

SONODUR 3

Portable hardness testing for maximum flexibility and reliable results





The best way to mobile hardness testing

The SONODUR 3 provides two different technology standards for hardness testing: The UCI method (Ultrasonic Contact Impedance) and the Leeb method. In addition, the user-friendly SONODUR 3 is designed for rough everyday use.

The mobile high-tech all-rounder is used for quality control at incoming goods or during the production process. Another field of application is the fast hardness testing of metallic materials after heat treatment or surface processing. The system is also excellently suited for hardness testing at hard-to-reach positions and for mobile weld inspection in a confined space. Pre-installed library for multi-material measurement (e.g. steel, aluminum, copper) and simple adjustment on almost all coarse-grained or heterogeneous materials (e.g. cast iron) complete the application areas of the SONODUR 3.

Your advantages at a glance:

- **Proven UCI methods:** According to the current standards DIN 50159 1,2-2021 and ASTM A1038 2019.
- **Maximum flexibility:** SONODUR 3 has the largest range of UCI test probes in the market.
- **Unique combination possibility with Leeb sensors via Bluetooth:** 2-in-1 concept.
- **Industrial-grade, rugged design:** Protection grade: MIL-G810, IP65.
- **Carrying strap:** For a safe and comfortable measurement (e.g. on scaffolds).

Professional software support

Operating system

The software of the SONODUR 3 is based on the future-proof Android platform with almost any expansion possibilities. The device is thus ideally equipped for daily use as a “workhorse” in hardening and industrial plants with outdoor operations. In addition, it can be used for tasks in connection with comprehensive communication for production lines, keyword IOT.

The application software of the SONODUR 3 is exemplary in terms of clarity and ease of use.



Highlights

- The **5 inch multi-touch display** is clearly arranged and has a user-friendly design. It allows direct access to the measurement menu and the measurement functions.
- The **Android system** of the SONODUR 3 permits the use of familiar functions from the smart phone, such as screenshots and photography (password protected).
- The **protective function** (software lock) prevents the unintentional triggering of a function when the touch screen is affected during carrying and measuring.
- The **documentation of the results** is flexible and easy to manage by exporting files via USB, Bluetooth, NFC or WLAN.
- The graphical “**live**” **representation** of the results in a clear form enables to detect irregularities caused by the material or the test procedure to be recognized immediately.
- When **tolerance thresholds** are set, the variation in percentages of the tolerance values is calculated and displayed in the results list in addition to the color marking. This aids a better overview and decision-making (e.g. for the identification of measurement outliers).
- The hardness values determined in Vickers can be shown directly on the display in all other common hardness scales.

Technical Data

Feature	SONODUR 3
Operating system	Android 7.0
Operating time	>10 h in measurement mode (depending on system settings and operating conditions)
Protection grade	IP65
Qualification	suitable for industrial use according to MIL-STD-810G method
Dimensions display unit	approx. 164 x 86 x 23 mm
Weight indicating instrument	approx. 320 g (incl. battery pack)

Test method

The SONODUR 3 masters the evaluations of different hardness testing methods UCI and the rebound hardness testing according to Leeb:

UCI test method

The rod of a UCI test probe is stimulated to oscillate in longitudinal direction with its natural frequency. A diamond is soldered into the lower end of the rod, which is pressed into the material in order to perform a measurement. With it a defined load is applied via a spring system. When the Vickers diamond penetrates towards the material, the vibration is damped and a frequency shift occurs, which can be measured. When the nominal test force has been reached within the final position, the hardness value is calculated from this frequency shift using the Vickers scale and will be displayed immediately. Due to the small indentation size and depth, the process is often considered to be non-destructive.

