BAYLAN
WATER METERS

BAYLAN BTB-07 TEST BENCH

Model	: BTB – 07
Nominal Diameter	: DN15 – DN25
Flowrate Range	: 10 l / h – 8 m^3 / h

TABLE OF CONTENTS

1. General Information

The correction of the water meter is determined via calculating the errors at various flows using Baylan BTB-07 Test Bench. In addition, whether the flow meter has a leakage under high pressures can be checked by means of the leakage test. There by, the strength of the water meter against high pressures is tested.

There is a special equipment used to adjust air pressure in the system. Air pressure is used for clamping the water meters to the test line. Moreover there is clamping system is controlled by pneumatic system. In case of power or air cuttage, system will lock itself and clamp mechanism will remain at the last position . Before starting the test, trapped air should be evacuated from system for proper testing.

There is a temperature gauge that measures output water temperature of the test line. This temperature data is send to microprocessors. Electrical control panel is equipped with microprocessor based on electronic circuits and program can be updated easily. There is an emergency button on the panel and pressing this button will stop all operations .

The tests and calibrations of the water meters are applied by means of the water tank placed on a weighing scale. In the gravimetric measurement system, the water passed through the water meters is collected in the water tank and it's weight are measured by the weighing scale placed below the tank. The measurement error percentage is calculated by comparing the value of volume taken from the water meter display and it's value taken from the weighing scale. Maximum working pressure is between 10bar and 16bar as optional.

Baylan BTB-07 Test Bench can perform tests within required flowrates for the meters between DN15 and DN25. The table below shows the quantity of the meters that can be connected to the bench in terms of nominal diameters and Q_3 measuring flow rates.

Quantity of water meters can be connected and the Q_3 value of the meters according to the nominal diameters and lenghts.

Lenght (mm)	Pieces	Q_3 (m^3/h)	Nominal Diameter
165	10	2,5	15
190	10	2,5	20
190	10	4,0	20
260	5	6,3	25

Baylan BTB-07 Test Bench provides tests according to the directive and standards below;

Recommended	OIML R49 E13
Standard	TS EN ISO 4064:2017
Directive	2014/32/EU (MID) MI-001

