



एफ.सी.आर.आई



Course on

Metrology, Pressure, Thermal & Electro Technical Measurements and Calibration

4th – 6th November 2020

204
in Series

Course Organised by:

FLUID CONTROL RESEARCH INSTITUTE

(Under Ministry of Heavy Industries & Public Enterprises, Govt. of India)

Kanjikode West, Palakkad-678 623, Kerala, India

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About FCRI

FCRI, a state of the art flow and fluid engineering facility, first of its kind in South East Asia is dedicated to Research & Development in Fluid Flow Measurement & Control Techniques. About 100 sponsored Projects for various reputed organisations have been successfully completed by the Institute. The Institute provides facilities towards technological developments to the flow product industries and serves as a National Certifying Authority and Quality / reliability evaluation facility. The Institute also provides facility for calibration of mechanical, thermal, electrical parameters, noise, vibration etc. apart from testing and calibration, the Institute conducts National and International training programmes in the field of flow control, measurement & Instrumentation, Calibration and related areas.

Major Calibration and Test Facilities

Laboratory Fluid flow NABL C026/T027		Maximum Flow Rate (m ³ /h)	Maximum Line Size	Uncertainty in Flow Rate (% reading)	Uncertainty in Volume (% reading)		
Water Flow		4500 15000	900mm 2000mm	Upto 200m ³ /h : ±0.05% 200 to 2500m ³ /h : ±0.10% 2500 to 4500 m ³ /h : ±0.15% 5000-15000m ³ /h : ±0.5%	2 m ³ - 20m ³ : ± 0.05%		
Air Flow At Ambient conditions		10000	400mm	0.016 m ³ /hr to 0.25m ³ /hr : ±0.3% 0.25 m ³ /hr to 40m ³ /hr : ±0.1% 0.7 m ³ /hr to 400m ³ /hr : ±0.15% > 400m ³ /hr 10000m ³ /hr : ±0.25%	0-0.5 m ³ : ±0.1% 2m ³ : ±0.1%		
Closed loop Air Test Facility (20 Bar) *Calibration Loop *Gravimetric Loop Velocity		10- 400m ³ /h 4-1000kg/h	150mm 50mm	± 0.3% ± 0.1%			
Oil Flow		650	250mm	0-100m ³ /hr : ± 0.05% 100-600m ³ /hr : ± 0.075%	Upto 1.8m ³ : ± 0.03% 1.8m ³ to 9 m ³ : ± 0.04%		
Compressed Natural Gas		4500 Kg/hr	1.5"	± 0.1%*	*under-Accreditation		
Mechanical Calibration Metrological, Pressure, Noise, Vibration etc. NABL C 056	Parameters	Range	Calibration & Measurement Capability	Parameters	Range	Calibration & Measurement Capability	
	MASS-Standards Weights	1mg and upto 500kg	0.0048 mg to 1.2g	PRESSURE pressure transducers	1 to 60bar 60 – 1200bar	0.04% of rdg 0.026% of rdg	
	MASS-Weighing Balance & Mass Comparator	Various ranges from 0-2 g to 600 Kg	0.005mg to 0.05 Kg	Pressure-gauge pressure transducers (pneumatic)	30mbr to 2000 mbar abs 0.25 bar to 20 bar abs	0.02% of rdg 0.038% of rdg	
		600 Kg to 2000 Kg	0.1 Kg				
		2000 Kg to 20000Kg	3.53 Kg				
	VOLUME -Specific Gravity bottle, Pipettes, Burettes Measuring Flasks	1 ml – 5000 ml	0.05ml to 0.7ml	Pressure-Low pressure gauge & differential	0.2 mbar to 10 mbar 10mbar to 160mbar	0.88% rdg ± 0.077%of rdg	
	DENSITY - Hydrometers	0.64 g/cc – 1.98 g/cc	±0.0005 g/ml	Pressure-gauge pressure transducer (pneumatic)	30 mbar to 2000 mbar	± 0.02% of rdg	
	VISCOSITY	Dynamic	1to 60000 mPas/cSt	± - 1.0% rdg	Pressure-vacuum (gauge)	-100 to 980mbar g	± 0.06 of rdg
		Kinematic	1to 60000 cSt	± - 1.0% rdg	LENGTH- slip Gauges (steel)	0.5 – 100 mm	0.05 µm to 0.16µm
	Acoustic Pressure – Free Field	125 Hz to 20 Hz	≤0.5 dB	Vibration Test Facility	6000 Kgf / 2000Kgf shaker 5 Hz to 2000 Hz		
	Acoustic Pressure – Pressure Field	94 & 114 dB @ 1 kHz 124 dB @ 250 Hz	0.5dB	Acoustic Test Facility	Hemi Anechoic Chamber ISO3745		
	Acoustic Power	125Hz to 16 kHz	2.0dB				
	Vibration Amplitude - Analyzer	0.1 to 15g (acceleration) 1 to 240mm/s(velocity) 0.01 to 10mm(displacement)	2.4 %	Temperature & RH Test Facility	-70 to 180 deg C 10 to 98 % RH		
	Vibration Amplitude –Sensor Linearity	2Hz to 15 kHz Upto 30g pk	≤2.5 % 1.25%			Dust – IP 5X, 6X	
Speed (Contact)	100 to 10000 rpm	1.6 rpm					
Speed (Non-contact)	60 to 100000 rpm	≤2.4 rpm	* IP Tests		Water – IP X3 to X8		
Thermal Calibrati on Electro Technical Calibration NABL C 0254		±100µV to ±1000 V ±0.1mV to ±1000V 1mV to 1000V 100mV to 1000V	0.60% to 0.001% 0.12% to 0.012% 0.4% to 0.014% 0.04% to 0.03%	DC Current Source Measure AC Current Source Measure	±100µA to ±1000A ±100µA to ±20A 100µA to 700A 100µA to 10A	0.014% to 2.0% 0.013% to 0.05% 0.04% to 1% 0.06% to 0.035%	
	Resistance Source Measure	10µΩ 10G Ω 100µΩ 1G Ω	0.6% to 0.02% 0.42% to 0.5%				
	Time	1 Sec – 5400 sec	1.53 µSec to 5.4mSec	Frequency	1 Hz to 1 GHz	10µmHz to 1.2 Hz	
	Temperature Chamber	-70 °C to +1200 °C -70°C to 180°C 10% to 95% RH	±0.07°C to 1.3°C	Fixed Point Cells	-38.8344°C to 961.78°C	2.9m°C to 19.7m°C	

