

Hardness testing of metals (Leeb)



Determining the hardness of metals is of particular significance during the preparation and use of metallic materials. Usually, hardness is determined using test machines in accordance with Vickers, Rockwell or Brinell.

For mobile measurements, the rebound method according to Dietmar Leeb, which was first used in 1978, has prevailed. To do this, a standardised impact body (such as SAUTER AHMO D01) is shot against the item to be tested. The rebound of the impact body leads to a deformation of the upper surface, which results in a loss of kinetic energy. This loss of energy is determined by measuring the speed and herefrom the Leeb hardness value (HL) is calculated.

These measuring devices can be used in any location. Usually they are equipped with a large internal data memory, which allows to record the measurements at goods receipt or in production.

Our range is equipped with compact measuring devices of the so-called "Pen Type" shape (HN-D) or measuring devices with external sensors connected by cables.

Quick-Finder

Readout	Sensor	Model		Page
[d] HL		SAUTER		
1	D	HK-D.		61
1	D	HK-DB		61
1	D	HMM.		62
1	D	HMO.		64
1	D	HN-D.		63
1	D	HMM-NP		62



Premium Durometer for hardness testing – now also with hardness comparison block included

Features

- Measures all metallic samples (> 3 kg, thickness > 8 mm)
- **External impact sensor** standard (Type D)
- **Mobility:** In comparison with stationary table-top devices and testing devices with an internal sensor, using the SAUTER HK-D, offers the highest level of mobility and flexibility
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **1 SAUTER HK-DB.: Hardness comparison block**, hardness approx. 800 HLD, included in delivery
- **2 Delivered in a sturdy carrying case**
- **Measurement value display:** Rockwell (Type A, B, C), Vickers (HV), Shore (HS), Leeb (HL), Brinell (HB)
- **Internal memory** for up to 600 data groups, with up to 32 values per group forming the average value of the group
- **Mini statistics function:** displays the measured result, the average value, the impact direction, date and time
- **Automatic unit conversion:** The measuring result is automatically converted into all specified hardness units

- **Measuring with tolerance range (limit-setting function):** Upper and lower limiting can be programmed individually. The process is supported by an audible and visual signal.
- **Matrix display:** Backlit multi-function display for all relevant functions at a glance
- **Robust metal housing**

Technical data

- Precision: ± 1 % at 800 HLD
- Minimum sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Minimum sample material thickness: 8 mm
- The lowest weight of the test item on solid support unit: 3 kg
- Dimensions W×D×H 132×82×31 mm
- Permissible ambient temperature -10 °C/40 °C
- Battery operation, batteries not standard 2× 1.5 V AA, operating time up to 200 h
- Net weight approx. 0,45 kg

Accessories

- **Plug-In for data transfer of measuring data** from the measuring instrument and transfer to a PC, e.g. in Microsoft Excel®, SAUTER AFI-1.0
- **Data transfer software**, KERN SCD-4.0
- **Support rings** for secure positioning, SAUTER AHMR 01
- **Impact body** Type D, net weight approx. 5,5 g, hardness ≥ 1600 HV, tungsten carbide, Impact ball Ø 3 mm, in accordance with the standard ASTM A956-02, SAUTER AHMO D01
- **External impact sensor** Type C. Low energy sensor: requires only 25 % impact energy compared to type D, for testing tiny or light objects or the surface of hardened layer, SAUTER AHMR C
- **External impact sensor** Type D, SAUTER AHMR D
- **External impact sensor** Type D+15. Slim front section for holes, grooves or re-entrant surfaces, SAUTER AHMR D+15
- **External impact sensor** Type DL, for very narrow surfaces (Ø 4,5 mm), SAUTER AHMR DL
- **External impact sensor** Type G. High energy sensor: 900 % impact energy compared to type D, SAUTER AHMR G
- **Connection cable durometer/ impact sensor** SAUTER HMO-A04
- **3 Test block** Type D/DC, Ø 90 mm (± 1 mm), net weight < 3 kg, hardness range 790 ± 40 HL, SAUTER AHMO D02 630 ± 40 HL, SAUTER AHMO D03 530 ± 40 HL, SAUTER AHMO D04
- **Factory calibration certificates** for SAUTER AHMO D02, AHMO D03, AHMO D04, SAUTER 961-132

