



INDUSTRIALHUB BD

RELIABILITY & ENGINEERING SERVICE PARTNER

PORTABLE HARDNESS TESTER

Choose, use and check rebound and UCI testers on site.



How to use this guide

For reliability and maintenance engineers who check metal hardness on site with a portable tester.

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HOW TO USE IT

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Hand-held rebound test on a large casting

Data status

Values are typical catalogue data and general practice. Confirm range, probe and scales against the manual of your own tester before use. Not stated means the documents we reviewed do not list it. Photos come from those documents; confirm usage rights before external use.

Read this first: hardness testing is only as good as the surface and the support. Prepare both before every test.

Why test hardness on site

Hardness is a quick, low-cost check of strength, wear resistance and heat treatment, right on the machine.

Check the grade

Is this the steel you ordered? Hardness separates look-alike grades.

Check heat treatment

Quench, temper and case depth show up as a hardness change.

Check wear

A worn or work-hardened surface reads different from new.

Check welds

Soft or brittle zones beside a weld are a failure risk.

WHERE ENGINEERS TEST IN A PLANT

Rolls and shafts

Wear, heat treatment

Gears and pinions

Case hardening

Welds and HAZ

Softening, hard spots

Pipes and vessels

Material check

Castings, forgings

Grade, batch quality

Bearing seats

Journals, bores



Hand-held tester with impact device and test block



Hand-held UCI tester and probe on a test stand

Portable

test on the machine, no cutting

In seconds

a reading in a moment

Any angle

test in any direction

KEY NOTE • HOW IT WORKS

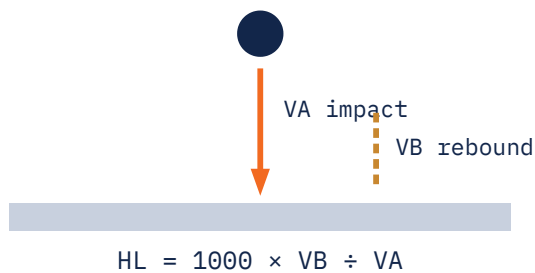
Hardness is a stand-in for several things at once. A harder surface usually means higher strength and better wear life, and a sudden change in hardness along a part points to heat treatment problems or a weld defect. That is why a few seconds of testing can tell you if the metal is the grade you paid for.

Not a lab test. A portable tester is for screening and trending. Use a lab bench test when a certificate is needed.

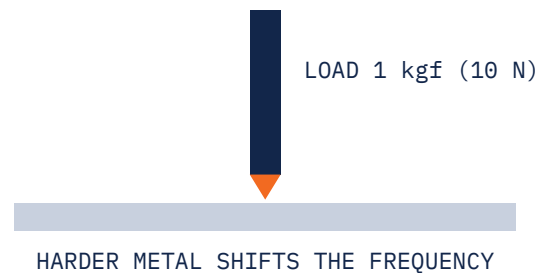
Choose the right method

Two methods cover most plant work. Choose by the size and thickness of the part.

LEEB REBOUND • A BALL IMPACTS AND REBOUNDS



UCI • A LOADED DIAMOND ON A ROD



	Leeb (rebound)	UCI
Best for	Heavy and thick parts: shafts, rolls, castings, welds	Small parts, thin walls, hardened layers, coatings
Range	170 to 960 HLD	HV 230–940; HRC 20–70; HB 90–650
Minimum thickness	Over 5 mm direct; 0.8–5 mm with coupling	From 1 mm
Accuracy	Reproducibility ± 6 HLD at 760 HLD	± 3 % HV; ± 1.5 % HRC

IMPACT DEVICES FOR REBOUND TESTERS

D

Standard, general work

DC

Compact: inside pipes, tight spaces

D+15

Slim tip: grooves and recesses

DL

Slender: deep, narrow places

KEY NOTE • HOW IT WORKS

A rebound tester drops a small hard ball on the metal and compares the speed after the bounce with the speed before. A hard surface returns more energy, so the ball bounces back faster. A UCI probe instead presses a diamond with a fixed load and listens to how its vibration changes; a harder metal leaves a smaller dent and shifts the frequency more.

