

Recherches & Réalisations Rémy



[www.3r-labo.com](http://www.3r-labo.com)

# UNIVERSAL TESTING MACHINES

# DESIGNER OF UNIVERSAL TESTING MACHINES

Created in 1987, nearly 30 years ago, the French company 3R is specialized in designing and manufacturing testing machines for materials.

Undisputed leader for more than 20 years on the french market of Civil Engineering testing equipments (with 80% market shares), the company has gradually established itself in the world of Universal Testing Machines (UTM), with a growing market share, collecting the most prestigious references, in the field of mechanics, aerospace, or nuclear. Its assets to establish itself remained the same since its creation and are based on three axles:

- 1** - a definitive will to produce only high quality machines, with no compromise on the choice of technical solutions, materials and suppliers. This strategy enables us to offer our customers an exceptional lifetime of their 3R machine, for a guaranteed return on investment.
- 2** - a dedicated R & D department, with talented engineers and technicians, able to innovate and customize any technical solution, in order to respond precisely to the specifications of our customers. Alongside our range of standard machines, we manufacture all year round tailor-made machines with often unconventional dimensions (see our Syntium range).
- 3** - a team of dynamic and highly mobile technicians for commissioning and maintenance of our machines, capable of responding in 24/48 h to the slightest request of our customers.

We manufacture all of our machines (machining and welding, painting, mechanical, electrical and hydraulic assembly), and our control systems (electronic boards, computer systems and software) in our 10.000 m<sup>2</sup> facilities in Montauban, equipped with modern production machineries.

Since September 2015, we have integrated the machining of our metal parts, with the creation of a new company (USR – Usinage Soudure Rémy), equipped with large capacity CNC machines, installed in a building of 2,500 m<sup>2</sup>, equipped with three 5 tons cranes and a 10 meter long painting booth.



*Recherches & Réalisations Rémy sas*



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# MAXIMIZE THE SUCCESS OF OUR CUSTOMERS WITH CUSTOM SOLUTIONS

Our goal is not only to sell testing machines, but to propose solutions to ensure and maximize your success.

Therefore we accompany you throughout the life cycle of your investment.

*"The engineering is not enough, we accompany the client from his request until the completion of the service, with a future-oriented open system"*



Our strong point, beyond our ability to design a range of machines perfectly suited to the expectations of our customers, is our capacity to manufacture high-technology machines in small series.

We are able to meet the current trend of systematic customization of customer solutions.

This customization is not a cosmetic criterion, but reflects our desire to satisfy at 100% the needs of our customers.

## THE FRENCH SOLUTION

Since June 6th 2012, 3R has been credited with the "ORIGINE FRANCE GARANTIE" label. This label obtained from the hands of Bureau Veritas Certification and CERIB.



*"Origine France Garantie", it is the guarantee for the consumer that the product bearing the logo was manufactured in France."*

The award of this label "Origine France Garantie" is defined by two cumulative criteria:

- 1- the product takes its essential characteristics in France (=the product is designed in France),
- 2- 50% to 100% of the unit cost of this product are acquired in France.

**It is with great pride that we affix this label on our products designed and manufactured in our factory in Montauban.**

# NOR BUYER OR SELLER BUT PARTNERS

Acquiring a testing machine is a global action.

Throughout the lifetime of the machine, 3R provides full monitoring and favors interactions with the customer. The customer is not just purchasing a 3R testing machine, he is investing in a long-term partnership with a dedicated supplier. And because 3R has everything to prove, we are highly motivated to give more to our customers.

We do not consider ourselves just as machines sellers, but above all as systems and solutions providers. We bring added value tailored to our customers' business.

*"We always imagine how we would like to be treated as a customer "*

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## **Customer satisfaction is the cornerstone of our development strategy.**

Make every task simple and intuitive, every day, through our expertise.

Our business approach and the care we take in the way we support our products all along their lifetime stands in direct line with this objective.



## **Our after sales service is reactive.**

It will be on your side to assist you throughout the lifetime of your equipment..

