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 impact 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.
The synergy of 3 areas of expertise

WHAT ARE OUR BUSINESSES?

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’ know-how is materialized in three areas of expertise:

- The Hydraulic division for all tests on sanitary and industrial fitting
- The Mechanical division to characterize the behavior of products and/or specimens
- The Special Machinery 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

- VALVES
- HYDRAULICS
- NUCLEAR
- ENERGY
- CONSTRUCTION
- INDUSTRY
- MEDICAL
- MECHANICS
- COMPOSITES
- AUTOMOTIVE
- AEROSPACE

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.

ASSEMBLY AND CONTROL BENCHES

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 PHILOSOPHY**

**STEP 1**
BRING YOUR PRODUCT

**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 BENCH

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**A TEAM AT YOUR SERVICE**

Our engineering teams accompany you at every stage of your project:
- Analysis of test requirements and standards
- Definition of specifications
- Proposal of a complete, efficient and innovative technical solution
- On-site installation, commissioning and user training
- Maintenance and calibration services for your equipment

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**EFFICIENCY OF THE TEST**

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

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

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**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.
Mechanical test benches

Our mechanical test benches perform tensile, compression, torsion, bending, creep, fatigue, peel or impact tests for all types of products or standardized specimens.

We offer unique and tailor-made testing and simulation solutions built around your product and meeting all the requirements of your specifications.

Ergonomic and easy to use thanks to Human-Machine Interfaces, our benches allow you to optimize your testing processes for quality control in production, product optimization in R & D or certification according to French and international standards.

Our benches are designed to bring you great comfort of use, thanks to their usability, while guaranteeing an optimal safety of the users.

The reliability and high technology of our machines allow you to perform extremely accurate and easily reproducible mechanical tests.

The accuracy of the results obtained during the whole duration of the tests will help you to analyze the behavior of your products in a simple and quick manner. Our mechanical test benches are part of your approach to continuous improvement and certification of your products.

THE TYPES OF TESTS

TRACTION  COMPRESSION  TORSION  BENDING  CREEP  IMPACT  FATIGUE  PEEL
How to choose the ideal test bench?

Characterizing the behavior of a complete material, element or system requires equipment that is perfectly suited to the product. Our philosophy is to conceive and build the machine around your product to ensure an optimal test result with an exact simulation of the actual conditions of use.

The 4 questions you need to ask yourself

Which product to test?

Characterizing the behavior of a complete material, element or system requires equipment that is perfectly suited to the product.

What tests should I apply?

Our test benches allow you to perform independently or simultaneously functions of traction, compression, torsion, peel, creep, fatigue and impact. Our engineers can help you determine the optimum testing parameters to best approximate the conditions of use of your product or to comply with existing testing standards.

What is my test environment?

We study your machine according to its environment to maximize the effectiveness of your tests. Optimization of shape or material, performance measurement, durability testing or sorting of non-compliant parts, the test environment involves different analysis functions and ergonomics.

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 products compliance, edit an automatic test report, or save the data in your own database.
A solution to your needs

Testing solutions for a wide range of applications

With more than 20 years of experience in mechanical test benches, LF Technologies provides high-tech solutions for industries that wish to test and analyze the performance, endurance and resistance of samples or products such as metals, plastics, composites or elastomers.

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 mechanical 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.

Security

At LF Technologies, user safety 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 resist high energy impacts due to deterioration of the products being tested, while ensuring maximum visibility of your product during the test. These casings are locked by tamper-evident locks. Our benches are equipped with tested product protection systems to ensure that the forces applied do not, in any case, exceed a predetermined threshold.

All safety functions are managed by a dedicated safety automaton, in parallel with all computer programs, with redundant systems ensuring total operator safety. This automaton also manages the machine reset phases after failure.

Our benches comply with the Machinery Directive 2006/42/EC and their operation is certified by an independent body of your choice (Apave, Dekra, etc.).

Expected performance

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.

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

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

Robustness of designs Reproductibility of results Precision of servo-controls

Examples of products tested on LF Technologies test benches...
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.

ACCUACY OF MEASUREMENTS AND ANALYSES/REPRODUCIBILITY
The software measures test performance up to 1 MHz and retains all test 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 number, 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.

Interaction software

The HMI, Human-Machine Interface, is the system that allows operators to interact with our mechanical test benches with ease. This advanced technology allows for a 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.

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 your user interface. Whatever the technical level of the mechanical testing machine, operators can easily interact with the contents in a safe and comfortable way.

