Accreditation No: LAB 001

Awarded to

NATIONAL METRLOGY INSTITUTE OF PAKISTAN
PLOT NO. 16, SECTOR H-9/1, ISLAMABAD, PAKISTAN.

The scope of accreditation is in accordance with the standard specifications outlined in the following page(s) of this document. The accredited scope shall be visible and legible in areas such as customer service, sample-receiving section etc and shall not mislead its users.

The accreditation was first time granted on **12-02-2004** by Pakistan National Accreditation Council.

The laboratory complies with the requirements of **ISO/IEC 17025:2017.**

The accreditation requires regular surveillance, and is valid until **11-05-2025.**

The decision of accreditation made by Pakistan National Accreditation Council implies that the organization has been found to fulfill the requirements for accreditation within the scope.

The organization however, itself is responsible for the results of performed measurements/tests.

PAKISTAN NATIONAL ACCREDITATION COUNCIL

10-02-2024
Date

SD
Director General

Testing Laboratory.

Accreditation Scope of **NATIONAL METRLOGY INSTITUTE OF PAKISTAN**
PLOT NO. 16, SECTOR H-9/1, ISLAMABAD, PAKISTAN.

Permanent laboratory premises X

Materials/ Products tested	Testing field (e.g. environmental testing or mechanical testing)	Types of test/ Properties measured	Reference to standardized method (e.g. ISO 14577-1:2003)/ Internal method reference
CHEMICAL METROLOGY			
Water/ Wastewater/ Industrial Effluents	Environmental testing	Measurement of Electrical Conductivity	2510-B, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Total Dissolved Solids (TDS)	2540-C, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Total Suspended Solids (TSS)	2540-D, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Total Hardness	2340-C, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Alkalinity	2320-B, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Chloride	4500-Cl^- B, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Calcium	3500-Ca B, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Magnesium	3500-Mg(B), Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		Chemical Oxygen Demand (COD)	5220-B, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA
		pH	4500-H^+, Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, AWWA/APHA

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Water/ Wastewater/ Industrial Effluents/ Solutions/ Liquids	Chemical and Environmental testing	Copper (Cu)	Standard Methods for the Examination of Water and Waste water, 24th edition, 2022, APHA, AWWA, WEF / Atomic Absorption Spectrometer, AAnalyst -100, Perkin Elmer-USA / Direct method (Flame - AAS)
		Iron (Fe)	
		Lead (Pb)	
		Zinc (Zn)	
		Chromium (Cr)	
		Sodium (Na)	
		Potassium (K)	
		Calcium (Ca)	
		Magnesium (Mg)	
		Cadmium (Cd)	
		Nickel (Ni)	
		Manganese (Mn)	
		Cobalt (Co)	

Calibration Laboratory.

Accreditation Scope of **NATIONAL METROLOGY INSTITUTE OF PAKISTAN**
PLOT NO.16, SECTOR H-9/1, ISLAMABAD, PAKISTAN.

Permanent laboratory premises X

Field of measurement: VOLUME METROLOGY			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
Micropipette	10 µL - 5000 µL	0.20 µL – 5.0 µL	**Equipment Used:** M-39 ME414S, Sartorius, Germany M-58 CP8200, Sartorius, Germany M-28 CC64K, Sartorius, Germany **Method Used:** ASTM E542-01 MMD/Vol-28/TPP-28
Glassware	1 mL - 1000 mL	0.010 mL – 2.9 mL	
Glassware	1 L - 5 L	0.0040 L - 0.030 L	
Metallic	20 mL - 2000 m L	0.12 mL - 5.8 mL	
Metallic	2 L - 5 L	0.0060 L - 0.017 L	
Metallic	5 L - 10 L	0.017 L - 0.029 L	
Metallic	10 L - 20 L	0.029 L - 0.050 L	
Field of measurement: DIMENSION METROLOGY			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
Length	(0-300) mm / (0-30) cm	0.041 - 0.071 mm	**Unit Under Test:** Foot Scales using Length Comparator **Method Used:** DMD/TP-1