## **Our 3 "Customer agreements":**

- 1 - Benefit from a complete range of machines and accessories to get the best performance.
- 2 - Associate with a reactive and proactive partner to ensure the best support in time.
- 3 - Enjoy the expertise of a French designer and manufacturer, at the most competitive price.

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# OUR DNA : DESIGNING OUR MACHINES

To answer in the best possible way to the requests of the market, 3R expands its testing machine range.

The high-end RIGI-DRIVE range has been deeply re-designed, the economical SMART-DRIVE-range appears, and the COMPACT-DRIVE targets for the low-capacity tests.

3R is positioning itself as an innovative player and consolidates its market leadership ambition.

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*"Innovative design"*

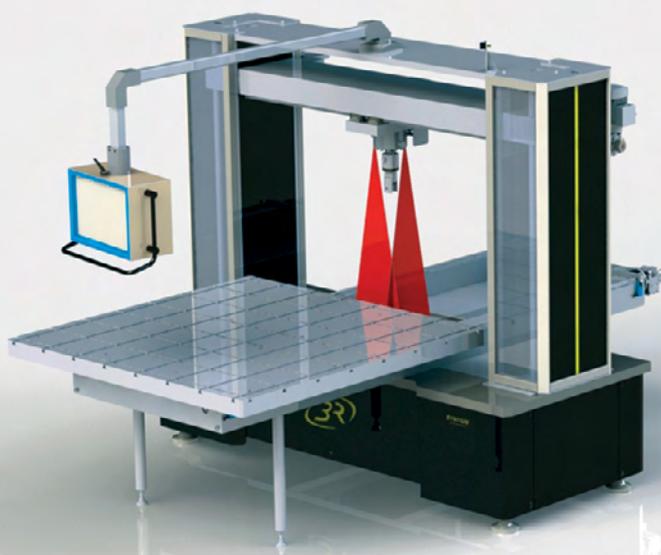
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Our 3 current ranges are the result of a global reflection.

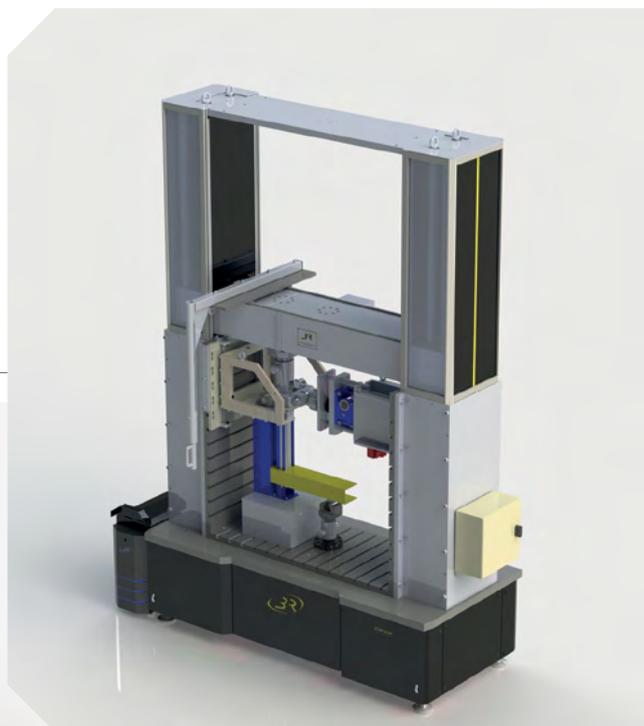
Everything has been optimized to provide our customers with the most performing and user-friendly equipment.

*Dual axis 350 kN/50 kN  
tailor-made*

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*Machine with motorized work table for easy positioning of samples*



# THE RIGIDRIVE CONCEPT

## The most performing solution on the market

**RIGID** transmission combined with low deformation frame.

In order to improve the stiffness of our frames, and thus the quality of guiding, SYNTECH frames are equipped with 2 to 4 columns (depending on max. load), and up to 4 ball screws for models over 400kN.