From the study to the complete design of your Human-Machine Interface, we offer turnkey services to meet your needs in terms of ergonomics and design.

- 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.
Traction / compression machine 1 kN

MAIN FUNCTIONS

The traction/compression machine of 1 kN is a compact machine allowing to characterize the behavior of products of small dimensions in tension and compression.

- High speed approach and automatic contact detection
- Test at regulated speed in compression or traction
- Stop in force or position
- Tests cycling

APPLICATIONS

- SPRINGS: Characterization of the elastic systems elasticity with hysteresis measurement.
- SPECIMENS: Standardized form test specimens for all types of materials.
- AEROSOL SPRAYS: Possibility to test many small dimensions products.

ADVANTAGES

- COMPACT MACHINE: Easily transportable machine of small dimensions.
- SINGLE-COLUMN MACHINE: The single-column machine makes it possible to have a good accessibility to the product.
- ERGONOMICS: Simple manual control for quick tests.
- PC CONNEXION: Possibility to connect to a PC to access additional test functions (touch screen compatible).

OPERATING PROCEDURE

- Automatic feed at a high speed until automatic contact detection
- Cycle(s) of automatic loading in compression/traction in accordance with configurable program sheets
- Editing of automatic reports

TECHNICAL CHARACTERISTICS

- Force: 1,000 N
- Extension: 500 mm
- Speed: 50 mm/s
- Power: 230 VAC

OPTIONS

- Thermal enclosure
- PC connection to perform tests according to configurable profiles, display, analysis and saving of the force/displacement results

TESTS ACCORDING TO STANDARDS:

- NF
- EN
- ISO
- ASTM

1 - Ball screw  2 - Guide  3 - Manual control  4 - Force sensor

Traction / Compression Machine 1 kN
Traction / compression test bench 2000 kN

MAIN FUNCTIONS

The hydraulic traction/compression test bench allows to carry out tensile and compression tests for products of high length (extension 3,000 mm) and high resistance (max. force 2,000 kN) at a regulated and servo-controlled speed.

Automatic test functions:
- High speed approach and automatic contact detection
- Test at regulated speed in compression or traction
- Stop in force or position
- Tests cycling

APPLICATIONS

SHOCK ABSORBERS
Possibility to test all types of absorbers (hydraulic, motorcycles, trains, etc.).

HYDRAULIC JACKS
Characterization of the force/displacement performance of hydraulic jacks.

ELECTRIC CABLES
Test of tension/compression resistance of the electric cables.

ADVANTAGES

EASE OF INSTALLATION
Ease of installation with adjustable automatic height brackets.

REGULATED SPEED
The speed is regulated according to configurable cycles.

OPERATOR SAFETY
The operator is protected by a reinforced sliding cover.

ERGONOMICS
Sliding control panel, always close to the test area.

TECHNICAL CHARACTERISTICS

- Max. compression force (rod output): 2,000 kN
- Max. traction force (sensor limit): 1,300 kN
- Extension: 3,000 mm
- Max. no-load speed: 1100 mm/min
- Jack diameter: 300 mm
- Rod diameter: 160 mm

OPTION
- Measurement analysis software and automatic reporting

TESTS ACCORDING TO STANDARDS:
NF EN ISO ASTM

OPERATING PROCEDURE

- Automatic adjustment of the supports height according to the dimensions of the product to be tested
- Automatic feed at high speed until automatic contact detection
- Cycle(s) of automatic loading in compression/traction in accordance with configurable program sheets
- Editing of automatic reports

1 - Hydraulic jack 2 - Force sensor 3 - Adjustment brackets 4 - Sliding cover 5 - Hydraulic unit
The torsion test bench can test samples up to 1,000 Nm and 400 °/min, according to programmable cycles, until they break. It automatically measures torsional stiffness and deformation energy. The specimen is fixed to a shifting head, allowing to test samples of variable lengths up to 500 mm. The torque measurement is carried out by a strain gauges torquemeter, the angle of deformation by a high resolution encoder.

**APPLICATIONS**

**CARDANS**
Measurement of the service life of the mechanical transmission elements.

**COUPLINGS**
Measurement of elasticity and performance of elastic couplings.

**INDUSTRIAL VALVES**
Measurement of the actuation torque of industrial valves.

**ADVANTAGES**

- **SIMPLE FIXING**: Fixing of the product by standard interchangeable chucks.
- **SIMPLE CONFIGURATION**: Programming of automatic cycles with simple parameters.
- **ANTI-BACKLASH SYSTEM**: Zero backlash thanks to a double pre-load transmission.
- **ADJUSTABLE LENGTH**: Adjustable length thanks to a sliding head equipped with a brake.

