Today the production process requires faster and more accurate quality control and documentation of the test process. The conventional Brinell or Rockwell hardness tests require much time and if test surface preparation is needed, it can be very expensive. It is very important to design maximum efficiency to ensure minimum expense.

The use of an automatic hardness tester for Rockwell and Brinell testing with an integrated test surface preparation device, has the following advantages:

- Increased productivity
- Effective quality control of each piece
- Elimination of operator errors
- Documentation of the test process

These hardness testers have been studied and developed in order to:

- Be incorporated into a production line (in this case no operator is needed)
- Incorporate a surface preparation system by milling or sanding
- Incorporate automatic piece sorting unit
- Perform different types of control on the production line

ROCKWELL HARDNESS TESTING

TWIN is the most qualified Rockwell hardness tester for high-volume testing.

BRINELL HARDNESS TESTING

BRE-AUT is the most qualified hardness tester for the automatic Brinell hardness testing.
A very simple calibration procedure assures maintaining extremely accurate results even when testing different materials, modifying the relation between test material and indentation diameter.

Automatic sequence is performed through push button, foot switch or other external impulse.

Standard type test cycle starts as follows:
- The test head moves towards the test piece, driven by an hydraulic cylinder
- The indenter comes into contact with the test surface
- Preload is applied
- Then full load is applied for the time chosen by the operator
- The measuring head returns to preload position
- Readout of Brinell result on large graphic LCD display

The entire test sequence takes about 7 seconds (that means testing up to 500 pieces per hour).

E-DATACAPTURE - Software expands the functionality of your hardness tester by allowing to capture and store the hardness testing data on a computer. Besides this, E-DATACAPTURE provides tolerance indicators, generates control limits and average values, provides scale conversion. E-DATACAPTURE generates X-bar, histograms and Cpk. It builds historical data file for an effective process control. E-DATACAPTURE is also available in a version permitting to connect up to 4 hardness testers simultaneously.
The automatic TWIN X hardness tester works according to the Rockwell and Superficial Rockwell principle with loads from 15KgF to 187.5KgF (147.1N to 1.839N). The testing cycle is completely automatic and starts when the indenter comes into contact with the component. It can be activated by the keyboard, footswitch or automatically via PC.

Overview:
- The indenter comes into contact with the test surface
- Preload is applied
- Then full load is applied for the time chosen by the operator
- The hardness tester returns to preload position
- Readout of Rockwell or Brinell result on large graphic LCD display

TWIN X is a Rockwell automatic hardness tester with direct read out in Rockwell and Superficial Rockwell scales. Can test large and irregular specimens up to 420 mm height (950 mm with special extended column). Overhanging pieces can be clamped without any extra support. The 50mm indenter’s stroke permits testing difficult-to-test parts without any adjustment. Most suitable for in-line applications.

IMPORTANT
- Thanks to our special patented clamping device, testing is not affected by deflection of the test part, resulting in more accurate results.
- The TWIN X hardness tester is equipped with an automatic safety device, which retracts the penetrator if a component is incorrectly positioned or in case of unintentional contact with the indenter.

NOTE
- TWIN X can test specimens of different shapes and dimensions. Overhanging pieces can be clamped without any extra support. Insensitive to any deflection of the test part. The electronics permits data collection of the test process. The elevating screw assembly can be removed for in-line application and a completely automated test process.

The TWIN X hardness tester is equipped with an automatic safety device, which retracts the penetrator if a component is incorrectly positioned or in case of unintentional contact with the indenter.

TWIN X Standard

Technical Characteristics:
- Working principle:
  - Rockwell
  - Superficial Rockwell
- Preload:
  - 3kgF (29.4N) - 10kgF (98.1N)
- Automatic load application method
- Minimum measurable diameter: 4mm with Superficial Rockwell test method
- 5mm with Rockwell test method
- Selectable functions:
  - Load selection R/SR
- Output interfaces:
  - USB Printer - data exportation on USB pen drive
  - Optional:
    - RS232 - RS485 - Profibus - Ethernet - Bluetooth
- Working conditions:
  - 0°C-50°C
- Weight:
  - 160kg
- Loads:
  - 15 - 15.6 - 30 - 31.2 - 45 - 60 - 62.5 - 100 - 125 - 150 - 187.5kgF
  - (N 147 - 294 - 305 - 441 - 612 - 980 - 1225 - 1470 - 1837)
- Load time:
  - can be selected via keyboard
- Standard scales:
  - HRC - HRD - HRA (0-100) - HRG - HRB - HRF (0-130)
  - HB30 (0-600) - kg/mm² (0-500) N/mm² (0-5000)
  - HB5 125 15 (0-300)
- Reading:
  - on LCD color touchscreen display 800 x 480 px
- Storage:
  - 400 files with 2500 tests each
- Languages:
  - English, Italian, German, French, Spanish. Further languages on request (up to 9)
- Power supply:
  - 100VAC - 240VAC self-setting
- Working area dimensions:
  - Max measurable height: 420 mm / depth: 225 mm (extended columns on request: +300 mm or +500 mm for specimen up to 920 mm)
- Norms and certifications:
  - Rockwell: ASTM E-18 - ISO6508