About the Programme

National and International trade depends on acceptable system of measurement standards for efficient operation. Recognizing critical role of metrology, the International Standards Organisation (ISO) has given it a due important place in the International Quality Standards – ISO 9000, 14000 & 18000 series by incorporating specific clauses on Calibration and Traceability. The course covers specification of laboratory reference equipments, testing and calibration techniques including documentation, traceability, uncertainty evaluation as required by ISO 17025/NABL 141 guidelines for accreditation of laboratories in different areas like Mechanical, thermal, Electro-technical etc.

Topics

- Basics of Measurement and Calibration
- Dimensional metrology – Precision Measurement / calibration Techniques
- Mass metrology (Mass, Density, Volume etc) and Calibration Techniques
- Pressure Metrology and Calibration of Pressure measuring instruments
- Thermometry and Calibration . Transducers, transmitters and calibration techniques
- Laboratory Accreditation as per NABL Norms . Traceability and inter – comparison Campaigns
- Traceability and inter-comparison campaigns
- Quality Standards and relevance of calibration
- Assessment of uncertainty of Measurements for Laboratory Environs
- Uncertainty Estimation – Case studies

General Information

Venue : FCRI, Kanjikode West, Palakkad
Course Timings : 9.30 a.m. to 5.30 p.m.



Target Group

Personnel with 2-3 years experience in Metrological or inspection sectors and quality groups from Engineering Industries, process control & instrumentation and other related areas can participate.

10% Discounts for nominating 5 or more participants from same organisation

Fees

Fees (Non Residential)

For Participants working in India :

Rs. 15,435/- + 18% GST Rs.2,778/- = Total Rs. 18,213/- per participant +1% KFC Rs.154/- (as applicable)

For Participants from abroad:

US \$ 908 + GST 18 % US \$163 + Charge US \$ 20 = Total US \$ 1,091/- per participant +1% KFC US \$ 9.

We accept e-payment only

Bank Details : State Bank of India(SME Branch) Kanjikode west, Palakkad - 678 623

Account Name : Fluid Control Research Institute

Account No. : 10258760349 & IFSC Code : SBIN0006640

Please email GST identification number , invoice address and e-payment details to training@fcriindia.com



NABL Approved Test Facilities

Control Valves/Actuators	Cv, FL, Seat leakage test, Fugitive emission, cryogenic testing, torque
Water Meters	All test as per IS6784, IS779, IS2373, ISO4064
Butterfly Valves & Actuators	POD tests as per AWWA C504 & C540
Venting devices/air valves	API 2000
Safety Relief Valves	ASME PTC 25
Gas Turbine Meters	OIMLR137-1 Model Approval
Gas Regulators	BS EN 334
Diaphragm Gas meters	BS EN 1359 Model Approval
Liquid Flow Meters	As per relevant standards



Other Test

Life Cycle Tests & Cavitation Tests for valves

Agency	Category
National Accreditation Board for Testing and Calibration Laboratories (NABL)	Calibration/Testing of Flow Products, Mechanical Measurements Thermal Calibration, Electro Technical Calibration
Netherlands Measurement Institute (NMI)	CLATF (20 Bar, 400 m ³ /h) of FCRI complies with the criteria for Calibration Laboratories as per ISO/IEC 17025
Department of Science & Technology	Recognized R&D Institute
Department of Weights & Measures (Ministry of Civil Supplies)	Model Approval tests on flowmeter for custody transfer of oil/gas as per OIML Standard
Chief Controller of Explosives, Nagpur	Testing of Safety Relief Valves
Bureau of Indian Standards	Testing of Water Meters, Anemometers etc.
Institution of Fire Engineers, New Delhi	Hydraulic Qualification tests on fire fighting equipments
Central Pollution Control Board	Certification of Petrol, Kerosene & Diesel Generators for type approval
Nuclear Power Corporation	Seismic Studies for Power plant Equipments
Ministry of External Affairs (ITEC) & Ministry of Finance, Dept. of Economic Affairs (Colombo Plan)	Training programmes for Foreign Nationals on Flow Measurement and Instrumentation for Oil Gas & Water utilities/industries
GCAS Quality Certification Pvt. Ltd.,	ISO 9001:2008 Certification in Calibration & testing of fluid flow component, calibration of mechanical, electro technical, thermal instruments, flow calibration & measurements at site, project consultancy & implementation, professional training.

Registration

Registration for the training program can be confirmed by sending the details: Name, Designation, Organisation, Postal Address Email/Phone/Fax/Post to the address given below. The course fee is to be remitted in advance through e payment only. The registration must be completed on or before 13rd Nov 2020.



For further information & Registration, please contact:

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