**OPERATING PROCEDURE**

The sample to be tested is fixed on two concentric chucks. The first chuck, fixed in rotation, is mounted on a shifting head with adjustable sliding position. The second chuck is driven in rotation by a brushless geared motor equipped with an anti-backlash system. The user sets a rotation speed, min and max angle or min and max torque of the test as well as a number of cycles. The software automatically measures the coefficient of torsional stiffness as well as the energy absorbed by the sample at each cycle.

**TECHNICAL CHARACTERISTICS**

- **Capacity**: 1,000 Nm
- **Rotation speed**: 0 to 400 °/min
- **Max diameter**: 380 mm
- **Max length**: 500 mm

**OPTIONS**

- Thermal enclosure
- Torsion fatigue cycles and automatic sample break detection

**TESTS ACCORDING TO STANDARDS:**

- EN 20898-7
- ISO 18338
- ASTM A 938
- ASTM-F 543
The operator adjusts the spacing between the two pressure supports. The downforce tool descends at high speed until it automatically finds contact with the product being tested. As soon as the tool comes into contact with the product, the downforce strength gradually increases according to a programmable ramp. The descent is carried out until the automatic detection of the rupture or until the maximum programmed force is achieved. The peak of maximum force achieved is saved and displayed on the screen.

Intuitive control of starting position setting and automatic cycle start.

EASE OF USE

Progressiveness and precision of the applied force, even for fragile and low deformable materials.

ACCURACY

Automatic saving of max force peak.

SAVING

External adjustment of the supports spacing.

SPACING ADJUSTMENT

Progressiveness and precision of the applied force, even for fragile and low deformable materials.

EASE OF USE ACCURACY SAVING SPACING ADJUSTMENT

The bending test bench allows to perform bending tests of your product and/or sample with optimized force progressivity up to a break or a programmable force. The progressivity of the increase in force is ideal for testing fragile materials such as tiles, roof tiles, earthenware, glass plates, and enables a perfect measurement of the maximum force reached during the break.

Bending strength tests on building materials (earthenware, sandstone, pebbles, glass, etc.).

TILES, ROOF TILES, GLASSWARE

Suitable for all machine components such as aluminum profiles.

INDUSTRIAL GOODS

Verification of all consumer goods capacity to withstand a bending load.

CONSUMER GOODS

The bending test bench allows to perform bending tests of your product and/or sample with optimized force progressivity up to a break or a programmable force. The progressivity of the increase in force is ideal for testing fragile materials such as tiles, roof tiles, earthenware, glass plates, and enables a perfect measurement of the maximum force reached during the break.

Bending Test Bench

Main Functions

The bending test bench allows to perform bending tests of your product and/or sample with optimized force progressivity up to a break or a programmable force. The progressivity of the increase in force is ideal for testing fragile materials such as tiles, roof tiles, earthenware, glass plates, and enables a perfect measurement of the maximum force reached during the break.

Applications

Bending strength tests on building materials (earthenware, sandstone, pebbles, glass, etc.).

Tiles, Roof Tiles, Glassware

Suitable for all machine components such as aluminum profiles.

Industrial Goods

Verification of all consumer goods capacity to withstand a bending load.

Consumer Goods

Operating Procedure

The operator adjusts the spacing between the two pressure supports. The downforce tool descends at high speed until it automatically finds contact with the product being tested. As soon as the tool comes into contact with the product, the downforce strength gradually increases according to a programmable ramp. The descent is carried out until the automatic detection of the rupture or until the maximum programmed force is achieved. The peak of maximum force achieved is saved and displayed on the screen.

Advantages

- EASE OF USE:
  - Intuitive control of starting position setting and automatic cycle start.

- ACCURACY:
  - Progressiveness and precision of the applied force, even for fragile and low deformable materials.

- SAVING:
  - Automatic saving of max force peak.

- SPACING ADJUSTMENT:
  - External adjustment of the supports spacing.

Technological Characteristics

- Max force: 10,000 N
- Force resolution: ± 1 N
- Control of the downforce strength ramp: 500 to 6,000 N/m
- Extension: 200 mm

Options

- Printing of results
- USB-PC connection for configuration, storing and analysis of results

Tests According to Standards:

- NF EN ISO ASTM

1 - Control panel
2 - Spacing adjustment
3 - Supports with adjustable spacing
4 - Downforce tool
The specimens are attached in "series" thanks to specific clamps. The assembly in series ensures a total equality of the surfaces applied to each specimen. After a first loading, the bench applies a servo-controlled creep force. To conduct elongation measurements by the optical extensometer, the operator selects on each specimen two optical markers which will be used as reference of the length measurement. The cameras then move automatically to follow the position of each marker.

