

# Automatic hardness testing devices

The measure of hardness, applied to rubber and plastic, is a measure of stiffness obtained from an indentation test.

An indenter is pressed into the sample under a given force and the resulting indentation, with the load applied, is measured.

Hardness is a measure of stiffness or modulus, which is an important property of rubbers in almost all applications. Its popularity is due to its practical simplicity, versatility in terms of the test piece required and non-destructive nature. Because of this, it is universally used as a quality control test, for troubleshooting, as a classification parameter for both compounds and products and as a requirement in material and product specifications. Hardness is widely used as a convenient, non-destructive measure of the state and uniformity of cure of a range of vulcanized products. It can also be used to track ageing, contamination and porosity and so is suitable for diagnostic purposes.

## Configurations

Gibitre produces hardness units for the most commonly used hardness

scales for Shore (A, D, A0, 00) and IRHD (Micro, Normal, Hard, Low) Different configuration have been developed to meet the specific requirements of the customers:

Single hardness units  
Multi-head hardness units  
Both single units and multi-head units can be used in connection with a standard pc or can be controlled by an electronic console  
All the units can be equipped with centring devices to ease the control of parts with specific shapes.

## General Characteristics of Gibitre Automatic units

High technology sensors have been selected both for Shore and for IRHD units to ensure repeatable and long-time stable readings  
For IRHD units, the weight applied to the sample is controlled using a load-cell-closed-loop system. This technology, widely used for hardness testers for metal, eliminates the effect of friction and increases test repeatability.  
The lifting movement is controlled with a ball screw system, which ensures extremely long duration to the system.

Each testing unit is fitted with a solid aluminium and Stainless steel support.  
The position of the testing unit can be manually regulated to enable the test of samples with thickness up to 300 mm.

## Multi-point automatic testing

The sample holding plate has a double motor controlled movement: it moves up and down and rotates. The combination of the two movements permits to perform automatically more tests in different points of the sample.

The user can set the number of tests and the rotation angle of the sample between one test and the next one.

## Modular construction

The main parts of the instrument are: the testing unit, the lifting system and the electronic card. Those parts have been specifically designed to enable independent and easy replacement in case of failure. This characteristic ensures quick failure recovery and low-cost maintenance.



## Electronic Console

Stand-alone hardness units and Multi-head automatic tester can be connected to Gibitre Hardness Electronic Console. The Electronic Console is alternative to the connection to pc and is suggested in case a basic hardness test is required and there is no need

for results storage.

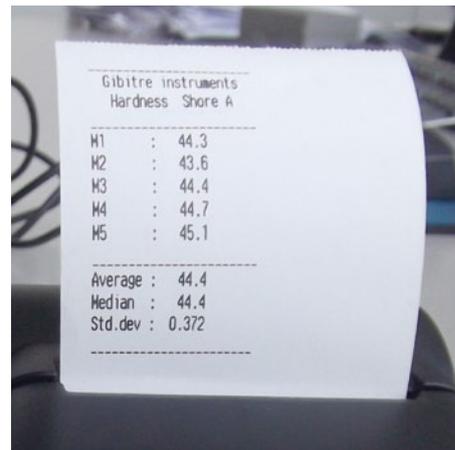
The electronic console permits to perform a single test or an automatic sequence of tests in different points of the sample. The user can set the test time, the number of automatic tests (up to 5) and the rotation angle of the support between two following tests.

When more tests are made the relative mean and standard deviation are automatically calculated.

A Thermal printer is available for data printout. The printout includes the results obtained, the relative mean and standard deviation.



Test mode	Automatic performance of tests (up to 5) in different points of the sample
Data displayed	Results of the 5 tests
Data analysis	Mean, Median, standard deviation of test results
Data Printout (with optional printer)	Company identification, results, mean and Std. Dev.



## Stand-alone Hardness Units

Stand-alone automatic hardness units are independent hardness measurement devices designed for the execution of hardness tests according to a specific hardness scale.

Stand-Alone automatic units have been designed to meet the requirements of research labs and for production control.

Available hardness scales are:

Shore A,  
Shore D,  
Shore A0, Shore 00,  
IRHD-Micro,  
IRHD-Normal,  
IRHD-Hard,  
IRHD-Low.

Stand-alone hardness units can be controlled both with Gibitre Hardness Software and with Gibitre Electronic Console.

In case of software control of more hardness units, each hardness unit can be connected to a standard pc using its usb cable and can be used simultaneously.