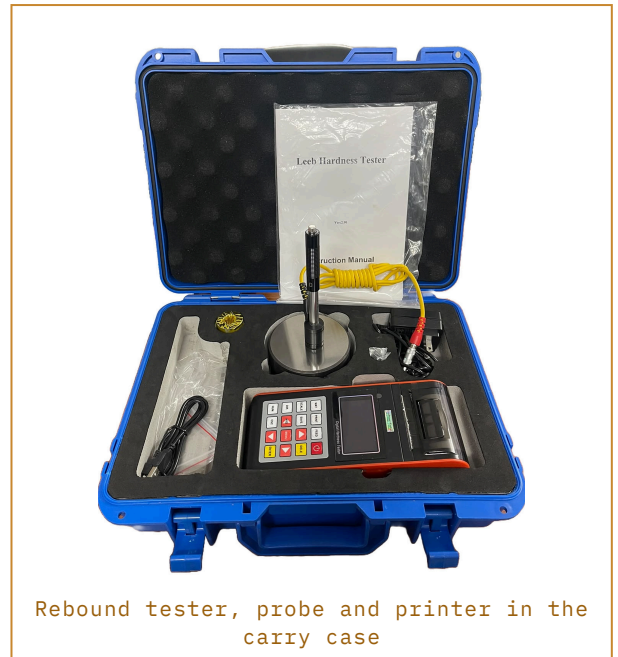
Rule of thumb: thick and heavy, use rebound. Thin, small or surface-hardened, use UCI.

Instrument and set-up

Set the tester up before the first shot. Every menu item changes the number you read.

TYPICAL DATA, REBOUND TESTER

Item	Detail
Range	170 to 960 HLD
Scales	HL, HRA, HRB, HRC, HB, HV, HS
Memory	600 records in 6 files
Power	2 × AA, about 50 hours
Conditions	10 to 50 °C, up to 90 % RH
Weight	About 350 g



Rebound tester, probe and printer in the carry case

MEASURE MENU: SET THESE FIVE ITEMS

- 1 **Impact direction** · +90°, -45°, 0°, +45° or -90°
- 2 **Readings per average** · Number of shots in each average
- 3 **Material** · Steel, stainless, cast iron, aluminium, brass, copper
- 4 **Probe type** · DL is the standard value
- 5 **Hardness scale** · HL, HRA, HRB, HRC, HB, HV or HS

Five keys

Material, Menu, Calibration, Scale and ESC. ESC steps back one level.

Data

Save readings to a USB stick from the menu. The USB port is for a stick only, not a PC. The tester switches off after about 5 minutes.

KEY NOTE · HOW IT WORKS

Think of the menu as telling the tester what it is looking at. The direction tells it which way gravity pulls on the ball. The material and scale tell it how to turn the bounce into a hardness number. A wrong setting does not give an error; it gives a confident wrong number.

First use or long break? Calibrate on the supplied test block before you test any part.

Test step by step

Follow the same seven steps for every test. A good set-up matters more than the instrument.



Rebound test on a large shaft



Reading the value on bar stock

1 Prepare the surface

Bare, smooth metal, Ra 2 µm or better, no oil, paint or scale.

2 Support the part

Heavy: no fixing.
Medium: on a hard base.
Light: couple to a heavy block.

3 Check on the test block

Five shots on the supplied block. The mean must match the stated value.

4 Set up

Material, hardness scale, impact direction and number of readings.

5 Load the device

Push the sleeve in until it clicks. Test the trigger in the air first.

6 Place at a right angle

Support ring flat on the surface. Press the trigger like a pen.

7 Take five readings

Keep the spacing.
Average five. Spread under 15 HL.

Magnetic parts

Keep the part below 30 gauss. Strong magnetism disturbs the reading.

SPACING OF READINGS

Distance	Minimum
Centre to centre	3 mm or more
Centre to edge	5 mm or more

MINIMUM PART SIZE

Part mass	Do this
Over 5 kg	Direct test, thickness over 5 mm
2 to 5 kg	Fix on a hard, steady base
0.05 to 2 kg	Couple to a heavy block with gel; 0.8–5 mm

KEY NOTE • HOW IT WORKS

Most of the work happens before the shot. A part that moves or flexes soaks up the impact energy and reads falsely soft, which is why light parts must be coupled to a heavy block. Impact direction matters because the ball is helped or slowed by gravity; set it in the menu or the value shifts with angle.

