

# TEST BENCH SERIES FMTB



The best way to predict the future *is to create it*

## Introduction



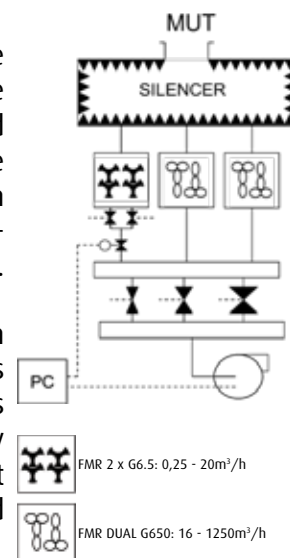
The FMTB test bench series are compact test benches using air under atmospheric conditions. The test bench is designed to calibrate to a high level of accuracy in the shortest possible test time. The FMTB is equipped with high quality sensors and instruments whose measurement results are traceable to international standards. The FMTB series units are fully automated and by reducing thermal expansion effects, the smart control makes it possible to calibrate meters in a very short time. Using a multi-channel data analyzer with built-in clock it is possible to sample and collect data with a very high accuracy. The Flow setting is performed over a frequency regulated blower in combination with regulation valves that enable fast and accurate flow regulation over a wide range at any set point. The FMTB is pre-calibrated by FMG and ready for use. It is suitable for calibration of diaphragm meters, rotary gas meters, turbine gas meters and ultrasonic gas meters. The smart design, self-diagnostics and use of high quality components ensure that maintenance is kept to a minimum. Remote operation using the internet makes service and support by FMG easy.

The user-friendly software enables flexibility in operation. Password protection and several user levels provide security of all important data and settings. Clear screens and the menu structure make it easy to set up the test bench. All necessary data is visible during the test. Former test results, stored in the database, are accessible via a built-in browser. The data can be printed directly or exported in several formats such as pdf, xls, rtf, xps, html and csv.

## Principle

The FMTB series works in a unique way. Using digital signal processing with a sample rate of 250 KHz it permits a start/stop time measurement on any pulse transition for both the Meter Under Test and the reference meters. In this way a stream of test data is collected and analyzed in a short time producing reliable values. Because of the short test time, the result is not influenced by changes of environmental condition such as thermal expansion due to temperature changes. The large amount of data in combination with smart algorithms make it possible to calculate average values and filter out unreliable measurements.

The complete system is operated by a small but powerful computer in combination with a bus system for controlling all analog and digital in- and outputs. In the sensor box it is possible to sample 4 pulse outputs of the Meter Under Test simultaneously. A silencer is used to overcome interaction or interference between the Meter Under Test (especially rotary gas meters) and the reference meters. High-end replaceable dust filters protect the reference meters from pollution. The reference meters are specially designed and manufactured to guarantee the highest accuracy and best performance.



## Applications

The FMTB series is suitable for testing several meter types in a large flow range. This makes the FMTB series attractive for manufacturers of gas meters and test laboratories, and also for companies with many field installed gas meters that have to be checked periodically. The compact design makes it possible to place the test bench in a small area. Due to the small volume of the FMTB and short test times the line pack effect (thermal expansion of the volume between the Meter Under Test and the reference meters during the test) is reduced to a minimum.

## Uncertainty

The uncertainty of the test bench is calculated according to EA-4/02 M: 2013 and ILAC-P14:01/2013. Taking into account all the uncertainty sources the test facility can be delivered with a maximum total uncertainty of 0.25% for flow rates over 1 m<sup>3</sup>/h and 0.35% below 1 m<sup>3</sup>/h which is well inside the limits of 1/3 of the Maximum Permissible Error (MPE) according MID or OIML.

## Reference Meters

FMG has designed a special range of reference meters optimized for test facilities and travel standards. The focus of these meters is on repeatability, long term stability and free of pulsations. High frequency pulse outputs of the master meters produce a large amount of pulses thus giving a high accuracy and low uncertainty even for short test times. The master meters are calibrated in the test bench with highly accurate travel standards directly traceable to international standards.



