



**National Accreditation Board for
Testing and Calibration Laboratories**
(A Constituent Board of Quality Council of India)



NABL /C/0025

03.07.2019

To
Mr. S. Srinivasa Pai, Quality Manager,
Fluid Control Research Institute,
Kanjikode West,
Palakkad – 678 623 (Kerala)
Phone: 0491 2566206, 2566120, 2566119;
Fax: 0491 2566326, 09446346850
Email: s.srinivasapai@fcriindia.com

Sub: Extension of validity for accreditation

Dear Sir,

This is in reference to your application for renewal of NABL accreditation. The accreditation of your Fluid Flow, Mechanical, Thermal & Electro-technical Calibration laboratory is expired on **30.06.2019** and re-assessment was conducted from **08-11.06. 2018**.

As per NABL criteria, since reassessment conducted before expiry and laboratory has applied before five months, the existing validity of accreditation in Fluid Flow, Mechanical, Thermal & Electro-technical Calibration is extended till **30.09.2019**.

This extension in validity is applicable only to existing scope issued by NABL.

Yours faithfully

Battal Singh
03/07/2019
(Battal Singh)
Joint Director
battal@nabl.qcin.org



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SCOPE OF ACCREDITATION

Laboratory Fluid Control Research Institute, Kanjikode West, Palakkad, Kerala
Accreditation Standard ISO/IEC 17025: 2005
Certificate Number CC-2395 Page 1 of 34
Validity 01.07.2017 to 30.06.2019 Last Amended on 30.08.2018

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
ELECTRO-TECHNICAL CALIBRATION				
I.	SOURCE			
1.	DC Voltage ^s	100 μ V to 1 mV 1 mV to 10 mV 10 mV to 10 V 10 V to 1000 V	0.64 % to 0.059 % 0.059 % to 0.007 % 0.007 % to 0.001 % 0.0025 %	Using MFC Wavetek 4808 by Direct Method Using MFC Fluke 5520A by Direct Method
	DC Voltage [*]	0.3 mV to 100 mV 100 mV to 1000 V	0.8 % to 0.0041 % 0.0041 % to 0.0020 %	Using MFC Fluke 5520A by Direct Method
2.	DC Current ^s	100 μ A to 1 mA 1 mA to 100 mA 100 mA to 10 A 10 A to 100 A 100 A to 1000 A	0.014 % to 0.006 % 0.006 % 0.006 % to 0.054 % 0.21 % 0.31 %	Using MFC Wavetek 4808 by Direct Method Using MFC Wavetek 4808 with Amplifier Ballantine 1620 Source (with shunt) by Direct Method Using MFC Fluke 5520A with Current Coil by Direct Method
	DC Current [*]	190 μ A to 3 A 3 A to 20 A 20 A to 1000 A	0.050 % 0.050 % to 0.31 % 0.36 %	Using MFC Fluke 5520A by Direct Method Using MFC Fluke 5520A with current coil by Direct Method

Mamta Bharti
Mamta Bharti
Convenor

Avijit Das
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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
3.	Resistance [*] (4Wire)	1 $\mu\Omega$ 10 $\mu\Omega$ 100 $\mu\Omega$ 10 m Ω 1 Ω , 10 Ω , 100 Ω 1 k Ω , 10 k Ω , 100 m Ω , 25 Ω , 100 k Ω 1 M Ω 10 M Ω 100 M Ω 1 G Ω	0.010 % 0.010 % 0.010 % 0.010 % 0.0004 % 0.009 % 0.009 % 0.0023 % 0.0045 % 0.0146 % 0.017 %	Using Standard resistors Discrete values (Guilidine & Fluke) by Direct Method
	Resistance [*]	2 Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 300 M Ω 300 M Ω to 1000 M Ω	0.12 % to 0.016 % 0.016 % to 0.071 % 0.071 % to 0.39 % 0.39 % to 1.8 %	Using MFC Fluke 5520A by Direct Method
4.	AC Voltage [*]	20 Hz to 1 kHz 1 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 100 V 100 V to 1000 V 1 kHz to 100 kHz 1mV to 10mV 10mV to 10V 10V to 100V	0.75 % to 0.075 % 0.075 % to 0.017 % 0.017 % 0.017 % to 0.033 % 0.033 % to 0.037 % 1.62 % to 0.27 % 0.27 % to 0.12 % 0.12 % to 0.24 %	Using MFC Fluke 5520A by Direct Method Using MFC Fluke 5520A by Direct Method
	AC Voltage [*]	45 Hz to 1 kHz 1 mV to 33 mV 33 mV to 330 V 330 V to 1000 V 1 kHz to 100 kHz 30 mV to 100 V	0.74 % to 0.04 % 0.04 % to 0.03 % 0.03 % to 0.037 % 0.45 % to 0.25 %	Using MFC Fluke 5520A by Direct Method

