National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

ELECTRONICS TEST & DEVELOPMENT CENTRE

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

30, GMC - NIO ROAD, P.O. GOA UNIVERSITY, BAMBOLIM, NORTH GOA, GOA, INDIA

in the field of

CALIBRATION

Certificate Number: CC-3602

Issue Date: 15/06/2023 **Valid Until:** 14/06/2025

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Identity : ELECTRONICS TEST & DEVELOPMENT CENTRE,GOA

Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer

SCOPE OF ACCREDITATION

Laboratory Name :	ELECTRONICS TEST & DEVELOPMENT CENTRE, 30, GMC - NIO ROAD, P.O. GOA UNIVERSITY, BAMBOLIM, NORTH GOA, GOA, INDIA		
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S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrument	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
Permanent Facility					
1	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	100 µA to 100 mA	0.1 % to 0.05 %
2	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using Current Shunt and 8½ Digit DMM by VIR Method	2 A to 20 A	0.24 % to 0.60 %
3	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (55 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	100 mA to 2 A	0.05 % to 0.11 %
4	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC High Voltage (50 Hz)	Using HV Probe and DMM by Direct Method	1 kV to 15 kV	5.7 % to 5.94 %

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5	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz)	Power Analyser by Direct Method	700 V to 1000 V	0.04 % to 0.1 %
6	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	1 V to 700 V	0.01 % to 0.04 %
7	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	10 mV to 100 mV	0.04 % to 0.01 %
8	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	100 mV to 1 V	0.01%
9	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Capacitance @ 1 kHz	Using LCR Meter by Direct Method	100 pF to 1 µF	0.11 % to 0.06 %

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10	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Inductance (1 kHz)	Using LCR Meter by Direct Method	100 µH to 10 H	0.3 % to 0.11 %
11	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Power Factor (50 Hz, 240 V, 1 A)	Using Power Analyser by Direct Method	0.2 PF to 1.0 PF (Lead & Lag)	0.025 PF to 0.018 PF
12	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Single Phase AC power (50 Hz, 60V to 240V, 0.1A to 20A, 0.5PF to UPF Lead/ Lag)	Using Power Analyser by Direct Method	6 W to 4.8 kW	0.035 % to 0.07 %
13	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz to 5 kHz)	Using Multifunction Calibrator by Direct Method	100 µA to 100 mA	0.25 % to 0.08 %
14	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz to 5 kHz)	Using Multifunction calibrator by Direct Method	100 mA to 3 A	0.08 % to 0.166 %

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15	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multifunction Calibrator with 50 Turn Current Coil by Direct Method	20 A to 1000 A	0.1 % to 0.71 %
16	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multifunction Calibrator by Direct Method	3 A to 20 A	0.166%
17	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz to 10 kHz)	Using Multifunction Calibrator by Direct Method	10 mV to 100 mV	0.1 % to 0.03 %
18	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz to 10 kHz)	Using Multifunction Calibrator by Direct Method	100 mV to 10 V	0.03%
19	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz to 8 kHz)	Using Multifunction Calibrator by Direct Method	10 V to 1000 V	0.03 % to 0.04 %
20	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Multifunction Calibrator by Direct Method	1 µF to 10 mF	0.42 % to 1.8 %

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21	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Decade Capacitance Box by Direct Method	100 pF to 200 pF	0.285 % to 0.5 %
22	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Standard Capacitors by Direct Method	1000 pF to 1 µF	0.060 % to 0.059 %
23	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Multifunction Calibrator by Direct Method	200 pF to 1000 pF	5.56 % to 0.42 %
24	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Inductance (1 kHz)	Using Standard Inductors by Direct Method	1 mH to 10 H	0.11%
25	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Inductance (1 kHz)	Using Standard Inductors by Direct Method	100 µH to 1 mH	0.29 % to 0.11 %
26	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Power Factor (240V, 5A, 50Hz)	Using Multifunction Calibrator by Direct Method	0.2 PF to 1.0 PF (Lead & Lag)	0.0013 PF to 0.001 PF