STANDARD					OPTION			
MEMORY	STATISTIC	UNIT	TOL	BATT	1 DAY	CAL BLOCK	SOFTWARE	+4 DAYS
HK-D								

Model	Sensor	Measuring range	Readout	Test block	Option	
					Factory calibration certificates	
SAUTER		[Max] HL	[d] HL	Typ D/DC approx. 800 HL		
HK-D.	Typ D	170-960	1	not standard		KERN 961-131
HK-DB	Typ D	170-960	1	standard		961-131



Advanced features for demanding applications

Features

- **1 Impact (rebound) sensor:** The bounce module is accelerated by a spring against the item being tested. Depending on how hard the object is, the kinetic energy of the module will be absorbed. The speed reduction will be measured and converted to Leeb hardness values.
- **External impact sensor (Type D)** included
- **Mobility:** In comparison with stationary table-top devices and testing devices with an internal sensor, using the SAUTER HMM. offers the highest level of mobility and flexibility
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **2 Standard block for calibration** included (approx. 790 ± 40 HL)
- **3 Delivered in a robust carrying case**
- **Internal memory** for up to 9 data groups, with up to 9 values per group forming the average value of the group
- **Mini statistics function:** displays the measured result, the average value, the impact direction, date and time
- **New:** SAUTER HMM-NP! This model has identical product features as the SAUTER HMM. model, but comes without the wireless infrared printer.

- **Measurement value display:** Rockwell (B & C), Vickers (HV), Brinell (HB), Shore (HSD), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion:** The measuring result is automatically converted into all specified hardness units

Technical data

- Precision: 1 % at 800 HLD (± 6 HLD)
- Measuring range tensile strength: 375–2639 MPa (steel)
- Min. sample weight on a solid and stable support: 3 kg
- Minimum sample material thickness: 8 mm
- Minimum sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Dimensions W×D×H 80×30×150 mm
- SAUTER HMM.: External mains adaptor for printer, as standard
- Ready for use: Batteries included, 3× 1.5 V AAA, block, operating time up to 30 h, AUTO-OFF function to preserve battery life, Battery charge indicator
- Net weight approx. 0,2 kg

Accessories

- Connection cable, without impact sensor, SAUTER HMM-A02
- **5 Attachment rings** for secure positioning, SAUTER AHMR 01
- **4 Impact body**, SAUTER AHMO D01
- **Test block** Type D/DC, Ø 90 mm (± 1 mm), net weight < 3 kg, hardness range 790 ± 40 HL, SAUTER AHMO D02 630 ± 40 HL, SAUTER AHMO D03 530 ± 40 HL, SAUTER AHMO D04
- **Paper roll**, 1 piece, for SAUTER AHN-02, SAUTER ATU-US11

STANDARD

OPTION

Model	Sensor	Measuring range	Readout	Option	
				Factory calibration certificates	
SAUTER HMM.	Typ D	[Max] HL 170-960	[d] HL 1	↓	KERN 961-131
HMM-NP	Typ D	170-960	1	↓	961-131





“Pen type” Leeb hardness tester for mobile hardness testing of metals

Features

- **User-friendly operation:** The compact version enables the product to be used in a significantly wider range of applications compared with traditional devices
- The measuring device has been designed for one-hand operation and this allows the user to work more quickly and flexibly
- **Modern LCD display:** Optimised for industrial applications: increased luminosity and backlight can be switched on, that way the display can be read from any angle
- **All measurement directions possible (360°)** thanks to an automatic compensation function
- **Internal impact sensor** included (Type D)
- **Measurement value display:** Rockwell (B & C), Vickers (HV), Brinell (HB), Leeb (HL)
Hardness comparison block not included
- **Internal data memory** for up to 500 measurements with date and time
- **USB-PC data output:** Easy to install on any PC
- **Delivered in a robust carrying case**