Mamta

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
5.	AC Current ^s	20 Hz to 5 kHz 1 mA to 1 A 1 A to 10 A	0.020 % to 0.025 % 0.025 % to 0.32 %	Using MFC Wavetek 4808 by Direct Method
		45 Hz to 5 kHz 10A to 20A	0.32 % to 0.17 %	Using MFC Fluke 5520A by Direct Method
		50 Hz 20 A to 1000 A	0.53 %	Using MFC Fluke 5520A with current coil by Direct Method
	AC Current [*]	45 Hz to 1 kHz 100 μ A to 1 A 1 A to 20 A	0.27% to 0.10% 0.10% to 0.17%	Using MFC Fluke 5520A by Direct Method
		1 kHz to 5 kHz 20mA to 1A 1A to 20A	0.11% to 0.65% 0.11% to 3.5%	
		50 Hz 20 A to 1000A	0.51%	Using MFC Fluke 5520A with current coil by Direct Method
6.	Frequency [#]	1 Hz to 9 kHz	1.0% to 0.0034%	Using Function Generator Agilent 33120A by Direct Method
		9 kHz to 1.0 GHz	0.00092% to 0.00012%	Using RF Signal Generator Agilent 9310A by Direct Method
7.	AC Power [#] 50Hz Single phase	1 W to 4.8 kW (UPF) 1 W to 3.8 kW (0.8PF) 1 W to 2.4 kW (0.5PF) 1 W to 1 kW (0.2PF)	0.49% to 0.17% 0.19% 0.39% 1.2%	Using MFC Fluke 5520A by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
8.	Oscilloscope# Bandwidth/Flatness (Relative to 50 kHz) Time Marker Amplitude DC Voltage @ 1 M Ω Load Amplitude AC Voltage (Sine Wave) @ 50 Ω Load and 1kHz Amplitude AC Voltage (Square Wave) @ 1M Ω Load and 1kHz	50 kHz to 600 MHz 10 ns to 10 ms 1 mV to 180 V 100 mV to 4.8 V 6 mV to 60 V	2.4% to 4.2% 0.10 % to 0.050 % 1.1 % to 0.30 % 1.7 % 0.41 % to 0.062 %	Using Oscilloscope Calibrator Wavetek 9500/600 by Direct Method
9.	Temperature Indicator# Thermocouple B Type C Type E Type J Type K Type N Type	600°C to 1820°C 0°C to 1000°C (-)100°C to 350°C 350°C to 1000°C (-)210°C to 150°C 150°C to 1200°C (-)200°C to 120°C 120°C to 1372°C (-)200°C to 410°C 410°C to 1300°C	0.45°C 0.37°C 0.19°C 0.24°C 0.27°C 0.23°C 0.35°C 0.42°C 0.42°C 0.30°C	Using MFC Fluke 5520A by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
	R Type	0°C to 1000°C 1000°C to 1767°C	0.60°C 0.42°C	
	S Type	0°C to 1000°C	0.47°C	
	T Type	1000°C to 1767°C (-)150°C to 400°C	0.46°C 0.28°C	
	RTD Sensor (PT-100)	(-)200°C to 0°C >0°C to 800°C	0.058°C 0.23°C	
	RTD Sensor (PT-1000)	(-)200°C to 0°C >0°C to 630°C	0.03°C 0.27°C	
II.	MEASURE			
1.	DC Voltage ^s	0.1 mV to 100 mV 100 mV to 1000 V	0.54 % to 0.0006 % 0.0006 % to 0.0009 %	Using DMM Fluke 8508A by Direct Method
	DC Voltage [*]	0.1 mV to 100 mV 100 mV to 1 V 1 V to 1000 V	4.2 % to 0.1 % 0.1 % to 0.007 % 0.007 %	Using DMM 34401A by Direct Method
2.	DC Current ^s	10 μ A to 100 μ A 100 μ A to 100 mA 100 mA to 1 A 1 A to 20 A	0.04 % to 0.002 % 0.002 % to 0.0066 % 0.0066 % to 0.021 % 0.021 % to 0.049 %	Using DMM Fluke 8508A by Direct Method
	DC Current [*]	0.1 mA to 10 mA 10 mA to 100 mA 100 mA to 3 A	2.42 % to 0.1 % 0.1 % to 0.07 % 0.07 % to 0.16 %	Using DMM 34401A by Direct Method Using DMM 34401A by Direct Method
3.	Resistance ^s (4 Wire)	750 $\mu\Omega$ to 1 k Ω	1.32% to 0.40%	Using Micro ohm meter Tinsley 5891 by Direct Method
		0.1 Ω to 1 Ω 1 Ω to 1 M Ω 1 M Ω to 100 M Ω	0.055 % to 0.0023 % 0.0023 % to 0.0015 % 0.0015 % to 0.022 %	Using DMM Fluke 8508A by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
	DC Resistance*	100 M Ω to 1 G Ω 1 G Ω to 10 G Ω	0.022 % to 0.23 % 0.23 % to 0.24 %	Using DMM Fluke 8508A by Direct Method
		100 $\mu\Omega$ to 10 k Ω	1.32 % to 0.40 %	Using Micro ohm meter Tinsley 5891 by Direct Method
		10 Ω to 100 Ω 100 Ω to 1 M Ω 1 M Ω to 10 M Ω 10 M Ω to 100 M Ω	0.13 % to 0.015 % 0.015 % 0.015 % to 0.048 % 0.048 % to 1.0 %	Using DMM 34401A by Direct Method
4.	AC Voltage ^s	20 Hz to 1 kHz 10 mV to 100 mV 100 mV to 1000 V	0.11 % to 0.02 % 0.02 %	Using DMM Fluke 8508A by Direct Method
		1 kHz to 100 kHz 100 mV to 100 V	0.09 %	
		100 kHz to 1 MHz 1 V to 10 V	3.5 %	
5.	AC Voltage*	40 Hz to 1 kHz 10 mV to 1 V 1 V to 750 V	0.55 % to 0.12 % 0.12 % to 0.15 %	Using DMM 34401A by Direct Method
	AC Current ^s	20 Hz to 1 kHz 100 μ A to 1 A 1 A to 20 A	0.096 % 0.096 % to 0.12 %	Using DMM Fluke 8508A by Direct Method
		1 kHz to 10 kHz 10 mA to 1 A 1 A to 10 A	0.11 % 0.11 % to 0.31 %	Using DMM Fluke 8508A by Direct Method
	AC Current*	40 Hz to 1 kHz 0.1 A to 1.0 A 1.0 A to 3 A	0.59 % to 0.17 % 0.17 % to 0.35 %	Using DMM 34401A by Direct Method