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	0-1000 mm (1Meter)	0.041 - 0.062 mm	**Unit Under Test:** Meter Scales using Length Comparator **Method Used:** DMD/TP-1
	0.005 - 50 m	0.053 - 0.19 mm	**Unit Under Test:** Measuring Tapes using Length Comparator **Method Used:** DMD/TP-1
	1000 mm	0.0015 - 0.0050 mm	**Unit Under Test:** End Standard Meter Gauge Block using End to End Comparator **Method Used:** DMD/TP-2
	0.03 - 0.1 mm	0.20 - 3.0 µm	**Unit Under Test:** Feeler Gauge using UMM_2 **Method Used:** DMD/TP-3
	0.5 - 100 mm	0.11 – 15 µm	**Unit Under Test:** Gauge Blocks using UMM_2 **Method Used:** DMD/TP-3
	101 - 300 mm	0.13 – 4.8 µm	**Unit Under Test:** Gauge Blocks using UMM_2 **Method Used:** DMD/TP-3
	0 - 300 mm	0.10 – 25 µm	**Unit Under Test:** Precision Glass / Scale / Slide using UMM_1 **Technique Used:** Direct Measurement
	0 - 80 mm	0.72 – 14 µm	**Unit Under Test:** Dial Indicator / Gauge using UMM_1 **Method Used:** DMD/TP-7
	0 - 300 mm	0.0058 - 0.088 mm	**Unit Under Test:** Digital Vernier /Dial Caliper using Gauge Blocks **Method Used:** DMD/TP-4
	0 - 25.4 mm	0.00060 - 0.0090 mm	**Unit Under Test:** Micrometer using Gauge Blocks **Method Used:** DMD/TP-5
	0 - 25 mm	0.00060 - 0.0067 mm	**Unit Under Test:** Dial Gauge Calibrator/ Dial Testing Machine using Gauge Blocks **Method Used:** Direct Measurement
Diameter External	0.5 mm - 100 mm	0.18 µm - 10 µm	**Unit Under Test:** Cylinders using UMM_2 **Method Used:** Direct Measurement
Diameter Internal	5.0 mm - 100 mm	0.74 µm - 16 µm	**Unit Under Test:** Ring Gauges using UMM_1

			Method Used: DMD/TP-8
Field of measurement: PRESSURE METROLOGY			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
Hydraulic Pressure	10 – 500 psi	0.033 psi	**Reference Standards:** Hydraulic Dead Weight Tester (P– 10/R) **Unit Under Test:** Dead Weight Testers, Hydraulic Gauges and transducers Pressure Indicator **Method Used:** PMD/TPP-29
	501 – 1000 psi	0.034 psi	
	1001 – 5000 psi	0.052 psi	
	5001 – 10000 psi	0.35 psi	
Hydraulic Pressure	200 psi	0.0060 %FS	**Reference Standards:** Electronic Dead Weight Tester (P-19) **Unit Under Test:** Dead Weight Testers, Hydraulic Gauges and transducers Pressure Indicator **Method Used:** PMD/TPP-38
	500 psi		
	1500 psi		
	2000 psi		
Pneumatic Pressure	(-1 – 0) bar	0.00030 bar	**Reference Standards:** Digital Pneumatic Pressure Calibrator (P – 10, P-13) **Unit Under Test:** Pneumatic/ vacuum gauges, pressure calibrator, manometers and transducers **Method Used:** PMD/TPP-24
	(1– 20) bar	0.0035 bar	
Pneumatic Pressure Indicator	(0 – 500) psi	0.34 psi	**Reference Standards:** Digital Pneumatic Pressure Calibrator (P – 10, P-16) **Unit Under Test:** Pneumatic/ vacuum gauges, pressure calibrator, manometers and transducers **Method Used:** PMD/TPP-24
	501 – 10000 psi	0.84 psi	
	-1 – 0 bar	0.00030 bar	
	0 – 2 bar	0.0035 bar	
Atmospheric Pressure	(0.70 – 1.10) bar	0.00016 bar	**Reference Standards:** Reference Barometer (P-12) **Unit Under Test:** Barometers and Manometers **Method Used:** PMD/TPP-30
Field of measurement: THERMAL METROLOGY			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**