**ADVANTAGES**

- **FORCE SENSOR**
  Drift-free high resolution force sensor.

- **OPTICAL EXTENSOMETER**
  The deformation measurement is performed by an optical extensometer.

- **THERMAL ENCLOSURE**
  Automatic control of the ambient temperature by forced air.

- **ERGONOMICS**
  Simple fixation of specimens and optical calibration rules.

**TECHNICAL CHARACTERISTICS**

- Traction force: 20,000 N
- Rate max: 40 mm/s
- Actuator extension: 200 mm.
- Accuracy of force measurement: 1 N

**OPTIONS**

- Multi-camera optical extensometer for simultaneous measurement on several samples.
- Compression creep test tooling.

**TESTS ACCORDING TO STANDARDS:**

- ISO 204
- EN ISO 899-1
- ISO/TC164/SC1
- ASTM E 139
- ASTM D 2990
Impact pendulum
Charpy, Izod impact tests

MAIN FUNCTIONS
Impact resistance is one of the most important properties to consider when designing a part or appliance. The impact pendulum test machine is used to determine the impact strength of a sample against a shock applied to it in accordance with ASTM and ISO standards. Impact pendulum test machines perform precise and repeatable impacts on a wide range of materials to determine the mechanical and physical characteristics of metals, polymers, composites, whether for R & D or quality control in production. Our machines carry out Charpy and Izod tests, which meet international standards.

APPLICATIONS

SHOCK SPECIMENS
Standardized specimens for Charpy, Izod impact tests for all materials.

TUBES
Measurement of the impact strength of specimens taken from tubes.

WATCHMAKING
Test of the impact resistance of watches (“shock resistant” standard).

ADVANTAGES

HIGH-PRECISION SUPPORT
High precision thanks to a monoblock specimen holder equipped with an automatic centering device.

QUICK RELEASE
Less than 5 seconds between placement and breakage of the specimen.

SECURITY
Total operator safety thanks to redundant security systems.

MOTORIZED ARM
Motorized arm to ensure precise positioning and on-the-fly hooking after the test.

OPERATING PROCEDURE
The automatic specimen centering system ensures a simple and effective use of the impact pendulum. The specimens are impacted within 5 seconds following their removal from the temperature unit. The use is simplified thanks to the rapid change of the knife and specimens supports. The motorized impact pendulum is equipped with a pneumatic hammer release system. The hammer resetting process is motorized for a better ease of use. A protective casing protects the operators during the displacement of the hammer.

TECHNICAL CHARACTERISTICS

- Energy available: pneumatic, electric, and hydraulic (300 J to 800 J)
- Adjustable speed: up to 6 m/s
- Energy measurement resolution: 0.02 J

OPTIONS
- Automatic charger
- Specimen temperature control enclosure of the test piece (-180°C to +600°C)

TESTS ACCORDING TO STANDARDS:
- EN 10045
- ISO 148
- ISO 179
- ASTM D 6110
- ASTM E 23

1 - Impact pendulum system
2 - Motorized arm
3 - Sliding door
4 - Automatic centering
The machine is attached to a test support or directly to the tested element. This hooking is achieved by an automatic servo-controlled system of tightening straps which allows to avoid the use of a gantry of large dimensions (test on an aircraft for example).

The user regulates the position and orientation of the impactor. The test bench automatically searches for a contact position. The impactor is then powered onto the product/sample at a regulated speed. The impactor is automatically caught up to avoid shocks after rebound.

The differential position of the impactor/target is measured by a laser measuring.

**Hooking**

Autonomous hooking on the tested product thanks to automatic tightening straps.

**Orientation**

Shots possible in all directions with motorized settings.

**Positioning**

Accurate firing position thanks to automatic X/Z adjustment with laser aiming.

**Diameter Adjustment**

Adjustable position of the backing pads to adapt to the product diameter.

**Advantages**

- Shots possible in all directions with motorized settings.
- Accurate firing position thanks to automatic X/Z adjustment with laser aiming.
- Adjustable position of the backing pads to adapt to the product diameter.

**Operating Procedure**

The machine is attached to a test support or directly to the tested element. This hooking is achieved by an automatic servo-controlled system of tightening straps which allows to avoid the use of a gantry of large dimensions (test on an aircraft for example).