- The encoder is directly linked to the servomotor for a highly responsive and stable control.
- The constant velocity transmission and its low elasticity coefficient ensure exceptional smoothness of movement over the entire speed range.
- Bevel gear with efficiency > 90% against 30% on standard. Saving space and power.
- Silent and smooth operation for greater comfort of the operators.

*"Proven and controlled technology "*

The exceptional rigidity of the transmission greatly limits the stored-energy which is released during the breaking of fragile materials.

The design of our SYNTECH frames is focused on 3 points:

- Easy and reliable assembly enables significant reduction of labor, and thus lower costs.
- Transmission efficiency is multiplied by 3!  
The power which is gained with RIGI-DRIVE greatly improves the responsiveness of the driving, and increases the lifespan of components.
- Compactness of the frame.  
Our design engineers have worked hard on the compactness of SYNTECH frames. Most of them are traveling standing straight (depending on max. load). They can enter a room through a standard door, with a simple pallet truck. This greatly simplifies the integration inside our customers laboratories.





## MAXIMUM ACCURACY

Our challenge is to achieve extreme driving accuracy on the widest range of travel speed.

Each machine configuration has to allow fast, accurate and controlled movement, in order to meet high number of tests, while allowing to achieve slow tensile tests, with instantaneous velocity lower than a micron/minute on a period of several weeks.

The remote electronics provides direct access and better electrical insulation (noise reduction).

The operator has easy access for connecting his peripherals.

Upgrading your equipment is simplified.

### *Technical specifications:*

- Adjustable Synchronous acquisition up to 1000 Hz.
- Direct servo current, closed loop, 1 kHz.
- Dimmer control with switching frequency up to 12 kHz.
- Choice of driving mode: displacement, load, strain, stress.
- I/O extension cards: gauges, LVDT, SSI rule, automatic and video extensometers...
- Supplied with LCD remote control and speed adjustment knob.
- Automatic recognition of connected load cells, with EEPROM connector.



**Driving accuracy of speed**

**0.005  
 $\mu\text{m/s}$**

Is the lowest speed rate available on all 3R  
universal testing machines

**At such rate, the machine movement  
is 3mm a week**

*We propose a complete line of high  
resolution and standard load cells*

# COMPACT-DRIVE RANGE

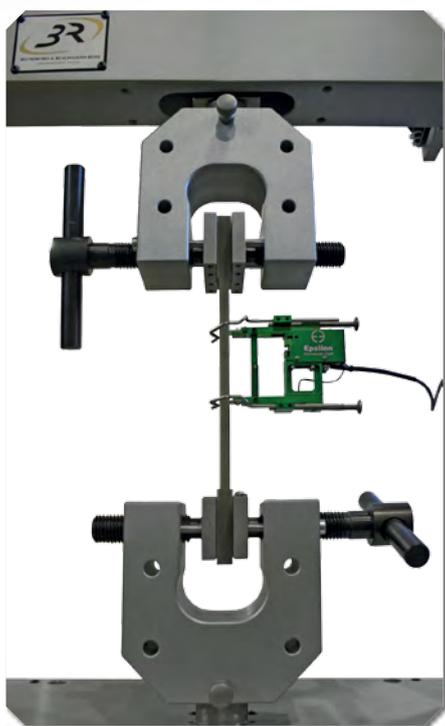
## MODEL SYNTHEZ 3kN, 5kN and 10kN

# syntheZ

**SyntheZ models literally break the codes of the complicated testing machine, with a handling in just a few minutes by the operator.**

### *Mechanical characteristics*

- Single-screw or dual-screw type to improve the access to the workspace.
- Guidance by 2 columns in tempered steel and chrome-plated ball bearing.
- "table-top" frame on 4 silent blocks.
- Body frame assembled in stainless steel and brushed aluminum.
- Capacity 3 or 5kN for single screw frame, and 10 kN for dual-screw frame
- Vertical daylight 500mm or 1200mm depending on customer's needs.
- Net weight 40kg to 80 kg, depending on models.
- Power supply 230V single phase, power 200W.