Heat Sources **Temperature (Sources)**	-80.00 °C	0.090 °C	**Reference Standards:** (Black Stack Thermometer FLUKE), (Working Standard PRT FLUKE), (R-Type Thermocouple 5649 FLUKE) (Zero Point Dry Well FLUKE) (Dry Block Calibrator (Model: Gemini700LRI) **Unit Under Test:** All types of Heat Sources **Method Used:** TMD/TPP-33
	0.00 °C	0.090 °C	
	100 °C	0.60 °C	
	200 °C	0.60 °C	
	299.3 °C	0.60 °C	
	400.0 °C	0.60 °C	
	500.0 °C	0.60 °C	
	600.0 °C	0.60 °C	
	700.0 °C	0.61 °C	
	1150 °C	0.61 °C	
Liquid-in-glass Thermometer **Temperature (Measure)**	-40 °C	0.10 °C	**Reference Standards:** Ultra Low Temperature Bath (Heart Scientific 7380) Liquid In Glass Thermometer (ASTM) High Precision Thermostatic Bath (Model: PROLABO) Oil Bath (HO-21S) Working Standard PRT (5628) Black Stack Digital Readout (1560) **Unit Under Test:** Liquid –In- Glass Thermometers **Method Used:** TMD/TPP-25
	0 °C	0.10 °C	
	10 °C	0.10 °C	
	30 °C	0.10 °C	
	50 °C	0.10 °C	
	80 °C	0.10 °C	
	100 °C	0.10 °C	
	150 °C	0.12 °C	
	200 °C	0.10 °C	
Thermo-Hygrometer **Temperature / Humidity (Sources)**	20 %RH	2.20 %RH	**Reference Used:** RH Generator (HumiLab) NESLAB RTE Bath/Circulator (USA) Humidity and Temperature Probe OMEGAETTE (USA) Model: HH311 Fluke 971 **Unit Under Test:** All types of Thermo hygrometers **Method Used:** TMD/TPP-32
	30 %RH	2.20 %RH	
	40 %RH	2.70 %RH	
	50 %RH	2.80 %RH	
	60 %RH	2.80 %RH	
	70 %RH	2.80 %RH	
	80 %RH	2.80 %RH	
	18 °C	0.40 °C	
	20 °C	0.40 °C	
	22 °C	0.40 °C	
	24 °C	0.40 °C	
	26 °C	0.40 °C	
	28 °C	0.40 °C	
Platinum Resistance Thermometer (PRT) **Temperature (Measure)**	-80 °C	0.0060 °C	**Reference Used:** Working Standard PRT (5628) Black Stack Digital Readout (1560) Dry Block Calibrator ISOTECH GIMNI 700LRI Ultra-Low Temperature Bath (7380) **Unit Under Test:** All types of PRT/RTD **Method Used:** MD/TPP-31
	0 °C	0.0040 °C	
	100 °C	0.0060 °C	
	200 °C	0.0070 °C	
	300 °C	0.0090 °C	
	400 °C	0.0090 °C	
	500 °C	0.014 °C	
	600 °C	0.014 °C	
Thermocouple **Temperature (Sources)**	-40 °C	0.60 °C	**Reference Used:** Dry Block Calibrator (Model: Gemini700LRI) Ultra-Low Temperature Bath (Model:7380 USA), E-Type Thermocouple (Serial#:2H19 Japan)
	0 °C	0.60 °C	

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	200 °C	0.60 °C	Black Stack Digital Readout (Serial#: A8B906, Fluke USA) R-Type Thermocouple (Serial #: 2J13 Japan) Furnace (9112B, Fluke USA) Temperature/Pressure Calibrator (Model#: 525BFluke USA), Working Standard PRT (Model #: 5628) Digital Thermometer (YEW 2575) Digital Thermometer (YEW 2572), R-Type Thermocouple Serial#:4996), Muffle Furnace (Model#:KE-6HK1200-3) Zero Point Dry Well (Model#:9101) S-Type Thermocouple (Model#:5650) **Unit Under Test:** S-Type Thermocouple R-Type Thermocouple K-Type Thermocouple **Method Used:** TMD/TPP-26
	400 °C	0.60 °C	
	600 °C	0.60 °C	
	800 °C	0.60 °C	
	1000 °C	0.61 °C	
	1100 °C	0.61 °C	

