LEAKAGE: 1.02 ml/min
FLOW: 12 l/min
TEMPERATURE: 37 °C
CYCLE: 1.34 x 10^6
PRESSURE: 123 bar

DESIGNER OF HYDRAULIC TEST BENCHES
Since 1995, LF Technologies has been providing products and solutions perfectly meeting the needs of its customers by providing the best user experience thanks to high quality products.

LF Technologies stands out in the field of high-precision engineering by offering fully customized special machines. Our equipment is entirely designed, manufactured and tested internally, which gives us complete control of our solutions. From the simple controller for measuring mechanical, electrical, hydraulic performances, to simulation benches, through to production machines, we have been able to take advantage of our expertise in designing complete high value-added solutions for your production systems.

Our know-how integrates all the necessary steps for the development of our test benches and special machines, from the analysis of your specifications to the commissioning of our equipment in your premises.

Being able to understand the mechanical behavior of your products, qualify the shock resistance or validate your parts under realistic conditions are aspects of strategic importance to optimize the performance and quality of your products.

Thanks to their skills in mechanics, automation and programming, our engineers design complete systems (single station or online integrated) ensuring an automated control of your production.

With its expertise, LF Technologies is part of the FIDEIP industrial group, which presents internal opportunities and growth synergies.
Designer and manufacturer of hydraulic test benches

LF Technologies designs mechanical test benches that evaluate the behavior of a finished product or standardized specimen under actual operating conditions by applying mechanical stress. We are able to offer machines covering a wide range of tests including tensile strength, compression, torsion, peel, fatigue and impact. Test parameters can be combined to characterize multiple aspects of your product on one bench.

SPECIAL MACHINES
LF Technologies manufactures special machines on request to meet all your requirements. These machines integrate manufacturing, assembly and control functions. LF Technologies also produces complete production cells integrating several independent modules linked together by a monorail on which automatically movable mobile bases carry the product to be manufactured. These systems offer total control and traceability of your production.

Our Know-How

Since 1995, LF Technologies has specialized in the development of tailor-made test benches with a high level of control and traceability. Each bench is the result of careful and rigorous work by engineering teams who integrate notions of client demands, product certifications and testing environment strains into equipment design.

LF Technologies’ expertise is materialized in three areas of expertise:

- Hydraulic division for all tests on sanitary and industrial fitting
- Mechanical division to characterize the behavior of products and/or specimens
- Special machines division for the creation of assembly and control benches

The experience and high technology of machines are widely recognized, whether by accreditation bodies or by customers operating in the sanitary and industrial fittings, aeronautics, energy, automotive, materials, or nuclear.

Our Areas of Expertise

- HYDRAULICS
- MECHANICAL
- SPECIAL MACHINES

HYDRAULICS
LF Technologies manufactures test benches allowing to test hydraulic components of sanitary and industrial equipment according to established testing procedures or French and international standards. These test benches allow to carry out tests on any type of hydraulic equipment in order to evaluate its mechanical resistance, endurance, hydraulic performance and thermal regulation characteristics.

MECHANICS
LF Technologies designs mechanical test benches that evaluate the behavior of a finished product or standardized specimen under actual operating conditions by applying mechanical stress. We are able to offer machines covering a wide range of tests including tensile strength, compression, torsion, peel, fatigue and impact. Test parameters can be combined to characterize multiple aspects of your product on one bench.

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HYDRAULIC TEST BENCHES

Our hydraulic test benches are able to carry out all the tests of evaluation of mechanical and hydraulic conformity of the sanitary equipment and valves in accordance with the requirements of the French and international standards.

Our know-how allows us to offer benches for tests of **performance**, **endurance** and **adjustment** that ensure the proper functioning of sanitary equipment and estimate the service life of components. In addition to our test benches, we offer autonomous water supply systems for **complete turnkey solutions**!

We offer a modular range of standard hydraulic test benches that can thus be adapted to all the requirements of your specifications.

Ergonomic and easy to use, thanks to dedicated HMIs, our benches provide you with optimal operating convenience for:
- Quality in production control;
- Optimization of your products in R&D;
- Obtaining a certification according to the French and international standards, or quality marks.

The accuracy and reproducibility of the obtained results will help you to analyze your products behavior. Our test benches are part of an approach to continuous improvement and certification of your products.

**Our primary objective is to ensure the best efficiency of your tests!**

François, Hydraulic Division Manager at LF Technologies.

TYPES OF TESTS

- PERFORMANCE
- ENDURANCE
- ADJUSTMENT
- PRESSURE
- THERMAL SHOCK
- FLOW
- ANTISCALD
- SEALING

Performance Test Bench and Hot Water/Cold Water Loop
How to choose the ideal test bench?

Characterizing the behavior of a shower, measuring the hydraulic performance of a pump or evaluating the service life of a mechanical mixer - all of them are operations that require suitable machines. Our hydraulic test benches take into account in equal measure the product to be tested, the hydraulic function and the test environment to ensure optimal and efficient test and results.

The experts at LF Technologies are there to accompany you at every stage of your project. They help you conceive ergonomic hydraulic test benches that will test your sanitary components according to the standards of your country.

How to choose the ideal test bench?

The choice of a test bench will be conditioned by the product or the sanitary component that is to be tested. Our benches can perform tests on equipment such as: faucets (mechanical and thermostatic mixers, diveters, mixing faucets, self-closing faucets, etc.), pumps, valves, circulators, hoses, WC cisterns, pipes, thermostats and temperature sensors or thermostatic cartridges.

What tests to perform? What are the applicable standards?

Our hydraulic test benches are designed to meet the test conditions for:
- laboratories (R&D);
- adjusting sanitary products and components.
Hydraulic tests are designed to verify and validate the quality of your products according to French and international standards. LF Technologies is able to offer you the right bench for each standard.

What water supply?

Hydraulic equipment tests require hot water and/or cold water supplies of the benches. Our test machines are designed for a range of possible power configurations. LF Technologies also offers solutions for generation of hot and cold water in closed-circuit system without water consumption that use energy-saving and energy recovery systems.

What are the expected results and analyses?

Because a test is valid only if its result is clearly expressed, without being subject to interpretation, our software interfaces are designed according to your needs. Each measurement can be automatically analyzed to determine your product’s compliance, edit an automatic test report, or save the data in your own database.

The 4 questions you need to ask yourself

Which product to test?

The choice of a test bench will be conditioned by the product or the sanitary component that is to be tested.

What to test?

Hydraulic test benches are designed to meet the test conditions for:
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A solution to your needs

Testing solutions for a wide range of applications

LF Technologies provides high-tech solutions for industries that wish to test and analyze the performance, endurance and resistance of sanitary equipment or products such as all types of faucets, hoses and pipes, lavatory covers or industrial valves.

Security

At LF Technologies, the safety of our test benches users is essential. This is why this aspect is taken into account from the stage of your equipment design. The protective casings of machines are designed to provide protection against splashes of water, oil or sample components during equipment testing, while ensuring maximum visibility of your product during the test. These casings are locked by tamper-evident strikes.

Our benches are equipped with protection systems of the tested product to guarantee that the forces applied do not in any case exceed a predetermined threshold.

All risks (burns, projection, burst) are monitored by sensors: watchdog, thermostat, pressure switch. These sensors are managed by a dedicated safety automaton, in parallel with all computer programs, with redundant systems ensuring total protection and safety of the operating personnel. This automaton also manages the machine reset phases after failure.

Our benches comply with current regulations (machinery directive, low voltage, EMC) and their operation is certified by an independent body you choose (Apave, Dekra, etc.).

Ease of use of our machines

The performance of your machine is also defined by its simplicity of use. This is why we have chosen to facilitate the implementation of the tests by means of adapted tools, automated adjustments and an ergonomic interface.

