

OIL FLOW LABORATORY



The inherent accuracy of an oil flow measurement system is mandatory in the present day economic scenario. The profitability of any organization is directly or indirectly dependent on the efficient and economic utilization of the resources. The resources are scarce, especially the hydrocarbons / fuels / crude oil. Hence we need to control the usage of oil / fuels / hydrocarbons. The control is mainly through accurate measurement of the flow. Flow measurement is unique in comparison with other measurements because it is directly connected with expenditure/return. Oil Flow Laboratory was commissioned in 1995, and is a unique facility for calibration of custody transfer flow products in oil media.



Max. Flow Rate(m ³ /h)	Max. Line Size	Uncertainty in Flow Rate (% reading)	Uncertainty in Mass (% reading)	Uncertainty in Volume (% reading)
650	250mm	Upto 100 m ³ /hr : ± 0.05% 100-650m ³ /hr : ± 0.075%	Upto 1.6 ton:±0.013% 1.6ton to 8 ton:±0.025%	Upto 1.8 m ³ : ± 0.03% 1.8m ³ to 9 m ³ :± 0.04%

Legal Metrology, Weights & Measures unit; Department of Consumer Affairs has recognized FCRI for conducting Model Approval tests on flow measuring instruments and volume measuring instruments and mainly makes use of oil flow laboratory for the purpose.

The facility makes use of static gravimetric calibration system for measurement and the calibration is performed by "Standing start and stop" method.

The principal flow medium is EXXSOL D80 with a maximum flow rate of 650 m³/hr. NABL (National Accreditation Board for Testing and Calibration laboratories) has accredited OFL for both testing and calibration categories.

The OFL measurement uncertainty is 0.025 % in mass, 0.05 % in volume and 0.075 % in volume flow rate. The test section can handle pipes of a maximum nominal size upto 250 mm (10") NB and the minimum size it can handle is as small as 6 mm NB.

The calibration of flow products at the laboratory are carried out with reference to American Petroleum Institute (API) standards, ISO standards, ASTM standards, OIML standards, etc.

International Inter-comparison program

Oil Flow Laboratory has conducted inter laboratory comparisons with Nmi Netherlands and National Engineering Laboratory, United Kingdom and proved that the FCRI calibration results are well comparable with International systems and the system reproducibility is stable over a period of time.

Level testing facility for probes.

Calibration of composite probes used in petroleum retail outlets for level, density and temperature measurement can be carried out in this facility.

The facility can test/calibrate level measuring probes /instruments upto a height of five meters. The calibration can be done in petrol, diesel, diesel - water interface and petrol - water interface.

The budgeted uncertainty is estimated to be better than 0.1 mm for level, 0.1 deg.C for temperature and 0.1 kg/m³ for density at 95% confidence level



Multi viscous calibration facility

The primary calibration system works on gravimetric method. The maximum flow rate achievable in the facility is 1200 lpm. The following oils are used for calibration in the facility: Diesel, 2cst, 15cst, 32cst, 68cst, 100cst and, 220cst and 460 cst oils. The facility is also utilized for the model approval of PD meters, turbine flow meters, mass flow meters, fuel dispensers etc. as recommended in OIML R117.

The budgeted uncertainty of the system is better than $\pm 0.05\%$ in volume measurement.



Density calibration facility.

Measuring density with least uncertainty is critical for oil flow in pipelines which is measured largely by volume, and conversions involving density are necessary for accurate financial reporting and trade.

Density measurement is a key element of both mass and volume flow rate measurement in the oil industry, and is fundamental to the commercial operation. The most widely implemented approach for mass flow measurement is the use of a volumetric flow meter and a density meter, both of which require periodic calibration.

The facility can be exclusively utilized for the density calibration of mass flow meters and density meters of various sizes in different densities ranging from 650kg/m³ to 1000kg/m³ in fluids like water (1000kg/m³), Exxsol D80 (780 kg/m³) and ether (650kg/m³). The budgeted uncertainty in the determination of the density is better than 0.005% of reading at 95% confidence level.