

	ACCREDITATION DOCUMENT	F-06/02 Issue Date: 10/08/15 Rev. No: 07 LAB 001
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Accreditation No: LAB 001

Awarded to

**NATIONAL PHYSICAL & STANDARDS LABORATORY.
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 17025:2005**.

The accreditation requires regular surveillance, and is valid until **11-02-2022**.

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

11-11-2019
Date

Director General



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(A) TESTING LABORATORY

Permanent laboratory premises (Testing Scope)

Chemical Metrology AAS / PCS / Viscosity (Water / Wastewater/ Industrial Effluents/ Solutions/ Liquids /Fluids)			
Materials/ Products Tested	Testing Field (e.g. environmental testing or mechanical testing)	Types of Tests/ properties measured	Reference to Standardized method (e.g. ISO 14577-1:2003)/ Internal method Reference
Water/ Wastewater/ Industrial Effluents	Environmental testing	Measurement of Electrical Conductivity	2510-B, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
		Total Dissolved Solids (TDS)	2540-B, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
		Total Suspended Solids (TSS)	2540-B, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
		Total Hardness	2340-B, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
		Alkalinity	2320-B, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
		Chloride	4500-C, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
		Calcium	3500-Ca, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
		Chemical Oxygen Demand (COD)	5220-B, Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, AWWA/APHA
Water/ Wastewater/ Industrial Effluents/ Solutions/ Liquids	Chemical and Environmental testing	Copper (Cu)	Standard Methods for the Examination of Water and Waste water, 22 nd edition, 2012, APHA, AWWA, WEF / Atomic Absorption Spectrometer, A Analyst -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)			

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		Nickel (Ni)	
		Manganese (Mn)	
		Cobalt (Co)	
Liquids / Fluids	Petroleum	Kinematic Viscosity	ASTM D 445-09

(B) CALIBRATION LABORATORY

Permanent laboratory premises

(i-a) Field of measurement: ELECTRICAL MEASUREMENTS(Measure Mode Scope)				
Measured Quantity	RANGE	Calibration & Measurement Capability Expressed as An Uncertainty (\pm)	Brief description of measurement & equipment used	
			Equipment used	Method used
DC VOLTAGE	100 mV	0.00085 mV	1. Reference Standard 3458-Agilent, 34401 – Agilent, 8508- A, Fluke, Digital multi-meters High voltage divider DVR 150 2. Unit under test Fluke-5720-a, 9100-Wavetek, Multifunction Calibrator, High voltage source)	EMD/TPP-08 EMD/TPP-10
	1 V	0.000042 V		
	10 V	0.000037 V		
	100 V	0.00056 V		
	1000 V 150kV	0.0056 V 0.5%		
DC CURRENT	100 μ A	0.0019 μ A	1. Reference Standard 3458-Agilent, 34401 – Agilent, 8508- A, Fluke, Digital Multi-meters, Clamp meter Radian TX-21 2. Unit under test Fluke-5720-A, 9100-Wavetek Multifunction Calibrator (Source)	EMD/TPP-09 EMD/TPP-10
	1 mA	0.000015 mA		
	10 mA	0.00015 mA		
	100 mA	0.0019 mA		
	3 A	0.00002 A		
	20 A 2000A	0.00024 A 1.5%		
AC VOLTAGE	10 mV, at 50Hz to 300Hz	0.00386 mV	1. Reference Standard 3458-Agilent, 34401 – Agilent, 8508- A,	EMD/TPP-08 EMD/TPP-10
	100 mV, at 50Hz to 300Hz	0.00039 mV		
	1 V, at 50 to 500Hz	0.00021 V		