Field of measurement: TIME AND FREQUENCY METROLOGY

Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
Frequency (Source)	10 Hz - 500 Hz @ 0 dBm	2.9E-03	**Reference Standards:** Cesium Frequency Standard 571A Precision Test System RFS10Rb Frequency Standard Marconi Instrument, AM/FM signal Generator 2024 (Source) SMF100 Signal Generator **Unit Under Test:** Agilent Universal Frequency Counter/Timer 53230A(Measure) Microwave Frequency Counter 53152A **Method Used:** Direct Frequency Comparison (T&FMD/TPP-01)
	501 Hz - 10 kHz @ 0 dBm	2.9E-03 to 1.2E-05	
	11 KHz - 500 kHz @ 0 dBm	1.2E-05	
	501 kHz - 1 MHz @ 0 dBm	1. 2E-05 to 1.3E-08	
	2 MHz - 100 MHz @ 0dBm	1.3E-08 to 1.0E-07	
	101 MHz - 500 MHz @ 0 dBm	1.0E-07 to 4.3E-07	
	501 MHz - 1 GHz@ 0 dBm	4.3E-07 to 1.7E-10	
	1.1 GHz - 10 GHz @ 0 dBm	1.7E-10 to 1.4E-09	
	11 GHz - 20 GHz @ 0 dBm	1.4E-09 to 2.0E-09	
	21 GHz - 30 GHz @ 0 dBm	2.0E-09 to 3.0E-09	
	31 GHz - 40 GHz @ 0 dBm	3.0E-09 to 1.4E-07	
	Time base 10 MHz	4.9E-07	
Frequency (Measure)	10 Hz to 500 Hz @ 0 dBm	1.2E-02	**Reference Standards:** Cesium Frequency Standard 5071A Agilent Universal Frequency Counter/Timer 53230A(Measure) Microwave Frequency Counter 53152A
	501 Hz to10kHz @ 0 dBm	1.2E-02 to 1.2E-05	
	11 KHz to 500 kHz	1.2E-05 to 8.0E-05	

	@ 0 dBm		**Unit Under Test:** Marconi Instrument, AM/FM signal Generator 2024 (Source) SMF100 Signal Generator **Method Used:** Direct Frequency Comparison with Frequency Counter (T&FMD/TPP-04)
	501 kHz to 1 MHz @ 0 dBm	8.0E-05 to 1.2E-08	
	2 MHz to 100 MHz @ 0 dBm	1.2E-08 to4.1E-07	
	101 MHz to 500 MHz @ 0 dBm	4.1E-07 to1.7E-08	
	501 MHz to 1 GHz @ 0 dBm	1.7E-08 to2.9E-10	
	1.1 GHz to 10 GHz @ 0 dBm	2.9E-10 to1.4E-09	
	11 GHz to 20 GHz @ 0 dBm	1.4E-09 to 2.6E-09	
	21 GHz to 30 GHz @ 0 dBm	2.6E-09 to2.4E-09	
	31 GHz to 40 GHz @ 0 dBm	2.4E-09 to2.4E-07	
	Time base 10 MHz	1.7E-08	
Time Interval Measure	1s to 60s (1min)	4.80E-01	**Reference Standards:** Cesium Frequency Standard 5071A Precision Test Systems GPS10RBN **Unit Under Test:** Casio, HS-60W-IDF, Q&Q Digital Stopwatch **Method Used:** Direct Frequency Comparison Method (T&FMD/TPP-02)
	1s to 1800s (1/2 hr)		
	1s to 3600s (1hrs)		
	1s to 7200s (2 hrs)		