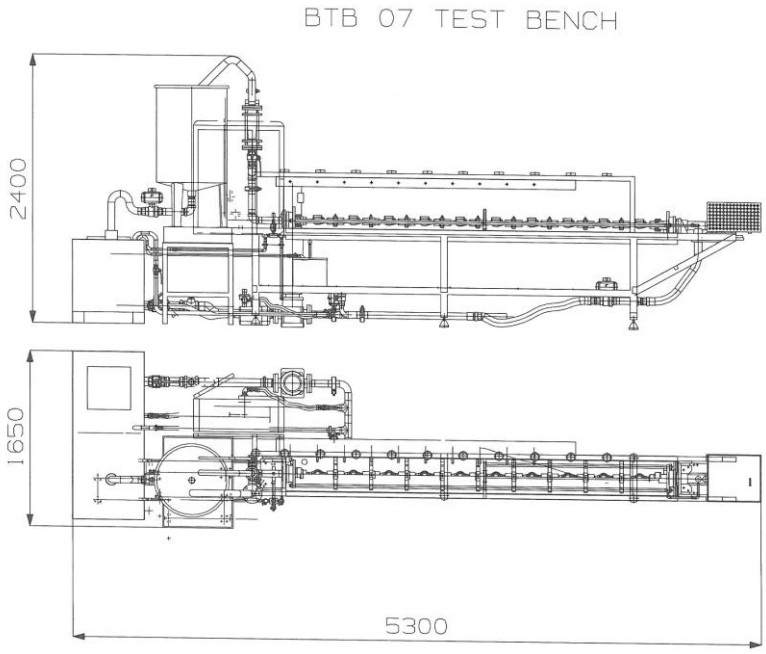

Figure 1 - BTB-07 DN15-DN25 Single Line Test Bench Dimensioned Technical Drawing

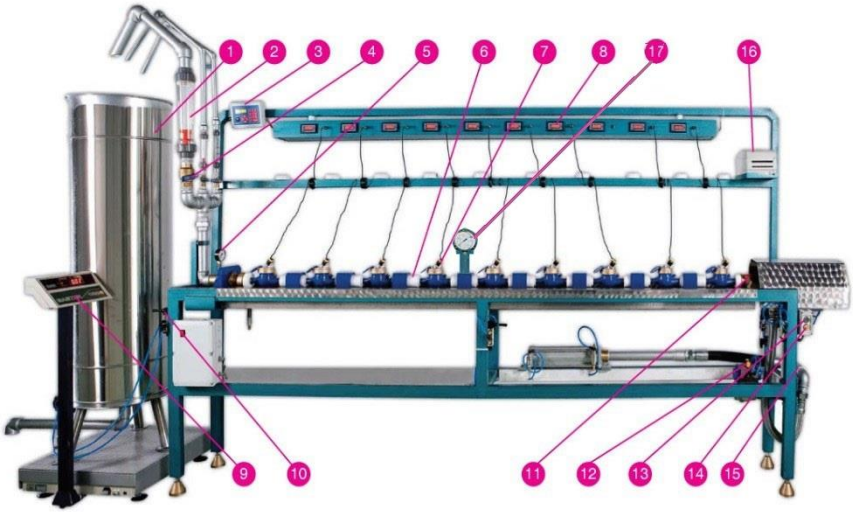

Figure *2 - Components of the Baylan Test Bench*

1- Water collecting tank
2- Flowmeters
3- Control Unit
4- Flowmeter gates
5- Water pressure manometer
6- Water meter connections
7- Sensors
8- Digit indicators
9- Weighing scale
10- Water collection tank discharge controller.
11- Measuring section water discharge gate.
12- Water supply valve controller
13- Incarcerate button.(There is a safety valve for prevent fastened clamp against opening if there is an air interruption)
14-Loosening button
15-Main Valve
16-Barcode Printer
17-Pressure Difference Manometer

"Due to continuous development of our products, we reserve the right to modify our product design or construction without prior notice."

2.Components of the Test Bench

2.1.Flowmeters

It is possible to test water meters at flowrates from 10 l/h to 8.000 l/h.

They are entirely made of shock-proof plastic materials. They also suited for operation with corrosive liquids such as caustic soda or hydrochloric acid. Measurement tubes are made of PVC. The float in the measurement tubes are made of AISI 316 stainless steel. Float stops are made of polypropylene. Maximum working temperature is 60°C. It has a accuracy of ± 2 %.

Figure 3 – Flowmeters

2.2.Weighing Scale

It has a maximum measurement capacity of 200kg. It has five-digit display. Its resolution is 10gr. It works on 220 VAC, 50HZ voltage. (It does not effected of voltage reductions down to 170 VAC) Before starting the scale, the water balance scale shall be adjusted by turning the lever with four screws. The air bubble shall be placed on the centre as shown below therefore the weighing scale is on the balance.

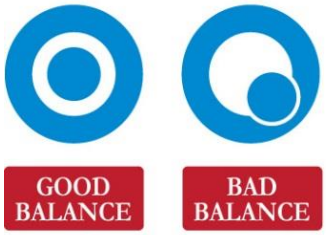

Figure 4 - Weighing Scale

1- ZERO IZE 2- TARE 3- TOTAL 4- RECORD 5- ON - OFF KEY

2.3.Manometer

The working pressure is 0-40 bar. Movable part is made of brass. Pressure element is made of CuSn8 tin soldered. Case is made of steel, front ring made of abs plastic. Manometer connection is R1/8" brass. The accuracy is 2,5 %. The working temperature is between -25°C and +60°

Figure 5 - Manometer

2.4. Temperature Sensors

The temperature sensor is located at outlet of the test line of the bench. This sensors can measure between 0-100 °C. The sensors will transfer the measured temperature values to the Baylan Control Unit in order to calculate the actual volume of the water.(Figure 6)

Specifications	
Measuring Range	0-100 °C
Temperature Sensor	PT 100

Figure 6 – Temperature Sensor

2.5. Opticald Sensors

Optical sensors are reading sensors that calculates the error curve of the meter by counting the movement of sensitive flow indicator. (Figure 7) BTB-07 Test Bench is equipped with 10 sensors that can send the read data to Baylan Control Unit.