Each of our test benches is equipped with a Human-Machine Interface (HMI) designed for precise and fast analysis of your hydraulic tests. The console is intuitive and easily customizable by users. A simple click is enough to run a test. The interface allows you to know in real time the status of your test. All measurements are saved automatically and can be exported to Excel, HTML, Word and PDF formats for easy reading and analysis.

Expected performance

Robustness of designs

The reliability of our machines depends in particular on the solidity of their design. Our design office develops equipment capable of testing your products repeatedly and over the long term without any technical failures.

Reproducibility of results

We design fully thought-out machines around your product and tests you choose. This optimization of the test/product pair ensures accurate and reproducible results.

Precision of servo-controls

The quality of the tests requires a total control of the movements, temperature control, pressure, etc. These accurate controls are managed by rigorous, high-frequency and high-fidelity servo-systems.

Examples of products tested on LF Technologies test benches

Examples of safety and protective casings.
Interaction software

The HMI, Human-Machine Interface, is the software through which operators interact with our hydraulic test benches with ease. This advanced technology allows for fully automated control of test operations and offers users the possibility to monitor the machine performance through real-time calculated indicators and analyze the results obtained.

This interface has become an essential element for the setting of operations and obtaining of extremely precise analyses. Our interfaces integrate the latest ergonomic and visual improvements to provide you with an efficient user experience.

Multi-screen division

Depending on the type of use, our machines can be equipped with several interfaces:
Main control screen and remote display screen for production monitoring, remote control panels, remote management on a tablet or smartphone.

Specific features that meet user expectations

SIMPLE CONFIGURATION
The test procedures can be parameterized and consist of a sequence of pre-programmed basic functions, with loop repetition functions for tests on a large number of cycles. Each test procedure can be saved in a separate file.

ACCURACY OF MEASUREMENTS AND ANALYSES/REPRODUCIBILITY
The software measures test performance up to 1 MHz and retains all results, test procedure parameters, product information, date and user feedback. All the collected post-test data is analyzed using automated reports in Excel, Word or PDF format.

TRACEABILITY OF OPERATIONS
For complete traceability of your tests, the machines can be interfaced with a database in SQL format (timestamps, user ID, product references, serial numbers, etc.). Automatic recognition systems of serial number (barcode, datamatrix, character recognition) and RFID badge reader enable fast and reliable identification of users.

ACCESS MANAGEMENT
All software designed by LF Technologies has an administrator interface to manage user accounts and their access rights. The levels of access to the various functions of the machine can be configured according to the type of user. The interface is thus completely controlled and secured.

An intuitive interface

An intuitive and ergonomic HMI allows better use of control systems. That is why LF Technologies pays the utmost attention to the design and graphic quality of the user interface. Whatever the technical level of the hydraulic testing machine, operators can easily interact with the contents in a safe and comfortable way.

From the study of your needs to the customized graphic design of your Human Machine Interface, LF Technologies offers a turnkey service.

- Ergonomic study according to your functional specifications:
  Definition of the interface functions, user’s actions, sequence of various screens, choice of menus, etc.

- Design and creation of graphical elements of your interface:
  Creation of graphic elements according to your graphic charter, graphic modernization of your existing HMI.

The HMI
Human-Machine Interface
OUR PHILOSOPHY

STEP 1
BRING YOUR PRODUCT/EQUIPMENT

STEP 2
SELECT THE TYPES OF TESTS OR STANDARDS ACCORDING TO THE DESIRED RESULTS

STEP 3
DESIGN OF YOUR TEST BENCH BY OUR DESIGN OFFICE

STEP 4
RECEPTION OF YOUR TAILOR-MADE TEST BENCH

OUR MACHINES FOR SANITARY EQUIPMENT

HYDRAULIC TEST BENCHES

<table>
<thead>
<tr>
<th>Type</th>
<th>Catalog</th>
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<tbody>
<tr>
<td>Performance Test Bench</td>
<td>HPMM</td>
</tr>
<tr>
<td></td>
<td>HPMT</td>
</tr>
<tr>
<td>Endurance Test Bench</td>
<td>HE</td>
</tr>
<tr>
<td>Demonstration Test Bench</td>
<td>HD</td>
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<tr>
<td>Adjustment Bench</td>
<td>HRC</td>
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<td></td>
<td>HRM</td>
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<tr>
<td>Test Loop</td>
<td>HBPC</td>
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<td></td>
<td>HBPTC</td>
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<td></td>
<td>HBTC</td>
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<tr>
<td>Cycle Pressure Test Bench</td>
<td>HPC</td>
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<tr>
<td>Flow/Pressure Test Bench</td>
<td>HDP</td>
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SUPPLY OF SANITARY EQUIPMENT

<table>
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<tr>
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<tbody>
<tr>
<td>Hot Water/Cold Water Generator</td>
<td>HG2D</td>
</tr>
<tr>
<td>Hot Water/Cold Water Test Bench</td>
<td>HG12</td>
</tr>
<tr>
<td>Complete Testing Laboratory</td>
<td></td>
</tr>
<tr>
<td>Standalone Performance Test Bench «Skydrobench»</td>
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</table>

COMPREHENSIVE SOLUTIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Catalog</th>
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</table>
Main Functions

The performance test benches HPMM and HPMT are designed to test mechanical resistance and hydraulic characteristics of faucets, mixing valves or thermostatic and mechanical mixers. They are able to simulate a multitude of water supply conditions and perform an accurate analysis of the response of your devices to temperature (HW), flow and pressure (HW, CW) variations. These performance benches have been designed to meet the needs of:

- R & D during their product design phase;
- production department for routine tests;
- laboratories for characterization, qualification and compliance with standards.

A system of automatic control of measuring instruments makes it possible to realize independent standardized tests and the delivery of a documented report.

Applications

- Mechanical mixers and mixing valves
- Thermostatic mixing valves

Mechanical mixers and mixing valves

Linear actuators and rotary actuators adjust flow rates and temperatures.

Thermostatic mixing valves

Two rotary actuators are positioned on the thermostatic mixing valves to start a complete test according to NF standards.

Applications

- Mechanical mixers
- Thermostatic mixing valves

Mechanical mixers

The performance bench is suitable for carrying out endurance tests on mechanical mixing faucets.

Operating Procedure

The test bench generates an adjustable pressure by means of servo pumps. Motorized actuators control the movement of the control levers of faucets, mixers, mechanical and thermostatic mixing valves. These actuators are installed on a "C" beam that allows flexible fixing of taps. When the devices to be tested are positioned on the test bench, the pre-programmed test scenarios will take place to measure and adjust pressures, flow rates, temperature, torque and operating force.

Technical Characteristics

- HW/CW flow: 0-25 l/min
- HW/CW pressure: 0-6 bar
- Pressure measurement: ± 0.01 bar
- HW, CW, MW flowmetering: ± 0.1 l/min
- Automatic movements

Options

- Additional rotary actuator
- Additional linear actuator
- By-Pass hot/cold
- Distributor of mixed water
- Static pressure test: 14 bar
- Detection of internal/external leaks
- Lowering of HWT
- Internal vessels of temperature control

Tests according to standards

NF EN 200 EN 817 EN 1111

1 - Faucet under test 2 - Rotary actuator 3 - Pressure measurement 4 - PC control 5 - Hydraulic assembly
Endurance test bench

Ref: HE

The endurance test bench is designed to measure the service life of faucets, mixers, diverters, mechanical and thermostatic mixers according to NF, EN et ASSE standards. The machine is equipped with a software that automatically records the behavior of the faucet during the entire test cycle (operating torque, sealing, pressures and temperatures). A malfunction detection system installed on the tested faucet, automatically stops the test in progress to protect both the product and the equipment.