The user regulates the position and orientation of the impactor. The test bench automatically searches for a contact position. The impactor is then powered onto the product/sample at a regulated speed. The impactor is automatically caught up to avoid shocks after rebound. The differential position of the impactor/target is measured by a laser measuring.

**Technical Characteristics**

- **Impact energy**: 50 to 500 J
- **Impact speed**: 1.2 to 4 m/s
- **Moving mass**: 54.9 to 65 Kg
- **Accuracy of applied energy**: ± 5%

**Options**

- Test frame
- Applied energy verification pendulum

**Tests According to Standards:**

- NF
- EN
- ISO
- ASTM
- DIN

**Applications**

- **Airframes**
  - Shock simulation between a ground vehicle and an aircraft on the tarmac.
- **Wind Turbine Towers**
  - Simulation of shocks on a wind turbine tower.
- **Tubes of Large Diameters**
  - Behavior of a tube subject to a static point load.
The impact drop tester is ideal for characterizing the shock resistance of a product (specimen or component) for measuring its energy absorption capacity or for checking its proper functioning after impact (“shock resistant”). The shock is ensured by a drop weight which strikes the sample with heights and a mass which are adjustable by the operators. A set of high-frequency sensors enables to measure the force, position and speed of the weight during impact. The machine is fully secured thanks to its system of protective casings, which avoids any risk of projection during the impact tests.

**Main Functions**

The user places the specimen to be tested in complete safety. After selecting the weight value and the drop height, the machine automatically adjusts the drop height and releases the weight on the test specimen. Measurements of height, speed, force and energy are automatically recorded at high frequency during the impact.

An automatic analysis system makes it possible to calculate the impact energy, the energy absorbed and the energy returned.

**Applications**

- **Shock absorbers**: Possibility to test all types of absorbers (hydraulic, motorcycles, trains, etc.).
- **Springs**: Springs of different materials (steel, nickel, chromium, carbon, titanium, etc.).
- **Bicycle/dirt bike helmets**: Impact resistance test of bike and motorcycle helmets of different sizes.

**Operating Procedure**

The user places the specimen to be tested in complete safety. After selecting the weight value and the drop height, the machine automatically adjusts the drop height and releases the weight on the test specimen. Measurements of height, speed, force and energy are automatically recorded at high frequency during the impact. An automatic analysis system makes it possible to calculate the impact energy, the energy absorbed and the energy returned.

**Technical Characteristics**

- Displacement measurement resolution: 0.1 mm
- Max drop operational height: 4.3 m
- Total height: 5.5 m
- Drop weight: 47.6 kg to 512 kg

**Options**

- Automatic charger
- Force/displacement and energy measurement by piezo-electric force sensor
- Prestress booster

**Tests According to Standards:**

- NF
- EN
- ISO
- ASTM
- DIN

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**Vertical Impact Drop Tester**

**Dynamic Shock Test Bench**

**Advantages**

- MEASUREMENTS: High frequency recording of measurements.
- MOTORIZED ADJUSTMENT: Precise drop height adjustment by automated lifting.
- RELEASE SYSTEM: Automatic release system fully secured by a certified automaton.
- OPERATOR SAFETY: Safety striker ensuring total protection for the operator.

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**Overview Diagram**

1. Automatic lifting system
2. Weights
3. Remote control console
4. Protective door
5. Product under test
MAIN FUNCTIONS

The dynamic shock test bench allows to produce linear shocks with adjustable energy, speed and mass. Its revolutionary heavy weights simulation system makes it possible to carry out impact tests corresponding to a collision with a mass of 40 to 200,000 kg at a speed adjustable from 0.5 to 9 m/s thanks to flywheels of a mass of less than 200 kg. A high-frequency acquisition ensures the recording of the force/position curve at 100 kHz and the calculation of the absorbed and restored impact energies.

APPLICATIONS

DAMPERS
Dynamic behavior of viscoelastic dampers for the industry.

SHOCK ABSORBERS
Verification of shock absorbers operation for wagons.

BRIDGE CRANE STOP
Simulation of an impact of a bridge crane over its end stops.

ADVANTAGES

WEIGHT SIMULATOR
Simulation of very heavy weights (up to 200 tons).

IMPLANTATION
With its capacity of 50,000 J and its 5m length, the machine occupies very little floor space and has no civil-works component.

RATE
Adjustment, assembly and disassembly times are low.

SECURITY
Machine protected by a detachable automatically triggered hydraulic stop. Absence of suspended load thanks to its horizontal position.

