FEDERATION FOR DEVELOPMENT OF ACCREDITATION SERVICES

118-119, First Floor, Sushant Tower, Sector – 56, Gurugram – 122011, Haryana, India.

CERTIFICATE OF ACCREDITATION

(AS PER ISO/IEC 17025:2017)

This is to attest that

M/s Precision Instrumentation and Services Private Limited

21, Shreerambhavan, F-9, Shreeramkunj, Takli road, Dwarka
Nashik-422011, Maharashtra, India

Calibration Laboratory

has demonstrated compliance with ISO/IEC Standard 17025:2017, General requirements for the competence of testing and calibration laboratories and supplementary criteria for calibration laboratories.

Certificate Number: CL-110

Issue Date: 22.09.2023 **Valid Until:** 21.09.2025

The certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard and the relevant requirements of FDAS. (for scope of accreditation visit website www. fdasindia.org).

DEVI SARAN TEWARI
Director

FEDERATION FOR DEVELOPMENT OF ACCREDITATION SERVICES

118-119, First Floor, Sushant Tower, Sector – 56, Gurugram – 122011, Haryana, India.

SCOPE OF ACCREDITATION

(Annexure to Certificate of CL – 110)

Validity 22.09.2023 to 21.09.2025 Last Amended on ……

Electro technical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Direct Current				
1	DC Voltage (source)	Using MFC Fluke 9100 by Direct Method As per IS 1248:2021	1 mV to 10 mV 10 mV to 1 V 1 V to 1000 V	0.76 % to 0.09 % 0.09 % to 0.014 % 0.014 % to 0.010 %
2	DC Current (source)	Using MFC Fluke 9100 by Direct Method Using MFC Fluke 9100 with Current Coil by Direct Method. As per IS 1248:2021	10 µA to100 mA 100 mA to 10A 10 A to 20 A 20 A to 1000 A	0.16 % to 0.03 % 0.03 % to 0.13 % 0.11 % to 0.11% 0.70%
3	DC Resistance (source)	Using MFC Fluke 9100 by Direct Method. As per IS 2806:1992	1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ωto 1 MΩ 1 MΩ to 100 MΩ 100 MΩ to 400 MΩ	1.46 % to 0.17 % 0.17 % to 0.04 % 0.04 % to 0.070 % 0.070 % to 0.35 % 0.35 % to 0.37 %
4	DC Resistance (Discrete)	Using Discrete Standard 4 wire Low Resistance By Direct Method As per IS 2806:1992	10 µΩ 50 µΩ 100 µΩ 1 mΩ 10 mΩ 100 mΩ 1 Ω	2.01 % 1.5 % 0.89 % 0.22% 0.22 % 0.14% 0.12 %
5	DC Resistance	Using Decade Resistance Box by Direct Method	1 Ω to 1MΩ	1.49% to 1.16%
6	DC Voltage (Measure)	Using 6 1/2 DMM HP 34401A by Direct Method As per IS 1248:2021	0.5 mV to 1 mV 1 mV to 100 mV 100 mV to 1000V	1.70 % to 0.48 % 0.48% to 0.046% 0.046 % to 0.007 %
7	DC Current (Measure)	Using 6 1/2 DMM HP 34401A by Direct Method As per IS 1248:2021	0.1 mA to 1 mA 1 mA to 100 mA 100 mA to 3 A	2.40 % to 0.29 % 0.29 % to 0.065 % 0.065 % to 0.18 %