MAIN FUNCTIONS

- Fixation of the faucet to be tested on the central stage
- Adjustment of the faucet position
- Assembly of the actuators on the faucet that control the rotational or translational movements (rotary and linear actuators)
- Programming the test to be performed on the control screen
- Starting the scenario
- Automatic termination in case of leakage or abnormal operating torque.

ADVANTAGES

- Quick and easy installation of faucets of any form.
- Simply set the test to be performed on the control screen.
- Launch and follow up of simple tests thanks to PC control.
- Closed enclosure for protection against potential water splashes.

APPLICATIONS

- ELECTRONIC MIXING VALVES: Triggering the valve by the passage of an actuator in front of the cell.
- SELF CLOSING FAUCETS: Test of the faucet service life by repeated operations.
- LAVATORY COVERS: The ring seat and the cover are fixed on a stage that simulates the grip on a toilet bowl.

OPERATING PROCEDURE

- Fixation of the faucet to be tested on the central stage
- Adjustment of the faucet position
- Assembly of the actuators on the faucet that control the rotational or translational movements (rotary and linear actuators)
- Programming the test to be performed on the control screen
- Starting the scenario
- Automatic termination in case of leakage or abnormal operating torque.

TECHNICAL CHARACTERISTICS

- HW/CW flow: 0-25 l/min
- HW/CW pressure: 0-6 bar
- Pressure measurement: ± 0.01 bar
- HW, CW, MW flowmetering: ± 0.1 l/min

OPTIONS

- Additional rotary actuator
- Additional linear actuator
- By-pass hot/cold
- Distributor of mixed water
- Static pressure test: 16 bar
- Detection of internal/external leaks

TESTS ACCORDING TO STANDARDS

- NF 077
- NF EN 200
- NF EN 1287
- NHS D08
- Doc. Tech 2
- ASSE 1016
The test and demonstration bench is compatible with all types of faucets. Its function is to perform simple tests in manual mode to control and measure:

- leaks by generating hot and cold water pressures, up to 10 bar in closed flow;
- flow rates;
- pressures;
- hot, cold and mixed water temperatures.

The equipment has been designed for specialized stores that wish to equip themselves with a system that allows them to perform rapid tests or to demonstrate the proper functioning of a faucet.

### MAIN FUNCTIONS

### ADVANTAGES

### SIMPLE CONFIGURATION

The bench is equipped with two pressure setpoint controls (HW/CW) for simple bench adjustment.

### COMPACT SOLUTION

Ergonomic unit, very compact and easily transportable.

### INDEPENDENT ADJUSTMENT

The HW pressure is adjusted independently of the CW pressure.

### EXPANDABLE SINK

The bench has two sinks that adapt to the type of a faucet tested.

### OPERATING PROCEDURE

- After installing the faucet to be tested, the user sets the two independent inlet pressures (hot water/cold water). The bench manages the servo-control of the pressure.
- A flying probe measures the temperature of the mixed water.
- The display shows pressure, temperature and flow measurements of the hot and cold water.

### APPLICATIONS

### TECHNICAL CHARACTERISTICS

- Max flow: 2-25 l/min
- Inlet pressure: 0 to 4 bar
- Outlet pressure: 6 to 10 bar
- DeltaP: ± 1 bar
- Pressure measurement: ± 0.01 bar
- Temperature measurement: ± 0.2°C
- Flow measurement: ± 0.1 l/min

### OPTIONS

- Antiscald test
- Initial draw test thanks to a hot/cold bypass

### TESTS ACCORDING TO STANDARDS

- EN 817
- EN 1111
- Doc Tech 3
- Doc Tech 4

1 - Control screen
2 - Cold/Hot pressure control
3 - Test valve
4 - Expandable sink

**Test & demonstration bench**

Ref: HD
Cartridge adjustment bench
Ref: HRC

MAIN FUNCTIONS

The cartridge adjustment bench is a machine destined to adjust the position of the cartridge temperature control to test its performance. The HRC bench allows you to:

- test air and water sealing;
- do the measurement of the mixed water temperature in warm conditions;
- automatically adjust the temperature and manually the flow of the mixed water;
- measure the antiscald and hysteresis;
- mill the cartridge to find the position of the preset temperature;
- dry the cartridge by blowing air.

APPLICATIONS

TEMPERATURE AND FLOW ADJUSTMENT
The pumps provide water at the desired pressure and the machine automatically sets the mixed water temperature.

PERFORMING NUMEROUS TESTS
Leakage test, flow rate, antiscald and hysteresis, mixed water temperature in full heat, pressure variation, etc.

MARKING OF THE 38°C POSITION
Automatic milling of the cartridge to identify the position of the predefined mixed temperature and chip extraction.

ADVANTAGES

REPRODUCIBILITY
Speed and repeatability of tests and adjustments.

AUTOMATIC CLAMPING
Automatic clamping and unclamping of cartridges in complete safety.

AUTOMATIC REPORTS
Archiving of all production controls through the editing of automatic test reports.

DETECTION OF TOOLING
Automatic detection of tooling according to the cartridge and chosen test.

OPERATING PROCEDURE

- Installing the cartridge
- Air and water sealing test
- Mixed temperature setting
- Flow measurement
- Antiscald test (safety test) and hysteresis measurement
- Marking of the set position (optional)
- Emptying and blowing the cartridge

TECHNICAL CHARACTERISTICS

- HW/CW flow: 0-25 l/min
- HW/CW pressure: 0-6 bar
- Max HW temperature: 70°C

OPTIONS
- Automatic marking of a rotating marker
- Distributor of mixed water
- Blowing of the cartridge
- Automatic tooling detection

TESTS ACCORDING TO STANDARDS
- EN 1111
- Doc Tech 4

Cartridge Adjustment Bench
Mixer setting Test Bench

Ref: HRM

MAIN FUNCTIONS

The thermostatic mixing valve is a faucet that delivers water at a constant chosen temperature, whatever variations of the inlet flow, temperature and pressure. LF Technologies has developed an adjustment bench for these thermostatic mixing valves that allows the mixer to be adjusted and checked for proper operation.

Its main functions are:
- testing air and/or water sealing;
- measurement of the mixed water temperature in warm conditions;
- adjusting the temperature and flow of the mixed water;
- measure the antiscaid and hysteresis.

APPLICATIONS

THERMOSTATIC MIXING VALVES

Check of the safe temperature limit on thermostatic mixing valves.

CENTRALIZED THERMOSTATIC MIXING VALVES

Adjustment and testing of mixing valves with high flow rates.

THERMOSTATIC VALVES

A module integrated in the mixing valve test bench makes it possible to check the antiscaid operation on faucets.

ADVANTAGES

REPRODUCIBILITY

The implementation of a control software makes it possible to perform fast and repeatable automatic tests.

CLAMPING/UNCLAMPING

Automatic clamping and unclamping of cartridges in complete safety.

ERGONOMICS

The configuration is done on a touch screen and the operations are controlled with 3 front buttons.

REMOVABLE STAGES

Simple and fast interchangeability of different test stages.

OPERATING PROCEDURE

The thermostatic mixing valve is installed on the adjustment bench with automatic clamping without screwing. The operator sets the adjustment of the mixed water temperature. The mixing valve is supplied with air and then with water to test its tightness. To do this, a pneumatic valve closes the mixed water outlet. The water supply is managed by 2 pressure-controlled pumps. Once the test is finished, the mixing valve is emptied and dried. The operator can start and stop the tests using three control buttons located on the front panel of the machine.