OPERATING PROCEDURE

Thanks to the calculation module, the user selects a weight to be simulated and an impact speed or energy. The software then automatically indicates which flywheel to use. The automatic launcher system accelerates the flywheels to the right speed, the striker is automatically engaged on the flywheels motion. The system is self-protected by a detachable automatically triggered hydraulic stop.

TECHNICAL CHARACTERISTICS

- Max energy: 50000 J
- Simulated weight: 40 to 200,000 kg
- Impact speed: 0.5 to 9 m/s
- Max. impact force: 150000 N
- Release force of self-protection: 1000 - 150,000 N

OPTIONS
- Additional flywheels
- Automatic recognition of used flywheels
- Automatic reset of the safety stop

TESTS ACCORDING TO STANDARDS:
NF EN ISO ASTM DIN

1 - Product under test  2 - Impactor  3 - Flywheel  4 - Sliding cover  5 - Stop position regulation
The testing machines allow to estimate the fatigue life of components and/or finished products. Fatigue tests characterize the ability of a material or product to withstand cyclical loading in order to best reproduce the operating conditions of the part. The traction/compression fatigue test bench allows to subject parts to tensile/compression stress according to slow or rapid cycling (fatigue tests).

**ADVANTAGES**

- Simple programming of endurance cycles by sequence of function blocks.
- Automatic recording of measurements at a configurable rhythm.
- Electric servo-cylinder with integrated force sensor designed for optimal endurance life.
- Protection of the user by glass door. Opening the door automatically stops the test.

**OPERATING PROCEDURE**

After positioning the part to be tested, the user defines a test program, consisting of a sequence of function blocks. Each function performs trapezoidal or sinusoidal cycles controlled in force or position at an adjustable frequency. The test is stopped automatically in the case of a rupture of the tested part.

**TECHNICAL CHARACTERISTICS**

- Max. force (tension and compression): 2,500 N
- Max. fatigue force: 2,000 N
- Max. rate: 200 mm/s
- Max. extension: 200 mm

**OPTIONS**

- Thermal enclosure
- Automatic test report with analysis of the forces and deformations evolution

**TESTS ACCORDING TO STANDARDS**

- NF
- EN
- ISO
- ASTM

**APPLICATIONS**

- **STIRRUPS**
  Optimization of equestrian stirrups form under various loading conditions.

- **AUTOMOTIVE VENTILATION SYSTEMS**
  Possibility of controlling the operating efforts (orientations and roller).

- **LEATHERWORK**
  Simulation of repeated opening/closing operations.
Combined traction and torsion fatigue test bench

MAIN FUNCTIONS

This testing machine allows to estimate the fatigue life of components and/or finished products. Fatigue tests characterize the ability of a material or product to withstand cyclical loading in order to best reproduce the operating conditions of the part. This bench makes it possible to apply to the tested product combined tensile and torsion tests up to its fatigue failure, in particular for testing the mechanical resistance of electric cables.

APPLICATIONS

- **ELECTRIC CABLES**
  - Verification of the electrical continuity of cables subjected to traction/torsion
- **WEBBING**
  - Test of the tensile strength of webbing.
- **HOSES**
  - Verification of the integrity of a hose subjected to traction/torsion cycles.

ADVANTAGES

- **ROBUST FIXATION**
  - Simple and robust fixation of the product being tested by double chuck (sheath clamping + conductor clamping).
- **SLIDING SUPPORT**
  - Sliding intermediate support with rotating rollers.
- **CONTINUITY TEST**
  - Electrical continuity test assured throughout the test.
- **OPERATOR SAFETY**
  - The safety covers protect the operator and the product under test. Their opening immediately stops the test.

OPERATING PROCEDURE

The sample to be tested is fixed on one side to a rotary-driven concentric chuck and at its other end is attached to a chuck actuated in translation. At each end of the cable tested, double chucks ensure the clamping of the outer sheath on one chuck and the inside of the cable on the other chuck.

The machine can perform combined traction and torsional cycles with the force, torque, position or angle servo-control.

TECHNICAL CHARACTERISTICS

- Max. traction force: 7,000 N
- Max. torque (in both directions): 700 Nm
- Max. cable diameter: 60 mm
- Max. rotation speed: 120 °/s

OPTIONS

- 8-way electrical continuity check for electric cable testing
- Automatic test reports (evolution of torques, force and deformation analysis)

TESTS ACCORDING TO STANDARDS:

- EN 50182
- EN 50540
- IEC 61089
- IEC 62219
- ISO 1352
The continuous peel test bench unrolls the composite bands through a speed-compensated drum while the composite sample is held in rotation by a second drum whose torque is also controlled. The peel angle is user-set and servo-controlled to prevent carbon fibers from breaking and thus allowing continuous peel. The higher the resistive torque, the more tangential the unwinding, and vice versa.

