

India's premier research laboratory entrusts Adept with the responsibility of setting up Water Meter and Flowmeter Testing and Calibration facility



National Physical Laboratory (NPL) selected Adept to play a major role in this project due to our experience of more than 3 decades in Flowmeters manufacturing and calibration as well as our self-developed NABL accredited calibration facilities.

Introduction



The National Physical Laboratory (NPL) is a National Metrology Institute (NMI) of India and premier research laboratory in the field of physical sciences. The NPL was conceptualised in 1943 by the Governing Body of Council of Scientific and Industrial Research (CSIR) and was one of the first National Laboratories to be set-up under the CSIR. Over the years, the Laboratory has fulfilled its primary mandate as the keeper of Measurement Standards for the nation. Over the years, it has also substantially expanded its research activities to

emerge as a leading national institution for research in the areas of physical, mechanical, advanced materials and devices, environmental and biomedical sciences.

NPL also offers calibration and testing services, acting as an interface between all the calibrating and testing groups of CSIR-NPL with numerous customers from the industry, various laboratories and government organisations - locally and globally.

NPL, Delhi -
The apex Indian institute
selected Adept
to design and deliver
a new Water Meter
Testing and Calibration
facility



About the requirement

The Fluid Flow Measurement Standard Group of NPL wanted to revamp their Water Meter Testing and Calibration set-up and replace it with a state-of-the-art facility conforming to the global standards that befit an institute with NMI status in India.

The NPL invited bids from various laboratories, institutes and companies with proven expertise in designing and implementing such systems. Adept was awarded the contract after a thorough evaluation and comparison of various technical parameters of the proposed system vis-à-vis competitors. The competence acquired by Adept in Flowmeter manufacturing and calibration for over 3 decades, and establishing self-developed NABL accredited calibration facilities played a key role during the selection process.

Challenges

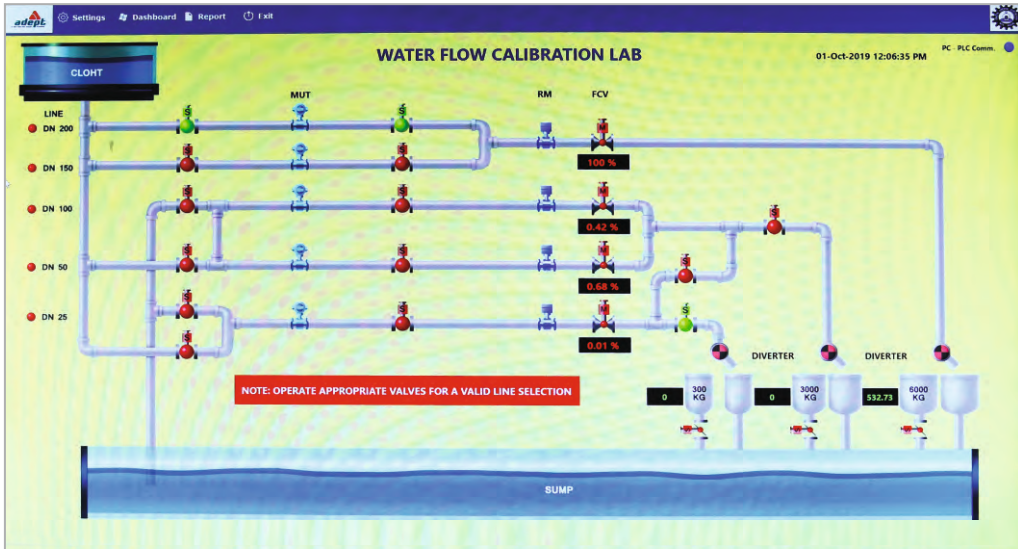
The existing set-up at NPL was very old and challenging to maintain mainly due to non-availability of spares and absence of thorough documentation. Various modules were lacking integration and centralised control was not possible. Being an old generation technology, it was also lacking in delivering the performance that is necessary to address the needs of today's industries. There were a few more drawbacks of the existing set-up.