TECHNICAL CHARACTERISTICS

- HW and CW pressure: 0 to 5 bar
- Accuracy of the pressure control (static pressure): ± 0.01 bar
- Accuracy of the pressure control (dynamic pressure): ± 0.05 bar
- Max HW temperature: 80°C

OPTIONS

- Automatic marking of a rotating marker
- Distributor of mixed water
- Mass flowmeter

TESTS ACCORDING TO STANDARDS

EN 1111 Doc Tech 4
Hydraulic hoses and couplings connect pumps, dispensers, actuators and other hydraulic components to reach the phase of breaking. They must withstand large ranges of pressure. To test their resistance to pressure, the HBPCE “Test Loop” test bench performs tests at high pressure (up to 1,800 bar) and at high temperature (up to 200 °C) to reach the phase of breaking. The bench is equipped with a fluid recovery sink as well as a double temperature regulation system that ensures homogeneity of the temperature in the thermal enclosure. All tests are controlled by a PC that automatically generates temperature and pressure ramps and detects the bursting or leakage of the test product.

**APPLICATIONS**

- **HOSES**
  The test loop performs tests on automatic brake hoses.

- **SANITARY PIPES**
  The product is tested until leak detection or bursting.

- **PUMPS AND CIRCULATORS**
  Tests can be performed at high pressure and high temperature until the bursting of a sample.

**MAIN FUNCTIONS**

A low pressure lift pump sucks the liquid into a container. This liquid is delivered, via a valve, into a vertical chamber of small volume. The upper part of the chamber is located inside the thermal enclosure. This chamber is equipped with a removable part receiving adaptor fittings to the lower part of the hose being tested. The upper part of the tested hose is connected to a servo-controlled damper valve, mounted on a vertical slide, allowing adaptation to the length of the hose being tested. A pressure sensor, located on the body of the vertical chamber, enables measurement and transmission of pressure applied to the hose.

**ADVANTAGES**

- The protection door locks when pressure or temperature is too high. It is equipped with an enveloping grid to avoid any impacts during the bursting of the hoses.
- Two servo-controlled and height-adjustable damper valves make it easy to assemble the equipment to be tested.

**OPERATING PROCEDURE**

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**TECHNICAL CHARACTERISTICS**

- Max pressure: 1,800 bar
- Accuracy of pressure measurement: ± 2 bar
- Resolution of the pressure measurement: 0.5 bar
- Accuracy of the pressure control: ± 3 bar
- Required electrical power: 7 kW

**OPTION**

- Possible tests on different fluids: brake fluid, oil, water, etc.

**TESTS ACCORDING TO STANDARDS**

- NF ISO 4038
- ISO 4926

1 - Liquid vapor evacuation turbine  2 - Lighting  3 - Lacking system  4 - Protective grille  5 - Hoses under test  6 - Servo-controlled damper valve  7 - Mobile control console
Test Loop
Pressure and cycle temperature
Ref: HBPTC

MAIN FUNCTIONS

Pumps, circulators, valves and sanitary appliances are subjected daily to pressure and temperature. To determine their level of resistance to these stresses, the HBPTC test bench performs pressure cycling and thermal shocks while controlling the progressive degradation of the sample. This “Test Loop” test bench is primarily intended for Research and Development laboratories wishing to optimize their product design.

APPLICATIONS

HOSES
Possibility of carrying out ageing tests on hoses thanks to a special integrated circulator.

CIRCULATORS
Service life test of a heating circulator pump.

BOTTOM OF BOILERS
Service life test of sanitary heating boilers.

ADVANTAGES

ENERGY SAVING
Large energy savings thanks to the optimization of hot and cold water volumes during the temperature shocks.

INDEPENDENCE OF TEST STATIONS
Different tests are carried out simultaneously on several components and independent stations.

LEAST SPACE REQUIREMENTS
The bench occupies very little floor space thanks to the dimensions of 3 x 1 m for a height of 2.20 m (for 5 independent stations).

SIMPLICITY OF ASSEMBLY
The products to be tested are easily mounted on the bench and require a minimum of operator movements.

OPERATING PROCEDURE

Once valves or sanitary fittings are installed, the device is supplied with water and undergoes cycles of pressure and temperature variations. Thanks to low volumes of hot and cold water, the HBPTC bench offers a very energy-efficient operation compared to conventional solutions on the market.

TECHNICAL CHARACTERISTICS

ENERGY SAVING

Large energy savings thanks to the optimization of hot and cold water volumes during the temperature shocks.

INDEPENDENCE OF TEST STATIONS

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APPLICATIONS

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CIRCULATORS
Service life test of a heating circulator pump.

BOTTOM OF BOILERS
Service life test of sanitary heating boilers.

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OPERATING PROCEDURE

Once valves or sanitary fittings are installed, the device is supplied with water and undergoes cycles of pressure and temperature variations. Thanks to low volumes of hot and cold water, the HBPTC bench offers a very energy-efficient operation compared to conventional solutions on the market.

TECHNICAL CHARACTERISTICS

ENERGY SAVING

Large energy savings thanks to the optimization of hot and cold water volumes during the temperature shocks.

INDEPENDENCE OF TEST STATIONS
Different tests are carried out simultaneously on several components and independent stations.

LEAST SPACE REQUIREMENTS
The bench occupies very little floor space thanks to the dimensions of 3 x 1 m for a height of 2.20 m (for 5 independent stations).

SIMPLICITY OF ASSEMBLY
The products to be tested are easily mounted on the bench and require a minimum of operator movements.

APPLICATIONS

HOSES
Possibility of carrying out ageing tests on hoses thanks to a special integrated circulator.

CIRCULATORS
Service life test of a heating circulator pump.

BOTTOM OF BOILERS
Service life test of sanitary heating boilers.

ADVANTAGES

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Thermostats and sensors are devices that check the temperature of industrial valves. Most of the time, they are in direct contact with the element to be observed (water and air).

The cycling test bench controls the heating or cooling ramps of 10 thermostats. The cycles are programmable via PC-controlled software, on which the thermostat switching values are archived as a workable Excel table.

A reheater enables the heating, while an exchanger and a chiller provide cooling of the test loop.

**MAIN FUNCTIONS**

**APPLICATIONS**

**ADVANTAGES**

**TECHNICAL CHARACTERISTICS**

**OPERATING PROCEDURE**

The chassis on wheels consists of a hydraulic circuit in a pressurized closed loop. The bench is automatically managed by a PC, equipped with a specific program. The operator presets low and high temperature setpoint values, heating period, cooling time and possibly a number of cycles. During the increasing temperature phase, the software records the opening temperature of each thermostat and during the decreasing temperature phase, the software records the closing temperature of each thermostat.

**STAINLESS STEEL CHASSIS**

The hydraulic circuit and the stainless steel chassis ensure good resistance to corrosion of the machine.

**CLOSED-LOOP CIRCUIT**

Closed-loop hydraulic system with a small volume of water (3 L) that optimizes thermal and electrical inertia.

**RECORDKEEPING**

Automatic saving of results in an Excel table.

**CONFIGURABLE RANGE**

The operating range is configurable for each of the thermostats tested.

**TECHNICAL CHARACTERISTICS**

- Heating capacity: 2,000 W
- Cooling capacity: 1,900 W
- Power supply: 230 VAC/50 Hz
- Electrical power: 3 kW
- Temperature range: 16°C to 95°C

**OPTIONS**

- Tests on PT 100 or PT 1000
- Digital/analog connection

**TESTS ACCORDING TO STANDARDS**

- NF EN 60068-2-14
- DIN EN 60751
- DIN IEC 751
This test bench is intended to perform water cyclic pressure tests on one or more products simultaneously. It simulates water hammers in piping systems or tests the ageing (accelerated) of components. It controls the absence of leakage by pressure drop or by flow detection. It also enables pressure tests for components subject to specific legislation. The shape of the stress curves is configurable. The number of cycles and their sequence are programmable. The air purge is automatic and checked by the system stiffness measurement.