Advantages:
- No sample preparation time
- Saving cost
- Patented system

Operating Procedure:
The continuous peel test bench unrolls the composite bands through a speed-compensated drum while the composite sample is held in rotation by a second drum whose torque is also controlled. The peel angle is user-set and servo-controlled to prevent carbon fibers from breaking and thus allowing continuous peel. The higher the resistive torque, the more tangential the unwinding, and vice versa.

Technical Characteristics:
- Max. torque: 500 N.m
- Accuracy of force measurement: 0.25 N.m
- Accuracy of resulting force measurement: < 2.0 N
- Rotation speed: 0 to 2 rpm

Options:
- Drums width 30mm
- Special drums on request

Tests According to Standards:
- NF
- EN
- ISO
- ASTM

Applications:
- Carbon tubes
- Aerospace
- Carbon parts wrapping

Main Functions:
The peel test bench enables continuous measures of the adhesive energy of thermoplastic laminated composites in order to test and optimize the bonding process. The principle of winding and bonding a composite strip is a technology increasingly used in the industrial sector because of its better productivity. In order to optimize the bonding performance between the layers of the composite and certain physical parameters such as pressure, temperature or heat transfer, LF Technologies has developed a continuous peel test bench. This highly innovative system offers a high degree of precision in the analysis of inter-laminar adhesion and peel force. The machine can be directly installed in the production workshop in order to assess in real time the adhesion parameters of the thermoplastic composites.

Applications:
- Carbon tubes
- Aerospace
- Carbon parts wrapping
The machine is equipped with a clip that allows to grasp the end of the sample to be tested. This clip is inserted in a coiling reel of Ø 150 mm. The drive wheels of the machine, together with an optical barrier, make it possible to keep the torn portion of the sample in the radial position without the deflection roller. Two removable lateral pulleys allow the machine to be strapped to the tube, if necessary. A 4-key keypad is used to control the clamping/loosening of the clip, drum rotation, machine displacement and cycle.

**ADVANTAGES**

- **PORTABLE MACHINE**: Autonomous and portable worksite machine with transport case.
- **EASE OF USE**: The use is simple and intuitive (including by an unskilled operator).
- **AUTOMATIC CLAMPING**: No tools are needed thanks to the automatic clamping of vices, jaws or clips.
- **STANDARD BATTERIES**: Standard Batteries (Makita).

**OPERATING PROCEDURE**

The machine is equipped with a clip that allows to grasp the end of the sample to be tested. This clip is inserted in a coiling reel of Ø 150 mm. The drive wheels of the machine, together with an optical barrier, make it possible to keep the torn portion of the sample in the radial position without the deflection roller. Two removable lateral pulleys allow the machine to be strapped to the tube, if necessary. A 4-key keypad is used to control the clamping/loosening of the clip, drum rotation, machine displacement and cycle.

**TECHNICAL CHARACTERISTICS**

- Max. traction force: 1,500 N
- Max. coating thickness: 12 mm
- Pullout length: < 200 mm
- Adjustable test speed: 5 - 50 mm/ min

**OPTIONS**

- Temperature measurement
- USB-PC connection for configuration, storing and analysis of results
- Automatic reporting

**TESTS ACCORDING TO STANDARDS:**

- NF
- EN
- ISO
- ASTM

**APPLICATIONS**

**PIPELINE TUBES**

Test of adhesion of pipeline insulation, aerial.

**COATED DRUMS**

Testing of rubber coating bonding for conveyor drums.

**TEST ON SITE**

Test of the coating bonding, directly on the shipyard.
STANDARDIZED TESTS
LF Technologies has integrated a wide variety of tests in its machine control interfaces, defined according to applicable standards (ASTM, ISO, BS, EN, DIN and JIS). These preprogrammed configurations integrate the test parameters, operation mode or even desired measurements and analyses. The standardization of tests offers an ease in the user experience for operators who will only have to worry about the analysis of the results.

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

AUTOMATIC EXPORT OF DATA
Our company has understood the needs of its customers to obtain a wide variety of test reports. That is why, thanks to our interface, you can directly print and save a file containing test results, test procedure parameters, product information, date and user comments. For fast and reliable processing of test results, our automated analysis and reporting modules allow you to quickly edit reports in spreadsheet and PDF formats, with automatic analyses of curves according to test standards or your own internal requirements.

