

W-20,W-20 a,W-B92
PORTABLE HARNESS TESTER



OPERATIONAL MANUAL

BMS Bulut Makina Sanayi ve Ticaret Ltd. Şti.

Kocaeli KOBİ OSB Köseler Mahallesi

6. Cadde No: 20/2 Dilovası / KOCAELİ / TURKEY

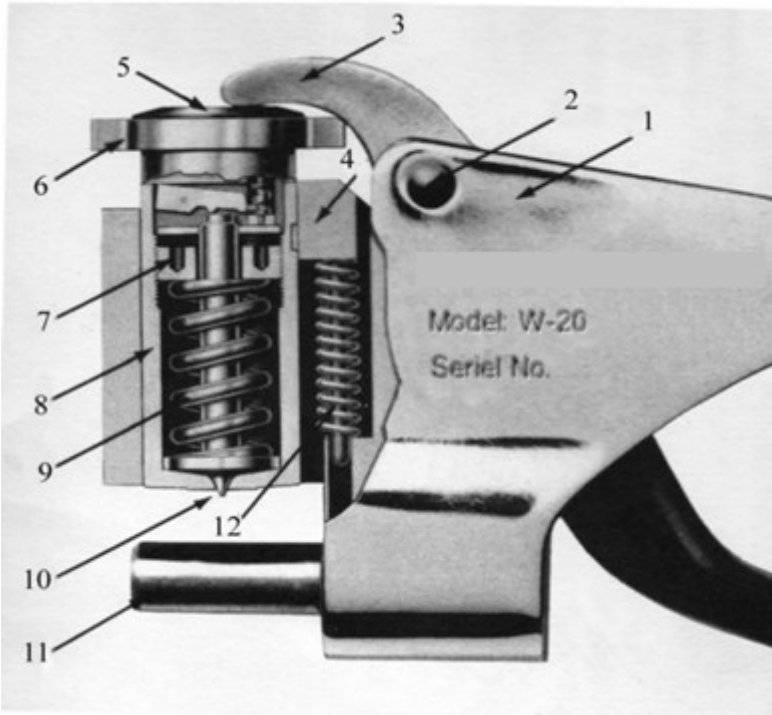
Phone: +90 262 502 97 73-76 / +90 262 503 06 51

Web: www.bulutmak.com e-mail: bms@bulutmak.com

1	Instrument Structure	3
2	Standard Package.....	3
3	Main Technical Parameters	4
4	Operating Method	4
5	Verification Report.....	4
6	Maintenance	4
6.1	Prevent contamination	4
6.2	Prevent rust.....	4
6.3	Prevent falling off.....	4
6.4	Disassembly forbidden.....	5
7	Factors Affecting the Test Accuracy.....	5
7.1	Test Piece	5
7.2	Sensitivity	5
7.3	Edge of test piece.....	5
7.4	Adjacent indentations.....	5
7.5	Oxide film	5
7.6	Coatings.....	5
7.7	Operation	5

1 Instrument Structure

The structure of Webster hardness testers is shown as Fig. 1:



- | | |
|--------------------|----------------------|
| 1— Frame | 2— Pivot screw |
| 3— Handle | 4— Reset key |
| 5— Adjusting screw | 6— Dial head |
| 7— Adjusting nut | 8— Indenter cylinder |
| 9— Load spring | 10— Indenter |
| 11— Anvil | 12— Return spring |

The indenters of each type of Webster hardness testers are different. The shapes of three types of indenters are shown as Fig.2.

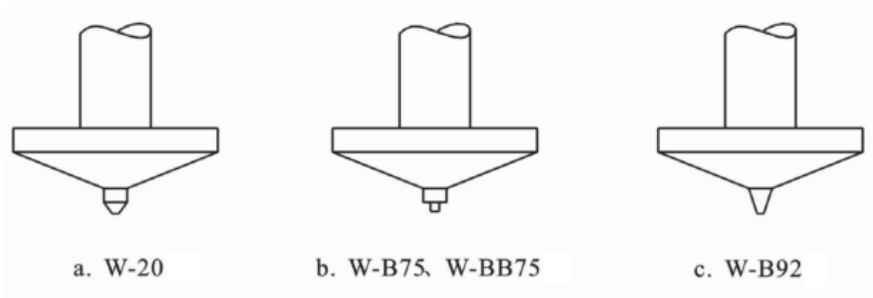


Fig. 2 Indenter Shapes

2 Standard Package

1 Tester

1 standard hardness block (attached with measurement and inspection report)