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	10 V, at 50 Hz to 10kHz	0.00381 V	Fluke, Digital Multi-meters (Measure) High Voltage Divider 2. Unit Under Test Fluke-5720-A, 9100- Wavetek Multifunction Calibrator (Source), High Voltage Source	
	100 V, at 50 Hz to 10kHz	0.0175 V		
	1000 V, at 50 Hz to 10kHz	0.028 V		
	1kV to 150kV, at 50Hz to 1kHz	0.5%		
AC CURRENT	100 μ A, at 10 Hz to 1kHz	0.012 μ A	1 Reference Standard 3458-Agilent, 34401 – Agilent, 8508- A, Fluke, Digital Multi-meters (Measure), Clamp meter 2. Unit Under Test Fluke-5720-a, 9100- Wavetwk Multifunction Calibrator (Source)	EMD/TPP-09 EMD/TPP-10
	10 mA, at 10 Hz to 1kHz	0.0013 mA		
	100 mA, at 10 Hz to 1kHz	0.013 mA		
	3 A, at 10 Hz to 1kHz	0.00013 A		
	20 A, at 10 Hz to 1kHz	0.00634 A		
	2000 A, at 50Hz to 1kHz	1.5%		
RESISTANCE	10 Ω	0.00017 Ω	1 Reference Standard 3458-Agilent, 34401 – Agilent, 8508- A, Fluke, Digital Multi-meters (Measure) 2. Unit Under Test Fluke-5720-A, 9100- Wavetek Multifunction Calibrator (Source)	EMD/TPP-10 EMD/TPP-11 EMD/TPP-12
	100 Ω	0.0014 Ω		
	1 k Ω	0.0000077 k Ω		
	100 k Ω	0.00069 k Ω		
	1 M Ω	0.00001 M Ω		
	100 M Ω	0.014 M Ω		
	2G Ω	0.00026G Ω		
	20G Ω	0.0024G Ω		
CAPACITANCE	10 pF	0.003 pF	1 Reference Standard PM-6306 Fluke ,Reference Digital Capacitance Meter (Measure) 2. Unit Under Test 9100-Wavetek, Universal Calibration System (Sources)	EMD/TPP-14
	1000 pF	3.16 pF		
	1 nF	0.001nF		
	1000 nF	2.89 nF		
	1 μ F	0.0001 μ F		
	1000 μ F	0.058 μ F		
INDUCTANCE	100 μ H	0.05 μ H	1. Fixed value working standard Inductors (source) 2. Unit under test Digital inductance/ LCR meter pm-6304 fluke, (measure)	EMD/TPP-15
	1 mH	0.0058 mH		
	10 mH	0.0058 mH		
	100 mH	0.008 mH		
	1 H	0.0001 H		

(i-b) ELECTRICAL MEASUREMENTS (Source/Generation Scope):

Measured Quantity	Range	Calibration & measurement capability expressed as an uncertainty (\pm)	Brief description of measurement & equipment used	
			Equipment used	Method used
DC VOLTAGE	1.018 V	0.2 μ V	1. Reference Standard Fluke – 732-B, Reference DC Voltage Standard (Source) 2. Unit Under Test	EMD/TPP-10
	10 V	0.4 μ V		

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			3458-Agilent Reference, 8508- A, Fluke, Digital Multi-meter (Measure)	
	220mV	0.00205 mV	3. Reference Standard Fluke – 5720-A Multifunction Calibrator (Source) 4. Unit Under Test All Types OF Digital / Analog Multi-meter 3458-AGILENT, 8508-A, Fluke, 45-Fluke, ETC (Measure)	EMD/TPP-10 EMD/TPP-08
	2.2 V	0.0000117 V		
	11 V	0.000041 V		
	22 V	0.000081 V		
	220 V	0.00114 V		
1100 V	0.00755 V			
DC CURRENT	220 μ A	0.148 μ A	1. Reference Standard Reference Standard, Fluke – 5720-A Multifunction Calibrator-9100 Source) 2. Unit Under Test All Types OF Digital / Analog Multi-meters 3458-Agilent, 8508- A, Fluke, 45-Fluke, Clamp meter,etc (Measure)	EMD/TPP-10 EMD/TPP-09
	2.2 mA	0.000084 mA		
	22 mA	0.000811 mA		
	220 mA	0.0106 mA		
	2.2 A	0.000188 A		
	20 A, 1000 A (via current coil)	0.00408 A 0.00444 A		
AC VOLTAGE	2.2mV, at 10 Hz to 100kHz	0.02594 mV	1. Reference Standard Reference Standard, Fluke – 5720-A Multifunction Calibrator (Source) 2. Unit Under Test All Types OF Digital / Analog Multi-meters 3458-Agilent, 8508- A, Fluke, 45-Fluke, etc. (Measure)	EMD/TPP-10 EMD/TPP-08
	22 mV, at 10 Hz to 100kHz	0.0794 mV		
	220 mV, at 10 Hz to 100kHz	0.639 mV		
	2.2 V, at 10 Hz to 100kHz	0.00404 V		
	22 V, at 10 Hz to 100kHz	0.0362V		
	220 V, at 10 Hz to 100kHz	0.0568V		
	750 V, at 40 Hz to 10 kHz	0.461V		
	1100 V, at 40 Hz to 10 kHz	0.671V		
AC CURRENT	220 μ A, at 10 Hz to 10 kHz	0.307 μ A	1 Reference Standard Fluke – 5720-A Multifunction Calibrator - 9100 (Source) 2. Unit Under Test All Types of Digital / Analog Multi-meter i.e 3458-Agilent, 8508-A, Fluke, 45-Fluke, clamp meters etc (Measure)	EMD/TPP-10 EMD/TPP-09
	2.2 mA, at 10 Hz to 10 kHz	0.00307 mA		
	22 mA, at 10 Hz to 10 kHz	0.0292 mA		
	220 mA, at 10 Hz to 10 kHz	0.252 mA		
	2.2 A, at 20 Hz to 10 kHz	0.01556 A		
	20 A, at 40 Hz to 10 kHz 1000 A, at 40Hz to 1kHz (via current coil)	0.04035 A		
RESISTANCE	1 Ω	0.000095 Ω	1 Reference Standard Fluke – 5720-A Multifunction Calibrator (Source) 2. Unit Under Test All Types OF Digital / Analog Multi-meter i.e 3458-Agilent, 8508-A, Fluke, 45-Fluke, etc (Measure)	EMD/TPP-10 EMD/TPP-11
	10 Ω	0.000023 Ω		
	100 Ω	0.00001 Ω		
	1 k Ω	0.000009 k Ω		
	10 k Ω	0.000009 k Ω		
	100 k Ω	0.00001 Ω		
	1 M Ω	0.00002 M Ω		
	10 M Ω	0.00005 M Ω		
100 M Ω	0.0001M Ω			

