THERMAL CYCLES TEST BENCH

BPV-T50-3-SWG

(Version 2023)

OPERATIVE RANGE:

Nominal total flow-rate:	**65 L/min at 12 bar**
Maximum total flow-rate:	**100 L/min at 12 bar**
Pressure range:	**1 - 15 bar approx.**
Cold water temperature*:	**10 - 25 °C**
Hot water temperature*:	**40 - 92 °C**
Testing stations:	**3**

*** With TCW E0. Note: inlet temperature, the achievement of the indicated temperatures depends on the features of the hydraulic plant that supplies the test bench.**

APPLICATIONS:

BPV-T series test benches are suitable for performing thermal testing cycles in accordance with the main industry Standards on piping and fitting assemblies. The tests are carried out in open circuit with alternating hot and cold water flow.

- The test pressure can be adjusted in the working range of 1-15 bar approximately, with the pumps controlled by a feedback inverter.
- The system is equipped with flow adjustment valves for each connected test system in order to set an adequate flow for each station.
- The system measures the temperature and pressure difference in real time between the inlet and outlet for each station
- The system is sized to ensure a temperature change at the inlet of the test pipe in less than 1 minute.
- Once the required temperature is reached, the stability within the acceptance ranges of the various regulations depends on several factors and cannot be guaranteed in advance. The main factors are:
    - Thermal power of the generator (or of the power supply system).
    - Volume inside the test samples (internal DN and length).
    - Mass and specific heat of the test sample.
    - Temperature delta between hot and cold cycles.
    - Range of acceptance of the power supply temperatures.

Examples:
N° 3 specimens internal DN 30 mm – length of each specimen: 7 m – ΔT: 73 °C - re-entry time: approx. 60 s.
N° 1 specimen internal DN 85 mm – length: 7 m – ΔT: 72 °C re-entry time: approx. 280 s.

STANDARD REFERENCE:

EN 12293	**EN ISO 19893**	**DVGW-W534**	**ISO 1587-5**
ISO 21003-5	**SI 5433-5**	**AS/NSZ 4020**	

A) SUPPLY AND CONTROL DEVICE:

HOUSED COMPONENTS:

- **N°2** 4.0 kW multistage vertical **pumps** with microprocessor inverter control and feedback transducer, by-pass and safety devices.
- Water supply and recovery circuit with insulated stainless steel pipes and compression fittings suitable for use up to 15 bar.
- **Two magnetic flow meters** located downstream of the supply pumps, with full scale of 100 L/min, used during the initial calibration. During the continuous cycle, the flow meter detects the total value delivered by each individual pump (equivalent to the sum of flow rates of the stations in operation).
- **Group of stainless steel pneumatic shut-off valves** of the hot and cold supply and discharge line.
- **Internal stainless steel hydraulic system** with press fittings and insulation on the hot and cold line, main collector DN 25.
- Each individual test station is equipped with a supply shut-off valve, stainless steel inlet and outlet connection unions with conical and VITON OR seal, outlet pressure and temperature transducer, stainless steel micrometric valve for flow rate adjustment.
- **PLC to control the work sequence** and the alarms.
- Power supply circuit with main switch, emergency button, warning lights and interconnection to the TCW E0 unit and to the supply and discharge collector.
- **Water collection tank with safety level control** and discharge shut-off valve.

Installed WORKSTATION consisting of:

- **Intel processor** – the configuration changes according the last components in the market: acquisition card National Instruments, network cards, two hard disks, DVD burner.
- **Keyboard and mouse wireless.**
- **A4 colour laser printer and support trolley – Code: KIT-LASERPRINTER.**
- **23" LCD monitor** 16:9, assembled on adjustable holder.
    - Available on request **Touchscreen monitor - Code: 4MONITOR23-TS.**
- **UPS power supply 500 W.**
- **Back-up external unit – USB HDD.**
- **Instruction manuals and Help on-line.**

Operative system and acquisition software SWG:

- Operative system: **Windows 10 Enterprise LTSC**.
- **Dedicated software: SWG 2023** to perform hydraulic tests.
  The new multilanguage software SWG allows to work with different units of measure**,** it allows to acquire the parameters for the functioning of the bench and to provide documentation for the tests through the following screens:
    ◊ Start-up screen with several options available: the account (admin/users) and passwords management, calibration, transducers check, selection of software language, units of measure, messages and software for the execution of the tests.
    ◊ Main screen showing the virtual synoptically panel, with all the measures acquired in real time.
    ◊ Specific screen showing temperatures in a graphic format with adjustable video size, possibility to perform enlargements of the working area. All the supply conditions (temperature, pressure and flow-rate) are shown and controlled continuously. Final report

with the starting conditions and the summary of failed cycles. It is always possible to save a single cycle report containing a significant video screen.

- ◊ Final report with all the test data and a significant video screen. It is possible to generate each report in different languages.
- ◊ It is possible to control the opening and closing of all the internal valves and the pumps by clicking with the mouse on the graphic symbol representing each components in the synoptic panel.
- ◊ All the existing screens may be printed with customer's notes and logo.
- ◊ Help On-line support, with all the main operational instructions.

BASIC SOFTWARE INSTALLED:

A) **AQ2TB-BASEMOD** "SWG" service software with multichannel acquisition engine, management of users, calibration, change of units of measure, change of language, messages, water and air temperature regulation (if available on the bench).

B) **AQ2TB-3EN12293** software for thermal exchange tests on three stations in parallel. Real-time graphic display of the inlet and outlet temperatures and the temperature delta. Real-time monitoring of all significant values (temperature, pressure, flow rate and force).
The software enables the management of the performed cycles, includes the analysis of KO cycles, the possibility to view all machine messages in real time and the possibility to stop and resume the test at any time.

C) **WINDOWS 10** OEM Multilanguage.

D) **MACRIUM BACKUP** software for automatic back up of test data and operative system.

E) **SOMACHINE** software for management of PLC.

F) **TEAM VIEWER** internet remote control.

Basic software included is in Italian language + second language English or German. Others languages only by request with extra cost

ETHERNET CONNECTION:

The test bench is provided with Ethernet socket in order to allow the connection to Internet and enable the remote assistance functionalities through TEAMVIEWER software (installed by default on the PC).
The Ethernet plug also allows the integration of the bench inside the customer's network (intranet). In this way is possible to export data and reports and remotely check the functioning of the bench.
It allows, in conjunction with AQ2TB-MANSYS software, the incoming (from corporate server to test bench) and outgoing data exchange (from bench to server).

SERVICE SOFTWARE:

AQ2TB-OPZ-MLG Possibility to generate and print in five different languages (Italian, English, German, French and Spanish) all the test reports. The language of the report is independent from the language of the software. Each report can be generated more than one time in different languages.

AQ2TB-DATA-EXP Possibility to export in a TXT format file all the samples acquired during a test. It is possible to activate this function for all the software; this function is independent by the graphs shown in each software. For laboratory tests, it is possible to export the data of the entire test. For endurance tests, it is possible to export data of a single cycle, the number of saved cycle can be chosen by the operator. The maximum acquisition frequency is about 10 Hz (sample per second) for each channel.

AQ2TB-TCW-ETH Option to manage the functioning of the TCW generator by Ethernet communication from the test bench.
Includes the possibility to choose the working modality (on/off – stand-by – weekly switch-on timer), read in real time the temperature of hot and cold water, modify the set points, and manage the alarms (real time status reading and events history).

AQ2TB-DATA-INFO Additional option for the personalization of the test information in all the active languages. The standard menu, composed in English by the entries "*Client*", "*Category*", "*Line*", "*Model*", "*Serial number*" and "*Test description*" can be modified in order to adapt the management of the tests on bench (including the reports) to the modality adopted by the company internally.

AQ2TB-MANSYS:

This optional software, installable on one or more PCs with suitable characteristics and integrated into the company network, can be used for remote management activities on the test bench.

