

## Mobile hardness tester with the double assignment.

### When to choose which method?

The UCI method is recommended for testing fine-grained materials having almost any shapes and sizes. It is especially used whenever material properties have to be determined within close tolerances. The small UCI probes equipped with a Vickers diamond are also a good choice for hardness testing on welded components, most of all for the critical heat-affected zone.

Rebound hardness testing is mainly carried out on large components having rough surfaces, on forgings having an inhomogeneous

surface structure, as well as on cast materials of all kinds.

The MIC 20 consequently places the complete range of applications at your disposal. For example UCI testing:

- on ready-assembled machines
- in the heat-affected zone of a weld (e.g. pipeline)
- on coatings (e.g. printing industry)
- on hardened surfaces (e.g. tooth flanks or tooth gullet)

For example rebound hardness testing:

- on motor units or machine parts made of steel and cast aluminum alloys
- on solid, coarse-grained components having a surface as rolled
- on large series parts during the production
- for material differentiation in material depots
- on wrought copper alloys.

## Specifications and Accessories

### Test methods

UCI method: hardness testing with an indenter according to Vickers, evaluation of the test indentation under load.

Rebound method according to the ASTM standard specification A956: dynamic test method with a ratio of rebound (Rp) and impact (Ip) speed with hardness output in Leeb HL = 1000 Rp/Ip

### UCI probes

To be selected according to application:

Handheld probes:

|               |          |            |
|---------------|----------|------------|
| 10 N (1 kgf)  | standard | MIC 201-A  |
|               | short    | MIC 201-AS |
|               | extended | MIC 201-AL |
| 50 N (5 kgf)  | standard | MIC 205-A  |
|               | short    | MIC 205-AS |
|               | extended | MIC 205-AL |
| 98 N (10 kgf) | standard | MIC 2010-A |

Motor probes:

|                 |            |
|-----------------|------------|
| 8.6 N (0.9 kgf) | MIC 211    |
| 3 N (0.3 kgf)   | MIC 2103-A |
| 1 N (0.1 kgf)   | MIC 2101-A |

### Rebound impact devices

To be selected according to application:

|   |        |
|---|--------|
| Ø 3 mm spherical tungsten carbide metal tip | Dyna D |
| Ø 5 mm spherical tungsten carbide metal tip | Dyna G |
| Diamond test tip                            | Dyna E |

### Measuring ranges/conversions (UCI)

20-1740 HV / 76-618 HB / 41-105 HRB / 20.3-68.0 HRC / 255-2180 N/mm<sup>2</sup> (only with 98 N/10 kgf handheld probe)

### Measuring ranges/conversions (rebound)

Depending on material group and impact device: 150-1000 HL / 75-1000 HV / 75-700 HB / 30-100 HS / 35-100 HRB / 19-70 HRC / 250-2200 N/mm<sup>2</sup>

### Display

Color display or color TFT display, 1/4 VGA, 5.7", 115.2 mm x 76.8 mm / 4.5" x 3.0"

### Dialog languages

German, English (among others)

### Conversion

Automatically according to DIN 50150, ASTM E 140

### Evaluation

Representation of test data as a curve, histogram, or in tabular form; calculation of statistical data, e.g.: average, standard deviation, range

### Automatic instrument shutdown

After a user-selectable period of time with automatic saving of test data and instrument settings

### Keyboard

Sealed membrane keypad with integrated touch screen

### Operating time

With NiMH battery pack MIC 20-BAT approx. 4 hours in continuous operations

### Battery charge indicator

Low-Batt indicator, instrument shutdown with low voltage

### Operating system

WinCE

### Interfaces

RS 232 bidirectional, Ethernet 10 Mbit

### Temperature ranges

Operation: 0 °C to 50 °C/-32 °F to 122 °F  
Storage: -20 °C to 70 °C/-4 °F to 158 °F

### Weight

Approx. 1.4 kg / 3.1 lbs (incl. MIC 20-BAT)

### Size

78 mm x 215 mm x 180 mm / 3.1" x 8.5" x 7.1" (H x W x D)

### Accessories

Transport case, large selection of guides and supports (UCI method), test attachments (rebound method), hardness reference plates and blocks including certificate, NiMH battery, battery-powered grinding set for surface treatment, printer cable, application software, data transmission cable  
More details on our extensive range of probes and accessories on request.