**MAIN FUNCTIONS**

- **Installation and clamping of the sample**
- **Connection of the supply hose and purge hose**
- **Software configuration/program selection**
- **Launch of the test**
- **Automatic purge, servo-controlled cycling, automatic leakage monitoring**
- **Record of result**

**APPLICATIONS**

The sink drain is equipped with a drop detector to stop the test in case of detected leakage.

**TECHNICAL CHARACTERISTICS**

- **Volume Sensor**
  - This sensor optimizes the positioning of the water flow and monitors the water volume.

- **Leak Detection**
  - The sink drain is equipped with a drop detector to stop the test in case of detected leakage.

- **Security**
  - A protective cover protects both operators and tested product, while ensuring optimal visibility.

- **Energy Saving**
  - Only 10% of the required instantaneous power is installed.

**TECHNICAL CHARACTERISTICS**

- Max water pressure: 40 bar
- Max Delta volume: 1 dm³
- Max increasing/decreasing flow rate: 20 dm³/s²
- Cycle pressure: 0 to 40 bar
- Max cycling frequency: 1Hz

**OPTIONS**

- Product holders
- Different characteristics

**TESTS ACCORDING TO STANDARDS**

- NF 04/5
- NF EN 12295
Flow/pressure test bench
Ref: HDP150-16

MAIN FUNCTIONS
The HDP150-16 test bench is used to check the behavior of sanitary fitting components under high pressure and high flow rates. The software, built into the bench, provides instructions for measuring the pressure drop of piping elements.

- Control of pressure (flow measurement and pressure loss)
- Control of pressure loss (flow measurement)
- Control of flow (pressure loss measurement)
- Valve opening/closing pressure test.

APPLICATIONS

PRESSURE REDUCING VALVE
Check of the outlet pressure stability according to the inlet pressure and the flow rate.

SAFETY VALVE
Check of the opening and closing pressure of the leakage flow control valve.

HYDRAULIC SAFETY GROUP FOR HOT WATER STORAGE HEATERS
Pressure test to verify the opening and mechanical resistance of the safety valve lift control.

ADVANTAGES
CLOSED-CIRCUIT SYSTEM
Coupled with the system of control by internal tanks, this equipment allows the bench to operate in a closed circuit.

PUMP CONTROLLED BY PRESSURE OR FLOW
Pump speed automatically controlled according to pressure, flow or pressure loss.

AUTOMATIC REGULATION OF THE PRESSURE LOSS
The proportional valve is automatically adjusted to simulate a pressure loss in the circuit.

AUTOMATIC COOLING
The cooling circuit makes it possible to carry out tests with a stabilized temperature, whatever the power consumed.

OPERATING PROCEDURE
The station is equipped with a multi-stage centrifugal pump, controlled by a variator. This pump sucks the water into a tank placed inside the station, and delivers it back into the device under test, through a magnetic flowmeter. At the entrance of the tested product, a precise and fast pressure sensor enables the servo-control of the pressure. Two level sensors placed inside the tank ensure that the pump is always supplied with water.

TECHNICAL CHARACTERISTICS

- Max flow at 16 bars: 150 l/min
- Max flow: 300 l/min
- Max pressure at zero flow: 16 bar
- Accuracy of temperature measurement: ± 0.5°C
- Resolution of the flow measurement: 0.5 l/min (from 5 to 300 l/min)

OPTIONS
- Connection to an external source of cold water
- Heating system
- Linear or rotary actuators
- Static high pressure tests

TESTS ACCORDING TO STANDARDS
- NF EN 1487
- NF EN 13828
- NF EN 1567
- NF 817
- NF 1111

1 - Glass doors 2 - Tested product 3 - Adjustable product fixing system 4 - Recovery sink 5 - Trap door with built-in keyboard and mouse
The hydraulic test benches for valves need to be constantly supplied with water. LF Technologies offers a generator providing temperature regulation in a hot water tank and cold water tank. These tanks allow operation in a closed circuit, that reduces the water consumption. With a heating and cooling capacities of 2x30 kW, the HG2D-35 generator provides a mixed flow of 28 liters per minute with a Delta-T° of 50 °C. Thanks to its energy recovery system, this equipment consumes only 35 kW of electricity for a thermal power of 60 kW. Combined with benches equipped with hot and cold water distributors, the energy consumption is reduced to its maximum when the tested faucets are not in the mixing position (see Endurance Tests Full Hot/Full Cold).

**MAIN FUNCTIONS**

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**APPLICATIONS**

The water generator can feed simultaneously several endurance stations according to the selected tests. The hot water/cold water generator can simultaneously supply two endurance stations and one performance station, or two production stations (adjustment 38 °C to 12 l/min).

**ADVANTAGES**

ENERGY SAVING

Energy recovery through the use of a heat pump.

CENTRIFUGAL PUMPS

All circulations of fluids are made by centrifugal pumps servo-controlled in speed.

INSULATED CONTROL TANKS

The tanks are made of double skin stainless steel with polyurethane insulation.

PC-CONTROLLED SYSTEM

The PC has a program that provides temperature control at ± 0.2 °C, regardless of the flow rate.

**OPERATING PROCEDURE**

A chilled water tank is cooled by a heat pump. This heat pump transfers some of the calories “pumped” into the cold reserve to the hot water tank. The control of the cold water vessel is done by controlled exchange with the chilled water vessel. The control of the hot water vessel is finalized by an electrical resistance. The surplus total heat (part not recovered by the heat pump) is discharged by an air heater, that can be offset from the generator to serve as heating in winter for example. Each tank is equipped with several temperature sensors measuring possible temperature stratification, and, in this case, trigger automatic mixing.

**TECHNICAL CHARACTERISTICS**

- Thermal heating/cooling power: 2x30 kW
- Continuous mixed water flow with Delta-T° 50 °C, 28 l/min
- Cold water min temperature: 10°C
- Hot water max temperature: 75°C
- Accuracy of temperature regulation: ±0.5°C

**OPTION**

- Anti-legionella cycle 70 °C

1 - Air heater  2 - Chilled water tank  3 - Control cabinet  4 - Hot water tank  5 - Heat pump  6 - Mixed water hot/mixed water cold return tank  7 - Cold water tank
To regulate the benches internal tank temperatures, LF Technologies has developed the "HW/CW Loop", which is used as a heating source and cooling source for the internal regulation of benches via heat exchangers. This double-stage regulation (primary in the loop, secondary in the bench) allows a very precise thermal regulation (+/- 1 °C) whatever the flow rate used. For applications that do not require high temperature accuracy (+/- 3 °C for cold and +/- 1 °C for hot), the HW/CW loop can be used as a direct water supply.

**MAIN FUNCTIONS**

The loop is equipped with 2 water containers (1 hot and 1 cold), regulated by electrical resistance and cooling unit. These tanks are equipped with a temperature measurement, level measurement and automatic filling system. Pumps suck water from the tanks to supply the bench, either directly or as a source of heating and cooling for the internal bench tanks (via heat exchanger).

**APPLICATIONS**

The hot and cold water loop system is an autonomous unit set apart in relation to the endurance, performance and adjustment benches.

**ADVANTAGES**

- **CLOSED-CIRCUIT SYSTEM**: Coupled with the system of control by internal tanks, this equipment allows the bench to operate in a closed circuit.
- **SECURITY**: The station is equipped with an emergency stop line that cuts off power to the loop.
- **LEAST SPACE REQUIREMENTS**: The hot/cold water loop has least space requirements.
- **SIMPLE CONFIGURATION**: Temperatures and hysteresis are set via the four buttons on the front panel.