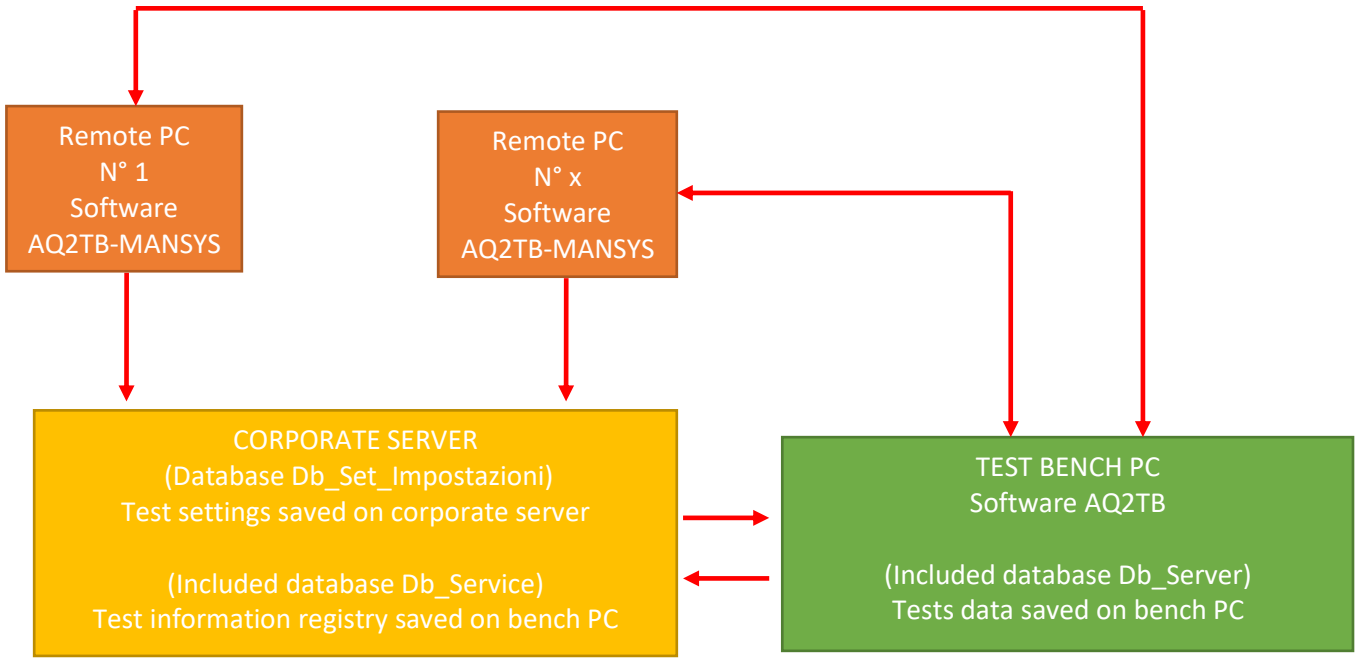
Software specification:

- The software allows the remote creation, modification and cancellation of the tests execution parameters for each test. (*)
- The software allows the access to the test data and, consequently, to their analysis and exportation; it allows the creation of the test report independently from the activity carried out on the bench in that moment. (**)
- It allows the visualisation of the bench status (normal functioning or in alarm) and the kind of test in execution in real time. (**)
- It allows the creation of test information registry usable on the bench during the saving procedure. (*)

* The bench will not have access to data in case of absence of network connection.
** Features active only in case of available network connection.

Notes:

- In case of absence of network connection, the normal functioning of the bench is always guarantee.
- The effective functioning of the software depends on the corporate server features, and cannot be guaranteed before the start-up of the bench.



STRUCTURAL CHARACTERISTIC:

- Supporting structural frame made of aluminium and laminated panels.
- Side doors located on both sides to easily access the internal system and make it possible to install up to three test stations.
- Compartment to house the work-station and the printer.
- Video support surface.
- Working tank in stainless steel (1,5 mm) with drain.
- Anticorodal profile guides for securing test tools and pipe brackets.
- Assembly on rotating wheels provided with parking brakes.
- Internal network for hot and cold water distribution made with stainless steel pipes and press fittings, insulation with closed cells Armaflex.
- Poppet valves used for all internal uses with pneumatic servo control and spring return.
- Double-stage filter unit.
- Internal separation between hydraulic plant and the area with PC and electrical cabling.