The solid construction of the instrument, the high quality sensors, and the lifting system with ball screw makes them ideal both for research purposes and for heavy-duty production control.

Each Hardness Unit is composed by the following parts: mechanical structure, Testing Unit, Sample Holder with motor-controlled rotation, motor-controlled-Lifting System with ball screw, Electronic card. All the parts, which compose the instrument, have been specifically designed for easy interchange in case of failure.



Standards the instrument complies with	Shore: ISO 868, 7619-1, ASTM D, 2240, DIN 53 505 IRHD and Micro-IRHD: ISO 48; ASTM D 1415; DIN 53 519
Available hardness types	Shore A, Shore D, Shore 00, IRHD (Normal, Hard, Low), Micro-IRHD
Unit control	Software or Electronic console
Test modality	Fully automatic test in different points of the same sample
Test results calculated for each test	Shore units: Initial hardness, hardness values after customer defined test times IRHD /micro IRHD Hardness after 30 sec, hardness values after customer defined test times
Resolution	0.1 Hardness point
Calibration	Electronic calibration Report with traceability to primary references ACCREDIA calibration Certificate (optional)
Power supply	220 VAC $\pm$ 10%, 50 Hz $\pm$ 3, 4 A, single phase, 40 W - Other on request
Dimensions	(W x D x H) 200 x 200 x 500 mm
Weight	30 Kg

## Multi-Unit Automatic hardness testing system

Multi-Unit Automatic hardness testing system has been designed for labs, which need to perform hardness tests according to different hardness scales.

The hardness testing unit to be used must be placed in the front position by rotating the top part of the support. The rotating system permits to interchange the test unit within a few seconds. No dismounting or replacement of delicate parts and no specific training are required to perform with full safety this operation.

This solid technical solution is ideal even in the case that the change of unit must be done many times in the same day by

The solid construction of the instrument, the high quality sensors and the lifting system with ball screw makes it ideal both for research purposes and for heavy-duty production control.

The instrument can be configured according to the needs of the custo-

mer: up to 4 units can be mounted on the same support. The available hardness testing units are:

Shore A,  
Shore D,  
Shore A0, Shore 00,  
IRHD-Micro,  
IRHD-Normal,  
IRHD-Hard,  
IRHD-Low.

The support of the unit is configured for the further installation of units in case free positions are available.

The Multi-Unit Automatic hardness testing system can be controller both with Gibitre Hardness Software and with Gibitre Electronic Console.

The Multi-Unit Automatic hardness testing system is composed by the following parts: mechanical structure, Rotating hardness testing unit support, Hardness testing units, Sample Holder with motor-controlled rotation, motor-controlled-Lifting System with ball screw, Electronic card.

All the parts, which compose the

instrument, have been specifically designed for easy interchange in case of failure.



Standards the instrument complies with	Shore: ISO 868, 7619-1, ASTM D, 2240, DIN 53 505 IRHD and Micro-IRHD: ISO 48; ASTM D 1415; DIN 53 519
Available Hardness types	Shore A, Shore D, Shore 00, IRHD (Normal, Hard, Low), Micro-IRHD
Unit control	Software or Electronic console
Test modality	Fully automatic test in different points of the same sample
Test results calculated for each test	Shore A /Shore D /Shore 00 Initial hardness, hardness values after customer defined test times IRHD /micro IRHD Hardness after 30 sec, hardness values after customer defined test times
Measure units and full scale	Shore A/D/00: Shore point, 0.1 p.t resolution IRHD: IRHD point, 0.1 p.t resolution Micro-IRHD: IRHD point, 0.1 p.t resolution
Calibration	Electronic calibration Report with traceability to primary references ACCREDIA calibration Certificate (optional)
Power supply	220 VAC $\pm 10\%$ , 50 Hz $\pm 3$ , 4 A, single phase, 40 W - Other on request
Dimensions	(W x D x H) 350 x 350 x 700 mm
Weight	61 Kg



## Centring Devices for Micro IRHD

### Laser Centring Device



This high technology centring device permits to improve the speed and ease of testing of small symmetric items like o-rings, seals, etc.

The device includes:

- Class I laser Sensor that detects the maximum thickness point of the part being tested
- Motor-controlled slide that moves the sample to perform the test in the optimum test position.

For the performance of the test the user must simply place the sample on the sample holder in the test area and press start.