Field of measurement: ELECTRICAL METROLOGY

A. (Measure Mode Scope)

Measured quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
DC Voltage	0 - 100 mV	0.00085 mV	**Reference Standards:** 3458-Agilent, 34401 – Agilent, 8508 - A, Fluke, Digital multi-meters High voltage divider DVR 150 **Unit Under Test:** Fluke-5720-a, 9100-Wavetek, Multifunction Calibrator, High voltage source) **Method Used:** EMD/TPP-09
	100.00001 mV - 1 V	0.0000042 V	
	1.000001 - 10 V	0.000037 V	
	10.00001 - 100 V	0.00056 V	
	100.0001 - 1000 V	0.0056 V	
	1000.001 V - 150 kV	0.50 %	
DC Current	0 - 100 µA	0.0019 µA	**Reference Standard:** 3458-Agilent, 34401 – Agilent, 8508 - A, Fluke, Digital Multi-meters, Clamp meter Radian TX-21 **Unit Under Test:** Fluke-5720-A, 9100-Wavetek Multifunction Calibrator (Source) **Method Used:** EMD/TPP-09
	100.0001 µA - 1 mA	0.000015 mA	
	1.000001 - 10 mA	0.00015 mA	
	10.00001 - 100 mA	0.0019 mA	
	100.01 mA - 3 A	0.000020 A	
	3.00001 - 20 A	0.00024 A	
	20.00001 - 2000 A	1.50 %	

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AC Voltage	0 - 10 mV, at 50Hz to 300 Hz	0.0039 mV	**Reference Standard:** 3458-Agilent, 34401 – Agilent, 8508 - A, Fluke, Digital Multi-meters (Measure) High Voltage Divider **Unit Under Test:** Fluke-5720-A, 9100-Wavetek Multifunction Calibrator (Source), High Voltage Source **Method Used:** EMD/TPP-09
	10.0001 - 100 mV, at 50Hz to 300 Hz	0.00039 mV	
	100.00001 mV - 1 V, at 50 to 500 Hz	0.00021 V	
	1.00001 - 10 V, at 50 Hz to 10 kHz	0.0038 V	
	10.00001 - 100 V, at 50 Hz to 10 kHz	0.018 V	
	100.0001 - 1000 V, at 50 Hz to 10 kHz	0.028 V	
	1kV to 150kV, at 50Hz to 1kHz	0.50 %	
AC Current	0 - 100 µA, at 10 Hz to 1 kHz	0.012 µA	**Reference Standard:** 3458-Agilent, 34401 – Agilent, 8508 - A, Fluke, Digital Multi-meters (Measure), Clamp meter **Unit Under Test:** Fluke-5720-a, 9100-Wavetwk Multifunction Calibrator (Source) **Method Used:** EMD/TPP-09
	100.001 µA - 10 mA, at 10 Hz to 1 kHz	0.0013 mA	
	10.0001 - 100 mA, at 10 Hz to 1 kHz	0.013 mA	
	100.001 mA - 3 A, at 10 Hz to 1 kHz	0.00013 A	
	3.00001 - 20 A, at 10 Hz to 1 kHz	0.0063 A	
	20.00001 - 2000 A, at 50 Hz to 1 kHz	1.50 %	
Resistance	0 - 10 Ω	0.00017 Ω	**Reference Standard:** 3458-Agilent, 34401 – Agilent, 8508 - A, Fluke, Digital Multi-meters (Measure) **Unit Under Test:** Fluke-5720-A, 9100-Wavetek Multifunction Calibrator (Source) **Method Used:** EMD/TPP-09 EMD/TPP-11 EMD/TPP-12
	10.00001 - 100 Ω	0.0014 Ω	
	100.0001 Ω - 1 kΩ	0.0000077 kΩ	
	1.0000001 - 100 kΩ	0.00069 kΩ	
	100.00001 KΩ - 1 MΩ	0.000010 MΩ	
	1.00001 - 100 MΩ	0.014 MΩ	
	100.001 MΩ - 2 GΩ	0.00026 GΩ	
	2.00001 - 20 GΩ	0.0024 GΩ	
Capacitance	0.00 - 10 pF	0.0030 pF	**Reference Standard:** PM-6306 Fluke, Reference Digital Capacitance Meter (Measure) **Unit Under Test:** 9100-Wavetek, Universal Calibration System (Sources) **Method Used:** EMD/TPP-14
	10.001 - 1000 pF	3.16 pF	
	1 nF	0.0010 nF	
	1.001 nF - 1000 nF	2.89 nF	
	1 µF	0.00010 µF	
	1.0001 - 1000 µF	0.058 µF	
Inductance	100 µH	0.05 µH	**Reference Standard:** Fixed value working standard Inductors (source) **Unit Under Test:** Digital inductance/ LCR meter pm-6304 fluke, (measure) **Method Used:** EMD/TPP-14
	1 mH	0.0058 mH	
	10 mH	0.0058 mH	
	100 mH	0.0080 mH	
	1 H	0.00010 H	