### *Load Measurement and extensometer*

- Machine comes with a load cell capacity between 5N and 5000N:
  - Strain gauge S type load cells
  - Usable in tension and compression testing
- 0.5 class from 1 to 100% of the measuring scale
- Possibility to connect several load cells of different capacity (not limited)
- Extensometer LVDT Input extension and gauge bridge
- Standard interface with male pin  $\varnothing 16$  + pin  $\varnothing 8$ mm for fast setting of new equipment (tensile, compression, bending...)

- Operating in autonomous mode, without software
- Speed regulation, adjustable from 1 mm/min up to 600 mm/min
- Sampling rate : 50Hz
- Load rate sampling resolution : 16 bits
- Positioning resolution of the crosshead : 0.01 mm
- PC connection via USB, software control by *SyntX Lite* and analysis on Excel®.

The association of a robust and reliable frame with proven electronics ensures international success to this low-capacity machine, equally at ease for control tests on production line and laboratory operations.

*SyntX-Lite* software includes the main features of a complete software, by offering a simplified interface, synonymous of simplicity and easy handling.



*An airbag hatch resistance test*

# SMART-DRIVE RANGE

## MODEL SYNTAX 100kN and 300kN

# syntax

**Thanks to the streamline design of its frames, the SYNTAX range offers, for a limited budget, to perform your tests efficiently, without compromise on accuracy or quality.**



### *Mechanical specifications*

- **High rigidity** Load frame: **100kN and 300kN**
- 2 preloaded ball screws
- Hybrid transmission with high stiffness reinforced belt and play free gearbox.
- Specific preloaded bearings, high stiffness, long lifetime, maintenance-free.

### *Control*

- Brushless servo motor with encoder and brake.
- Speed 0, 1  $\mu\text{m}/\text{min}$  up to 800 mm/minute
- Crosshead resolution:  $\pm 0.1\mu\text{m}$ .
- External Blackbox with all acquisition and electronic control, forced ventilation and filtration.
- Dimmer control with 12 kHz sampling frequency.
- Synchronous measuring channels, adjustable acquisition up to 1000 Hz.
- Direct control mode, with direct-loop current, frequency 1000 Hz.
- Power supply 230V + T for 100kN model and 3 x 400V + T for 300kN model.
- Intuitive remote control with LCD display and adjustable controller (optional).





### Protection and design

- Side cladding in sturdy profiled steel for improved stiffness.
- Lower box and metal frame.
- Protection for each ball screws with bellows
- Flush lower crosshead, protected by the casing
- Safety opening doors (optional).  
Transparent polycarbonate and aluminum, with safety switch.



### Ergonomics

- Working height (with optional pedestal) 975mm (SYNTAX 100).
- Crosshead stroke 1230mm.
- Horizontal daylight 450mm to receive all accessories.
- Easy front-end handling by pallet jack or forklift, passes through a standard door.
- Wide range of tooling: tensile, compression, flexural, shear, peeling, friction and so on compliant to EN, ASTM, DIN, ISO... standards.
- Storing pedestal for accessories (optional on 100 kN)



**Complies with machinery  
directive 2006/42/EC**

# RIGI-DRIVE RANGE

## MODEL SYNTECH 150kN, 400kN and 700kN

**syntech**

**Rigid transmission Rigi-Drive II, for the accuracy of speed and positioning, compact design for easier commissioning inside your laboratory.**

### *Mechanical specifications*

- Load frame **150kN, 400kN and 700kN.**
- 2 massive guiding columns for 150 kN and 4 columns above.
- 2 preloaded ball-screws play-free for 150 kN and 4 ball-screws above.
- High performance RIGI-DRIVE transmission, maintenance-free and play-free.
- Conical torque gearboxes.
- Machine-tool type bearings, sealed and greased for life, maintenance-free.