**OPERATING PROCEDURE**

The loop is equipped with 2 water containers (1 hot and 1 cold), regulated by electrical resistance and cooling unit. These tanks are equipped with a temperature measurement, level measurement and automatic filling system. Pumps suck water from the tanks to supply the bench, either directly or as a source of heating and cooling for the internal bench tanks (via heat exchanger).

**TECHNICAL CHARACTERISTICS**

- Heating capacity: 20 kW
- Cooling capacity: 20 kW
- Power supply (three-phase + neutral + earth): 380 VAC - 40 A
- Automatic filling
- Hot water temperature control: ± 1°
- Cold water temperature control: ± 3°
- Max HW temperature: 75°C
- Max CW temperature: 10°C

**TESTS ACCORDING TO STANDARDS**

- NF EN 200
- NF EN 1508

1 - Control console  2 - Heat abstraction system  3 - HW/CW inlet and outlet connection board
Main Functions

The LF Technologies' design office devises and elaborates complete hydraulic test and production benches to analyze the behavior of faucets, mixers, mechanical and thermostatic mixing valves, sanitary fittings and thermostatic cartridges. Our engineers are able to offer you complete solutions for valve testing: from performance to endurance tests, by going through pressure and burst tests. All these solutions include closed-circuit hot and cold water generation systems for fully autonomous operation. Our testing laboratories are delivered to you for a quick use without commissioning delays.

Applications

- Mechanical Mixing Valves: Endurance test bench for testing the service life of faucets.
- Thermostatic Cartridges: Adjustment bench for cartridges or mixing valves.
- Thermostatic Mixing Valves: Performance test bench characterizing the behavior of faucets.

Advantages

- Large Number of Tests: Ability to perform many tests: endurance, performance, flow measurement, pressure, temperature, etc.
- Least Space Requirements: The complete testing laboratory combines several test benches into one, thus limiting space requirements.
- Energy Saving: A mixed water distributor, a heat pump and closed-loop circulation of water, all are designed for energy saving.
- Consistency of Results: Homogeneity of test reports regardless of the bench used.

Operating Procedure

The testing laboratory consists of a performance test bench, one to three endurance test benches and a generator of hot and cold water. Thanks to its modular system, it can also integrate other types of valve test benches as adjustment benches. The generator supplies the test benches with temperature-controlled water at ± 0.5 °C.

Technical Characteristics

- Performance Test Bench
- Endurance Test Bench
- Adjustment Bench
- HW/CW Generator

Tests According to Standards

- NF EN 200
- NF EN 1508
- NF EN 1287
- Doc Tech 3
- Doc Tech 4
- ASSE 1016
Autonomous performance
Test bench
Ref: Skydrobench

For a one-time need or only to evaluate the performance of your equipment, LF Technologies offers the “SKYDROBENCH” test bench for hire, with an option to buy. This complete test bench system is capable of performing performance, endurance and adjustment tests on all types of sanitary fitting. It comes with a water heater and cooling unit that works in total autonomy. The SKYDROBENCH bench and its HW/CW loop are arranged on a skid that facilitates its transport and installation.

MAIN FUNCTIONS

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APPLICATIONS

MECHANICAL MIXING VALVES
Performance characterization of mechanical and thermostatic mixing valves.

DIVERTER FAUCETS
The bench offers a function ensuring a smooth transition from bath mode to shower mode.

ELECTRONIC FAUCETS
Check of the proper functioning of the electronic control.

ADVANTAGES

POSSIBILITY OF RENTAL
The SKYDROBENCH unit is available for rental for one-time use or to test equipment before purchase.

AUTOMOUS SYSTEM
SKYDROBENCH requires only electrical and pneumatic power and operates in a closed loop.

TESTS ACCORDING TO STANDARDS
The tests are automatic and pre-programmed according to the chosen standards.

AUTOMATIC REPORTS
Analysis of results and editing of automatic test reports.

OPERATING PROCEDURE

Thanks to the SKYDROBENCH, you will be able to carry out performance and endurance tests, customized or according to standards, on all types of sanitary faucets: single faucets, mixers, mechanical mixing valves, thermostatic mixing valves, self-closing faucets, electronic faucets. Throughout the duration of the SKYDROBENCH test bench rental, including transport, the commissioning, training, tailor-made setup and telephone support are included.

TECHNICAL CHARACTERISTICS

- HW/CW flow: 0-25 l/min
- HW/CW pressure: 0-6 bar
- Pressure measurement: ± 0.01 bar
- HW, CW, MW flowmetering: ± 0.1 l/min
- Heating/cooling capacity: 2x20 kW

OPTIONS
- Performance Test Bench
- Endurance Test Bench
- Adjustment Bench

TESTS ACCORDING TO STANDARDS
- NF EN 200
- NF EN 1508
- NF EN 1287
- Doc Tech 3
- Doc Tech 4
- ASSE 1016
Options according to your application

The distinctive feature of LF Technologies is to offer you unique hydraulic test benches that test your product according to your equipment and current standards.

Our expertise consists in designing a fully customized test bench around your application.

- **STATIC PRESSURE TESTS UP TO 16 BAR**
  A piston plunger allows to carry out static pressure tests up to 16 bar, with automatic detection of leaks.

- **DETECTION OF INTERNAL/EXTERNAL LEAKS**
  The internal and external leak detection system consists of two sensors. The first is placed at the outlet of the faucet to check that it is not dripping when it is in the closed position (internal leak). The second is positioned at the recovery sink to detect abnormal leaks (external leakage) and stop the testing process and water supplies.

- **DISTRIBUTOR**
  When the water supply circuit of a test bench is a closed one, the distributor returns the water mixed by the faucet to the hot water circuit on one side and cold water on the other in proportion to the temperature. Thanks to this system, the heating and cooling capacities of the hot water and cold water generator can be greatly reduced.

- **MOTORIZED HINGE BRACKET IN ROTATION**
  Motorized hinge bracket facilitates precise positioning of the valve against the fixation beam of the actuators along two axes (translation and rotation). The program control allows the user to store a particular test position associated with a certain type of faucets.

- **AUTOMATIC MARKING OF A ROTATING MARKER**
  The automatic marking allows to make a mark on the temperature control and the body of the cartridge. This marking is associated with a specific adjustable temperature adjustment position (usually 38°C) in order to correctly position the cartridge in the faucet during assembly.

- **ANTI-LEGIONELLA CYCLE 70 °C**
  To remove a maximum of legionella, this module heats the hot and cold water loops up to 70 °C in all the generator and bench piping.

- **ACTUATORS**
  **ROTARY ACTUATOR**
  The rotary actuator turns on rotating valve controls (mixer and thermostatic mixing valve). It is equipped with a torque and position measurement, and can be controlled in position, speed and torque. The output shaft is a splined hollow shaft that is able to fit a multitude of tools. It can also be coupled to a linear actuator (operation of single-lever mechanical mixers, for instance).

  **LINEAR ACTUATOR**
  The linear actuator allows to operate the valve controls such as mechanical mixing valve flow, diverter controls, self-closing faucets. It is equipped with a force and position measurement, and can be controlled in position, speed and force.

- **TEMPERATURE REGULATION**
  **INTERNAL TANKS OF TEMPERATURE CONTROL**
  The tanks regulate, with high precision, the hot and cold water supply temperatures of the bench. Thanks to their limited volumes, the change of temperature setpoint is carried out quickly. The heating and cooling capacities are provided by external water supplies (existing circuit or independent HW/CW loops).