Dealing Officer

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Electro technical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Alternate Current				
1	AC Voltage (source)	Using MFC Fluke 9100 by Direct Method. As per IS 1248:2021	50 Hz 10 mV to 1 V 1 V to 1000 V	4.48 % to 0.07 % 0.07 % to 0.07 %
2	AC Current (source)	Using MFC Fluke 9100 by Direct Method. Using MFC Fluke 9100 with Current Coil by Direct Method As per IS 1248:2021	50 Hz 100 µA to 100mA 100 mA to 10 A 10 A to 20 A 20 A to 900 A	0.13 % to 0.13 % 0.13 % to 0.28 % 0.28% to 0.28% 0.85%
3	Capacitance (source)	Using MFC Fluke 9100 by Direct Method	1kHz 1 nF to 100 nF 100 nF to 100 µF 100 µF to 1 mF	2.09 % to 0.56 % 0.56 % to 0.79 % 0.79 % to 1.05 %
4	Frequency (source)	Using MFC Fluke 9100 by Direct Method As per IS 1248:2021	10 Hz to 10 MHz	0.058 % to 0.0081 %
5	High Resistance (@Test Voltage upto1000V)	Using High Resistance Box by Direct Method: As per IS 2806:1992	5 MΩ 10 MΩ 100 MΩ 200 MΩ 500 MΩ 1 GΩ 10 GΩ 100 GΩ	3.60% 6.70% 3.46% 3.43% 2.41% 4.23% 4.29% 10.23%
6	Single Phase/ Three phase AC Power 50Hz (50Vto250V,5A, PF0.5, (Lag& lead to UPF)	Using Three phase power Energy Meter Calibrator by Direct Method	50 Hz 125 W to 3.75KWh	1.5%

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Electro technical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
7	AC Voltage (Measure)	Using 6 1/2 DMM HP 34401A by Direct Method As per IS 1248:2021	50 Hz to 1 KHz 1 mV to 100 mV 100 mV to 1 V 1 V to 750 V	 5.10 % to 0.12 % 0.12 % to 1.18 % 1.18 % to 0.10 %
8	AC Current (Measure)	Using 6 1/2 DMM HP 34401A by Direct Method As per IS 1248:2021	50 Hz to 1 KHz 200 mA to 3 A	 0.15 % to 0.24 %
9	Resistance (Measure)	Using 6 1/2 DMM HP 34401A by Direct Method As per IS 2806:1992	1 Ω to 100 Ω 100 Ω to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 100 MΩ	0.54 % to 0.017 % 0.017% to 0.013 % 0.013 % to 0.052 % 0.052% to1.12 %
10	Frequency (Measure)	Using 6 1/2 DMM HP 34401A by Direct Method As per IS 1248:2021	50 Hz to 300 kHz	0.011 % to 0.0058 %
Group-Temperature Simulation				
1	Temperature Simulation (Indicator/controller Calibration) RTD Thermocouple J- Type Thermocouple K-Type Thermocouple R-Type Thermocouple S-Type Thermocouple T-Type Thermocouple	Using MFC Fluke 9100 by Direct Method As per Euramet Guide Cg-11	-200 °C to 850 °C -200 °C to 1200 °C -200 °C to 1300 °C 0 °C to 1750 °C 0 °C to 1750 °C -200 °C to 350 °C	0.26°C 0.28°C 0.32°C 0.34°C 0.42°C 0.22°C

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Electro technical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Others				
1	Time (source)	Using Digital Time Calibrator By Comparison Method	1 s to 24 hour	0.30 s to 82 s

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Electro technical Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Direct Current				
1	DC Voltage (source)	Using MFC Fluke 9100 by Direct Method	1 mV to 10 mV 10 mV to 1 V 1 V to 1000 V	0.76 % to 0.09 % 0.09 % to 0.014 % 0.014 % to 0.010 %
2	DC Current (source)	Using MFC Fluke 9100 by Direct Method Using MFC Fluke 9100 with Current Coil by Direct Method.	10 µA to 100 mA 100 mA to 10 A 10 A to 20 A 20 A to 1000 A	0.16 % to 0.03 % 0.03 % to 0.13 % 0.11 % to 0.11% 0.70%
3	DC Resistance (source)	Using MFC Fluke 9100 by Direct Method.	1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 MΩ 1 MΩ to 100 MΩ 100 MΩ to 400 MΩ	1.46 % to 0.17 % 0.17 % to 0.04 % 0.04 % to 0.070 % 0.070 % to 0.35 % 0.35 % to 0.37 %
4	DC Resistance (Discrete)	Using Discrete Standard 4 wire Low Resistance By Direct Method	10 µΩ 50 µΩ 100 µΩ 1 mΩ 10 mΩ 100 mΩ 1 Ω	2.01 % 1.5 % 0.89 % 0.22% 0.22 % 0.14% 0.12 %
5	DC Resistance	Using Decade Resistance Box by Direct Method	1 Ω to 1MΩ	1.49% to 1.16%
6	DC Voltage (Measure)	Using FLUKE 725 By Direct Method	1 mV to 10 mV 10 mV to 100 mV 100 mV to 20 V	7.96 % to 0.80 % 0.80 % to 0.066 % 0.066 % to 0.13 %
7	DC Current (Measure)	Using FLUKE 725 By Direct Method	1 mA to 24 mA	0.67 % to 0.041 %
8	DC High Voltage (Measure)	Using HV Probe with DMM by Direct Method	1 kV to 40 kV	3.1 % to 3.03 %