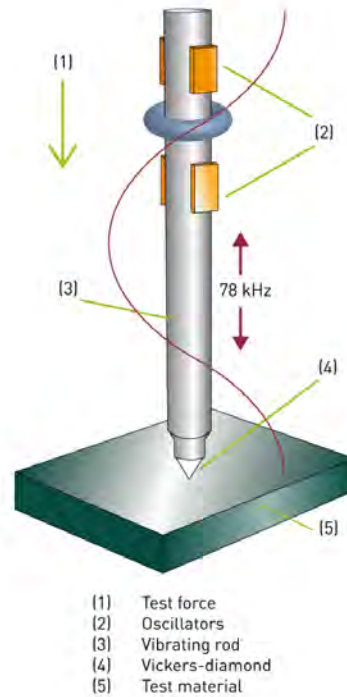


Fig. 1: Mobile hardness testing with UCI

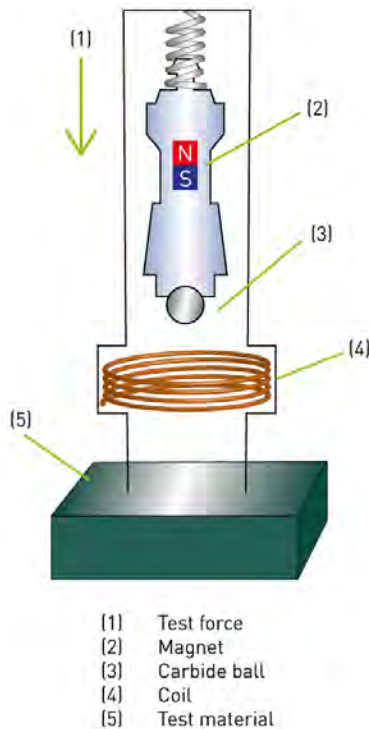


Fig. 2: Leeb Rebound Hardness Test

Leeb test method

With the Leeb rebound method, an impact body with a carbide ball at its front end is pushed against the surface of the test piece with a defined energy. The impact causes a deformation of the surface, which leads to a loss of kinetic energy of the impactor. This energy loss is determined by means of velocity measurement before and after the impact and a hardness value is calculated from this.

Standards

Compliance with international standards forms an important part of professional quality assurance and ensures the high quality of the end product. Units and systems by FOERSTER perform testing in accordance with these international standards to ensure that your materials and components meet the tough requirements.

Below is a selection of standards covered by the SONODUR 3 test system. Please do not hesitate to contact us should you wish to perform testing in accordance with any standards that are not listed.

UCI method, according to DIN 50159-1,2-2021, ASTM A1038-2019

- Conversion according to the latest ASTM E140-12b^{e1} (2019) and EN ISO 18265:2019.

Leeb method, according to ASTM A956, ISO 16859, GB/T 17394

- Conversion according to the latest EN ISO 18265-2019, ASTM-E 140-2019, EPRI correlation-P91-2020 (HV5/HV10 with HB).
- Calculation of the Vickers hardness HV from the L-value (LD und LG acc. to ISO 16859).



Hardness reference blocks for UCI- and Leeb measuring technology

Highest demands on quality and homogeneity

Our hardness reference blocks with factory certificate (on request also with DAkkS certification) enable continuous checking and calibration of your UCI probes or Leeb rebound devices for consistently stable measurement results.

The hardness reference blocks are available in different versions with certified hardness.



Overview of probes and applications



SONO H (UCI)

Stable and reproducible measurement values

The hand-held measuring probes in robust stainless-steel housing are designed for daily use. They allow very accurate positioning measurements in any direction, simply by placing and pressing. The measured value is produced immediately when the nominal test force has been reached in the forward movement. No maintenance time is required by holding or lifting the probe to display the measured value.

The intelligent measuring system of each probe covers the entire hardness range of the classic Vickers scale. The hand-held probes are suitable for measurements of metals, industrial ceramics and, with certain restrictions, also for highly heterogeneous materials such as cast iron (nodular cast iron e.g. GJS500 or laminar graphite).

Our hand-held measuring probes with test loads from 10 N (HV1) to 98 N (HV10) are currently available for solving a wide range of testing tasks depending on component weight, thickness or geometry, with test probes and dimensions adapted to the task.



SONO S (UCI)

Guided measurements for demanding measurement positions

The SONO S series combines our hand-held measuring probes in a high-quality stand housing. The integrated guide and the multi-part set of probe attachments, with and without prism, make it possible to position the probe cleanly on curved surfaces and to perform the measurement precisely and reproducibly. Transverse forces are virtually eliminated. Other areas of application are wherever a hold-down is required or an adaptation with self-centering makes sense on unevenly curved surfaces.



SONO M (UCI)

Repeatable, uniform application of force into the material to achieve highly accurate measurements

The rugged, mechanical construction of the motorized measuring probes is developed for everyday industrial use. The robust housing made of anodized aluminum protects the sophisticated mechanics. The intelligent measuring system of each probe covers the entire hardness range of the classic Vickers scale.

Motorized measuring probes have the advantage that the Vickers diamond is initially protected and is not extended until the probe is positioned over the material. Probe feet are available for cylindrical surfaces for accurate centric measurement of surface hardness. Inexperienced inspectors can quickly obtain reliable results by holding the probe feet.

Motorized measuring probes operate with significantly lower test forces of 1 N (HV0.1) to 8.6 N (HV0.9) than hand-held probes, making them particularly suitable for sensitive surfaces on which only minimal test indentations are to be made. The field of application includes thin, sensitive surface layers such as in the gravure printing industry (Cu, Cr coatings), in compliance with the applicable penetration times, for pistons and platings as well as sensitive components/materials.



SONO L (Leeb)

Latest sensor technology for optimal measurement results

Due to the stable design, our Leeb rebound sensors are ideally suited for everyday use on large components in the industrial work environments. The "2-in-1 concept" enables the parallel use of Leeb rebound sensors (via Bluetooth) and UCI measuring probes with the SONODUR 3 device. Areas of application are large, solid test parts with a minimum component weight requirement of 5 kg and a minimum thickness greater than 25 mm (SONO HLD).

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