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27	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Single Phase AC Active Power (50 Hz, 60V to 240V, 0.1A to 25A, 0.5PF to UPF, Lead / Lag)	Using Multifunction Calibrator by Direct Method	3.0 W to 4.8 kW	0.09 % to 0.015 %
28	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using Current Shunt with 6½ Digit DMM by V/R Method	>2 A to 20 A	0.15 % to 0.57 %
29	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 8½ Digit DMM by Direct Method	100 µA to 100 mA	0.004 % to 0.006 %
30	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 8½ Digit DMM by Direct Method	100 mA to 2 A	0.006 % to 0.02 %
31	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC High Voltage	Using HV Probe and DMM by Direct Method	1 kV to 30 kV	2.5 % to 2.3 %
32	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 8½ Digit DMM by Direct Method	1 mV to 100 mV	0.03 % to 0.001 %

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33	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 8½ Digit DMM by Direct Method	10 V to 1000 V	0.001%
34	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 8½ Digit DMM by Direct Method	100 mV to 10 V	0.001%
35	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (2 Wire)	Using 8½ Digit DMM by Direct Method	100 Mohm to 1 Gohm	0.05 % to 0.57 %
36	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 wire)	Using 8½ Digit DMM by Direct Method	0.01 ohm to 1 ohm	0.57 % to 0.008 %
37	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	1 mohm to 10 mohm	5.7 % to 0.58 %
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	1 ohm to 100 ohm	0.008 % to 0.002 %

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39	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	10 Mohm to 100 Mohm	0.007 % to 0.05 %
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	100 ohm to 10 Mohm	0.002 % to 0.007 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multifunction Calibrator by Direct Method	1 A to 20 A	0.027 % to 0.118 %
42	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multifunction Calibrator by Direct Method	100 µA to 1 A	0.04 % to 0.027 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multifunction Calibrator with 50 Turn Current Coil by Direct Method	20 A to 1000 A	0.54 % to 0.62 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multifunction Calibrator by Direct Method	1 mV to 100 mV	0.117 % to 0.004 %

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45	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multifunction Calibrator by Direct Method	10 V to 1000 V	0.002%
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multifunction Calibrator by Direct Method	100 mV to 10 V	0.004 % to 0.002 %
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 wire)	Using Megohm Box by Direct Method	0.1 Mohm to 1 Mohm	2.20 % to 0.55 %
48	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 Wire)	Using Decade Megohm Box by Direct Method	1 Mohm to 10 Gohm	0.55 % to 0.57 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 Wire)	Using Decade Megohm Box by Direct Method	10 Gohm to 100 Gohm	0.57 % to 1.1 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 wire)	Using Standard Resistors by Direct Method	10 Mohm to 1 Gohm	0.01 % to 0.568 %

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51	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 wire)	Using Decade Megohm Box by Direct Method	100 Gohm to 1 Tohm	1.1 % to 2.4 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	0.01 ohm to 1 ohm	0.09 % to 0.006 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 mohm to 10 mohm	0.566 % to 0.080 %
54	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 Mohm to 10 Mohm	0.01%
55	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 ohm to 100 ohm	0.006%
56	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 mohm to 10 mohm	0.566 % to 0.08 %

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57	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	100 ohm to 1 Mohm	0.006 % to 0.01 %
58	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope: AC Voltage Level (1 kHz)	Using Multifunction Calibrator with scope option by Direct Method	1 mV_{pp} to 120 V_{pp}	0.48 % to 0.13 %
59	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope: Bandwidth	Using Multifunction Calibrator with scope option by Direct Method	10 kHz to 600 MHz	4%
60	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope: Time Marker	Using Multifunction Calibrator with Scope Option by Direct Method	2 ns to 5 s	0.11 % to 0.028 %
61	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for B Type Thermocouple	Using Temperature Calibrator by Direct Method	920 °C to 1800 °C	0.56°C
62	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for E Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)200 °C to 1000 °C	0.26°C

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63	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for J Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)190 °C to 1200 °C	0.27°C
64	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for K Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)160 °C to 1260 °C	0.27°C
65	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for N Type Thermocouple	Using Temperature Calibrator by Direct Method	0 to 1300 °C	0.29°C
66	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for R Type Thermocouple	Using Temperature Calibrator by Direct Method	150 °C to 1750 °C	0.45°C
67	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for RTD Pt-100	Using Temperature Calibrator by Direct Method	(-)200 °C to 850 °C	0.15°C
68	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for S Type Thermocouple	Using Temperature Calibrator by Direct Method	170 °C to 1750 °C	0.45°C