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Electro technical Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Alternate Current				
1	AC Voltage (source)	Using MFC Fluke 9100 by Direct Method.	**50 Hz** 10 mV to 1 V 1 V to 1000 V	 4.48 % to 0.07 % 0.07 % to 0.07 %
2	AC Current (source)	Using MFC Fluke 9100 by Direct Method.Using MFC Fluke 9100 with Current Coil by Direct Method	**50 Hz** 100 µA to 100mA 100 mA to 10 A 10 A to 20 A 20 A to 900 A	 0.13 % to 0.13 % 0.13 % to 0.28 % 0.28% to 0.28% 0.85%
3	Capacitance (source)	Using MFC Fluke 9100 by Direct Method	**1kHz** 1 nF to 100 nF 100 nF to 100 µF 100 µF to 1 mF	 2.09 % to 0.56 % 0.56 % to 0.79 % 0.79 % to 1.05 %
4	Frequency (source)	Using MFC Fluke 9100 by Direct Method	10 Hz to 10 MHz	0.058 % to 0.0081 %
5	High Resistance (@Test Voltage upto1000V)	Using High Resistance Box by Direct Method:	5 MΩ 10 MΩ 100 MΩ 200 MΩ 500 MΩ 1 GΩ 10 GΩ 100 GΩ	3.60% 6.70% 3.46% 3.43% 2.41% 4.23% 4.29% 10.23%
6	Single Phase/ Three phase AC Power 50Hz (50Vto250V,5A, PF0.5, (Lag& lead to UPF)	Using Three phase power Energy Meter Calibrator by Direct Method	**50 Hz** 125W to 3.75KWh	1.5%
7	AC High Voltage (Measure)	Using HV Probe with DMM by Direct Method	1 kV to 28 kV	6.55 % to 6.45 %

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Electro technical Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Temperature Simulation				
1	Temperature Simulation (Indicator/controller Calibration) RTDThermocouple	Using MFC Fluke 9100 by Direct Method	-200 °C to 850 °C	0.26°C
	J- Type Thermocouple		-200 °C to 1200 °C	0.28°C
	K-Type Thermocouple		-200 °C to 1300 °C	0.32°C
	R-Type Thermocouple		0 °C to 1750 °C	0.34°C
	S-Type Thermocouple		0 °C to 1750 °C	0.42°C
	T-Type Thermocouple		-200 °C to 350 °C	0.22°C
Group-Others				
1	Time (source)	Using Digital Time Calibrator By Comparison Method	1 s to 24 hour	.30 s to 82 s

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Dimension				
1.	Caliper (Vernier/Dial/Digital) L.C.:10µm L.C.:20µm	Using Caliper Checker; Gauge Block Grade'0'); Length Bar & External micrometer by comparison Method As per IS 16491:2016	0 mm to 600 mm 0 mm to 1000 mm	16.9 µm 24.31 µm
2.	Depth Vernier (Vernier/Dial/Digital) L.C.:10µm L.C.:20µm	Using Gauge Block sets (Grade'0') & surface Plate by Comparison Method: As per IS 16491:2016	0 mm to 300 mm	14.1 µm
3.	Height Gauge (Vernier/Dial/Digital) L.C.:10µm	Using Caliper Checker, Length Bar & Surface Plate by Comparison Method, As per IS 2921:2016	0 mm to 600 mm 0 to 1000 mm	15.2 µm 16.4 µm
4.	External Micrometer (Analog, dial, digital) L.C.:1µm L.C: 10µm	Using Gauge Block Sets (Grade'0'), and Length Bar by comparison Method, As per IS 2967:1983	0 mm to 150 mm Up to 400 mm	1.1 µm 7.7 µm
5.	Depth MicrometerL.C.:1µm	Using Gauge Block Sets (Grade'0') & surface Plate by comparison method As per IS 2966:1964	Up to 300 mm	2.0 µm
6.	Plunger Dial Gauge L.C.:1µm L.C.:10µm L.C.:10µm	Using ULM by Comparison Method: As per IS 2092:1983	Up to 10 mm Up to 25 mm Up to 50 mm	1.1 µm 5.9 µm 5.9 µm
7.	Lever Dial Gauge L.C.:1µm L.C.:10µm	Using ULM by Comparison Method As per IS 11498:1985	Up to 0.14 mm Up to 1.0 mm	1.1 µm 5.8 µm