  **RAPID TEMPERATURE DECREASE**
  LF Technologies offers an optional system that controls a decrease of 10 °C of the hot water temperature in a few seconds. It can be used in particular to characterize the behavior of thermostatic mixing valves creating a sudden variation in the temperature of the hot water inlet.

- **AUTOMATIC MEASUREMENT, ANALYSIS AND REPORTING**
  **STANDARDIZED TESTS**
  LF Technologies has integrated, in all its machine control interfaces, a wide variety of pre-programmed tests that meet the applicable standards, namely: ASTM, ISO, BS, EN, DIN and JIS. These configurations involve test parameters, operation mode or even expected measurements and analyses. The standardization of tests aims to facilitate the bench operating experience.

  **REAL TIME DISPLAY OF RESULTS**
  The interface, developed by LF Technologies engineers, displays in real-time the results observed during the tests. Operators can quickly check the good progress of the test through a clear display.

  **AUTOMATIC EXPORT OF DATA**
  LF Technologies understood the need of customers to collect various test reports. That is the reason why, through its machine interface control, you can directly print and save a file containing test results, test procedure parameters, product information, date and user comments. All automated analysis and report modules quickly edit documents - in spreadsheet and PDF formats - with automatic curve analyzes according to defined test standards or internal criteria. These reports are a real asset for a reliable and quick processing of test results.
Designer and manufacturer of hydraulic test benches

CSTB, the French Scientific and Technical Centre for Building, has as a mission to guarantee the quality and safety of buildings.

This organization is carrying on four activities:
- research and expertise;
- evaluation;
- certification;
- dissemination of knowledge.

CSTB is a Technical Assessment Body that conducts tests on sanitary and industrial valves. It evaluates, under close to actual operating conditions, their performance and endurance.

Certification a guarantee of confidence

The certification recognizes that the characteristics of a body, component or part are in conformity with those described in a frame of reference. This frame of reference defines the certified characteristics of a product, performance to be achieved and control methods. This sign of quality aims to reassure users in the advantages of an offer, in connection with targeted expectations. This voluntary initiative gives players a visible means of differentiating their offer from competition. For more information on the certification of your products, in the field of building and more particularly in sanitary fitting, please contact CSTB.

CERTIFICATION A GUARANTEE OF QUALITY

- Consistency of production and product performance
- Product adapted to its use
- Clear, objective and published information that facilitates the recognition of quality

LF Technologies at the heart of certification

LF Technologies is a privileged partner of the CSTB certification body. For twenty years, our company has been designing test benches and special machines to evaluate the conformity of faucets, equipment and sanitary components.

Examples of facilities present at CSTB

- ENDURANCE AND MEASUREMENT TEST BENCH
- TEST BENCH FOR SELF CLOSING MIXING VALVES
- ENDURANCE TEST BENCH FOR LAVATORY COVERS
- TEST BENCH FOR FLUSH TANKS
- TEST BENCH FOR MECHANICAL MIXING VALVES
- CONTROL CENTER FOR ENDURANCE STATIONS
**Standards versus Marks**

How do standards and quality marks work in Europe?

**CERTIFICATION BODY**
Approved standards originate in work conducted at different levels: global (ISO, IEC or ITU), European (CEN, CE-NELEC or ETSI) or national.

**STANDARDS**
The approved standards are frames of reference which technical value is recognized and officialized by the public authorities, in particular to serve as a reference in regulation, public market, certification mark... Certification as a standard is attested, according to the level at which they were developed, by prefixes such as "NF EN", "DIN EN", "UNI EN", etc.

**QUALITY MARKS**
Quality or certification marks are granted to products that comply with defined rules. They are based on a reference frame that was designed by a certifying body and published in the Official Journal. Being certified requires being audited by an independent third party. The frame of reference of a quality mark is generally based on a standard (by modifying or supplementing it). Example: the NF mark, issued by AFNOR and CSTB, is based on the valve sector on NF-EN standards, supplemented by "technical documents" that are provided by CSTB.

**How are standards transformed in each European country practically?**
Taking the example of the European Committee for Standardization CEN, it is possible to see that all European countries will adapt nominally this approved standard. The EN-XXXX standard will thus become the NF-ENXXXX standard in France. Certified external laboratories will give audited products a certification in reference to a quality standard or mark.

**Overview of standards and marks**

<table>
<thead>
<tr>
<th>Country</th>
<th>Standards</th>
<th>Quality marks</th>
<th>Main laboratories</th>
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<td>Europe</td>
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<tr>
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<td>Other international organizations</td>
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</tr>
</tbody>
</table>

| UK*       | NHS D08      | TMV3          | NSF              |

* Hospitals and healthcare facilities

**Note:** The table is not exhaustive. It aims to present certain quality standards and marks in and outside Europe. The scope of LF Technologies’ activities extends worldwide.

**Beyond french standards...**

LF Technologies is able to design hydraulic test benches that meet the quality standards or marks in each country at a global level.

**Case study:**
The company has designed an endurance test bench for mechanical mixing valves cartridges on behalf of a Finnish customer. This bench had to meet the SFS-EN817 standard to perform endurance and performance tests (accuracy, sensitivity, flow determination) on six modules simultaneously.

As part of a development of its products throughout Europe, the customer decided to work in collaboration with LF Technologies to create hydraulic test benches, with great flexibility of processing and analysis of sanitary components, able to meet the different standards that govern the European markets.

Test bench for mechanical mixing valves cartridges
Tailored Test Benches

A team of your service

Our engineering teams accompany you at every stage of your project:
- analysis of test requirements and standards;
- definition of the specifications;
- proposal for a complete, efficient and innovative technical solution;
- on-site installation, commissioning and user training;
- maintenance and calibration services for your equipment;

“Handmade” solutions

The design office of LF Technologies focuses its concerns on your products (sanitary or industrial valves equipment) to conceive hydraulic test benches meeting the highest requirements in terms of national and international standards. Depending on your specifications, our engineers can propose you specific options/developments of our standard benches or customized machines entirely designed according to your specific need. Each of our machines is unique in order to adhere as closely as possible to the requirements of your product, your industry and the expected performance.

Simplicity of the Human-Machine Interfaces, machine ergonomics, protection of operators and repeatability of the tests are equally the criteria of great importance in the ideation of the test benches of tomorrow.

Knowledge of standards, high technology of our machines and our numerous partnerships with certification bodies make LF Technologies a key player in the field of hydraulic testing. Our teams accompany you at every stage of your project, from the conception of the test benches in 3D to the implementation of the test machine on your site.

We leverage our 20 years’ experience to advise you on the functionalities to integrate to the test bench and to refine your specifications for a result that will live up to your expectations.
Multiple possibilities of products to be tested

During its 20 years of experience, LF Technologies has developed a wide range of hydraulic test benches for faucets and sanitary equipment (valves, shower cabins, shower heads, hoses, drain plugs, etc.). The characteristic of the company lies in its ability to offer solutions that are fully customized and modular to accommodate a plurality of products on the same bench. Speed, simplicity and reproducibility are the key words of these test benches.

Efficiency of the test

REPRODUCIBILITY OF RESULTS

Thanks to the technical quality of our designs and products, we guarantee reliable results. The accuracy and reproducibility of our benches ensures complete confidence in your test results.

Implementation ergonomics and Human-Machine Interfaces allow you to perform your tests quickly and easily.

INTUITIVE SOFTWARE

Our software is systematically adapted to your specifications for a simple and intuitive use while ensuring a total traceability of your test data.

AUTOMATIC REPORTS

The automatic analysis and reporting module enables you to edit your test reports in PDF, Excel or interfaced with your own databases.