1 spare indenter

1 wrench

1 small screwdriver

1 instruction manual

1 carrying case

Optional Accessories

Spare indenter

Standard hardness block

Spare dial glass

3 Main Technical Parameters

Festing Range : 0~20HW

Accuracy : 0.5HW

Equivalent range : See Table 1

Weight : 0.5kg

Table 1: Models Selection

Item	Type	Applicable Materials	Hardness Range	Specimen Size/mm
1	W-20	Aluminum alloy	25-110 HRE 58-131 HV	Thickness 0.4-6 Inner diameter>10
2	W-20a			Thickness 0.4-13 Inner diameter>10
3	W-20b			Thickness 0.4-8 Inner diameter>6
4	W-B75	Brass in hard or half hard state, super-hard aluminum alloy	63-105 HRF	Thickness 0.4-6 Inner diameter>10
5	W-B75b			Thickness 0.4-8 Inner diameter>6
6	W-BB75	Soft brass, pure copper	18-100 HRE	Thickness 0.4-6 Inner diameter>10
7	W-BB75b			Thickness 0.4-8 Inner diameter>6
8	W-B92	Cold-rolled steel sheet, stainless steel	50-92 HRB	Thickness 0.4-6 Inner diameter>10

4 Operating Method

Put the specimen between the anvil and the indenter and press down the handle until the bottom is felt. At the time the dial indicator will point at a reading which is the hardness value obtained. Excessive pressure beyond this limit will not damage the tester, but it is unnecessary.

Hold tight the handle when reading the value. Any torsion or movement will make the reading incorrect during the test.

5 Verification Report

The verification report should include the following information:

Material brand and name

Type and serial number of the hardness tester

Reading of each test (accurate to 0.5 scale)

Average hardness value (accurate to 0.5 scale)

No. of standard applied

Inspector and date

6 Maintenance

The testers of this series are precision instruments, of which the service life mainly depends on the correct method of use and timely and proper maintenance. The following items should be taken into account:

6.1 Prevent contamination

This instrument should often be cleaned with the soft cloth to remove the dust and dirt on the surface of it, especially on the anvil and supporting surface of the cylinder. Specially prevent the dirty things to get in from the dial seams or indenters, otherwise, the filthy things from those parts might influence on the testing precision or cause malfunction.

6.2 Prevent rust

Although all the parts of instrument have been treated to prevent rust, the improper maintenance or long time of use on the production spot without paying attention to maintenance may also cause the rust to some components. When using it, pay special attention to its waterproof performance except clean it frequently, because many parts will bear rust with water, the water in the dial may cause deadly rust to make the instrument useless.

6.3 Prevent falling off

This instrument is made up of many precision components, falling off of it will result in the permanent damage to some parts.

6.4 Disassembly forbidden

The testing accuracy of this instrument is guaranteed by the good collaboration of some of the precision parts. This collaboration is not easy for the nonprofessional people to master. Consequently, disassembly of the parts is not allowed except for those allowed in calibration, otherwise this will bring you trouble and the warranty of this instrument will terminate.

7 Factors Affecting the Test Accuracy

7.1 Test Piece

The surface of the specimen should be treated smooth and clean. The dirt on the specimen, especially the tiny sand grains may affect the test accuracy.

7.2 Sensitivity

The instrument scale below 4HW and above 17HW, its sensitivity will decline strikingly, and the testing accuracy will also be reduced. Applying another tester should be considered.

7.3 Edge of test piece

The distance between the testing point and the edge of the test piece should be bigger than 5mm. Test close to the edge of the test piece will affect the accuracy.

7.4 Adjacent indentations

During the test the distance between the two adjacent indentations should be no smaller than 6mm; otherwise, the previous indentation will affect the next testing accuracy.

7.5 Oxide film

Although the hard oxide film is thin, it will also influence on the hardness accuracy of the aluminum extrusions. Experiences indicate that the oxide film with hardness of 10 μ m will increase the hardness value by 0.5~1HW.

7.6 Coatings

All kinds of coatings will affect severely the testing accuracy, so sand paper or solvent is needed to remove the coatings first before carrying on the hardness testing.

7.7 Operation

Improper operation will affect the accuracy of the hardness.

The accuracy of this instrument should be often checked in use to see if the full scale point (20HW) and the calibration point are still correct. Calibrate it immediately when something is wrong.