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AC Power	50 mW – 2.7 kW (Direct) Up to 96 MW (with Sensors)	0.13 mW to 0.0067 kW 9.0 mW (with Sensors)	**Reference Standard:** Three Phase Power Network Tester/ Analyzer (TE30) Portable Transformer Analyzer (TX-21) Three Phase 4 Channel Power Analyzer (PA2203A) Three Phase Reference Standard (MT3000) **Unit Under Test:** Electrical Power Standard (6105A), Three Phase Current & Voltage Source (MT551) Reference Standard Universal Calibration System **(Source)** **Method Used:** EMD/TPP-16
Field of measurement: ELECTRICAL METROLOGY **B. (Source Generation Scope)**			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
DC Voltage	1.018 V	0.20 µV	**Reference Standard:** Fluke – 732-B, Reference DC Voltage Standard (Source) **Unit Under Test:** 3458-Agilent Reference, 8508 - A, Fluke, Digital Multi-meter (Measure) **Method Used:** EMD/TPP-10
	10 V	0.40 µV	
	220 mV	0.0021 mV	**Reference Standard:** Fluke – 5720-A Multifunction Calibrator (Source) **Unit Under Test:** All Types OF Digital / Analog Multi-meter 3458-AGILENT, 8508-A, Fluke, 45-Fluke, ETC (Measure) **Method Used:** EMD/TPP-10
	2.2 V	0.000012 V	
	11 V	0.000041 V	
	22 V	0.000081 V	
	220 V	0.0011 V	
	1100 V	0.0076 V	
DC Current	220 µA	0.15 µA	**Reference Standard:** Fluke – 5720-A Multifunction Calibrator-9100 Source) **Unit Under Test:** All Types OF Digital / Analog Multi-meters 3458-Agilent, 8508- A, Fluke, 45-Fluke, Clamp meter, etc. (Measure) **Method Used:** EMD/TPP-10
	1.2 mA	0.000084 mA	
	22 mA	0.00081 mA	
	220 mA	0.011 mA	
	2.2 A	0.00019 A	
AC Voltage	20 A, 1000 A (via current coil)	0.0041 A 0.0044 A	**Reference Standard:** Fluke – 5720- A Multifunction Calibrator
	2.2 mV, at 10 Hz to 100	0.026 mV	