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RESISTANCE	0.0001 Ω	60 $\mu\Omega$	1. Hi-Accuracy Working Standard 4-Terminal Standard Resistors 20-E/D to 28-E/D, H&B Germany (Source) 2. Unit Under Test 34420-Agilent Digital $\mu\Omega$ Meter (Measure)	EMD/TPP-12
	10 k Ω	0.008 Ω		
CAPACITANCE	0.1 μF	0.0005 μF	1. Fixed Value Working Standard Capacitors (Source) 2. Unit Under Test Digital Capacitance/ LCR Meter PM-6304 Fluke, (Measure)	EMD/TPP-13
	1 μF	0.0005 μF		
	4 μF	0.05 % + 3 pF	1. Reference Standard 9100-Wavetek, Universal Calibration system (Source) 2. Unit Under Test Digital Capacitance Meter LCR Meter, (Measure)	EMD/TPP-13
	40 μF	0.05 %		
	400 μF	0.05 %		
	4 mF	0.05 %		
40 mF	0.1 %			
DC POWER	1W - 500kW	0.1W to 0.155 kW	1. Reference Standard 9100-Wavetek, Universal Calibration system (Source) 2. Unit Under Test Power Analyzer / Wattmeter (Measure)	EMD/TPP-14
AC POWER	1W - 500kW, at 50Hz – 1kHz	0.1W to 0.155 kW	1. Reference Standard Universal Calibration System 9100-Wavetek (Source) 2. Unit Under Test Power Analyzer (Measure)	EMD/TPP-14
INDUCTANCE	100 μH	0.008 μH	1. Fixed Value Working standard Inductors (Source) 2. Unit Under Test Digital Inductance/ LCR Meter PM-6304 Fluke, (Measure)	EMD/TPP-15
	1 mH	0.006 mH		
	10 mH	0.006 mH		
	100 mH	0.006 mH		
	1 H	0.006 H		