	Syntech <b>150 kN</b>	Syntech <b>400 kN</b>	Syntech <b>700 kN</b>
L1 - Total width (in mm)	1 202	1 492	1 492
H1 - Total height (in mm)	2 017	2 484	2 544
L2 - Daylight width (in mm)	650	750	750
H2 - Daylight height (in mm)	1 300	1 555	1 700
Weight (in kg)	915	2 300	3 650

### *Protection and design*

- Ball-screws covering in stainless steel and transparent polycarbonate.
- Protection of the ball-screws by rigid Kevlar bellows.
- Working table covered with a stainless steel sheet for protection and daily use.
- Safety opening doors. Transparent polycarbonate and aluminum (optional), with safety switch.



## Control

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- Brushless servo motor with encoder and brake.
- External Blackbox with all the acquisition and electronic control, forced ventilation and filtration.
- Crosshead resolution:  $\pm 0.1\mu\text{m}$ .
- Speed 0, 1  $\mu\text{m}/\text{min}$  up to 800 mm/minute
- Dimmer control with 12 kHz sampling frequency.
- Synchronous measuring channels, adjustable acquisition up to 1000 Hz.
- Direct control mode, with direct-loop current, frequency 1000 Hz.
- Intuitive remote control with LCD display and adjustable controller (optional).
- Direct regulation mode, with direct current control loop, 1000Hz frequency.
- Intuitive remote control with LCD display.



## Ergonomics

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- Working height 450mm (150 kN) or 550mm (above).
- Great crosshead stroke and important daylight (minimum 650 mm) width to receive all type of accessories useful for your tests.
- Easy front-end handling by pallet jack or forklift.
- Wide range of tooling: tensile, compression, flexural, shear, peeling, friction and so on compliant to EN, ASTM, DIN, ISO... standards.



# RIGI-DRIVE RANGE

## MODEL SYNTIUM from 10kN up to 2000kN

Our R&D department can design 100% tailor-made machines to meet your specific requirements in terms of :

- dimensions
- vertical daylight
- tooling
- ergonomics
- stiffness
- speed
- accuracy

The mechanical components of these machines, the controller and the software are taken from standard models SYNTECH.

Here are some examples:

### ROPES AND TEXTILE

Frame: 400kN testing machine horizontal daylight length 1500mm x depth 1500mm, crosshead stroke 3500mm

Place: Malaysia

Type of tests: Harnesses and mountaineering equipment, full-scale testing, with mannequins

Specificities: High energy density during testing generating products breaks exceeding the speed of sound (ropes). Specific protection with energy absorbers

# syntium



### FOUNDRY

Frame: Testing machine with X-Y-Z movement. Horizontal daylight 1500 x 1500mm, crosshead stroke 700mm, with grooved table and transverse movement of the motorized load cell

Place: France

Type of tests: Manhole covers testing according to new EN 124 standard for European market

Specificities: No manual manipulation of the operator thanks to the motorization of all 3 axes for applying forces on any part of the structure. Measuring with 4 points contactless lasers (integrated in the software)





Frame: 600kN Tensile machine

Place: France

Type of tests: Multi materials and structures testing

Specificities: Machine with reduced height for integration inside low ceiling laboratory. Our R&D department has designed a specific frame, with grooved table and special fasteners for 600kN quick change of tooling.



COMPOSITE

Frame: 500kN compression machine outsized with ball joint upper platten 1400mm x 1400mm and crosshead stroke 1500mm

Place: France

Type of tests: Composite tanks for civil engineering

Specificities: oversized frame with high stiffness for exceptional accuracy strain measurement without using extensometer



12  
TONS

That is the weight of the Syntium 1500 kN

# CONTROL SOFTWARE

3R has developed a "Full touch-screen" software in tune with the today's market requests:

**Friendly-user, quick-access and performance**

# synt-x

## Efficiency

The settings of the software allows instant-access to the test in just a few clicks, leaving little room for mistakes. It also allows total freedom for the user to create and modify his own test cycles and his own reports. All products to be tested can be preprogrammed.