	kHz		(Source) **Unit Under Test:** All Types OF Digital / Analog Multi- meters 3458 -Agilent, 8508- A, Fluke, 45-Fluke, etc. (Measure) **Method Used:** EMD/TPP-10 EMD/TPP-08
	22 mV, at 10 Hz to 100 kHz	0.079 mV	
	220 mV, at 10 Hz to 100 kHz	0.64 mV	
	2.2 V, at 10 Hz to 100 kHz	0.0040 V	
	22 V, at 10 Hz to 100 kHz	0.036 V	
	220 V, at 10 Hz to 100 kHz	0.057 V	
	750 V, at 40 Hz to 10 kHz	0.46 V	
	1100 V, at 40 Hz to 10 kHz	0.67 V	
AC Current	220 µA, at 10 Hz to 10 kHz	0.31 µA	**Reference Standard:** Fluke – 5720-A Multifunction Calibrator - 9100 (Source) **Unit Under Test:** All Types of Digital / Analog Multi-meter i.e 3458-Agilent, 8508-A, Fluke, 45-Fluke, clamp meters etc. (Measure) **Method Used:** EMD/TPP-10
	2.2 mA, at 10 Hz to 10 kHz	0.0031 mA	
	22 mA, at 10 Hz to 10 kHz	0.029 mA	
	220 mA, at 10 Hz to 10 kHz	0.25 mA	
	2.2 A, at 20 Hz to 10 kHz	0.016 A	
	20 A, at 40 Hz to 10 kHz 1000 A, at 40 Hz to 1 kHz (via current coil)	0.040 A	
Resistance	1 Ω	0.000095 Ω	**Reference Standard:** Fluke – 5720-A Multifunction Calibrator (Source) **Unit Under Test:** All Types OF Digital / Analog Multi-meter i. e. 3458-Agilent, 8508-A, Fluke, 45-Fluke, etc. (Measure) **Method Used:** EMD/TPP-10 EMD/TPP-11 EMD/TPP-12
	10 Ω	0.000023 Ω	
	100 Ω	0.000010 Ω	
	1 kΩ	0.0000090 kΩ	
	10 kΩ	0.0000090 kΩ	
	100 kΩ	0.000010 Ω	
	1 MΩ	0.000020 MΩ	
	10 MΩ	0.00005 MΩ	
	100 MΩ	0.00010 MΩ	
	1 TΩ	0.000030 MΩ	
Resistance	0.0001 Ω	60 µΩ	**Reference Standard:** Hi-Accuracy Working Standard 4-Terminal Standard Resistors 20-E/D to 28-E/D, H&B Germany (Source) **Unit Under Test:** 34420-Agilent Digital µΩ Meter (Measure) **Method Used:** EMD/TPP-11 EMD/TPP-12
	10 kΩ	0.0080 Ω	
Capacitance	0.1 µF	0.00050 µF	**Reference Standard:** Fixed Value Working Standard Capacitors (Source) **Unit Under Test:** Digital Capacitance/ LCR Meter PM-6304 Fluke, (Measure)
	1 µF	0.00050 µF	

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			Method Used: EMD/TPP-13
	4 µF	0.050 % + 3.0 pF	**Reference Standard:** 9100-Wavetek, Universal Calibration system (Source) **Unit Under Test:** Digital Capacitance Meter LCR Meter, (Measure) **Method Used:** EMD/TPP-13
	40 µF	0.050 %	
	400 µF	0.050 %	
	4 mF	0.050 %	
DC Power	1 W – 500 kW	0.10 W to 0.16 kW	**Reference Standard:** 9100-Wavetek, Universal Calibration system (Source) **Unit Under Test:** Power Analyzer / Wattmeter (Measure) **Method Used:** EMD/TPP-17
AC Power	1 W – 500 kW, at 50 Hz – 1 kHz	0.10 W to 0.16 kW	**Reference Standard:** Universal Calibration System 9100-Wavetek (Source) **Unit Under Test:** Power Analyzer (Measure) **Method Used:** EMD/TPP-17
Inductance	100 µH	0.0080 µH	**Reference Standard:** Fixed Value Working Standard Inductors (Source) **Unit Under Test:** Digital Inductance/ LCR Meter PM-6304 Fluke, (Measure) **Method Used:** EMD/TPP-14
	1 mH	0.0060 mH	
	10 mH	0.0060 mH	
	100 mH	0.0060 mH	
	1 H	0.0060 H	

Field of measurement: CHEMICAL METROLOGY

Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
Calibration of Conductivity meter	1413 µmhos /cm	5.2 µmhos /cm	**Reference Standard:** NIST Traceable Conductivity standard solution **Method Used:** APHA, AWWA, WEF, USA, 2510B
Calibration of pH meter	0 -14	0.020	**Reference Standard:** NIST Traceable pH buffers **Method Used:** APHA, AWWA, WEF, USA, 2510B Standard Buffer solutions / Two - point calibration method

10-02-2025
Date

Sd
Director

Calibration Laboratory.