CLIMATIC ENCLOSURES
ONE-TIME OR LONG-TERM APPLICATIONS
Thermal tests are of great importance because the resistance properties of certain materials, such as polymers, fluctuate with temperature. To guarantee the best level of performance, reliability and safety of your products, LF Technologies is able to equip all its mechanical test benches with thermal enclosures.

LIFE OR DRY ENVIRONMENT
The heating of the self-contained enclosure is carried out by a gaseous or liquid bath with a temperature measurement placed closest to the sample under test.

AUTOMATIC TRANSFER SYSTEM FROM THE CLIMATIC ENCLOSURE TO THE TEST AREA
Rapid transfer robotic systems minimize product temperature variations between the climatic enclosure and the test area.

Our Options

OPTICAL EXTENSOMETER
A sensor for measuring deformation applied to a sample or specimen. The optical extensometer has many advantages compared to the so-called traction devices which come into contact with the test piece. Low maintenance, no influence on the specimen, no slipping of the knife edges, no errors due to the inertia of moving parts, elimination of risks of damage applied by the energy release in the event of breakage. The optical extensometer is particularly suitable for reliable and accurate measurements in tensile tests on materials, having high elongations, highly expandable and sensitive to contact materials.

PIEZO-ELECTRIC FORCE SENSORS
Measurement of forces through an electric charge proportional to the applied force. Very low deformation and high resonance frequency, ideal for dynamic applications.
- Measurement with high prestressing
- A measurement with maximum resolution even with unfavorable conditions.
- In severe environments
Hermetic connection ensures high dependability.

AUTOMATIC BREAK DETECTION
Automatic detection of product breakage in test. Whatever the type of force applied (traction, compression, torsion, bending, etc.), the rupture analysis system automatically detects an abnormal variation in the force/position pair according to parameterizable criteria or by self-learning. This detection automatically ensures a stop of the test and an automatic recording of the peak of force reached during the rupture of the sample.

PC - ETHERNET CONNECTION
PC connection to get the test results on screen. Reading your test measurements is facilitated by connecting the test bench directly to your computer via an Ethernet cable. This feature not only allows you to easily set up the test bench from your PC by selecting various tests, but also to store the measurements obtained and analyze the results thanks to the automatically saved test reports.

Our expertise is to be able to design a fully customized machine around your application.

Our Options
Carrying out testing in real conditions is the most effective way to get the best quality of your products. Depending on your specifications and in collaboration with your R & D department and design office, we jointly define the test conditions: force, speed, power, temperature. All these data can be set up to configure the operating cycles (thermal shocks, pressure resistance, acceleration and braking, centrifugal force, variable climatic environments, etc.).

These custom benches are real simulators adapted to your product. Examples of LF Technologies’ realizations: railway couplings, hydraulic jacks for submarines, sanitary equipments, nuclear power plant ball valve, tearing straps for aerospace.

For product tests incorporating mechanical and hydraulic testing functions, the know-how of our hydraulic and mechanical divisions allows us to develop a complete test solution. These tests simulate 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).

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.

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.
AESTHETICALLY TECHNICAL TEST BENCHES

Because machines must not only be functional, LF Technologies adds a stylistic approach to the design of its mechanical 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.

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

2 - 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.

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

ADVANTAGES

- The assurance of a quality product
For a customer, seeing the product tested in real time is a guarantee of product quality. The test benches, which test the equipment you sell, carry many elements of reassurance to the end customer. Durability, endurance or resistance are all guarantees for the customer who will more easily make a purchasing decision.

- 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* (repeatability of tests, applied stress, analysis of measurements, etc.). Their particularity lies in a resolutely more attractive and appealing design for commercial use.

We relied on LF Technologies to produce a demonstration test bench at Eurobike fair in Germany. This ergonomic and technical bench was a fun way to highlight the quality of our bike equipment.

Stéphane M., Aivee Sales Manager

*According to your needs, more simplified versions of test benches can also be studied by our engineering office.
The possibility of renting and trying

For a one-time need or to evaluate our equipment, we offer you the possibility of renting our machines, weekly or monthly, in order to test them and to ensure that they correspond to 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 a purchase option if the machine offers you satisfaction.

Certified equipment

In order to control the 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 and DEKRA. 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.

A customer service for the sustainability of your equipment

LF Technologies ensures proper commissioning of the 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 the calibration of the sensors.

Engineers at your disposal to provide you with advice

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

Our Support Services

Certified equipment

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