGINE TACHOMETER<sup>§</sup></b> (Non Contact Type)	10 rpm to 75,000 rpm	2.3% to 0.4 %	Using Digital Tachometer And R.P.M. Generator

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<b>VI. VOLUME</b>				
1	MICROPIPETTE <sup>§</sup>	1 $\mu$ l to 10 $\mu$ l 10 $\mu$ l to 100 $\mu$ l 100 $\mu$ l to 1000 $\mu$ l	0.02 $\mu$ l 0.11 $\mu$ l 0.2 $\mu$ l	Using Digital Micro Balance and distilled water of known density
2	GLASS PIPETTES <sup>§</sup>	>1 ml to 10 ml >10 ml to 100 ml	0.2 $\mu$ l 1.0 $\mu$ l	Using Digital Precision Balance and distilled water of known density
3	BURETTE <sup>§</sup>	>1 ml to 10 ml >10 ml to 100 ml	0.2 $\mu$ l 1.0 $\mu$ l	Using Digital Precision Balance and distilled water of known density
4	VOLUMETRIC FLASK/MEASURING CYLINDER/BEAKER AND OTHER APPARATUS <sup>§</sup>	>5 ml to 100 ml >100 ml to 500 ml >500 ml to 1000 ml	2.0 $\mu$ l 0.1 ml 0.2 ml	Using Digital Precision Balance and distilled water of known density
<b>VII. DENSITY AND VISCOSITY</b>				
1	HYDROMETER/ LACTOMETER/BRUX HYDROMETER/ ALCOHOLMETERS/ BAUME HYDROMETERS/ SPECIFIC GRAVITY HYDROMETER <sup>§</sup>	0.65 g/ml to 1.6 g/ml	0.008 g/ml	Using Standard Weights and Micro Balance (Range:200 g and Readability: 0.00001g/0.0001g) With Density kit
2	LIQUID DENSITY <sup>§</sup>	0.5 g/ml to 2.0 g/ml	0.008 g/ml	Using Standard Weights and Micro Balance (Range:200 g and Readability: 0.00001g/0.0001g) With Density kit

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3	SOLID DENSITY <sup>s</sup>	2.5 g/ml to 22.0 g/ml	0.028 g/ml	Using Standard Weights and Micro Balance (Range:200 g and Readability: 0.00001g/0.0001g) With Density kit(Solid)
4	DENSITY/FLOW CUP/FORD CUP/SPECIFIC <sup>s</sup>	B4	1.1 %	Using Stop watch & Liquid of standard density
<b>IX. WEIGHTS</b>				
1.	MASS <sup>s</sup> Weights of Class E2 Accuracy up to 200 g	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 50 kg	0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.003 0.004 0.004 0.005 0.010 0.010 0.012 0.092 0.092 0.10 0.03 0.05 0.1 0.5 0.5 1.0 1.0	E1 Class Weights and Micro Balance (Readability: 0.000001g), Semi Micro/ Precision Balance (Readability: 0.00001g/ 0.0001g) by Substitution Method as per OILM R 111:2004  Using F <sub>1</sub> Class Weights And Electronic balance (Readability:0.01g)  Weighing Balance (Readability:0.5g/ 0.001 kg)

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2	SPRING BALANCE <sup>§</sup> L.C.: 100 g and above	0 to 50 kg	120 g	Using Calibration Newtonian Weights
<b>X. WEIGHIGN SCALE AND BALANCE</b>				
1.	<b>CALIBRATION OF WEIGHING BALANCE<sup>#</sup></b>			
	d=0.001 mg	1 mg to 200 g	0.005 mg	Using Standard Weights (E1 Class as per OIML R-76-1:2006
	d=0.01 mg		0.02 mg	
	d=0.1 mg and coarser		0.16 mg	
	d=1 mg and coarser	>200 g to 2 kg	2.5 mg	Standard Weights (F1 Class as per OIML R-76-1:2006
	d=10 mg and coarser	>2 kg to 10 kg	150 mg	
	d=1 g and coarser	>10 kg to 50 kg	2.5 g	

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

<sup>§</sup>Only in Permanent Laboratory

\*Only for Site Calibration

<sup>#</sup> The laboratory is also capable for site calibration however, the uncertainty at site depends on the prevailing actual environmental conditions and master equipment used.

<sup>ϕ</sup>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.