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69	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for T Type Thermocouple	Using Temperature Calibrator by Direct Method	-100 °C to 400 °C	0.21°C
70	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for B Type Thermocouple	Using Temperature Calibrator by Direct Method	920 °C to 1800 °C	0.54°C
71	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for E Type Thermocouple	Using Temperature Calibrator by Direct Method	-200 °C to 1000 °C	0.25°C
72	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for J Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)190 °C to 1200 °C	0.25°C
73	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for K Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)160 °C to 1260 °C	0.25°C
74	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for N Type Thermocouple	Using Temperature Calibrator by Direct Method	0 to 1300 °C	0.26°C

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75	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for R Type Thermocouple	Using Temperature Calibrator by Direct Method	150 °C to 1750 °C	0.43°C
76	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for RTD Pt-100	Using Temperature Calibrator by Direct Method	-200 °C to 850 °C	0.15°C
77	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for S Type Thermocouple	Using Temperature Calibrator by Direct Method	170 °C to 1750 °C	0.44°C
78	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for T Type Thermocouple	Using Temperature Calibrator by Direct Method	-100 °C to 400 °C	0.16 °C
79	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Frequency Counter/Timer by Direct Method	10 Hz to 10 kHz	0.00012 % to 0.000002 %
80	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Frequency Counter/Timer by Direct Method	10 kHz to 3 GHz	0.000002%

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81	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time	Using Frequency Counter/Timer by Direct Method	1 s to 3600 s	0.03 s to 0.06 s
82	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Multifunction Calibrator by Direct Method	1 Hz to 10 kHz	0.0009 % to 0.00002 %
83	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Signal Generator by Direct Method	10 kHz to 100 MHz	0.00002 % to 0.00001 %
84	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Signal Generator by Direct Method	100 MHz to 3 GHz	0.00001%
85	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Caliper: Dial/Analog/Digital (L.C.: 0.01 mm)	Using Gauge Blocks (Grade O) and Accessories Set by Comparison Method	0 to 300 mm	8.8µm

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86	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Dial Gauge: Plunger Type Analog / Digital (L.C.: 0.01 mm)	Using Gauge Blocks (Grade O) and Accessories Set by Comparison Method	0 to 20 mm	6.6µm
87	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	External Micrometer: Analog/Digital (L.C.: 0.01 mm)	Using Gauge Blocks (Grade O) by Comparison Method	0 to 25 mm	4.0µm
88	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Vernier Caliper: Dial/Analog/Digital (L.C.: 0.02 mm)	Using Gauge Blocks (Grade O) and Accessories Set by Comparison Method	0 to 300 mm	15.8µm
89	MECHANICAL-DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)	Vernier Height Gauge: Analog/Dial/Digital (L.C.: 0.02 mm)	Using Slip Gauges, Long slip Gauges & Surface Plate by Comparison Method	0 to 600 mm	18.6µm
90	MECHANICAL-PRESSURE INDICATING DEVICES	Hydraulic Pressure Gauge, Pressure Indicator & Pressure Calibrator	Using Dead Weight Tester by Direct Method as per DKD-R 6-1	3 bar to 400 bar	0.27bar

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91	MECHANICAL-PRESSURE INDICATING DEVICES	Hydraulic Pressure Gauge, Pressure Indicator & Pressure Calibrator	Using Digital Hydraulic Pressure Calibrator by Comparison Method as per DKD-R 6-1	0 to 400 bar	0.70bar
92	MECHANICAL-PRESSURE INDICATING DEVICES	Pneumatic Pressure Gauge, Pressure Indicator & Pressure Calibrator	Using Digital Pressure Calibrator by Comparison as per DKD-R 6-1	0 to 2 bar	0.022bar
93	MECHANICAL-PRESSURE INDICATING DEVICES	Pneumatic Pressure Gauge, Pressure Indicator & Pressure Calibrator	Using Digital Pressure Calibrator by Comparison Method as per DKD-R 6-1	2 bar to 25 bar	0.018bar
94	MECHANICAL-PRESSURE INDICATING DEVICES	Vacuum Gauges, Vacuum Indicators & Vacuum Calibrator	Using Digital Pressure Calibrator by Comparison Method as per ISO 3567 & 27893	(-) 0.90 bar to 0.00	0.005 bar
95	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 Class Standard Weights & Digital Semi Micro Balance (readability: 0.01 mg) by Comparison Method as per OIML R 111-1	1 g	0.07mg

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96	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	1 mg	0.06 mg
97	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	10 g	0.07 mg
98	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	10 mg	0.07 mg
99	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.1 mg) by Comparison Method as per OIML R 111-1	100 g	0.19mg

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100	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	100 mg	0.07mg
101	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	2 g	0.07mg
102	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	2 mg	0.06mg
103	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	20 g	0.07mg