Dimensions: 6.000 x 1.200 x (h) 2.000 mm.
Electric power: 12,0 kW.
Power supply: 400 V – 3 ph + N + GND – 50 Hz.

B) TEST STATION:

Constructed with aluminium profiles, support frame mounted on castors that make it easy to move in case of maintenance. Possibility of easily mounting tested pipes since it is possible to position the brackets on aluminium profiles with telescopic guides that slide vertically (the position of the brackets must be defined according to the types and combinations of the pipes to be tested).
Connection to the test bench and recovery units with rigid piping suitable for the foreseen test flow rates and pressures.
Internal area with stainless steel collection tank on the bottom that collects the water if there are leaks in the tested pipe and it then sends a signal to a sensor, signalling the problem and interrupting the test.
Bottom step on grille that gives easy access to the test area.
The test rack includes the possibility of installing three test pipes connected to the supply and discharge collector.
Sliding folding safety doors with an aluminium frame and front guard in tempered glass. The door can be opened separately in two parts and is equipped with safety locking devices and door open signal.

Test station overall dimensions: 3.800 x 1.000 x 2.000 (h) mm

ADDITIONAL DEVICES:

N°3 traction devices with a 1000 N load cell to place pipes in traction before starting the test and axial load force. It can be used to detect the pull-out force of the fittings when hot and cold water are circulating.
The devices can operate in continuous traction or be locked after the initial pre-load.
Code: **BPF-OPZ-LOAD1000**

2,0 kW thermal **external conditioning unit** to prevent thermal dispersion from increasing the internal temperature of the test area.
Code: **DEK20LT0B**

TRANSDUCERS INSTALLED:

TEMPERATURE:	accuracy ±0,3 °C, resolution 0,01 °C. Pt100 low-inertia, 3-wires probes.
PRESSURE:	operative range 0-50 bar. accuracy ±0,05% of the full-scale value. resolution 0,01 bar, pressure probes with high dynamic response.
FLOW-RATE:	accuracy ±0,25% of reading value (from 25 to 97 L/min). resolution 0,01 L/min with precision electromagnetic flow meter with output connected to microprocessor converter.
FORCE:	operative range 10-2000 N. accuracy ±10 N, resolution 0,1 N.

The measuring equipment assembled on the bench is equipped with an inspection report relative to the operational fields and performed according to the ISO 9001 standards, with reference to the ACCREDIA (Italian Calibration Service) primary samples.

The test bench is provided with a final test report of electrical safety according to standard CEI EN 60204-1 and CE declaration of conformity.

TECHNICAL DATA:

WEIGHT AND DIMENSION	
- LENGTH	6000 mm
- DEPTH	1200 mm (+100 mm)
- HEIGHT	2000 mm (+350 mm)
- WEIGHT (APPROX)	1600 kg
SUPPLY CHARACTERISTICS	
- ELECTRICAL SUPPLY	400 V 3 phases + N + GND 50 Hz
- POWER	12,0 kW
- HYDRAULIC SUPPLY (From TCW E0)	50 L/min
- PNEUMATIC SUPPLY	5÷9 bar
- WATER DRAIN FLOW	80 L/min
- WATER TEMPERATURE (From TCW E0)	10÷92 °C