Further details on TWIN X can be found in the specific flyer or by consulting our website www.ernsthardness testers.com
Large capacity automatic Brinell hardness tester for testing large and awkward parts up to 1500mm height and several tons weight.

Bigger frame with higher capacity is available on request, an example on the right.

The system may be equipped with surface preparation unit, which may be used only on accurately clamped pieces, as required for machine tools.

The test load may be selected at 750 or 3000 kgF. The impression is made by the BRE-AUT test head, which thanks to the deflection compensation system can perform tests safely maintaining the load within the required tolerances as per ISO 6506 - ASTM E 10 standards, unlike systems employing low deformation load cells.

Indentation reading is performed by the e-BRIO automatic optical reader, data are saved on industrial PC.

Automatic hardness tester BRE AUT SOR for the testing of oil pipes. Available in different capacities for diameters ranging from 60 to 440mm.

Equipped with surface preparation by milling, the hardness tester in question, produced in several tens of units, allows to perform the automatic in-line test of oil pipes as required by the specifications relating to this type of test.

The measuring cycle consists of: blocking of the pipe to be tested (usually in the initial and final positions) under the hardness tester: surface preparation with adjustable depth from 0.5 to 2.5mm; measurement on the surface with application of the load with 3.000Kgf (750Kgf for pipes of small diameter, low thickness) and automatic reading of the hardness on the digital display.

Insensitive to caving-in or bending, which are common in pipes, it is now universally recognized as a reference for these types of tests, which take place 24 hrs a day in extremely critical environmental situations.

Working principle: Rockwell principle with direct reading in Brinell points
Preload: 200 KgF
Standard scales: HB 30 3000 / 750 KgF Ball diam 10 / 5mm
Storage: industrial PC
Languages: English, German, Italian, French - other languages on request
Power supply: 380V 50Hz. other voltages on request
Working area dimensions: Positioned into production line - aprox 1.5m x 1.5m
Norms and certifications: Conform to standards ISO 6506/1 6506/2 6506/3 ASTM E 10 with indentation optical measuring device
Loads: 3000 / 750 KgF (N 29430 -/ 7360)
Load time: Adjustable from 1 to 30 secs
Reading: In Brinell points
Selectable functions: Load time, tolerances, stats, languages...
Output interfaces: Profibus, Ethernet
Working conditions: 0-50°C
Weight: aprox. 2 tons
Notes: Due to the fact that with this system the measurement isn’t influenced by bending nor deflection, BRE-AUT SOR has become the worldwide reference in control of oil pipes in production lines.
The hardness testing system in question is the last plant designed for the automatic hardness test of train wheels of a major industrial group in the Far East.

The reliability and full capacity (24 hrs a day) of our systems have made a crucial contribution to our leadership in this specific sector.

The plant in question is able to perform hardness test of finished wheels with the help of a lamellar grinding wheel, as shown in the video clip.

The transfer tool has a very important significance in reducing the test cycle. The main cart carries two wheels simultaneously alternately loaded by mechanical arms, the wheels are carried to the test point and finally positioned in unloading position.

Based on machining centers technology with a ball screw activating the high speed conveyor table, the transfer tool allows to carry two wheels simultaneously from the loading point and the measurement point under the hardness tester to the unloading point, allowing the machine to perform a hardness test every 60 seconds including surface preparation.

The wheel may be measured in three points on the same circumference at a distance of 25 mm between a test and the other, as required by specific regulations in case a test is outside the required hardness range.
The plant in question, designed in collaboration with leading industries in the construction of machining centers in gantry design, performs the surface preparation on each point of the programmed surface by means of a large and powerful milling head, which is able to make preparations of metal sheets of hardness up to 600HB with a depth of 3mm and to automatically perform the impression at 3000Kgf. As well as an optical reading of the latter. The milling system may be CNC programmed in order to obtain a surface suitable for the automatic reading.