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104	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	20 mg	0.07mg
105	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.1 mg) by Comparison Method as per OIML R 111-1	200 g	0.20mg
106	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	200 mg	0.07mg
107	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	5 g	0.07mg

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108	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	5 mg	0.06mg
109	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	50 g	0.07mg
110	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	50 mg	0.07mg
111	MECHANICAL-WEIGHTS	Mass/Weight (M1 class and coarser)	Using E2 class Standard Weights & Digital semi Micro Balance (readability 0.01 mg) by Comparison Method as per OIML R 111-1	500 mg	0.07mg

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112	MECHANICAL-WEIGHTS	Mass/Weight (M3 class and courser)	Using E2 Class Standard Weights & Electronic Weighing Balance (readability 0.01 g) as per OIML R 111-1	1 kg	0.014g
113	MECHANICAL-WEIGHTS	Mass/Weight (M3 class and courser)	Using E2 Class Standard Weights & Electronic Weighing Balance (readability 0.1 g) as per OIML R 111-1	10 kg	0.4g
114	MECHANICAL-WEIGHTS	Mass/Weight (M3 class and courser)	Using E2 Class Standard Weights & Electronic Weighing Balance (readability 0.01 g) as per OIML R 111-1	2 kg	0.014g
115	MECHANICAL-WEIGHTS	Mass/Weight (M3 class and courser)	Using E2 Class Standard Weights & Electronic Weighing Balance (readability 0.1 g) as per OIML R 111-1	5 kg	0.13g
116	MECHANICAL-WEIGHTS	Mass/Weight (M3 class and courser)	Using E2 Class Standard Weights & Electronic Weighing Balance (readability 0.01 g) as per OIML R 111-1	500 g	0.014 g

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Site Facility					
1	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	100 µA to 100 mA	0.1 % to 0.05 %
2	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (50 Hz)	Using Current Shunt and 8½ Digit DMM by VIR Method	2 A to 20 A	0.24 % to 0.60 %
3	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current (55 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	100 mA to 2 A	0.05 % to 0.11 %
4	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC High Voltage (50 Hz)	Using HV Probe and DMM by Direct Method	1 kV to 15 kV	5.7 % to 5.94 %

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5	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz)	Power Analyser by Direct Method	700 V to 1000 V	0.04 % to 0.1 %
6	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	1 V to 700 V	0.01 % to 0.04 %
7	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	10 mV to 100 mV	0.04 % to 0.01 %
8	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage (50 Hz to 1 kHz)	Using 8½ Digit DMM by Direct Method	100 mV to 1 V	0.01%
9	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Capacitance @ 1 kHz	Using LCR Meter by Direct Method	100 pF to 1 µF	0.11 % to 0.06 %

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10	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Inductance (1 kHz)	Using LCR Meter by Direct Method	100 µH to 10 H	0.3 % to 0.11 %
11	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Power Factor (50 Hz, 240 V, 1 A)	Using Power Analyser by Direct Method	0.2 PF to 1.0 PF (Lead & Lag)	0.025 PF to 0.018 PF
12	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Single Phase AC power (50 Hz, 60V to 240V, 0.1A to 20A, 0.5PF to UPF Lead/ Lag)	Using Power Analyser by Direct Method	6 W to 4.8 kW	0.035 % to 0.07 %
13	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz to 5 kHz)	Using Multifunction Calibrator by Direct Method	100 µA to 100 mA	0.25 % to 0.08 %
14	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz to 5 kHz)	Using Multifunction calibrator by Direct Method	100 mA to 3 A	0.08 % to 0.166 %

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15	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multifunction Calibrator with 50 Turn Current Coil by Direct Method	20 A to 1000 A	0.1 % to 0.71 %
16	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current (50 Hz)	Using Multifunction Calibrator by Direct Method	3 A to 20 A	0.166%
17	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz to 10 kHz)	Using Multifunction Calibrator by Direct Method	10 mV to 100 mV	0.1 % to 0.03 %
18	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz to 10 kHz)	Using Multifunction Calibrator by Direct Method	100 mV to 10 V	0.03%
19	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Voltage (50 Hz to 8 kHz)	Using Multifunction Calibrator by Direct Method	10 V to 1000 V	0.03 % to 0.04 %
20	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Multifunction Calibrator by Direct Method	1 µF to 10 mF	0.42 % to 1.8 %