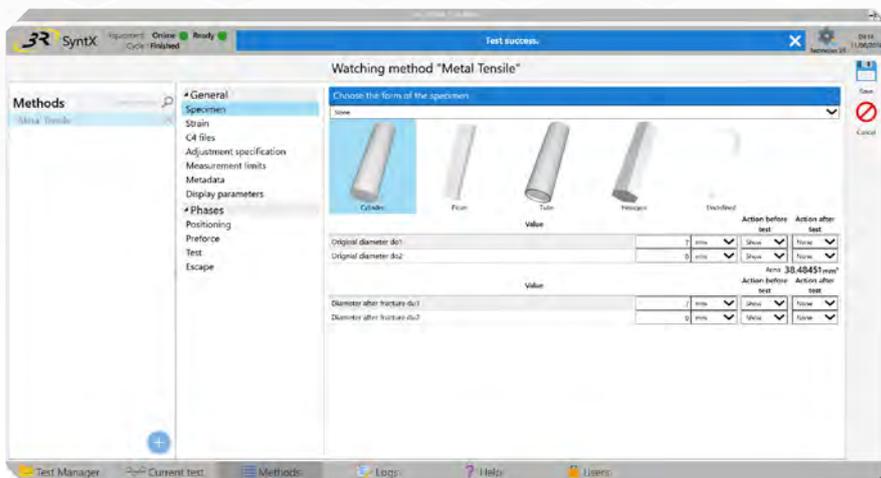
Batch Testing Manager

## Performance

The software contains an assistance program for calibration and adjustment of the control interface.

## Ergonomics

The Setup interface is very intuitive, and permits tests selection and reports settings in a few clicks.

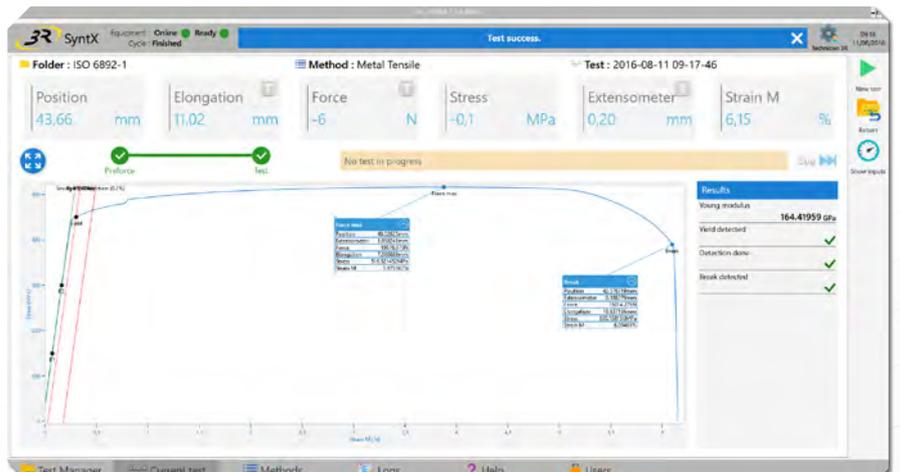


Setting screen of stress calculation

Main screen

## Features

Combining all control functions, Synt-X offers the possibility to perform load or deformation controlled cycles, stress steps, or locked loop displacement or deformation on all connected sensors.