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
8.	Bore GaugeL.C.:10µm	Using ULM by Comparison Method As per JIS B 7515	Up to 1 mm	3.1 µm
9.	Dial Thickness Gauge L.C.:1µm L.C.:10µm	Using Gauge Block Sets (Grade'0') by comparison Method:	Up to 10 mm Up to 30 mm	0.8 µm 6.4 µm
10.	Plain Plug Gauge	Using ULM & OD Master by Comparison Method: As per IS 3455: Part 1 Amd. 1: 1988 IS 6137: 1983 IS 6244 Amd. 1: 1984 IS 6246 : 1980	0 to 200 mm	1.15 µm
11.	Cylindrical Measuring Pin	Using ULM by Comparison Method As per IS 11103 : 1984	Up to 25 mm	1.0 µm
12.	Thread Measuring Wires	Using ULM by Comparison Method As per IS 6311 Amd. 1 : 1983	0.16 mm to 6.35 mm	0.9 µm
13.	Snap gauge	Using ULM & Master ring by Comparison Method: As per IS 7876: 1975 IS 8023: 1991 IS 3455: Part 1 Amd. 1 : 1988	Up to 200 mm	2.3 µm
14.	Plain Ring gauge	Using ULM & Master Ring by Comparison Method As per IS IS 7876: 1975 IS 3455: Part 1 Amd. 1: 1988 IS 3485 Amd. 1: 1986	0 to 200 mm	2.0 µm
15.	Thread Plug gauge	Using ULM, OD Master& Thread measuring wires by comparison method As per IS 4218:2022	0 to 200 mm	4.29 µm

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
		IS 2334: 2001 IS 10216: 1988 IS 10685: 1983 Euramet Cg-10		
16.	Thread Ring gauge	Using ULM & Master Ring by Comparison Method As per IS 2334: 2001 Euramet Cg-10 IS 10216 : 1988	0 to 100 mm	1.7 µm
17.	Feeler gauge	Using ULM by Comparison Method As per IS 3179 : 1990	Up to 3 mm	0.9 µm
18.	Shim /Foil	Using ULM by Comparison Method:	Up to 2 mm	0.9 µm
19.	Measuring Scale	Using Scale & Tape Calibrator by Comparison Method As per IS 1481 Amd. 2 : 1990	Up to 2000 mm	147(√L/1000) µm (where L in mm)
20.	Measuring Tape	Using Scale & Tape calibrator by comparison Method As per IS 1269 : Part 1 & Part 2	Up to 50 m	290(√L/1000) µm (where L in mm)
21.	Circumference / Pie Tape/Circometer	Using Scale & Tape calibrator by comparison Method	Up to 50 m	147(√L/1000) µm, (where L in mm)
22.	Inside /Inner dia Caliper	Using Caliper Checker; Gauge Block(Grade'0'), Length Bar & external micrometer by comparison Method	Up to 600 mm	14.3 µm
23.	Inside Micrometer L.C-0.01mm	Using Gauge Block Sets Gr '0' by comparison Method As per IS 2966:1964	0 to 300 mm	3.5 µm
24.	Micrometer Setting Rod	Using ULM by Comparison Method:	13 to 225 mm	8 µm