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21	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Decade Capacitance Box by Direct Method	100 pF to 200 pF	0.285 % to 0.5 %
22	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Standard Capacitors by Direct Method	1000 pF to 1 µF	0.060 % to 0.059 %
23	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Capacitance (1 kHz)	Using Multifunction Calibrator by Direct Method	200 pF to 1000 pF	5.56 % to 0.42 %
24	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Inductance (1 kHz)	Using Standard Inductors by Direct Method	1 mH to 10 H	0.11%
25	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Inductance (1 kHz)	Using Standard Inductors by Direct Method	100 µH to 1 mH	0.29 % to 0.11 %
26	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Power Factor (240V, 5A, 50Hz)	Using Multifunction Calibrator by Direct Method	0.2 PF to 1.0 PF (Lead & Lag)	0.0013 PF to 0.001 PF

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27	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Single Phase AC Active Power (50 Hz, 60V to 240V, 0.1A to 25A, 0.5PF to UPF, Lead / Lag)	Using Multifunction Calibrator by Direct Method	3.0 W to 4.8 kW	0.09 % to 0.015 %
28	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using Current Shunt with 6½ Digit DMM by V/R Method	>2 A to 20 A	0.15 % to 0.57 %
29	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 8½ Digit DMM by Direct Method	100 µA to 100 mA	0.004 % to 0.006 %
30	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 8½ Digit DMM by Direct Method	100 mA to 2 A	0.006 % to 0.02 %
31	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC High Voltage	Using HV Probe and DMM by Direct Method	1 kV to 30 kV	2.5 % to 2.3 %
32	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 8½ Digit DMM by Direct Method	1 mV to 100 mV	0.03 % to 0.001 %

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33	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 8½ Digit DMM by Direct Method	10 V to 1000 V	0.001%
34	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 8½ Digit DMM by Direct Method	100 mV to 10 V	0.001%
35	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (2 Wire)	Using 8½ Digit DMM by Direct Method	100 Mohm to 1 Gohm	0.05 % to 0.57 %
36	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 wire)	Using 8½ Digit DMM by Direct Method	0.01 ohm to 1 ohm	0.57 % to 0.008 %
37	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	1 mohm to 10 mohm	5.7 % to 0.58 %
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	1 ohm to 100 ohm	0.008 % to 0.002 %

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39	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	10 Mohm to 100 Mohm	0.007 % to 0.05 %
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance (4 Wire)	Using 8½ Digit DMM by Direct Method	100 ohm to 10 Mohm	0.002 % to 0.007 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multifunction Calibrator by Direct Method	1 A to 20 A	0.027 % to 0.118 %
42	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multifunction Calibrator by Direct Method	100 µA to 1 A	0.04 % to 0.027 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Current	Using Multifunction Calibrator with 50 Turn Current Coil by Direct Method	20 A to 1000 A	0.54 % to 0.62 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multifunction Calibrator by Direct Method	1 mV to 100 mV	0.117 % to 0.004 %

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45	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multifunction Calibrator by Direct Method	10 V to 1000 V	0.002%
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	DC Voltage	Using Multifunction Calibrator by Direct Method	100 mV to 10 V	0.004 % to 0.002 %
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 wire)	Using Megohm Box by Direct Method	0.1 Mohm to 1 Mohm	2.20 % to 0.55 %
48	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 Wire)	Using Decade Megohm Box by Direct Method	1 Mohm to 10 Gohm	0.55 % to 0.57 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 Wire)	Using Decade Megohm Box by Direct Method	10 Gohm to 100 Gohm	0.57 % to 1.1 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 wire)	Using Standard Resistors by Direct Method	10 Mohm to 1 Gohm	0.01 % to 0.568 %

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51	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (2 wire)	Using Decade Megohm Box by Direct Method	100 Gohm to 1 Tohm	1.1 % to 2.4 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	0.01 ohm to 1 ohm	0.09 % to 0.006 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 mohm to 10 mohm	0.566 % to 0.080 %
54	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 Mohm to 10 Mohm	0.01%
55	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 ohm to 100 ohm	0.006%
56	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	1 mohm to 10 mohm	0.566 % to 0.08 %