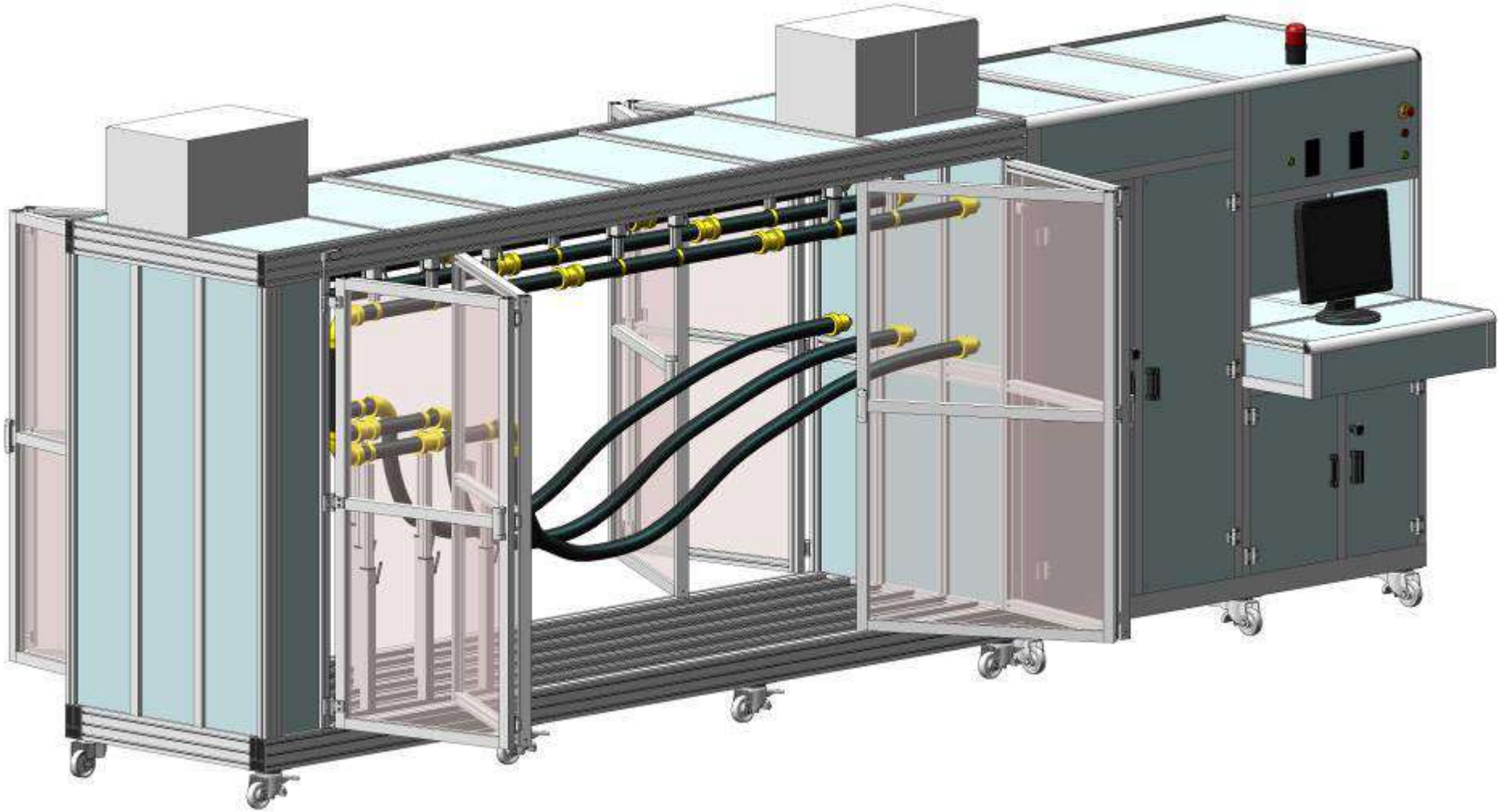
C) WATER SUPPLY:

TCW E0

Hot and cold water supply generator

The TCW water generator allows to supply continuously, in closed circuit, the hydraulic test bench.
It is equipped with three 400+400+100 L tanks for hot, cold and mixed water accumulation.
Heating power: 48 kW, six heating resistances 8 kW each, hot water range: 40÷92 °C.
Cooling power: 46 kW, scroll type compressor, cold-water range: 10÷25 °C.
PLC for faults controller and Ethernet communication with the test bench.
Size: 1600 x 2700 x (h) 2050 mm.
Weight: 750 kg (approx.).
Electrical supply: 400 V - 50 Hz.
Power: 70,2 kW.
Filling from customer supply plant.

KIT-FILTROBWT-2XL water treatment to reduce the hardness and contamination of water supply, including mechanical filter and flow counter.
Weight: 11,0 kg – Filtering capacity: 14000 L at 17 °f (10 °d).



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