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
25.	Spirit Level / Electronic Level/Frame Level	Using Electronic level by Comparison Method As per IS 5706: 1993 & JIS B 7510	Up to 5 mm/m	15 µm/m
26.	Test Sieves(Apparatus Size)	Using Digital Vernier Caliper As per IS 460 : Part 1,2,3 : 2020	4.75 mm to 150 mm	29.27 µm
27.	Ultrasonic Thickness Gauge L.C-0.01mm	Using Gauge Block Sets Gr '0' by comparison Method	Up to 40 mm Up to 600 mm	11.5 µm 35.2 µm
28.	Coating Thickness Gauge	Using Master Foil Sets by comparison Method As per IS 12434:1988	Up to 12 mm	7 µm
29.	Bevel Protractor, Combination Set, Angle Protractor	Using Angle Gauge Block Sets and Surface Plate by comparison Method As per IS 4239 : 2023	0 ° to 90 ° 0 ° to 180 °	3 min of arc 31 min of arcs
Group-Pressure				
1.	Pneumatic (Dial Pressure gauge, Digital Pressure gauge, Pressure Transmitter, Pressure Switch, pressure recorder)	Using Digital pressure indicator by comparison method as per DKD -R-6-1	0 to 3 bar 3 to 30 bar	0.0007 bar 0.03 bar
2.	Hydraulic (Dial Pressure gauges, Digital Pressure gauges, Pressure Transmitter, Pressure Switch, pressure recorder)	Using Digital pressure indicator by comparison method as per DKD -R-6-1	30 to 300 bar 300 to 700 bar 700 to 1000 bar	0.05 bar 0.088 bar 1.20 bar

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
3.	Low Pressure Gauges	Using Digital pressure indicator by comparison method as per DKD -R-6-1	0 to 2 mbar -20 to 20 mbar 10 to 100 mbar 100 to 1000 mbar	0.0063 mbar 0.063 mbar 0.32 mbar 0.6 mbar
4.	Vacuum (Dial Gauges, Digital Gauges' Vacuum transmitter, Vacuum Switch)	Using Digital pressure indicator by comparison method as per DKD -R-6-1 & DKD -R-6-2	-0.94 bar to 0 bar	0.6 mbar
Group- Acceleration and speed				
1	RPM Meter/Speed centrifuge (Contact) Tachometer (Contact)	Using Digital Tachometer by Comparison Method As per TR-45	10 to 3000 RPM	4 RPM
2	RPM Meter/Speed centrifuge (Non-Contact) Tachometer (Non-Contact)	Using Digital Tachometer by Comparison Method As per TR-45	10 to 5000 RPM 5000 to 81000 RPM	3 to 3.5 RPM 5.38 RPM
Group-Acoustics Calibration				
1	Sound Level Meter	Using Sound Level calibrator As per IS15575:2005	94 dB & 114 dB	0.78 dB & 1.30 dB
Group-Weights				
1.	Weights Calibration of E2 class weights and coarser	Using E1 Accuracy Class Standard Weights and Microbalance of Readability 1µg by Substitution Method	1 mg	0.002 mg
			2 mg	0.002 mg
			5 mg	0.002 mg
			10 mg	0.002 mg

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
		And ABBA Weighing Cycle, as per OIML R 111-1:2004	20 mg	0.002 mg
			50 mg	0.002 mg
			100 mg	0.002 mg
			200 mg	0.002 mg
			500 mg	0.003 mg
			1 g	0.003 mg
			2 g	0.004 mg
			5 g	0.004 mg
2.	Weights Calibration of E2 class weights and coarser	Using E1 Accuracy Class Standard Weights and Microbalance of Readability 10µg by Substitution Method And ABBA Weighing Cycle, as per OIML R 111-1:2004	10 g	0.01 mg
			20 g	0.013 mg
			50 g	0.02 mg
			100 g	0.03 mg
			200 g	0.03 mg
3.	Weights Calibration of F1 class weights and coarser	Using E2 Accuracy Class Standard Weights and Electronic balance of Readability 1mg by Substitution Method And ABBA Weighing Cycle, as per OIML R 111-1:2004	500 g	0.47 mg
			1000 g	1.03 mg
			2000 g	1.89 mg
4.	Weights Calibration of M1 class weights and coarser	Using F1 Accuracy Class Standard Weights and Electronic balance of Readability 0.1g by Substitution Method And	5000 g	72 mg
			10000 g	100 mg
			20000g	100 mg