Onsite Accreditation Scope of

NATIONAL PHYSICAL & STANDATRDS LABORATORY
PLOT NO.16, SECTOR H-9/1, ISLAMABAD, PAKISTAN.

Mobile laboratory (Onsite Calibration) X

Field of measurement: MASS METROLOGY			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
Balance/ Weighing machine	Up to 500 g	0.010 to 0.10 mg (depends upon readability/resolution of unit under-test)	E2 class standard masses (1 mg to 5000 g) **Method Used:** MMD/TPP-21/04
	500 g to 5000 g	0.10 to 1.0 mg (depends upon readability/resolution of unit under-test)	
Field of measurement: THERMAL METROLOGY			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**
Calibration of Thermocouples	Ambient to 650 °C	1.0 °C to 1.5 °C	Dry block Temperature Calibrator, Digital Readout, Reference Thermometers, Zero-point Dry Well **Method Used:** TMD/TPP-26
Calibration of PRT/SPRT	Ambient to 650 °C	0.15 °C to 0.50 °C	Reference Thermometers, Digital Readout, zero point Dry Well, Dry block Temperature Calibrator **Method Used:** TMD/TPP-31
Calibration of Low Temperature Bath/ Heat Sources (Oven, Incubator, Dry Block, Furnace)	-80 °C to1400 °C	0.10 °C to 0.50 °C	PRT, S & R Type Thermometer **Method Used:** TMD/TPP-34
Calibration of Thermo Hygrometers	20 %RH to 80 %RH	1.4 % RH to 1.9 %RH	RH Generator Humi-Lab. Humidity and Temperature Probe (OMEGAETTE, USA; Model: HH311) **Method Used:** TMD/TPP-32
Field of measurement: ELECTRICAL METROLOGY			
Measured quantity	**Range**	***Expanded Uncertainty (±)**	**Technique, Reference Standard, Equipment**

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DC Voltage	100 mV	0.00085 mV	**Reference Standard:** Digital multi-meters High voltage divider DVR 150 **Unit under test:** Multifunction Calibrator, High voltage source
	100.00001 mV - 1 V	0.0000042 V	
	1.000001 - 10 V	0.000037 V	
	10.00001 - 100 V	0.00056 V	
	100.0001 - 1000 V	0.0056 V	
	1 kV – 150 kV	0.50 %	
AC Voltage	100 mV – 1000 V at 50 Hz to 10 kHz	0.0039 mV - 0.028 V	
	1kV - 150kV at 50Hz to 1kHz	0.50 %	
DC Current	1 mA – 20 A	0.00015 mA – 0.00025A	**Reference Standard**: 3458-Agilent, 34401- Agilent, 8508- A, Fluke, Digital Multi-meters, Clamp meter Radian TX-21 **Unit under test:** Multifunction Calibrator High Current Source
	20 A – 2000 A	1.50 %	
AC Current	1 mA to 20 A, at 10 Hz to 1 kHz	0.0013 mA	
	20 A – 2000 A, at 50 Hz to 10 kHz	1.50 %	
Resistance	1 Ω - 2 GΩ	0.00017 Ω - 0.00026 GΩ	**Reference Standard**: Digital multi-meters **Unit Under Test:** Resistance Calibrator Fixed / Decade Resistance Box
	2 GΩ - 20 GΩ	0.0026 GΩ	
Capacitance	1 nF – 1000 µF	0.0010 nF – 0.058 µF	**Reference Standard:** PM-6306 Fluke **Unit Under Test:** Decade / Fixed Capacitance Standards
Inductance	100 µH – 1 H	0.050 µH – 0.0061 H	**Reference Standard:** PM-6306 Fluke, **Unit under test:** Digital / Fixed / Decade Inductance

* **Expanded Uncertainty:**

- Expanded Uncertainty is the measurement uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of k = 2. This measurement uncertainty is a value for which the laboratory has been accredited using the procedure that was the subject of assessment. In certificates issued under its accreditation scope an accredited laboratory is not permitted to quote an uncertainty that is smaller than the published uncertainty for respective ranges as given above.

10-02-2025
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