- ▲ It was a fully automatic system but the automation was highly complex making it difficult to monitor and maintain
- ▲ Only pulse output type Flowmeters could be calibrated
- ▲ Straight length requirements were not met for Flowmeters of different sizes particularly when reducers were used
- ▲ It was a highly complicated system, making it difficult to operate and maintain



National
Physical Laboratory
(NPL)





Solution from Adept

- ▶ No electronics or instrumentation engineer was available to maintain the set-up
- ▶ Weighing systems were not interconnected
- ▶ Large volume of water was required to be collected
- ▶ Being a load cell based weighing system, uncertainty was higher leading to less accuracy of readings

Before undertaking the design of the new facility, the Engineering Solutions team of Adept thoroughly inspected the existing set-up and interacted with the NPL team to understand their exact requirements and expectations from the new system.

Knowing this, Adept decided on the gravimetric-based flow calibration facility employing the latest in instrumentation and control. Adept successfully installed and commissioned it while adhering to proven and best engineering practices.

After installation, the NPL team closely monitored various trials, which were successfully concluded to their utmost satisfaction.

The key features of the system are:

- ▶ Dedicated pipelines for five Flowmeter sizes from DN 25 to DN 200
- ▶ Provision for seven intermediate pipelines for Flowmeter sizes DN 15 onwards
- ▶ High performance weighing systems with exceptional repeatability and linearity
- ▶ Diverter, fishtail and nozzle subsystems to ensure extremely low diverter error
- ▶ Pumps with VFDs for precision flow control and energy saving
- ▶ Professional grade measurement instruments for accurate time totalising plus current and frequency averaging
- ▶ Segregated systems for power and instrumentation & control to achieve highest levels of operational reliability
- ▶ On-screen graphics to display the instantaneous status of all the field devices
- ▶ Inbuilt operational safety features



Certificate Generation

Select Action: Add Edit Delete

Customer Name: Aquatech corporation | O. A. No.: 1250

Serial No.: 1800710 | Certificate No.: NPL/2018/0006

Calibration Date: 08-Feb-2018 | Due Date: 08-Feb-2019

Product: UFM 6740 | Calibrated By: SAD

Verified By: SNR | Certificate Type: Qc QI

Technical Specifications

Line Size: DN 300 | Display Range: 0 - 400 m³/h

Power Supply: Battery Powered | Accuracy: (+/-) 1 % of Full Scale

Output Signal: N/A | Calibration Factor: 1.112541

Water Temperature: 23.2 °C | Water Density: 997.256 kg/m³

Calibrated Range: R1 0 | R2 400 | Unit: m³/h

Environmental Parameters

Ambient Temperature: 25 °C | Humidity: 99 %Rh

Barometric Pressure: 12.1 mBar

Sr.No.	Weight of Water	Time (t)	Std Flow Rate (Qa)	Displayed Flow Rate (QI)	Deviation in QI
1	1998.10	33.25412500	217.134	218.200	0.49
2	1668.80	42.52584200	141.810	142.600	0.56
3	3024.00	30.32551400	360.354	361.500	0.32
4	3024.00	30.32551400	360.354	361.500	0.32
5	3024.00	30.26500000	361.075	361.072	0
6	3025.55	25.28100000	432.480	432.140	-0.08
7	30.24	36.32500000	3.008	3.008	-0.01

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Benefits to NPL

NPL is experiencing multiple benefits while using the new facility delivered by Adept. Significant among them are:

- ▲ **Capability to calibrate Flowmeters of 12 different sizes from DN 15 to DN 200, all under a single roof**
- ▲ **The uncertainty in Flowmeter calibration for totalized mass and totalized volume parameters is in the range of 0.01-0.02% (at k=2) whereas for mass flow rate and volume flow rate parameters is in the range of 0.03-0.05% (at k=2) which are at par with the international level**
- ▲ **Inbuilt mathematical and statistical functions completely eliminate human error**
- ▲ **Efficient and reliable operations**
- ▲ **Operation and monitoring from the comfort of the centralised control room**
- ▲ **Password protection to ensure only authorised person/s can access the system**

This prestigious installation of Flowmeter Testing and Calibration facility at NPL, Delhi is a further attestation of our quality, reliability and capability in the flow instrumentation business



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