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
		ABBA Weighing Cycle, as per OIML R 111-1:2004	50000 g	400 mg
Group-Volume				
1.	Pipette	Using Balance of readability Distilled Water 1µ By Gravimetric Method As Per ISO:8655-6	1 µl to 10 µl	0.03µl
2.	Pipette	Using Balance of readability Distilled Water 1µg By Gravimetric Method As Per ISO:8655-6	10 µl to 100 µl	0.05µl
3.	Pipette	Using Balance of readability Distilled Water 1µg,10µg by Gravimetric Method as Per ISO:8655-6	100 µl to 1 ml	0.2µl
4.	Pipette	Using Balance of readability Distilled Water 1µg, 10µg µg by Gravimetric Method as Per ISO :4787	1 ml to 25 ml	0.01 ml
5.	Burette, conical flask, Graduated Jar, Graduated Cylinder, Measuring Flask	Using Balance of readability Distilled Water 1µg, 10µg by Gravimetric Method as Per ISO :4787	1 ml to 100 ml	0.01ml
6.	Graduated Cylinder/ Measuring Flask/Jar	Using Balance of readability Distilled Water 10µg, 0.1g by Gravimetric Method as Per ISO :4787	100 ml to 500 ml	0.09ml

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
7.	Graduated Cylinder/ Measuring Flask/Jar	Using Balance of readability Distilled Water 10µg, 0.1g by Gravimetric Method as Per ISO :4787	500 ml to 2000 ml	1.0 ml
8.	Graduated Cylinder/ Measuring Flask/Jar	Using Balance of readability Distilled Water 0.1g by Gravimetric Method as Per ISO :4787	2000 ml to 5000 ml	1.0 ml
Group-Weighing scale and Balance				
1.	Balance Readability1µg 10µg (Class I and Coarser)	Using E1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 6.1 g	0.006 mg
2.	Balance Readability10µg 0.1 mg (Class I and Coarser)	Using E1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 210 g	0.03 mg 0.064 mg
3.	Balance Readability1mg (Class I and Coarser)	Using E2 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 1 kg	0.636 mg
4.	Balance Readability1mg (Class I and Coarser)	Using E2 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 3000 g	0.851 mg
5.	Balance Readability100mg(Class II and Coarser)	Using F1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 10 kg	61.12 mg
6.	Balance Readability100 mg	Using F1 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 50 kg	88.29 mg

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Mechanical Calibration (Laboratory based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
7.	Balance Readability100 mg (Class II and Coarser)	Using F1 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 100 kg	89 mg
8.	Balance Readability 50 g (Class II and Coarser)	Using F1 & M1 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 150 kg	29 g
9.	Balance Readability 50 g and coarser (Class III and Coarser)	Using M1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 300 kg	39 g
10.	Balance Readability 100 g and coarser (Class IIII and Coarser)	Using M1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 1200 kg	67 g
Group-Torque Generating Devices				
1	Torque Tools / Torque Wrench / Screw Driver / Torque Meter / Torque Tools (Hydraulic) Type -I Class A, B, C, D, E Type- II Class A,B,C,D,E	Using Torque transducers with Display unit as per IS 16906:2018	0.5 Nm to 5 Nm 2 Nm to 20 Nm 10Nm to 100 Nm 20 Nm to 500 Nm 200 Nm to 2000 Nm	3.00 % 1.50 % 1.20 % 1.09 % 1.49 %

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Mechanical Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Dimension				
1.	Surface plate	Using Electronic Level As per IS 2285: 2003 IS 7327: 2003 IS 12937 Amd. 1 : 1993	5100X5100mm	1.3*under root (L+W/150) µm (where L and Win mm)
Group-Pressure				
1.	Pneumatic (Dial Pressure gauge, Digital Pressure gauge, Pressure Transmitter, Pressure Switch, pressure recorder)	Using Digital pressure indicator by comparison method as per DKD -R-6-1	0 to 3 bar 3 to 30 bar	0.0007 bar 0.03 bar
2.	Hydraulic (Dial Pressure gauges, Digital Pressure gauges, Pressure Transmitter, Pressure Switch, pressure recorder)	Using Digital pressure indicator by comparison method as per DKD -R-6-1	30 to 300 bar 300 to 700 bar 700 to 1000 bar	0.05 bar 0.088 bar 1.20 bar
3.	Low Pressure Gauges	Using Digital pressure indicator by comparison method as per DKD -R-6-1	0 to 2 mbar -20 to 20 mbar 10 to 100 mbar 100 to 1000 mbar	0.0063 mbar 0.063 mbar 0.32 mbar 0.6 mbar
4.	Vacuum (Dial Gauges, Digital Gauges' Vacuum transmitter, Vacuum Switch)	Using Digital pressure indicator by comparison method as per DKD -R-6-1 & DKD -R-6-2	-0.94 bar to 0 bar	0.6 mbar