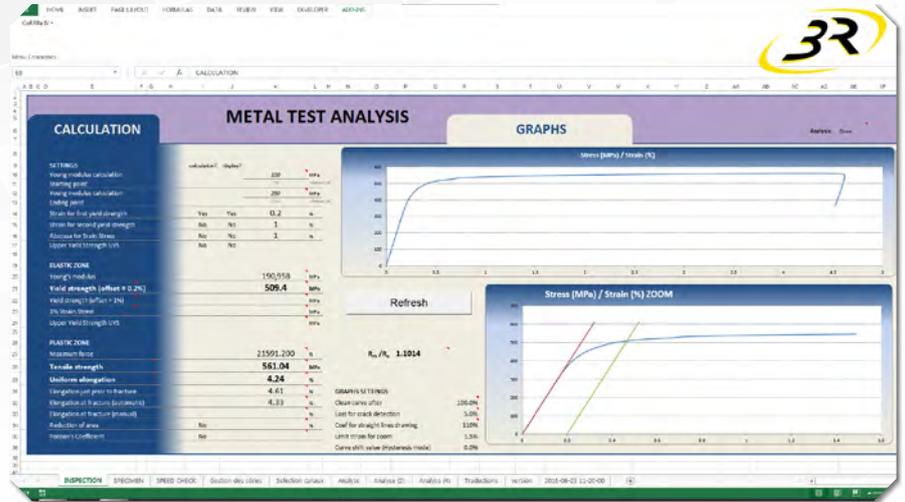


# EDITION OF REPORTS

## Flexibility

Analysis of tests is done through an integrated interface that can be modulated and adapted to your needs with Excel. The software offers no limit for the analysis of normative and specific results. All main standards are available in a simple click.

All tests data are easily accessible and can be integrated into the database, can be transferred and viewed on remote workstations.



## Tensile test report

	Test 1	Test 2	Test 3			
Date	18/11/2011	18/11/2011	18/11/2011			
Time	14:33:14	14:37:35	15:04:32			
Test type	Tensile test	Tensile test	Tensile test			
Test speed (mm/min)	60	60	60			
Detection value (N)	5	5	5			
RESULTS	Max value	Rupture	Max value	Rupture	Max value	Rupture
Load (N)	643,713	529,959	632,980	484,764	635,912	505,682
Displacement (mm)	59,263	67,244	56,826	69,093	59,342	75,021
Strength (Mpa)	364,267	299,896	358,194	274,320	359,853	286,157
Strain (%)	26,222	29,754	25,144	30,572	26,258	33,195

New sequential calculation tools have been added, and allow the user to perform more complex operations.

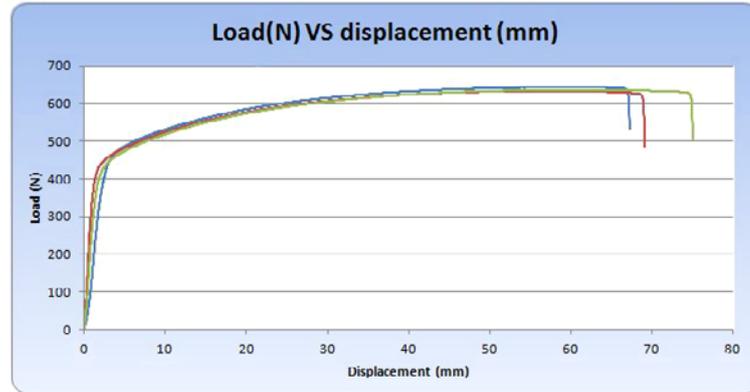
Edition of reports can be done in a simple way, and be incorporated into Word documents, PowerPoint, web pages and other media.

## The BENEFITS of Synt'X software

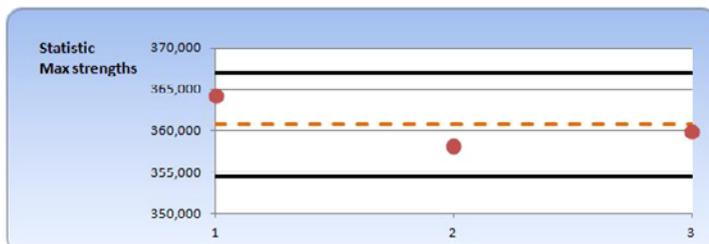
Fully compatible with the MS Pack Office. Totally configurable, easily adjustable and customizable. Connectable in networks.

## The BENEFITS of 3R's remote maintenance

All our machines benefit from our remote maintenance service (F.O.C. during warranty period), allowing fast (within a few hours) resolution of your technical questions.



Statistic		
Average of strengths at breaking point	286,79	MPa
Average of Max strengths	360,77	MPa
Standard deviation of max strengths	3,14	
Average of strains at breaking point	31,174	%



Inspector signature

Date  
18/11/2011

# RETROTECH

## MACHINES REVAMPING



### You have:

- An old machine out of order is congesting your lab ?
- Your machine has failed, is unreliable or lacks of accuracy ?
- Your machine is old and lacks of performance ?
- You need to perform new tests, new cycles that your old machine is unable to ?