# Krautkramer MIC 20

## Combined Hardness Tester according to the UCI and Rebound Methods



## One instrument - two test methods - a thousand and one applications.

### Static plus dynamic.

For the first time the Krautkramer MIC 20 combines the quasi-static UCI and the dynamic rebound hardness testing methods: the MIC 20 now places "hardness testing in a twin pack" at your disposal with these two different physical methods - and covers their complete application range.

This makes the MIC 20 a universal instrument: you can use it to test fine-grained materials having different masses and shapes or heat treated surfaces (UCI method), as well as large, coarse-grained components, forgings, and cast materials (rebound method).

### The two methods.

The UCI method (Ultrasonic Contact Impedance) determines the hardness of a material on the basis of the size of the test indentation left behind in the material by a Vickers diamond after applying the test load.

In the case of the rebound method, an impact body is impelled by spring force against the test surface. The impact and rebound velocities are each measured in a non-contact mode; the hardness value is calculated from these two values.

The MIC 20 automatically sets to the corresponding method as soon as you connect a UCI probe or a rebound impact device.

### The double benefits.

The two methods enable you to easily measure the hardness of your test object in a matter of seconds: place probe or impact device on the test object, and read the measured value on the display. In this way you can measure anywhere and in any direction. We have used a patented signal processing to also put this advantage into practice for the rebound hardness method.

In addition, the following applies to the two test methods: easy and fast calibration capability, presentation of the results according to the usual hardness scales, extremely easy handling in mobile use in daily testing situations.

## Hardness testing can be easy.

### The many years of experience that we have...

of mobile hardness testing have left their mark on this combined instrument. Possibility to use proven Krautkramer technology: the complete range of UCI handheld and motor probes with different test loads and oscillation rod lengths can be used just like all rebound impact devices from our product range. This ensures optimum adaptation to the test task and material. For you this also means: you can simply extend the range of applications of your MIC 20 that you have bought for a specific subsequent application: all you need are the corresponding probes or impact devices which you then connect - and there you have another hardness tester.

### Field-oriented ease of operation...

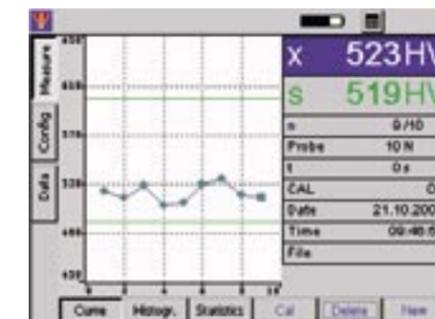
is characteristic of the MIC 20. You can directly see the indicated measured value according to the selected hardness scale on the large color LCD or the color TFT display. The graphic user interface shown on the display is adapted to the known Windows standard and is intuitively presented. You don't need any mouse for the operation, merely a pen to touch the touch screen and to set the functions. As an alternative, you also have conventional pushbuttons at your disposal for most settings.

You will soon be able to cope with the operating concept: three main menus ensure easy access to the essential functions - so there's no chance of getting lost in a menu maze!

The MIC 20 makes for example the calibration easy for you. The setting parameters are then simply filed and recalled by pressing a button or by a "click" in the corresponding application case.



"Hardness testing as a twin pack": The MIC 20 with a selection of rebound impact devices and UCI probes, as well as with the quick support including motorprobe.



The user-friendly display of the MIC 20: you will see all information at a glance. To store your data, just create different directories as required: the input of alphanumeric data is no problem either.

A straightforward data memory enables convenient and structured saving and management of test results. The MIC 20 also presents the necessary functions for your analysis: you can have your series of measurements displayed as a curve, histogram, or as a table with statistical data. You can print the data either directly on a printer or transfer them to the PC by means of the application software UltraDAT. You can use e.g. the Windows standard applications for further processing, evaluation, and statistics.

### The on-site use...

with the mobile and flexible MIC 20 will certainly be something that you will like: besides a mains connection, the instrument is operated by means of our rechargeable battery pack allowing internal charging in the instrument. The display is switched off after a certain period of time and can be reactivated by touching the touch screen. A complete shutdown can also be triggered automatically after a preset period of time - which ensures an energy-saving operation.