The plant in question is also equipped with a 16 position-tool changer to allow the system to work autonomously for hours (even for days) without any intervention of the operator.

The reading is carried out by an optical reading system of the Brinell impression with maximum reliability.

High power-aspirator for collecting milling shavings.

The hardness tester BRE-AUT WG BRG, one of the largest plants ever produced, allows the in-line control of high hardness metal sheets of size from 6 to 16m length, from 1 to 3m wide with thickness varying from 4 to 60mm.
Hardness tester BRE-AUT MAR for automatic Brinell hardness testing of train wheels. Automatic plant with transfer tool to alternately move two wheels throughout all positions (loading, measuring and unloading).

This hardness testing system was the first plant we designed for a major industrial group in Eastern Europe for automatic testing of train wheels. Its reliability and full capacity (24 hrs a day) have contributed to the diffusion of other machines present in this site for the same application.

The plant in question is able to test the hardness both of the finished and unfinished wheels with preparation by means of lamellar grinding wheel or by milling.

The transfer tool has a very important significance in reducing the test cycle. The main cart carries two wheels at the same time which, alternately loaded by mechanical arms, are moved to the test point and finally positioned in unloading position.

Testing cycle time, including surface preparation, amounts to 80 seconds per wheel.

The wheel may be measured in several points of the same circumference.

- Working principle: Brinell
- Load time: Selectable from 1 to 30 sec
- Reading: Automatic through Ernst e-brio
- Selectable functions: From load time to statistics, hardness tolerances, etc.
- Output interfaces: Proibus, Ethernet - others on request
- Working conditions: 0-50°
- Weight: approx. 10 tons
- Notes: Has been operating 24 hours daily from 2007
- Loads: 3000 KgF
- Standard scales: HB 30 /3000 KgF ball diam. 10mm
- Storage: Industrial PC
- Languages: English, German, Italian, French - other languages on request
- Power supply: 380 V 3 Ph
- Working area dimensions: Required area 10m x 10m
- Norms and certifications: Standard Brinell ISO 6506/1 6506/2 6506/3 and ASTM E 10 for Brinell test
The hardness testing plant in question is the second machine designed for an important industrial group in Far East for automatic control of train wheels.

Its reliability and full capacity (24 hrs a day) have contributed to the diffusion of other machines present in this site for the same application.

The plant in question is able to perform the hardness test on coarse wheels through milling, as shown in the video clip.

The transfer tool is particularly important in reducing the testing cycle. The main cart is moved in measuring position and finally translated reversely into unloading position.

Testing cycle time, including surface preparation, amounts to 120 seconds per wheel.

The wheel may be measured in several points of the same circumference.

In case the measured hardness does not correspond to the preset tolerances, a second measurement is carried out automatically by rotating the wheel by a few degrees in order to perform the test in another point.

- Working principle: Brinell 3000 KgF
- Load time: Selectable from 1 to 30 sec
- Reading: Automatic through Ernst e-brio
- Languages: English, German, Italian, French - other languages on request
- Working area dimensions: 5m x 3m
- Norms and certifications: ISO EN 6506 and ASTM E 10 for Brinell test
- Loads: 3000 KgF
- Standard scales: HB 30 3,000 KgF
- Storage: industrial PC
- Power supply: 380V 3 Ph - other voltages on request
- Weight: Aprox. 5 tons
The plant in this particular application was designed to automatically carry out the hardness testing of oil pipe connectors of length between 150 and 600mm and a diameter from 80 to 300mm.

The hardness test takes a total of 75 seconds. This includes the time required to perform surface preparation by milling - with preparation depth up to 3mm in depth - of the pieces by means of marking.

The optical reading is carried out automatically and the data and impression images may be stored in peripheral devices via Profibus communication or other requested systems.

Complies with ISO EN 6506 and ASTM E 10 regulations for Brinell test.