(ii) Field of Measurement: Time & Frequency Measurements

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Measured Quantity	Range	Calibration & Measurement Capability (CMC) expressed as an uncertainty (Expanded) (±)	Brief description of measurement and equipment used	
			Equipment Used	Method Used
Frequency (Source)	10-MHz	2.56E-09 MHZ	Reference Standards: a) Cesium Frequency Standard 5071A b) Agilent Universal Frequency Counter/Timer 53230A(Measure) Unit Under Test: Precision Test Systems RfFS10,Rb.Frequency Standard (Source)	Direct Frequency Comparison with Frequency counter (T&FMD/TPP -03)
Frequency (Measure)	10 Hz to 500 Hz @ 0dBm	2.91E-03	Reference Standards: c) Cesium Frequency Standard 571A a) Marconi Instrument, AM/FM signal Generator 2024 (Source) b) SMF100 Signal Generator Unit Under Test: a) Agilent Universal Frequency Counter/Timer 53230A(Measure) b) Microwave Frequency Counter 53152A	Direct Frequency Comparison (T&FMD/TPP -01)
	500 Hz to 10kHz @ 0dBm	2.91E-03 to 1.15E-05		
	10 KHz to 500 kHz @ 0dBm	1.15E-05		
	500 kHz to 1 MHz @ 0dBm	1.15 -05 to 1.33E-08		
	1 MHz to 100 MHz @ 0dBm	1.33E-08 to 1.02E-07		
	100 MHz to 500 MHz @ 0dBm	1.02E-07 to 4.28E-07		
	500 MHz to 1 GHz @ 0dBm	4.28E-07 to 1.73E-10		
	1 GHz to 10 GHz @ 0dBm	1.73E-10 to 1.42E-09		
	10 GHz to 20 GHz @ 0dBm	1.42E-09 to 1.98E-09		
	20 GHz to 30 GHz @ 0dBm	1.98E-09 to 3.04E-09		
	30 GHz to 40 GHz @ 0dBm	3.04E-09 to 1.38E-07		
Time base 10 MHz	4.90E-07			
Frequency (Measure)	10 Hz to 500 Hz @ 0dBm	1.15E-02	Reference Standards: d) Cesium Frequency Standard 5071A c) Agilent Universal Frequency Counter/Timer 53230A(Measure) d) Microwave Frequency Counter 53152A Unit Under Test: Marconi Instrument, AM/FM signal Generator 2024 (Source) a) SMF100 Signal Generator	Direct Frequency Comparison with Frequency Counter (T&FMD/TPP -04)
	500 Hz to 10kHz @ 0dBm	1.15E-02 to 1.15E-05		
	10 KHz to 500 kHz @ 0dBm	1.15E-05 to 8.00E-05		
	500 kHz to 1 MHz @ 0dBm	8.00E-05 to 1.16E-08		
	1 MHz to 100 MHz @ 0dBm	1.16E-08 to 4.13E-07		
	100 MHz to 500 MHz @ 0dBm	4.13E-07 to 1.73E-08		
	500 MHz to 1 GHz @ 0dBm	.73E-08 to 2.91E-10		
	1 GHz to 10 GHz @ 0dBm	2.91E-10 to 1.42E-09		
	10 GHz to 20 GHz @ 0dBm	1.42E-09 to 2.61E-09		
	20 GHz to 30 GHz @ 0dBm	2.61E-09 to 2.42E-09		
	30 GHz to 40 GHz @ 0dBm	2.42E-09 to 2.39E-07		
Time base 10 MHz	1.65E-08			
Time (Measure)	01s to 2-hrs.	2.60E-01s	Reference Standards: e) Cesium Frequency Standard 5071A	Direct Comparison Method (T&FMD/TPP -02)

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			a) Precision Test Systems GPS10RBN Unit Under Test: a) Casio, HS-60W-IDF, Q&Q Digital Stopwatch.	
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(iii) Field of measurement: Pressure Metrology

MEASURED QUANTITY	RANGE	Calibration & Measurement Capability Expressed As An Uncertainty (\pm)	BRIEF DESCRIPTION OF MEASUREMENT & EQUIPMENT USED	
			EQUIPMENT USED	METHOD USED
Hydraulic Pressure (0.1 – 1100) bar	(0.1 – 35) bar	0.060 bar	Hydraulic Dead Weight Tester (P- 01) is used to calibrate Dead Weight Testers, Hydraulic Gauges and transducers. Its measurement is traceable via NML, SIRIM.	Direct Comparison
	(36 – 500) bar	0.220 bar		
	(501 – 1100) bar	0.276 bar		
Hydraulic Pressure (10 – 18000) psi	(10 – 1000) psi	1.35 psi	Hydraulic Dead Weight Tester (P- 09) is used to calibrate Dead Weight Testers, Hydraulic Gauges and transducers. Its measurement is traceable via NML, SIRIM.	Direct Comparison
	(1001 – 5000) psi	2.29 psi		
	(5001 – 10000) psi	3.70 psi		
	(10001 – 18000) psi	4.50 psi		
Pneumatic Pressure (-1 – 20) bar	(-1 – 0) bar	0.007 bar	Pneumatic Pressure Calibrator (P – 10) is used to calibrate Pneumatic/ vacuum gauges, pressure calibrator, manometers and transducers. . Its measurement is traceable via NVLAP, USA.	Direct Comparison
	(0– 10) bar	0.062 bar		
	(11 – 20) bar	0.039 bar		
Atmospheric Pressure (0.70 – 1.10) bar	(0.70 – 1.10) bar	0.00016 bar	RPM4 Reference Barometer (P-12) is used to calibrate Barometers and Manometers. Its measurement is traceable via aZLa Fluke USA.	Direct Comparison