Curved surface under 30 mm radius? Use a smaller or special support ring.

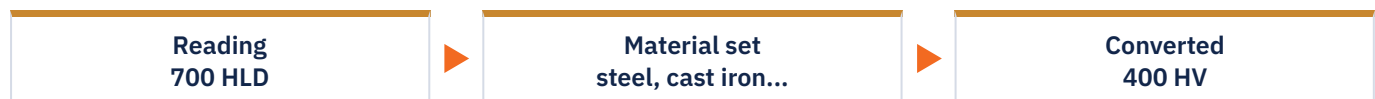
Hardness scales and conversion

A rebound tester measures Leeb hardness. Other scales are converted for the material you chose.

SCALES YOU WILL MEET

HL / HLD · Leeb Native rebound value	HB · Brinell Ball indent, castings and forgings	HV · Vickers Diamond pyramid, all hardness	HRC · Rockwell C Hardened steels
HRB · Rockwell B Soft steels, brass	HRA · Rockwell A Very hard, thin layers	HS · Shore Elastic rebound scale	

ONE READING, MANY SCALES: ONLY VALID FOR THE MATERIAL CHOSEN



RANGE THAT CAN BE CONVERTED, BY MATERIAL

Material	Rockwell	Brinell	Vickers
Steel and cast steel	HRC 17.9–68.5	HB 127–651	HV 83–976
Stainless steel	HRB 46.5–101.7	HB 85–655	HV 85–802
Grey cast iron	—	HB 93–334	—
Nodular cast iron	—	HB 131–387	—
Cast aluminium	HRB 23.8–84.6	HB 19–164	—
Brass	HRB 13.5–95.3	HB 40–173	—
Bronze	—	HB 60–290	—
Copper	—	HB 45–315	—

KEY NOTE · HOW IT WORKS

Hardness scales are different rulers for the same property, and no single formula converts between them for every metal. The tester uses a stored table for the material you pick. If you pick the wrong material, the converted number is wrong even though the rebound reading itself was good.

For exact conversion, run a contrast test: same sample, an accredited tester, at least three sets of five readings.

Results, checks and care

Read the result with its scale, check the tester on a block, and keep the device in good order.

HOW A RESULT IS WRITTEN

700 HLD

Leeb value with a type D impact device

400 HV HLD

Converted to Vickers from a Leeb reading

HRC • HB • HV

Scales: HRC, HRB, HRA, HB, HV, HS

TEST BLOCK CHECK

Block	Error	Repeat
760 ± 30 HLD	± 6 HLD	6 HLD
530 ± 40 HLD	± 10 HLD	10 HLD

- Five shots on a standard Leeb block
- Mean off the block value: use the calibration menu
- Calibrate on first use and after a long break



UCI test on a hardened part

Converting scales

A Leeb value converts to HRC, HB or HV only for the chosen material. For a precise conversion, make a contrast test with an accredited tester on the same sample.

Materials

Steel, stainless steel, grey and nodular cast iron, cast aluminium, brass, bronze and copper.

DO

- Calibrate every year, with a certificate
- Keep the case closed and dry
- Clean with a damp cloth only
- Log readings with part, point and date

DO NOT

- Test a rough, oily or painted surface
- Test thin parts without coupling
- Store near strong magnets or in sun
- Open the case or change the device yourself

KEY NOTE • HOW IT WORKS

A result is only meaningful with its scale and device type written next to it. 700 HLD and 400 HV describe the same piece of metal in two different rulers. Logging the part, the point and the date lets you trend wear and catch a slow change before it becomes a failure.

No reading or odd value? Take out the batteries and refit them. If it persists, send the tester for service.

Common errors and fixes

Most bad readings come from the set-up, not from the instrument. Check this list first.

Tilted: wrong

A tilted device changes the impact and gives a wrong value.

Square to the surface: right

Hold the support ring flat and the device square to the surface.