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Mechanical Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Weighing scale and balance				
1.	Balance Readability1µg 10µg (Class I and Coarser)	Using E1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 6.1 g	0.006 mg
2.	Balance Readability10µg 0.1 mg (Class I and Coarser)	Using E1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 210 g	0.064 mg
3.	Balance Readability1mg (Class I and Coarser)	Using E2 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 1 kg	0.636 mg
4.	Balance Readability1mg (Class I and Coarser)	Using E2 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 3000 g	0.851 mg
5.	Balance Readability100mg(Class II and Coarser)	Using F1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 10 kg	61.12 mg
6.	Balance Readability100 mg	Using F1 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 50 kg	88.29 mg
7.	Balance Readability100 mg (Class II and Coarser)	Using F1 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 100 kg	89 mg
8.	Balance Readability 50 g (Class II and Coarser)	Using F1 & M1 Accuracy Class Standard Weights as per OIML R -76-1:2006	0 to 150 kg	29 g

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Mechanical Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
9.	Balance Readability 50 g and coarser (Class III and Coarser)	Using M1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 300 kg	39 g
10.	Balance Readability 100 g and coarser (Class IIII and Coarser)	Using M1 Accuracy Class Standard Weights As per OIML R -76-1:2006	0 to 1200 kg	67 g

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Thermal Calibration (Laboratory Based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Temperature				
1.	RTD Sensor & Thermocouple with or without indicator Dig. Thermometers, Data Loggers with Sensor, Recorders with sensor, Temperature transmitter with indicator, Temp Switch, Temp. Transmitter, Transducer	Using SSPRT and 6&1/2 DMM by comparison method As Per DKD-R-5-1 & ITS -90	-80°C to 0°C 0°C to 50°C 50°C to 250°C 250°C to 600°C	0.10°C 0.10°C 0.18°C 2.00°C
2.	Thermocouples, Dig Thermometers, Temp. Indicator with or without indicator Sensor Data loggers With Sensor, Recorders with Sensor, Temp Switch, Temp Transmitter, Transducer, Muffle Furnace.	Using R Type T/C, and 6&1/2 DMM by comparison method As Per EURAMET cg-8 & ITS -90	600°C to 800°C 800°C to1000°C 1000°Cto1500°C	2.64 °C 2.78 °C 3.50 °C
3.	Temp indicator with sensor of Liquid bath, Dry Block, Furnace Oven, Incubator ,Freezer	Using SSPRT, R Type T/C, and 6&1/2 DMM by comparison method (Single position method). DKD-R5-7 & Euramet Cg-13	-80°C to 0°C 0°C to 50°C 50°C to 250°C 250°C to 600°C 600°C to 800°C 800°C to1000°C 1000°Cto1500°C	0.58°C 0.13°C 0.20°C 2.00°C 2.64°C 2.72°C 3.45°C
4.	Glass Thermometer, Temperature Gauge,	Using SSPRT, and 6&1/2 DMM by	-80°C to 0°C 0°C to 50°C	0.12°C 0.13°C

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Thermal Calibration (Laboratory Based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
	Dial Type Thermometers	comparison method As per IS 6274, IS 2480, OIML R 133	50°C to 100°C 100°C to 250°C	0.20°C 0.20°C
5.	Non-Contact Thermometer /pyrometer/Infrared Thermometer/Infrared Temperature Gun/Thermal Imaging Camera/IR Sensor/Portable/on Line IR radiation Thermometer	Using Pyrometer Blackbody Furnace by comparison Method MSL technical Guide 22	0°C to 50°C 50°C to 300°C 300 °C to 600°C 600°C to 800°C 800°C to 1000°C 1000° to 1200°C	1.2°C 1.5°C 3.04°C 4.50°C 4.50°C 4.50°C
Group-Humidity				
1	RH Sensor, Dry & Wet bulb Thermometer, thermo- hygrometer Humidity indicator with inbuilt or External sensor, Temperature and Humidity indicator with sensor, Digital and Analog Hygrometers, Temperature/RH Data logger, Humidity Transmitter, Humidity Transducer.	Using Temp & Humidity indicator with sensor by comparison method:	15%RH to 95%RH 5^0C to 50 ^{0}C	0.79 %RH 0.75^0C
2	Temperature Humidity indicator with sensor of	Using Temperature Humidity Indicator with Sensors by comparison method	15%RH to 95%RH 5^0C to 50 ^{0}C	0.74 %RH 0.75^0C