Technical data

- Accuracy ± 4 HLD
- Dimensions W×D×H 35×25×145 mm
- Operation by rechargeable battery, standard, operating time without backlight 16 h, charging time 3 h
- Mains adapter, external, standard
- Net weight approx. 0,07 kg

Accessories

- **Plug-In for data transfer of measuring data** from the measuring instrument and transfer to a PC, e.g. in Microsoft Excel®, SAUTER AFI-1.0
- **Test block** Type D/DC, $\varnothing 90$ mm (± 1 mm), Net weight < 3 kg, hardness range 790 \pm 40 HL, SAUTER AHMO D02 630 \pm 40 HL, SAUTER AHMO D03 530 \pm 40 HL, SAUTER AHMO D04
- **Factory calibration certificates** for SAUTER AHMO D02, AHMO D03, AHMO D04, SAUTER 961-132

STANDARD



OPTION



Model	Sensor	Measuring range	Readout	Option	
				Factory calibration certificates	
SAUTER HN-D.	Typ D	[Max] HLD 170-960	[d] HL 1	KERN 961-131	



Advanced features for professional applications

Features

- **Innovative touchscreen**
- **Automatic recognition of the impact (rebound) sensor** connected to the HMO.
- **Mobility:** In comparison with stationary table-top devices and hardness testing devices with internal sensor, the SAUTER HMO offers the highest level of mobility and flexibility
- **All measurement directions possible (360°)** by defining the direction of impact on the device
- **USB interface** for connection to the printer and charging the batteries
- **1 Standard block for calibration** included
- **Internal memory** up to 500 values
- **Mini statistics function:** Displays the measure value, the average value, the difference between the maximum and minimum values, date and time
- **Measurement value display:** Rockwell (B & C), Vickers (HV), Brinell (HB), Leeb (HL), tensile strength (MPa)
- **Automatic unit conversion:** The measuring result is automatically converted into all specified hardness units
- **2 Delivered in a robust carrying case**

Technical data

- Precision: 1 % at 800 HLD (± 6 HLD)
- Measuring range tensile strength: 375–2639 MPa (steel)
- Min. sample weight on a solid and stable support:
 - Sensor D + DC: 3 kg
 - Sensor G: 15 kg
- Minimum sample material thickness:
 - Sensor D + DC: 8 mm
 - Sensor G: 10 mm
- Minimum sample radius (concave/convex): 50 mm (with support ring: 10 mm)
- Dimensions W×D×H 83×24×135 mm
- Rechargeable battery pack internal, operating time up to 50 h
- Mains adapter included
- Net weight approx. 228 g

Accessories

- **Operation by rechargeable battery pack**, operating time up to 50 h, SAUTER HMO-A03
- **External impact sensor** Type D, as standard, can be reordered, SAUTER AHMO D
- **3 External impact sensor** Type DC. Short impact sensor for tests in holes or hollowed objects, SAUTER AHMO DC
- **4 External impact sensor** Type G. High energy sensor: 900 % impact energy compared to type D, SAUTER AHMO G
- **Support rings** for bended testing samples available on request, SAUTER AHMR 01
- **5 Impact body**, SAUTER AHMO D01
- **Connection cable durometer/ impact sensor**, SAUTER HMO-A04
- **Test block** Type D/DC, 90×50 mm (± 1 mm), net weight < 3 kg, hardness range
 - 790 \pm 40 HL, SAUTER AHMO D02
 - 630 \pm 40 HL, SAUTER AHMO D03
 - 530 \pm 40 HL, SAUTER AHMO D04
- **Paper roll**, 1 piece, for SAUTER AHN-02, SAUTER ATU-US11

STANDARD



OPTION



Model	Sensor	Measuring range	Readout	Option	
				Factory calibration certificates	
SAUTER HMO.	Typ D	[Max] HL 170–960	[d] HL 1	KERN	961-131