The instrument:

- finds automatically the optimum test point of the sample



- measures the thickness of the sample in the test point.
- moves the sample in the test position
- performs the hardness test in the optimum test point
- moves back to the start point to prepare for the next test.

### Diaphragm centring device for O-rings



The device is used in combination with the Micrometric Slide (code 8-HSO-44-000-0) and enables automatic multiple tests to be carried out on O-ring or round parts with external diameter up to 75 mm.

The use is very simple:

- 1) set on the manual gauge-meter of the sliding system the dimension of the o-ring to be tested  $(\text{int. diam} + \text{cord})/2$  to centre it correctly.
- 2) put the o-ring on the Diaphragm centring and fix the o-ring slightly using the open-close leverage
- 3) start a multiple test session to make automatically tests in different points of the sample.

When you test different o-rings of the same kind, no regulation is required between one o-ring and the next one

The distance between the plate and the diaphragm can be regulated according to the cross-section of the o-ring.

The Y axis position is automatically centred due to the mechanical construction of the instrument

### Micro cylinder centring device for O-rings



The device is designed for the quick centring of O-rings or cylindrical parts independently from the diameter. This device permits to make one test on the sample and requires manual re-positioning of the sample between one tests and the next.

This device is mounted directly on the standard plate of the instrument. The use is very simple:

- 1) the sample is placed between the vertical micro-cylinders.
- 2) the position of the micro-cylinders is regulated using the handle to fix the sample in the middle.
- 3) the middle position of the micro-cylinders is the correct centring point for the test.

The height of the micro-cylinder can be regulated using the regulation ring according to the cross-section of the sample.

The Y axis position is automatically centred due to the mechanical construction of the instrument

### Centring device for tubes



A piece of tube is placed on the horizontal cylinder for testing.

Note: this device requires manual re-positioning of the sample between one tests and the next.

## ACCREDIA Calibration

Gibitre Instruments' metrological laboratory is official ACCREDIA calibration laboratory for the calibration of Shore A, Shore D, IRHD Micro, IRHD-Normal, IRHD-Hard, and IRHD-Low hardness testers.

Gibitre Laboratory is accredited since March 2005 and provides official calibration for hardness testers of the most known brands.

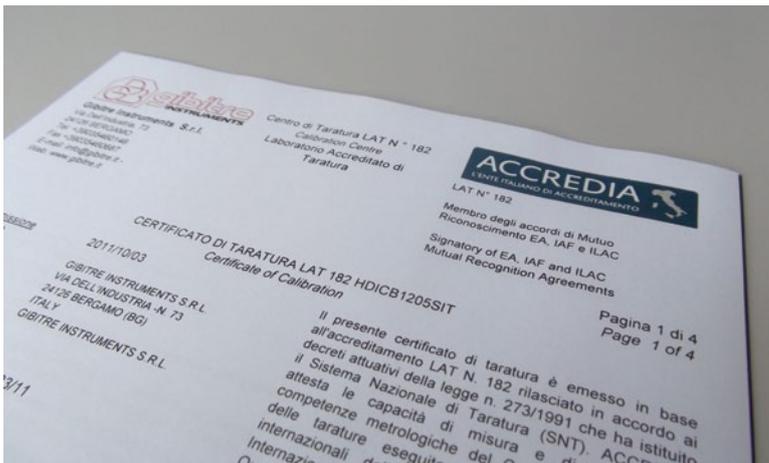
ACCREDIA is a member of EA (European Cooperation for Accreditation), the organization which coordinates the national calibration services in numerous countries within Europe and beyond through mutual recognition agreements. Through these agreements, each signee recognizes the operational procedures of accreditation used in the metrological laboratories of the other nations.



**LAT N° 182**

**Signatory of EA, IAF and ILAC Mutual Recognition Agreements**

**Membro degli accordi di Mutuo Riconoscimento EA, IAF e ILAC**



## Certified rubber samples

The use of certified samples permits to perform periodical verification of the conformity of the reading of your instrument in the period between two calibrations.

Periodical verifications are useful considering the importance of hardness as a testing parameter. Characteristics of the product The hardness of elastomeric products is strongly influenced by the temperature. For this reason the

samples produced by Gibitre have a shape that permits easy handling without transmitting the heat of the hand to the testing area.

The samples are provided with a calibration Certificate with traceability to the certified hardness tester used for the measurements.

The samples are provide with an insulated protection case that ensures protection of the samples from temperature variations and from the light.