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Thermal Calibration (Laboratory Based)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
	Climatic/ Environmental Chamber, Climatic Chambers	(Single Position Method) DKD –R5-7		

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Thermal Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Temperature				
1	RTD Sensor & Thermocouple with or Without indicator Dig. Thermometers, Data Loggers with Sensor, Recorders with sensor, Temperature transmitter With indicator, Temp Switch, Temp. Transmitter, Transducer	Using RTD Sensor, and MFC FLUKE 725 by comparison method	-30 °C to 0 °C 0 °C to 50 °C 50 °C to 250 °C 250 °C to 600 °C	0.64 °C 0.64 °C 0.64 °C 2.10 °C
2	Thermocouples, Dig Thermometers Temp. Indicator with or without sensor, Data loggers With Sensor, Recorders with Sensor,Temp Switch,Temp Transmitter, Transducer, Muffle Furnace.	Using R Type T/C, and MFC FLUKE 725 by comparison method	600 °C to 800 °C 800 °C to 1000 °C 1000 °C to 1500°C	3.03 °C 3.20 °C 3.20 °C

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Thermal Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
3	Temp indicator with sensor of Liquid bath, Dry Block, Furnace Oven, Incubator, Freezer	Using RTD Sensor, R Type T/C, and MFC FLUKE 725 by comparison method (Single position method)	-30°C to 0°C 0 °C to 50°C 50°C to 250°C 250°C to 600°C 600°C to 800°C 800°C to 1000°C 1000°Cto 1500°C	0.64°C 0.64°C 0.64°C 0.64°C 2.87°C 2.87°C 3.68°C
4	Glass Thermometer, Temperature Gauge, Dial Type Thermometers	Using RTD Sensor, and MFC FLUKE 725 by comparison method	-30°C to 0°C 0 °C to 50°C 50°C to 100°C 100°C to 250°C	0.64°C 0.64°C 0.64°C 0.68°C
5	Temp Calibration of Refrigerator\deep Freezers, Autoclaves, Cold Chamber/Environmental chamber, Oven ,Incubator, Furnace	Using RTD, N type T/C (minimum 9) with 9 channel data loggers (multiposition method): IEC 60068	-80°C to 200°C 200 °C to 400°C 400°C to 1200°C	0.35°C 2.68°C 2.98°C
6	Non-Contact Thermometer /pyrometer/Infrared Thermometer/Infrared Temperature Gun/Thermal Imaging Camera/IR Sensor/Portable/on Line IR radiation Thermometer	Using Pyrometer and Blackbody Furnace by comparison Method	0°C to 50°C 50°C to 300°C 300°C to 600°C 600 °C to 800°C 800°C to 1000°C 1000°C to1200°C	1.2°C 1.5°C 3.04°C 4.50°C 4.50°C 4.50°C

Dealing Officer

FEDERATION FOR DEVELOPMENT OF ACCREDITATION SERVICES

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Thermal Calibration (At Site)

S. No.	Parameter	Calibration Method/ Procedure & Equipment used as Reference Standard	Range	Uncertainty in Measurement (±) *
Group-Humidity				
1	RH Sensor, Dry & Wet bulb Thermometer, thermo-hygrometer Humidity indicator with inbuilt or External sensor, Temperature and Humidity indicator with sensor, Digital and Analog Hygrometers, Temperature/RH Data logger, Humidity Transmitter, Humidity Transducer.	Using Temp & Humidity indicator with sensor by comparison method:	15%RH to 95%RH 5^0C to 50 ^{0}C	0.79 %RH 0.75^0C
2	Temperature Humidity indicator with sensor of Climatic/ Environmental Chamber, Climatic Chambers	Using Temperature Humidity Indicator with Sensors by comparison method: (Single Position Method) DKD –R5-7	15%RH to 95%RH 5^0C to 50 ^{0}C	0.74 %RH 0.75^0C

*** Expanded uncertainty expressed in coverage probability of approximately 95% (coverage factor K=2)**

Dealing Officer