(iv) Field of measurement: CONDUCTIVITY MEASUREMENTS

Measured quantity	Range	Calibration & Measurement Capability (CMC) expressed as an uncertainty(\pm)	Brief description of measurement and equipment used
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Calibration of Conductivity Meter	1410 $\mu\text{mhos/cm}$	+5.2 $\mu\text{mhos/cm}$	Calibration of conductivity meters by using KCl standard solution.
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(v) Field of measurement: pH MEASUREMENTS

Measured quantity	Range	Calibration & Measurement Capability (CMC) expressed as an uncertainty(\pm)	Brief description of measurement and equipment used
pH	0-14 pH	0.02	Standard Buffer solutions / Two point calibration method

(vi) : Field of measurement: VISCOSITY MEASUREMENTS

Measured quantity	Range	Calibration & Measurement Capability (CMC) expressed as an uncertainty (\pm)	Brief description of measurement and equipment used
UBBELOHDE Viscometer Calibration	(0.003 to 500) $\text{mm}^2 \text{s}^{-2}$	1.05 %	ASTM D 2162-06 Viscosity Standard oils

(vii) Field of measurement: TEMPERATURE MEASUREMENTS

MEASURED QUANTITY	RANGE	Calibration & Measurement Capability Expressed As An Uncertainty (\pm)	BRIEF DESCRIPTION OF MEASUREMENT AND EQUIPMENT USED	
			EQUIPMENT USED	METHOD USED
TEMPERATURE (SOURCES) Heat Sources	-80.00 °C	0.20°C	1. REFERENCE STANDARDS:- (Black Stack Thermometer FLUKE), (Working Standard PRT FLUKE), (R-Type Thermocouple 5649 FLUKE) (Zero Point Dry Well FLUKE) (Temperature/ Pressure Calibrator 512B) 2. UNIT UNDER TEST:- All types of Heat Sources	TPP-33
	0.00 °C	0.20°C		
	100 °C	1.18°C		
	200 °C	1.14°C		
	299.3 °C	1.13°C		
	349.2 °C	1.14°C		
	399.1 °C	1.14°C		
	800.0 °C	2.00°C		
LIQUID-IN-GLASS THERMOMETER TEMPERATURE (MEASURE)	-40 °C	0.60 °C	1. REFERENCE STANDARDS:- a) Ultra Low Temperature Bath (Heart Scientific 7380) b) Liquid In Glass Thermometer (ASTM) c) High Precision Thermostatic Bath (Model: PROLABO) d) Oil Bath (HO-21S) e) Working Standard PRT (5628) f) Black Stack Digital Readout (1560) 2. UNIT UNDER TEST:- Liquid –In- Glass Thermometers	TPP-25
	0 °C	0.12 °C		
	10 °C	0.12 °C		
	30 °C	0.12 °C		
	50 °C	0.12 °C		
	80 °C	0.20 °C		
	100 °C	1.20 °C		
	150 °C	1.20 °C		
THERMO-HYGROMETER TEMPERATURE /HUMIDITY (SOURCES)	20 %RH	1.38 %RH	1. REFERENCE USED:- a) RH Generator (Humi Lab) b) NESLAB RTE Bath/Circulator (USA) c) Humidity and Temperature Probe (HMP75) (Viasala) 2. UNIT UNDER TEST:- All types of Thermo hygrometers	TPP-32
	30 %RH	1.38 %RH		
	40 %RH	1.38 %RH		
	50 %RH	1.74 %RH		
	60 %RH	1.74 %RH		
	70 %RH	1.86%RH		
	80 %RH	1.86%RH		
	18 °C	0.26 °C		
	20 °C	0.26 °C		
	22 °C	0.26 °C		
	24 °C	0.26 °C		
	26 °C	0.26 °C		
TEMPERATURE (°C) (MEASURE)	-80 °C	0.02 °C	1. Reference Used:- a) Working Standard PRT (5628)	TPP-31
0 °C	0.06 °C			