3R offers **RETROTECH Solution** for technological upgrade of your machine:

- ↳ **Locked loop control in load, stress, displacement, deformation...**
- ↳ **Complex cycles, test analysis, reports and database integration**
- ↳ **Improved reliability and safety standards of your equipment**

### *Performance*

The highest level of modernization on the market, with a complete review of every sensitive mechanical parts and the complete replacement of electrical and electronic components of the machine, regardless of age and brand.

### *Efficiency & Performance*

Each machine is treated independently by our technicians, under the control of our R&D department. The new control system is compatible with strain gauges and existing accessories, and allows addition of new equipment and accessories.

### *Economy*

Re-use of your sensors and tools.

### *Reliability & Durability*

Completely refurbished equipment with last generation of electronics and software. All the replaced parts are now available with our after sales department.

### *Adaptability*

RETROTECH service may include the supply and / or design of new specific support, a protection system and upgrade safety standards.

### *Safety*

Protection doors with safety switch can be mounted on your old frame.



A free study is made  
following a visit on  
your site.  
**Feel free to contact us!**

# TOOLING

An extensive selection of standard and custom designed accessories are available for all types of tests:

- Compression tests,
- Tensile tests on bars, tubes, ropes, straps, cables, chains, strands...
- Bending tests,
- Peeling tests,
- Shear tests,

*Non-exhaustive list*

We offer standard tools in compliance with international standards for materials such as steel, alloys, copper, cast iron, plastics, composites, polymers, etc.

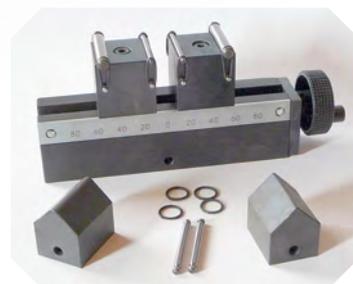
We also offer thermal and climatic chambers for experiments in controlled temperature and humidity.

Our research department also designs tooling to meet your specific needs.



*A variety of tools for tensile testing on varied forms specimens*

*Thermal Chambers and ovens*



*Tools for bending tests*



*Tools for tensile tests on ropes, cables, etc*

*Tools for peeling tests*



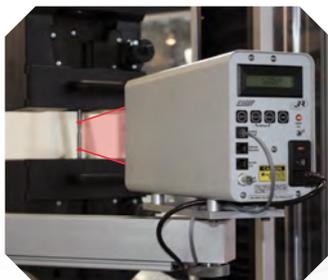
*Hydraulic grips for high load tensile tests*



# EXTENSOMETERS

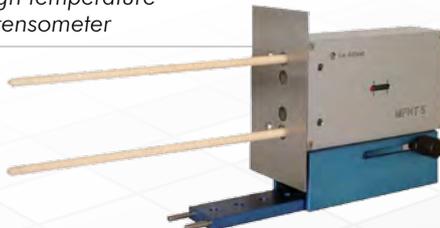
The range of extensometers available from 3R include models for testing a wide range of materials, including metals, plastics, composites and ceramics, meeting all requirements of the international standards in terms of deformation and displacement.

The range, the gauge length and accuracy can be defined to meet specific needs.



*Laser extensometer*

*High temperature extensometer*



*Video extensometer*



*Clip-on" extensometer*



*Automatic extensometer*



IS ALSO SUPPLYING...



#### *Pendulum Impact Testers*

ISO and EN impact tester  
Capacity 300J, 450 J, 600J and 750J  
Temperature testing

#### *Hardness tester*

Portable hardness measuring device based on the UCI method.  
The most reliable equipment in its class.  
Hardness Vickers, Rockwell etc.



#### *Creep tests*

Range of standard and custom machines for the fatigue testing by creep, with or without extensometer, oven and electronics control.  
Dead weight, electromechanical or hydraulic technology according to the need.  
Capacity 10 kN to 1000kN

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