Specifications	
Accuracy Class	1
Setting	Manual or Automatic
Output	PNP ve NPN
Exterior Material	ABS
IP Protection Class	IEC IP67; NEMA 6
Voltage	24V

Figure 7 – Optic Sensor

2.6. Pumps

BTB-07 Test Bench has 2 different pumps working seperatly for high and low flowrates. In order to provide clean water passage between the tanks and the pumps, closing valves and control valves are equiped with filters.

- Big Pump

For the flowrates higher than 0,5m^3/h.

Big Pump Specifications	
Working Principle	Centrifuge
Obtainable Working Pressure	11 bar
Maximum Flowrate	7,875 m^3/h (*)

Figure 8 – Small and Big Pump

- ## Small Pump

For the flowrates lower than 0,5m^3.

Small Pump Specifications	
Control Type	Frequency Controlled
Obtainable Working Pressure	5 bar
Maximum Flowrate	0,5 m^3/h (*)

(*) NOTE: The maximum flow of the big pump rate is specified by calculating the Q_4 value of the biggest meter that can be connected to the test bench. Pumps together with pressure losses will provide at least this value.

2.7.Water Tanks

Specifications of Water Tanks	
Material Type	AISI 304 Stainless Steel
Main Water Tank	600 liter
Scale Tank	285 liter

- ## Main Water Tank

Main water tank is a tank that where all the water is collected after the measurement of the water mass. In order to prevent any overflow, the appendent water-gauge inside of the tank sends order to the system to stop water flow.

Figure 9 – Main Water Tank

- ## Scale Tank

Scale tank is the tank that measures and collects the weight of water that water meters passes through within the testing process. If the weight is over the capacity of the tank the control unit system will shut down the inlet valve . Water-gauge which located inside of the scale tank is used as a flooding security system.

Figure 10 – Scale Tank

2.8.Body

It's a construction that gathers the components of the test bench. It's made of steel covered with stainless sheet. It is ergonomicly designed for easy use.

Specifications	
Material Type	ST-37
Paint Type	Epoxy

2.9.Compression Piston

Meters which will be mounted to the test line are stablized by the pneumatic piston. Within this system there is security valve and non-return valve. System is controlled by the forward or backwards keys.

Control Keys (Switches):

Forward and Backwards Switch makes compressor piston goes forward and backwards. The piston will move to the direction where switch is rotated. The emergency stop button is used in emergency situations. When the emergency stop button is pressed, the pump will stop automatically. Big and Small pump start or stop working with rotary switch.

Figure 11 - Piston and Pumps Control Switches/Emergency Stop Button

2.9.Static Pressure Piston

While applying the static pressure test, required pressured air is manually set by use of pneumatic pressure adjuster by the operator. (Figure 14) If the pneumatic adjuster moves down, pressure raises up and if it moves up it releases the pressure. (Figure 15)

Figure 12 – Static Pressure Piston

Figure 13 - Pneumatic Pressure Adjuster

2.10.Baylan Control Unit

The Baylan Control unit automatically calculates the error rates of the meters, using optical reader and transfers the results to the led display. Each meter type has its own pulse value. When these values are recorded in Baylan Control unit, it can be selected according to the required meter type and after the test the results can be printed out.

Figure 14 Baylan Control Unit

2.11.Pressure Adjuster

The pressure adjuster is used to regulate the pressure of the high-pressure air required to control the pneumatic system.

2.12.Electrical Panel

Electrical panel which is located on the test bench has a power source of 24 V and equipped with electrical switches which run the devices that operates with electric.

Figure 15 - Electrical Panel

2.13.Connection Apparatus

Before the test begins, in order to mount meters to the connection line, between every single meters and also at the inlet and outlet of connection line, there should be apparatus made of POM. POM aparatus are durable against high pressure and impacts. Also, POM apparatus made from the same material with the support apparatus for stabilizing the water meters to the test line.

Figure 16– POM Connection Apparatus and Support Apparatus

Specifications	
Material Type	POM
Nominal Diameter / Meter Length	DN15 / 170mm
Nominal Diameter / Meter Length	DN20 / 190mm
Nominal Diameter / Meter Length	DN25 / 260mm

2.13.Compressor

Test panel system requires compressed air. The compressor covers the expectations of this compressed air requirement. Compressor is powered by single-phase electric line and operating voltage is 220V in this test bench.

Specifications	
Air Pressure (Minimum)	6 bar
Air Tank Capacity	50 litre
Voltage	220 V

Figure 17 – Compressor