- Working principle: Brinell conform to international standards ISO-EN 100003/ ASTM E18
- Load time: Adjustable from 1 to 30sec
- Objective lenses: e-brio Ernst automatic Brinell indentation measuring system
- Selectable functions: Test load, load application time, hardness tolerances, stats., etc.
- Power supply: on request
- Weight: Complete plant approx. 6 tons
- Loads: 3000 - 750 KgF (N 29,430 - 7.360)
- Standard scales: HB 30 (100 - 600 HB)
- Storage: industrial PC
- Languages: English, Italian, German - other languages on request
- Working conditions: 0-50°C
- Norms and certifications: ISO 6506/1 6506/2 6506/3
- Notes: Completely automatic testing cycle with in/out tolerances selection
TWIN TDM is a Rockwell hardness tester with test loads ranging from 15 to 187.5 KgF. (N 147 - 1839) but also available with loads of 750 KgF. Complies with ISO-EN and ASTM standards for Rockwell testing, which has been designed for in-line hardness testing of thin-walled tanks with length from 180 to 2,000 mm. and diameters between 80 and 220 mm.

The line in question consists of two hardness testers with two systems of surface preparation by means of lamellar grinding wheels, with pressure increases on the wheels through absorption of current which varies according to slats consumption.

The surface preparation systems and the two hardness testers are installed on two parallel lines, so that the tank may be loaded and unloaded in the same position by means of master controller.

The two lines are connected by the translation system / tank rotation system in order to automatically perform the hardness control on two points at 180 ° - or 6 tests in different spots may be programmed from the control panel in order not only to perform a more accurate hardness testing, but also to comply with different regulations according to the country.

Obtainable productivity amounts to 40 seconds per tank with two opposed tests.

- Working principle: Rockwell with loads from 15 to 187.5 KgF
- Preload: 3-10 Kgf.
- Standard scales: HRC I HRA I HRB I HR15N I HR30N I HR45N I HB30 I HB10 I HB5
- Storage: 64 Files with 4000 values per file
- Output interfaces: English, German, Italian, French - other languages on request
- Working conditions: 0 - 50°C in critical enviroments
- Weight: Aprox. 4 tons
- Loads: 15 / 15.6 / 30 / 31.2 / 60 / 62.5 / 100 / 125 / 150 / 187,5 KgF
- Load time: Adjustable from 1 to 30 secs
- Reading: On high resolution display
- Selectable functions: Load time, stats, superficial preparation depth and automatic compensation
- Power supply: 380V 50Hz
- Working area dimensions: 7m x 3m
- Norms and certifications: ISO 6508/1 6508/2 6508/3 - ASTM E 18
**TWIN VEC**

**Technical Characteristics:**
- Pre-loads: 3Kgf-10Kgf (29.4N-98N)
- Test loads:
  - 15Kgf-30Kgf-45Kgf (147N-294N-441N) (Superficial Rockwell)
  - 15.6Kgf-31.2Kgf-62.5Kgf-125Kgf-187.5Kgf (153.2N-306.5N-612.9N-1,226N-1,839N) (Brinell)
  - 60Kgf-100Kgf-150Kgf (588N-980N-1,471N) (Standard Rockwell)
- Indenter’s stroke: 45mm

On request a surface preparation system can be built-in.

The components, which may be of different shapes, are first positioned on special shaped plastic supports, then transported one by one under the hardness tester, clamped by a pneumatic system and then tested.

**NOTE**
The process used for hardness testing, being a variation of the Rockwell principle, allows testing even if there are small deflections or bendings. Surface preparation is required only in the test point.

**TWIN V.E.C. SPECIAL EXECUTION**

Automatic motorized Rockwell and Superficial Rockwell hardness tester for batch testing of different components

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**ELECTRONICS ernst automatic systems**

Our best attention has been given to the electronics to satisfy the most sophisticated requirements and especially to guarantee continuous working without inconvenience; even in critical environments such as heat treatments, foundries and different production divisions.

All significant parameters for an accurate hardness test, such as scale, tolerance and file description, can be set directly on the integrated touch screen panel, and then automatically sent to the two hardness test control displays. The touch screen panel also allows setting all the parameters concerning the length and diameter of the bottles, distance between the test points etc. This allows a fully automatic test cycle, remarkably increasing production and preventing any operator error.

The hardness test results are directly shown on the double hardness testing control display, one for each hardness tester.

The measuring of the Brinell impression occurs by optical scanning with ernst e-brio system on industrial PC. It is possible to set up the PC parameters for the hardness measuring directly through the integrated keyboard or mouse. Our new releases make use of Proibus communication system. On request it is possible to implement the software for exporting data to a main data processing system.