The test bench can be configured with master meters that have a double setting. The small master meter is a double chamber with special rotor meters with a capacity of 10 m<sup>3</sup>/h per chamber and a maximum capacity of 20 m<sup>3</sup>/h in parallel. The chambers can be checked individually. For the higher flow rates two pulsation free dual rotor meters can be fitted. The minimum capacity of 6.5 m<sup>3</sup>/h provides an overlap of the small master meter. The two larger master meters used in parallel can reach a maximum flow rate of 2500 m<sup>3</sup>/h. In this setting redundancy is guaranteed and all master meters can be checked against each other giving a high level of performance confidence.



## Delivery

The test bench fulfills the requirements of the applicable European directives (machines, low voltage, EMC) and is delivered with CE marking and a declaration of conformity. The test bench is delivered as plug and play. Connection of power cable and compressed air of 6 bar is required only for starting up the test bench. Pre-installed software on the computer allows the test bench to be put into immediate operation.

A complete documentation set is delivered with the test bench including:

- Installation and maintenance instructions
- Operation instructions
- Overview of the calibration results at factory calibration
- Uncertainty calculation according to EA-4/02 M: 2013 and ILAC-P14:01/2013
- Certificates of all reference equipment traceable to international standards
- Manufacturer information of the used equipment
- Technical drawings
- Spare parts list



## Technical Specifications

Type	Flow range (m <sup>3</sup> /h)*	Number of master meters	Power supply (Vac)**	Dimensions W x D x H (mm)	Weight (kg)
FMTB-B650/10	0,25 - 650	2	200 - 240	1350 x 1150 x 1500	500
FMTB-B1000/10	0,25 - 1000	2	380 V 3 phase	1350 x 1150 x 1500	500
FMTB-B1600/10	0,25 - 1600	3	380 V 3 phase	1350 x 1150 x 1500	600
FMTB-B2500/10	0,25 - 2500	3	380 V 3 phase	1350 x 1150 x 1500	650

\*. Larger test facilities up to 10.000 m<sup>3</sup>/h on request.  
 \*\*. Other values of power supply on request.

## Options

- Set of travel standards
- Side connection to calibrate multiple diaphragm meters in series.
- Lower minimum capacities
- Side inlet on upper header for second MUT position
- Calibration by independent institute like VSL, PTB or equivalent
- Technical training at manufacturer location or on site including certificate of participation
- On site commissioning



# About us

## FLOW METER GROUP B.V. (FMG)

FMG is an engineering/manufacturing company specializing in the development and production of energy and gas measurement systems. Located in the Netherlands, FMG produces a wide range of rotary and turbine gas meters, volume conversion devices, master meters and calibration benches. Unique product features include self diagnosis and tamper prevention. All products and services are certified by the Dutch NMI and comply with the latest EU and/or OIML directives.

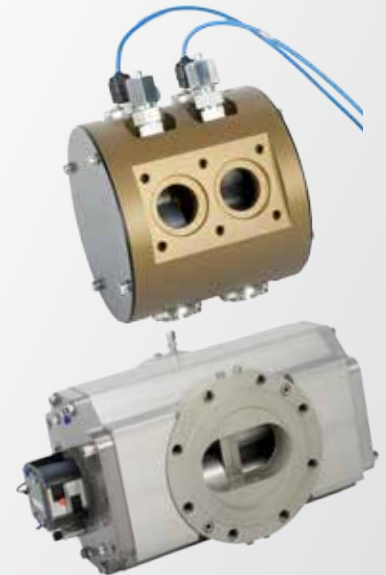
## Flow Meters

FMG offers a large variety of flow meters ranging from very small (100 dm<sup>3</sup>/h) up to very large (40.000 m<sup>3</sup>/h) flow rates and in pressures from atmospheric to 100 bar (1440 psi). All FMG meters comply with international safety and metrological standards. Meters designated for fiscal use are tested, certified and approved by the Netherlands Metrological Institute NMI.

FMG has added extra features to the meters in terms of increased accuracy, protection from manipulation, increased rangeability and superior performance in order to go beyond the minimum requirements of the existing standards.



**Positive Displacement Meters**



**Master Meters**



**Custody Transfer Short Length Turbine Meters**



**Flow Computers**



**Turbine Meter Series FMT**

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