Some of the solutions provided

- **MECHANICAL SIMULATION BENCH**

  In collaboration with the customer’s R&D department and in keeping with its specifications, the LF Technologies design office defines the test conditions: force, speed, power and temperature. All these data can be configured to set the operating cycles: thermal shocks, pressure resistance, acceleration and braking, centrifugal force, variable climatic environments, etc. Tailor-made benches perform tests under real conditions suited to your product. Examples of realizations: test benches for railway couplings, hydraulic jacks for submarines, sanitation facilities, nuclear power plant ball valve, tearing straps for aeronautics.

- **HYDRO-MECHANICAL TEST**

  LF Technologies’ know-how in hydraulic and mechanical technologies enables it to design test benches integrating these two processes for a comprehensive solution. Hydromechanical test benches are used for pressure cycling applications of high amplitudes (0 to 2,000 bar), pressure bursting, mechanical stress of traction/torsion under pressure, measurement of the operating torque of pressure valves and fluid circulation at variable temperatures (-40 °C to + 300 °C).

- **FLEXIBLE ASSEMBLY CELL WITH BUILT-IN TEST**

  The assembly of sensitive products (medical, nuclear, armaments) requires a unitary control and a total traceability.

  LF Technologies develops assembly cells (fitting, crimping, screwing, marking) integrating a control phase at each stage (presence and conformity of the sub-unit, assembly effort). All these data together with the operator identification are saved and associated with the marking number of the product assembled by the cell.

- **MOBILE TEST BENCH**

  LF Technologies provides you with mobile and stand-alone test solutions that allow you to verify procedural compliance directly on your installation.

  Examples of LF Technologies’ realizations: measurement of insulation coating delamination on a pipeline, injection of tracer for flow measurement in a nuclear power plant circuit, impactor for aeronautical cabins.
This “SUBEA” test bench by Decathlon has been designed to test the resistance and performance of diving fins. An articulated leg, equipped with a flipper, allows to recreate swinging movements from top to bottom to reproduce identically the stress exerted by the Human on the equipment throughout the practice of diving. The machine is fully controlled by a management interface that analyzes and measures stress applied to the fin.

A product development and demonstration machine

Faucets, toilet seats, WC cisterns, showers and even hoses are hydraulic products for which LF Technologies is able to offer simplified test benches for final consumers. Small in size, the machines fit perfectly into the environment of supermarkets and hypermarkets and become an asset of seduction for customers who can observe in real time the behavior of equipment under full load.

Building a relationship of trust
The inability to try certain products is a real constraint that frustrates consumers. With LF Technologies “general public” test benches, it is now possible for retail chains to bring to the forefront a strong marketing advantage and create a new consumer experience. The product is tested in real time, under the eyes of passersby, and this for several hours to measure their degree of resistance.

Custom design
LF Technologies works in close collaboration with an industrial designer who brings aesthetic improvements to the testing machine, without impacting its features, so that it is visually attractive and ergonomic while being in accordance with the communication policy of the brand.

A laboratory machine
Demonstration of the performance of fins to future buyers is not the only function of the SUBEA machine. It is also a great tool for developing new technologies. This test bench makes it possible to design a fin that answers the following questions: Which product, for which user, under which conditions? Leave no room to chance to create a fin in total adequacy with its use and its users.
The test loop for pressure valves and thermal shocks is intended to perform cyclic water pressure tests, and thermal shocks on a product. A pressure difference is applied upstream and downstream of the valve up to 270 bar DeltaP. The bench, which is equipped with a special circulator that can reach up to 300 l/min for a DN40, allows to carry out a thermal shock of 20 to 285 °C on the valve, in a circuit under pressure up to 270 bar.

**MAIN FUNCTIONS**

**Pressure valves and thermal shock test loop**

The operator installs and fixates the valve on the removable support and then positions and locks the valve in the test area. The valve ports are connected to the water inlets and outlets. The operator couples (or electrically connects) the operating and parts. The doors are then closed manually and lock automatically. A Human-Machine Interface (HMI) allows to create and save test routines. The test can be started.

**ADVANTAGES**

- **EASILY POSITIONED ACTUATOR**
  The actuator has been designed to be easily positioned and equipped with a torque measurement system.

- **PRESSURE CONTROL**
  System allowing to adjust and regulate pressure accurately.

- **REMOVABLE STRUCTURE**
  The support structure of the test bench for pressure and thermal shock valves is equipped with wheels to facilitate its installation.

- **ROTATING AND REMOVABLE WATER SUPPLY**
  Water inlets are rotating and removable.

**EXPLANATORY LEGEND**

1 - Inlet pressure 0-270 bar
2 - Height-adjustable removable support
3 - Actuator 1,000 Nm
4 - Outlet pressure 0-270 bar
5 - Rotating coupling
6 - Double hinge safety doors
7 - Table lock
8 - Purge system sight glass
SOME CUSTOMER REFERENCES
AESTHETICAL AND TECHNICAL TEST BENCHES

Because machines must not only be functional, LF Technologies adds a stylistic approach to the design of its hydraulic test benches. Our engineering teams work in partnership with an industrial designer who integrates the notions of form and appearance to imagine tomorrow's test equipment.

REFLECTION ON PRODUCT POSITIONING
Understand the positioning of the brand and client's offer to conceptualize test benches that will respond to the identity issues.

ANALYSIS OF THE BRAND ENVIRONMENT
Identification of color codes and linear layout. This phase allows to create a machine that will fit perfectly into the brand landscape.

MODELING OF THE TEST BENCH
Combination of aesthetic and machine-use research elements to create a powerful visual identity.

ADVANTAGES

- ASSURANCE OF A QUALITY PRODUCT
For a customer, to see the product tested in real time is a guarantee of product quality. The test benches, that test the equipment you sell, carry many elements of reassurance to the end customer. Performance, endurance or resistance are all guarantees for the customer who will more easily make a purchasing decision.

The test bench for your end-user audience is a real innovation that shows, in an indisputable way, the reliability of the products you market.

- TESTS IDENTICAL TO THOSE OF LABORATORIES
LF Technologies' machines, for specialist brands, exhibitions or distribution networks, have the same level of technology as the test benches present in the laboratories. They carry out the same test procedures such as repeatability of tests, analysis of the product behavior under mechanical stress or determining the product rupture.

Their particularity lies in a resolutely more attractive and appealing design for commercial use. According to your needs, more simplified versions of test benches can be studied and developed by our engineering office.
The possibility of renting and trying

For a specific need or to evaluate our equipment, we offer you the possibility to rent our machines, for a week or month, to test them and to ensure that they meet your expectations. The rental can be done on our premises, or directly on site. Commissioning, on-site training and support are provided by our specialized technician. The rental has an option to purchase if the machine offers you satisfaction.

Certified Equipment

In order to control technical, human and environmental risks, all our test benches meet the CE manufacturing criteria and the Machinery Directive. To ensure their compliance, we also offer you the possibility of having our machines certified by accreditation bodies, in particular APAVE, DEKRA and VERITAS. These organizations perform three levels of control: one in the course of study, one on the finished machine and the last one when it is put into service in your premises. These certifications assure you of the safety and quality of our machines.

Engineers at your disposal to provide you with advice

The experts at LF Technologies are at your disposal to answer all your requests. Whether you choose a machine or a test, reduce your operating costs, speed up the marketing of your products or test new equipment, all our engineers are there to offer you the solutions and adapted equipment, and will accompany you at every stage of the project.

A customer service for the sustainability of your equipment

LF Technologies ensures proper implementation of test benches in your premises by offering various services, such as on-site installation, monitoring of our machines through maintenance operations, servicing and revision, on-site assistance as well as consultancy and training. We intervene, in particular, on the changes of spare parts and calibration of the sensors.