



GAIL (India) Limited

GAS METER CALIBRATION FACILITIES AT HAZIRA AND DIBIYAPUR





GAS METER AND ITS CALIBRATION

Use:

Gas meters are used to measure the quantity of gas flowing through the meter which is generally measured in volumetric terms. For commercial transactions, the volume registered by the meter and the energy content of the gas flowing through the meter is used for invoicing purposes.

Importance

Thus, accurate measurement of the gas flowing through the meter is of paramount importance as it is directly reflected in terms of the financial figures. A gas meter is, therefore, the cash register of any gas operator/transportation entity. Any mis-measurement impacts in financial terms in the books of accounts of the entity.

Gas Meter Calibration:

A gas meter calibration is the activity which establishes that the meter under test is operating within stated error/uncertainties limits and complying to the applicable National/International Standards, if calibrated at an accredited calibration laboratory.

Need for Calibration:

Considering a 0.1% bias error in a customer measurement system with daily gas drawl of 1 MMSCMD at \$8/ MMBTU, the cost of mis-measurement can be approximately 1 crore per annum.

Therefore, Calibration / Re-calibration is necessary to reduce technical and financial risks.

- Technically, to check the meter's general health conditions and to ensure that the meter meets the performance requirements as per applicable standards.
- Financially, to ensure correct custody transfer in the supply chain and avoid costly mis-measurements.

Post calibration, the meter is certified to be accurate and the measurement results are traceable to Primary SI unit of measurement with certain level of confidence.

BENEFITS OF CALIBRATION TO GAS BUSINESS

a. Equipment Performance Evaluation:

Over time, flow meters may encounter wear, drift, or aging, potentially leading to inaccuracies in readings. Calibration identifies and rectifies these issues, aligning the flow meter's measurements with actual flow rates.

b. Regulatory Compliance

Numerous industries operate under stringent regulations governing fluid flow rate measurement and reporting. Properly calibrated flow meters are pivotal in meeting these regulatory stipulations. By ensuring precise measurements, calibrated flow meters enable businesses to exhibit compliance, evade penalties, and uphold favorable relationships with regulatory bodies.

c. Resource Optimization

Flow meter calibration contributes to resource management efficiency. Accurate flow measurements facilitate optimal utilization of gas resources. By ensuring precise measurement of gas usage or transportation, wastage is minimized, yielding cost savings and bolstered sustainability.

d. Process Safety

In certain industries, accurate flow measurements are pivotal for ensuring process safety. For instance, in process plants or refineries, precise flow monitoring is indispensable to avert overflows, leaks, or other hazardous chemical/mechanical scenarios. Flow meter calibration maintains the accuracy of safety-critical measurements, fostering a safer operational environment.

e. Make in India Initiative: Forex saving

The calibration facilities at GAIL are amongst the top high-pressure natural gas calibration facilities worldwide. These facilities offer traceable gas meter calibrations at affordable prices saving forex on such calibration activities.

f. Low Lead time for calibration

These facilities offer substantially low lead time for the meter under calibration as compared to facilities under other part of the world. Thus, the gas measurement systems availability is increased resulting in low chances of Mis-Measurement.



CALIBRATION FACILITIES AT GAIL (INDIA) LIMITED

GAIL (India) Limited has the unique state-of-the art calibration facilities at Hazira (Gujarat) and Dibiyapur (Uttar Pradesh) (upcoming) which operate on the Natural Gas as the calibration media. Hazira Calibration facility is Open loop type and Dibiyapur Calibration facility is closed loop.

Open Loop Calibration Facilities:

In this facility, the source of the calibration media (natural gas) is connected in series with the trunk pipeline network. Thus, the calibrations are carried out at the pressure available at the upstream of the calibration facility.

Closed loop Calibration facilities:

This facility operates on variable gas pressure within the design pressure range and the gas quality during the calibration remains constant.

Calibration principle adopted in above facilities:

Gas Meter calibration facilities in GAIL operate on Master Meter method which is based on the mass conservation principle. In this method, a master meter and test meters are kept in series and mass entering and exiting the loop remains fixed. Quantities measured at the Master meters and Test meters are corrected for deviations. In addition to these corrections the double-timing method is used to avoid truncation of pulses in the time interval during which a calibration run is performed.

SALIENT FEATURES OF THE FACILITIES ARE AS UNDER

All flow meters interact in some way with the flowing fluid (i.e. Natural Gas). The nature of this interaction is affected by the properties of the fluid or the velocity distribution of the fluid passing through the device. Changes in this interaction alter the ability of the device to give an accurate representation of the quantity. The magnitude of the error is different for different meter types and fluids. For this reason, it is desirable to calibrate using the same fluid and pipework configuration within which the meter will normally operate.

a. Hazira Meter Calibration Facility:

Hazira Meter Prover Facility (HMPF) is one of the world's leading high-pressure test facilities for gas meters. The facility has wide range of flow meters calibration capacity which includes Mass Flow Meters, Ultrasonic flow meters, Turbine meters and other volumetric flow meters. It is installed and operational at Hazira Compressor Station, Surat (Gujarat).

FACILITY DETAILS & KEY FEATURES

Type	Open Loop
Flow Range	10 to 19000 m ³ /hr
Test Meter calibration capacity	2" to 30" Nominal dia
Meter Pressure Class	600# and 300#
Test Medium	Natural Gas
Working Standards	4 x 12" Turbine with USM in series 1 x 8" Turbine with USM in series 1 x 4" Turbine with USM in series 2 x 2" Two Turbine in series
Transfer Standards	16", 10", 8", 4" TFM and 2" RPD
Best CMC	0.16%
Metrological Partner	VSL, The Netherlands
Traceability	GOPP of VSL & HPPP of Force Technology
Accreditation	ISO 17025: 2017 by NABL India

b. Dibiyapur Meter Calibration Facility:

Dibiyapur Meter Prover facility will be available all year round, independent of the season positively from Oct'2024. Anticipated performance parameters of the facility are as under:

Type	Close Loop
Medium	Natural Gas
Meters Type (MUT)	USM, TFM, RPD
Flow Range	4 – 2500 M ³ /Hr.
Meter Class	150#, 300#, 600#
Meter Size	2", 3", 4" & 6"
Pressure	Variable, 2 bar(g) to 49 bar(g)
Temperature Stability	Better than 0.05 Deg C
Pressure Stability	Better than 0.05 bar
Flow stability	± 0.1%
Facility CMC	± 0.30% or better (10% to 90% of Flow Range)



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