Symptom	Likely cause	Fix
Readings scatter widely	Rough, oily or painted surface; part moves	Grind to bare metal, Ra 2 µm; fix the part
Low value on a small part	Part under 5 kg or a thin wall	Couple to a heavy block; use UCI under 5 mm
Value changes with angle	Impact direction not set	Set the direction in the menu
Drift from the test block	Needs calibration; worn tip	Five shots on the block; calibrate
Odd value on cast iron	Wrong material selected	Select the material
Value shifts on a curve	Radius under 30 mm	Use a smaller or special support ring
Drift near a magnet	Part over 30 gauss	Demagnetise or test elsewhere
No reading or frozen	Weak batteries	Remove and refit; replace 2 × AA

BEFORE EVERY TEST

Surface bare, smooth, dry	Part heavy or fixed	Block check passed
Direction, material, scale set	Device loaded, square to surface	Five shots, spacing kept

KEY NOTE • HOW IT WORKS

Work from the outside in: surface, support, set-up, then the instrument. If the test block still reads right, the tester is fine and the fault is in how the part is prepared or held. If the block fails after calibration, the impact device itself is worn and needs service.

Still wrong? Test the block again. If the block fails, calibrate. If it fails after that, service the impact device.

Global brands and cross-reference

IndustrialHub BD helps engineering teams choose portable hardness testers by method, material, part size, scales and calibration needs.

Proceq

LEEB AND UCI TESTERS

Global maker of portable hardness testers, including the Equotip range. Model data not stated.

Waygate Technologies

UCI TESTERS · PROBES

Global maker of inspection instruments, with UCI hardness testers. Model data not stated.

Mitutoyo

HARDNESS TESTERS

Global measuring-instrument maker, with portable and bench hardness testers. Model data not stated.

Novotest

UCI AND LEEB TESTERS

Maker of portable hardness testers for industrial use. Model data not stated.

CROSS-REFERENCE RULE

Never mix impact devices, probes or test blocks between brands. Match these points against the maker's own data first, then compare the offers.

Method: Leeb or UCI	Range and scales	Minimum thickness	Accuracy, repeatability	Impact device types
Memory and printer	Materials list	Test block included	Case rating, battery	Calibration certificate

Maintenance team

Start from the job: part size, thickness, material and scale. Cross out the testers that miss one of these, then shortlist on page 11.

We support solutions from recognized brands including Proceq, Waygate Technologies, Mitutoyo and Novotest, subject to technical suitability, product availability and specific customer requirements.

Global brand comparison statement

The two portable methods on the points that decide most selections. Use it to shortlist by part, then ask each supplier for the full data sheet.

MAJOR KEY POINTS

	Leeb rebound	UCI
Principle	Ball impacts and rebounds	Loaded diamond on a rod
Best for	Heavy, thick parts: shafts, rolls, castings, welds	Small parts, thin walls, hardened layers, coatings
Range	170 to 960 HLD	HV 230–940; HRC 20–70; HB 90–650
Min. thickness	Over 5 mm direct; 0.8–5 mm coupled	From 1 mm
Accuracy	±6 HLD at 760 HLD	±3 % HV; ±1.5 % HRC
Impact devices	D, DC, D+15, DL	Probe on a rod, 1 kgf (10 N) load
Typical tester	350 g, 2 × AA, about 50 h	Not stated
Memory	600 records in 6 files	Not stated

How maintenance and procurement use this page

Maintenance picks the method by part size, thickness and surface. Procurement then asks every supplier for the model and revision, impact devices and probes in the kit, test blocks, printer and software, calibration certificate, warranty, training and delivery time. Brand data for Proceq, Waygate Technologies, Mitutoyo and Novotest were not in the documents we reviewed; ask for current data sheets.

Not stated means the document we used does not list it. Ask for the current data sheet before you order. We support solutions from recognized brands including Proceq, Waygate Technologies, Mitutoyo and Novotest, subject to technical suitability, product availability and specific customer requirements.



REQUEST A QUOTATION

Send the metal, part size and thickness, hardness range and surface. We reply with the right hardness tester, probes, price and delivery time.

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WHO LEADS US

- Erect, commission and revamp mills
- Operation, maintenance & shutdowns
- Troubleshoot and spares

WHAT WE SUPPLY AND SUPPORT

PARTS

- Portable rebound (Leeb) testers
- UCI hardness testers
- Impact devices and probes
- Test blocks, rings, printers

SUPPORT

- Pick the right method
- Probe and scale advice
- Calibration advice
- Quotation and delivery follow-up