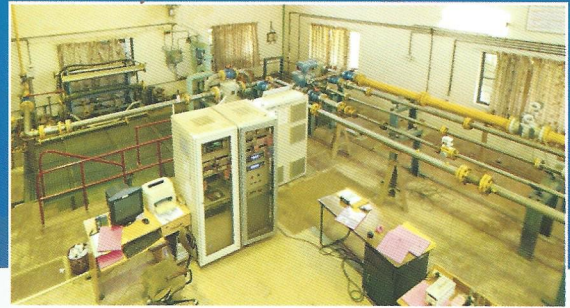


# 20 BAR AIR FLOW LABORATORY



## a. Open Loop / Blow Down Air Test Facility

This facility is used for testing of different types of Control & other Valves, Filters, Regulators, Small size flow meters, Venting devices etc. The facility is also used for Aerodynamic noise studies for valve trims and Silencers.

This facility operates in Open loop / Blow down mode. Four interconnected pressure vessels of 11 m<sup>3</sup> water capacity store air at maximum of 20 bar. The three reciprocating compressors together deliver 4000 lpm FAD. The air treatment system purifies air to -60 °C tpd dew point, less than 5 ppm oil carry over and 5 $\mu$  particle size



*Safety valve testing for CCI-USA*

### Other testing capabilities

- ◆ Model approval / Capacity test of Safety relief valve.
- ◆ Model approval / Capacity test of breather valve.
- ◆ Model approval / Capacity test of Regulator & Gas safety equipment.
- ◆ Noise level measurement of valves, stacks and control devices, automobile air vents.

## b. Closed Loop Air Test Facility (CLATF)

Loop essentially has an encapsulated blower, chilled water temperature control system, filters and metering lines. Cleaned, dried, filtered compressed air is filled in the closed loop at required static pressure. The 35 kW blower maintains the flow circulation in the loop and makes up for pressure losses. Frequency control speed drive controls the flow rates through the system. A 16 TR chilled water package system maintains and controls the air temperature within  $\pm 1^\circ\text{C}$  during the period of calibration. A group of 2" and 3" turbine meters calibrated with primary / transfer standards serve as references with traceability to National Standards.

### Specifications

Medium	:	Compressed air
Operating pressure	:	2 – 20 bar (g)
Flow rate (max)	:	400 m <sup>3</sup> /h (actual)
Temperature	:	25 $\pm$ 1°C
Reference meter	:	Turbine meters
Uncertainty	:	0.3%



*Air Reservoirs*



*CLATF*

## c. Primary Standard Gravimetric System (PSGS)

Primary Standard Gravimetric System enables calibration of meters up to 50 mm for maximum flow rate up to 50 m<sup>3</sup>/h (actual). The operating pressure ranges from 1.3 to 20 bar. The overall system uncertainty is 0.1%. The facility is accredited by NABL and approved by NMI for ISO 17025 criteria. The facility, also uses for calibration of Coriolis type mass flow meters upto 1000 kg/h. This facility is the only Primary Standard in India for gas calibration.

The electronic precision mass comparator provides accurate measurement with 1g sensitivity in its capacity of 1200 kg. The precision dome loaded pressure regulator maintains the pressure in the test set up. The critical flow venturi nozzles with different throat diameters controls the flow rate through the set up.



PSGS

## Intercomparison program

Traceability of basic quantities such as mass, length, time or derived quantities like pressure, viscosity, density etc. established to the relevant National Standards alone is not sufficient for overall uncertainty assessment due to lack of absolute knowledge of all sources of errors associated with flow measurement and further, the quantity is a time integration of instantaneous flow rate. Upstream Pipe configuration, type of compressor/pump and quality of fluid etc. influence the measurement. Hence to validate the complete calibration system, equipment and personnel, two or more laboratories should perform the same tests on selected meter. FCRI successfully participated in such exercises.

## NMI Certification

Netherlands Measurements Institute(NMi), the Netherlands, certified the Closed Loop Air Test Facility (CLATF) and Primary Standard Gravimetric System (PSGS) as back as November 2002. In addition to NABL accreditation, this loop got international acclaim through Round Robin tests.



NMI officials at FCRI

## General Specification

Testing conditions	Facility	Max. Flow rate (m <sup>3</sup> /h)	Max. Line Size (mm)	Uncertainty in Flow rate
20 Bar pressure	CLATF	400	100	0.30 %
	PSGS	50	50	0.10 %
	Blow down	-	300	1-2%