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
6.	Frequency [#]	1 Hz to 225 MHz	10 MHz to 0.00062 MHz	Using Universal Counter Agilent 53131A by Direct Method
7.	Time [#]	1s to 5400s	10.3 μ s to 5.4 ms	Using Universal Counter Agilent 53131A by Direct Method
8.	AC Power [#] Single phase 50 Hz	15 V to 1000 V 0.5 A to 20 A UPF 7.5 W to 20 kW	1.1 %	Using Digital Power Meter Yokogawa WT1030M by Direct Method
9.	Temperature Indicator [#] Thermocouple Type B	600°C to 1820°C	0.53°C	Using MFC Fluke 5520A by Direct Method
	Type C	0°C to 1000°C	0.39°C	
	Type E	(-)100°C to 350°C 350°C to 1000°C	0.25°C 0.21°C	
	Type J	(-)210°C to 150°C 150°C to 1200°C	0.27°C 0.23°C	
	Type K	(-)200°C to 120°C 120°C to 1300°C	0.4°C 0.4°C	
	Type N	(-)200°C to 410°C 410°C to 1300°C	0.4°C 0.27°C	
	Type R	0°C to 1000°C 1000°C to 1767°C	0.68°C 0.49°C	
	Type S	0°C to 1000°C 1000°C to 1767°C	0.47°C 0.46°C	
	Type T	(-)150°C to 400°C	0.32°C	

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Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability ($\pm$)	Remarks
10.	Temperature Indicator*			
	RTD Sensor (PT-100)	(-)200°C to 850°C	0.011°C	Using DMM Fluke 8508A with ITS-90 Table by Direct Method
	RTD Sensor (PT-1000)	(-)200°C to 630°C	0.014°C	
	Temperature Indicator*			
	RTD Sensor (PT-100)	(-)200°C to 850°C	0.15°C	Using DMM 34401A with ITS-90 Table by Direct Method
	RTD Sensor (PT-1000)	(-)200°C to 630°C	0.13°C	

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