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57	ELECTRO-TECHNICAL-DIRECT CURRENT (Source)	Resistance (4 wire)	Using Standard Resistors by Direct Method	100 ohm to 1 Mohm	0.006 % to 0.01 %
58	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope: AC Voltage Level (1 kHz)	Using Multifunction Calibrator with scope option by Direct Method	1 mV_{pp} to 120 V_{pp}	0.48 % to 0.13 %
59	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope: Bandwidth	Using Multifunction Calibrator with scope option by Direct Method	10 kHz to 600 MHz	4%
60	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Source)	Oscilloscope: Time Marker	Using Multifunction Calibrator with Scope Option by Direct Method	2 ns to 5 s	0.11 % to 0.028 %
61	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for B Type Thermocouple	Using Temperature Calibrator by Direct Method	920 °C to 1800 °C	0.56°C
62	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for E Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)200 °C to 1000 °C	0.26°C

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63	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for J Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)190 °C to 1200 °C	0.27°C
64	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for K Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)160 °C to 1260 °C	0.27°C
65	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for N Type Thermocouple	Using Temperature Calibrator by Direct Method	0 to 1300 °C	0.29°C
66	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for R Type Thermocouple	Using Temperature Calibrator by Direct Method	150 °C to 1750 °C	0.45°C
67	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for RTD Pt-100	Using Temperature Calibrator by Direct Method	(-)200 °C to 850 °C	0.15°C
68	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for S Type Thermocouple	Using Temperature Calibrator by Direct Method	170 °C to 1750 °C	0.45°C

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69	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Measure)	Temperature Simulator for T Type Thermocouple	Using Temperature Calibrator by Direct Method	-100 °C to 400 °C	0.21°C
70	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for B Type Thermocouple	Using Temperature Calibrator by Direct Method	920 °C to 1800 °C	0.54°C
71	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for E Type Thermocouple	Using Temperature Calibrator by Direct Method	-200 °C to 1000 °C	0.25°C
72	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for J Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)190 °C to 1200 °C	0.25°C
73	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for K Type Thermocouple	Using Temperature Calibrator by Direct Method	(-)160 °C to 1260 °C	0.25°C
74	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for N Type Thermocouple	Using Temperature Calibrator by Direct Method	0 to 1300 °C	0.26°C

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75	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for R Type Thermocouple	Using Temperature Calibrator by Direct Method	150 °C to 1750 °C	0.43°C
76	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for RTD Pt-100	Using Temperature Calibrator by Direct Method	-200 °C to 850 °C	0.15°C
77	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for S Type Thermocouple	Using Temperature Calibrator by Direct Method	170 °C to 1750 °C	0.44°C
78	ELECTRO-TECHNICAL-TEMPERATURE SIMULATION (Source)	Indicator for T Type Thermocouple	Using Temperature Calibrator by Direct Method	-100 °C to 400 °C	0.16 °C
79	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Frequency Counter/Timer by Direct Method	10 Hz to 10 kHz	0.00012 % to 0.000002 %
80	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Frequency Counter/Timer by Direct Method	10 kHz to 3 GHz	0.000002%

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81	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Time	Using Frequency Counter/Timer by Direct Method	1 s to 3600 s	0.03 s to 0.06 s
82	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Multifunction Calibrator by Direct Method	1 Hz to 10 kHz	0.0009 % to 0.00002 %
83	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Signal Generator by Direct Method	10 kHz to 100 MHz	0.00002 % to 0.00001 %
84	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Signal Generator by Direct Method	100 MHz to 3 GHz	0.00001%
85	MECHANICAL-PRESSURE INDICATING DEVICES	Hydraulic Pressure Gauge, Pressure Indicator & Pressure Calibrator	Using Digital Hydraulic Pressure Calibrator by Comparison Method as per DKD-R 6-1	0 to 400 bar	0.70bar
86	MECHANICAL-PRESSURE INDICATING DEVICES	Pneumatic Pressure Gauge, Pressure Indicator & Pressure Calibrator	Using Digital Pressure Calibrator by Comparison as per DKD-R 6-1	0 to 2 bar	0.022bar

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87	MECHANICAL-PRESSURE INDICATING DEVICES	Pneumatic Pressure Gauge, Pressure Indicator & Pressure Calibrator	Using Digital Pressure Calibrator by Comparison Method as per DKD-R 6-1	2 bar to 25 bar	0.018bar
88	MECHANICAL-PRESSURE INDICATING DEVICES	Vacuum Gauges, Vacuum Indicators & Vacuum Calibrator	Using Digital Pressure Calibrator by Comparison Method as per ISO 3567 & 27893	(-) 0.90 bar to 0.00	0.005 bar

*** CMCs represent expanded uncertainties expressed at approximately the 95% level of confidence, using a coverage factor of k = 2.**