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PLATINUM RESISTANCE THERMOMETER (PRT)	100 °C	0.20 °C	b) Black Stack Digital Readout (1560) c) Dry Block Calibrator ISOTECH GIMNI 700LRI d) Ultra Low Temperature Bath (7380) 2. Unit Under Test:- All types of PRT/RTD	
	200 °C	0.22 °C		
	300 °C	0.26 °C		
	400 °C	0.31 °C		
	500 °C	0.40 °C		
	600 °C	0.50 °C		
TEMPERATURE (SOURCES) THERMOCOUPLE	-40 °C	0.2°C	1. Reference Used:- a) Dry Block Calibrator (Model: Gemini700LRI) Ultra Low Temperature Bath (Model:7380 USA), E-Type Thermocouple (Serial#:2H19 Japan) b) Black Stack Digital Readout (Serial#: A8B906, Fluke USA) R-Type Thermocouple (Serial #: 2J13 ,Japan) Furnace (9112B,Fluke USA) c) Temperature/Pressure Calibrator (Model#:525BFluke USA), Working Standard PRT (Model #: 5628) d) Digital Thermometer (YEW 2575) Digital Thermometer (YEW 2572), R-Type Thermocouple Serial#:4996), Muffle Furnace (Model#:KE-6HK1200-3) e) Zero Point Dry Well (Model#:9101) f) S-Type Thermocouple (Model#:5650) 2. Unit Under Test:- a) S-Type Thermocouple b) R-Type Thermocouple c) K-Type Thermocouple	TPP-26
	0 °C	0.1°C		
	200 °C	0.2°C		
	400 °C	0.4°C		
	600 °C	0.6°C		
	800 °C	1.5°C		
	1000 °C	1.8°C		
	1100 °C	2.0°C		

CALIBRATION LABORATORY

Onsite Accreditation Scope of National Physical & Standards Laboratory (NPSL), Islamabad, Pakistan.

Mobile laboratory (Onsite Calibration)

Field of measurement: i) TEMPERATURE MEASUREMENTS			
Measured quantity	Range	Calibration & Measurement Capability (CMC) expressed as an uncertainty (±)	Brief description of measurement and equipment used
Calibration of Thermocouples	Ambient to 650 °C	1 °C to 1.5 °C	Dry block Temperature Calibrator, Digital Readout, Reference Thermometers, Zero point Dry Well.
Calibration of PRT/SPRT	Ambient to 650 °C	0.15 °C to 0.5 °C	Reference Thermometers, Digital Readout, Zero point Dry

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			Well, Dry block Temperature Calibrator.
Calibration of Low Temperature Bath/ Heat Sources (Oven, Incubator, Dry Block, Furnace)	-80°C to 1400°C	± 0.1 °C to ± 0.5 °C	PRT, S & R Type Thermometer.
Calibration of Thermo Hygrometers	20%RH to 80%RH	1.4% RH to 1.9 %RH	RH Generator Humi-Lab. Humidity and Temperature Probe (VAISALA).

Field of measurement: ii) ELECTRICAL MEASUREMENTS

Measured Quantity	RANGE	Calibration & Measurement Capability Expressed as An Uncertainty (±)	Brief description of measurement & equipment used
			Equipment used
DC VOLTAGE	100 mV – 1000V	0.00085 mV - 0.0056 V	<ul style="list-style-type: none"> • Reference Standard Digital multi-meters High voltage divider DVR 150 • Unit under test Multifunction Calibrator, High voltage source
	1kV - 150kV	0.5%	
AC VOLTAGE	100 mV – 1000V at 50Hz to 10kHz	0.0039 mV - 0.028 V	-----do-----
	1kV - 150kV at 50Hz to 1kHz	0.5%	
DC CURRENT	1 mA – 20 A	0.00015 mA – 0.00025A	<ul style="list-style-type: none"> • 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 - 2000A	1.5%	
AC CURRENT	1mA to 20A, at 10 Hz to 1kHz	0.0013 mA	-----do-----
	20A - 2000A, at 50Hz to 10kHz	1.5%	
RESISTANCE	1Ω - 2GΩ	0.00017 Ω - 0.00026GΩ	<ul style="list-style-type: none"> • Reference Standard, Digital Multi-meters • Unit Under Test Resistance Calibrator Fixed / Decade Resistance Box
	2GΩ - 20GΩ	0.0026GΩ	
CAPACITANCE	1nF – 1000µF	0.001nF – 0.058µF	<ul style="list-style-type: none"> • Reference Standard PM-6306 Fluke, • Unit Under Test Decade / Fixed Capacitance Standards
INDUCTANCE	100 µH – 1H	0.05 µH – 0.0061H	<ul style="list-style-type: none"> • Reference Standard, PM-6306 Fluke, • Unit under test Digital / Fixed / Decade Inductance

11-11-2019
Date

Director