

## THE LABORATORY

Trafileria A. Mauri & Figli S.p.A. has an internal laboratory performing different tasks:

- It cooperates with the Purchase Department in the drawing up of the raw material purchase specifications and checks the compliance of the incoming raw material;
- It supports production checking the quality of the finished product with chemical, physical and dimensional tests.
- It supports the Sales Department checking the enquiries and the customer specifications

The laboratory carries out following tests and inspections:

- Quantometer analysis
- Determination of the mechanical features  $R_m - R_{p0,2} - A5\%$
- Brinell, Rockwell, Vickers hardness
- Metallographic tests
- Records of the most important steel standards

### *Quantometer analysis:*

A fixed and a portable quantometer (SPECTROLAB) allow the determination of the chemical analysis of a steel and its belonging to a certain heat.

A special software enables the analysis of

non-alloy / alloy steels

free-cutting steels

stainless steels

The check can be carried out on pieces of small, medium and big sizes (starting from 2 mm)



### *Determination of the mechanical features $R_m - R_{p0,2} - A5\%$ :*

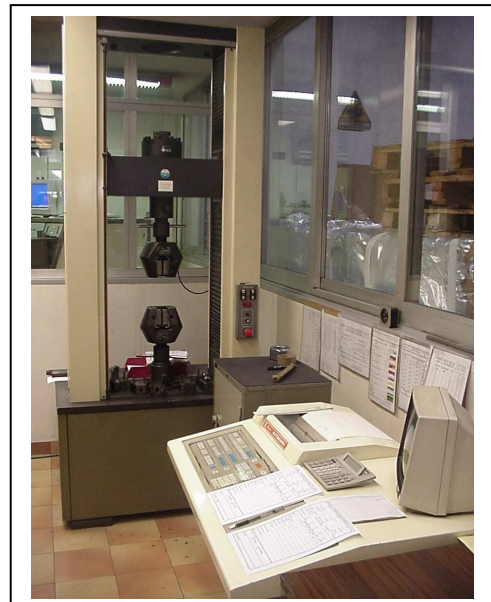
Tensile stress test

It consists in subjecting a test piece to a gradually growing tensile stress till the test piece breaks.

The stress is exerted by a machine with a tensile capacity of 25 tons enabling the execution of tests on samples with full, round, square, hexagonal section with a size between 2 and 22 mm.

As far as bigger sizes are concerned and upon request we use standard test pieces.

The tensile stress test provides values concerning material elasticity, deformability and resistance.

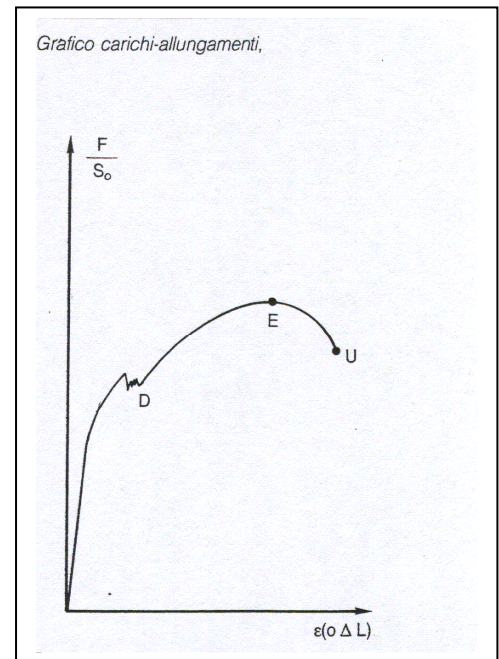


The determined parameter are listed below:

- Tensile stress test  $R_m$
- Yield point  $R_{p0,2}$
- Breaking elongation  $A_5 \%$

The tensile stress test results in a chart showing the values loads-elongation.

It is a chart in the Cartesian coordinates system with the X-axis representing the elongations undergone by a test piece and the y-axis the applied loads.



*Brinell, Rockwell, Vickers hardness:*

Hardness is defined as the resistance offered by a material to the penetration of a harder body.

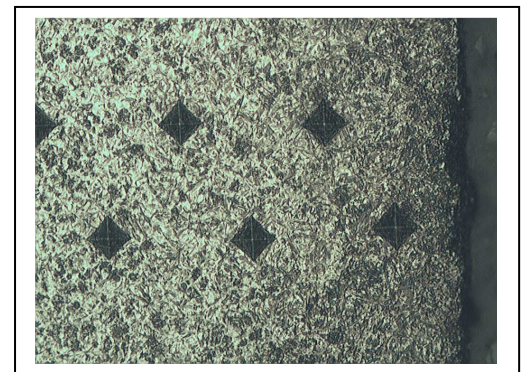
The laboratory is equipped with two fixed hardometers for the determination of the Brinell (HB 30) and of the Rockwell (HRC, HRB, HRA etc.) hardness and for the hardness test on pieces in the as rolled, annealed, normalized or hardened and tempered condition.



A Vickers microhardometer enables the check of surface hardened layers, structural components, pieces of small thickness, wire, decarburization depth, etc.

This image shows a series of Vickers impressions  $HV_{0,5}$  carried out from the surface to the core at a distance of 0,05 mm from each other.

Hardened sample of steel grade 100Cr6  
Magnification: 200 X

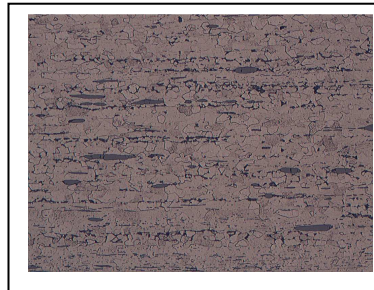
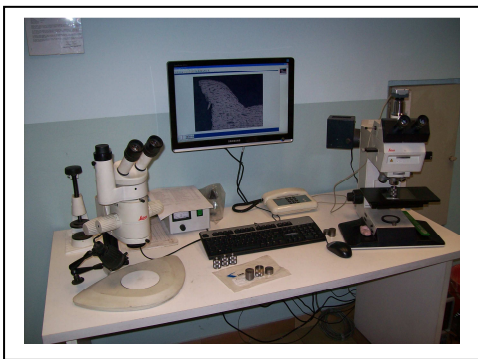


### *Metallographic tests :*

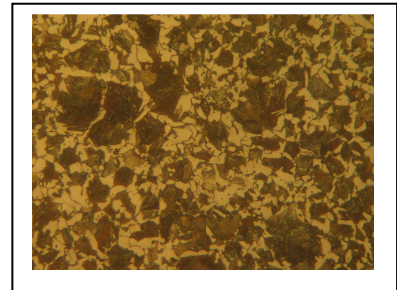
The metallographic department has a room for the preparation of test pieces (cut, incorporation of the test piece in resin, polishing, acid etching, electrolytic etching) and a room destined to their examination and evaluation.

The metallographic test enables the check of :

- structure (as rolled, spheroidized annealed, ferrite/pearlite annealed, normalized, hardened and tempered)
- condition of the inclusions (microcleanness K, manganese sulphides in free-cutting steels etc.)
- surface defects and decarburization



Manganese sulphides  
11SMnPb37  
magnification: 100 X



ferrite/pearlite blocks  
C45  
magnification: 500 X

### *Standard records:*

The laboratory has a broad collection of the most important standards (UNI, DIN, AFNOR, EN, ISO standards).

The recurrent consultation of the internet site of the Italian standardization body UNSIDER enables the continuous update of standards, the replacement of the old standards and the adoption of the new ones.