The surface of the test piece should be vertical to the indenter and the bottom of specimen should contact the anvil during the test, otherwise errors will occur.

During the test enough grip strength should be applied at one time, adding the strength slowly will make the test result inclined to the low side.

During the test the test piece should not twist, otherwise it will make errors and damage the indenter.

Table 2 Hardness Conversion Table for W-20 Series Hardness Testers

Webster HW	Rockwell E HRE	Rockwell F HRF	Vickers HV
18	101	98.5	131
17	97	95	119
16	92.5	91	108
15	88	87.2	99
14	84	83	91
13	79.5	78	83
12	75	74	78
11	71	70	73
10	67	66	69
9	62.5	62.5	65
8	58	58	61
7	54	54	58
6	49.5	50	
5	45	46.5	
4	41		

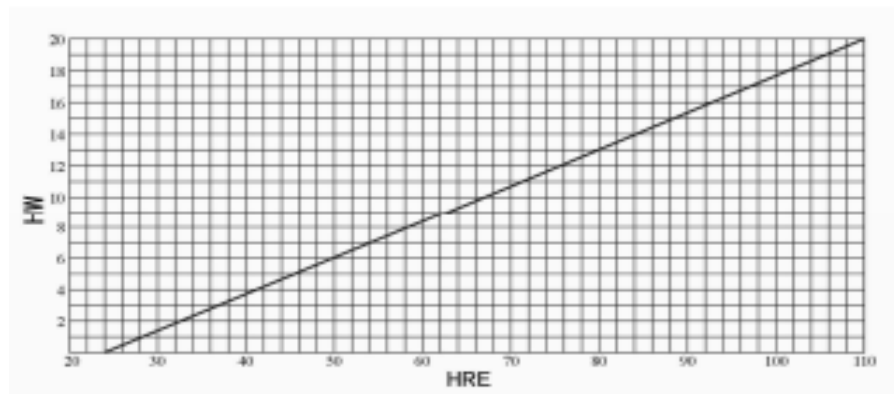
Table 3 Hardness Conversion Table for W-B75 series Hardness Testers

HW	HRB
4	53.0
5	53.3
6	54.1
7	54.8
8	56.7
9	58.5
10	60.8
11	63.4
12	66.4
13	69.7
14	73.5
15	77.9
16	82.1
17	86.9
18	92.2

Table 4 Hardness Conversion Table for W-Bb75 Series Hardness Testers

HW	HRF
4	30.2
5	34.9
6	39.6
7	44.3
8	49.0
9	53.7
10	58.4
11	63.1
12	67.8
13	72.5
14	77.3
15	82.0
16	86.7
17	91.4
18	96.1

Fig. 5 W-20 Series Hardness Conversion Curve



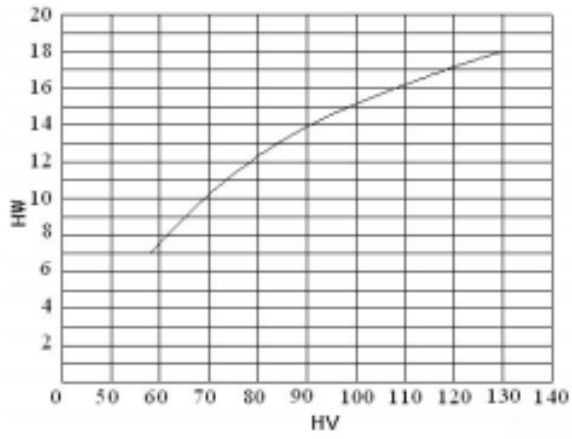


Fig. 6 W-20 Series Hardness Conversion Curve

Fig. 7 W-B75 Series Hardness Conversion Curve

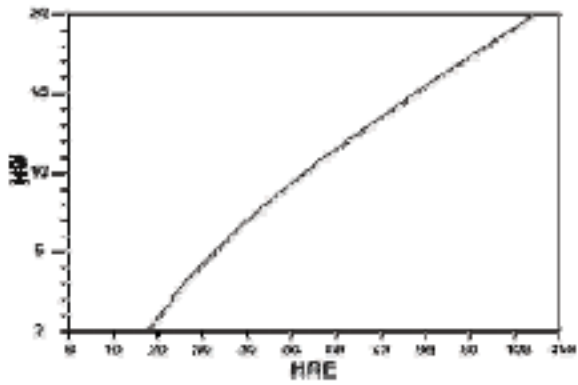
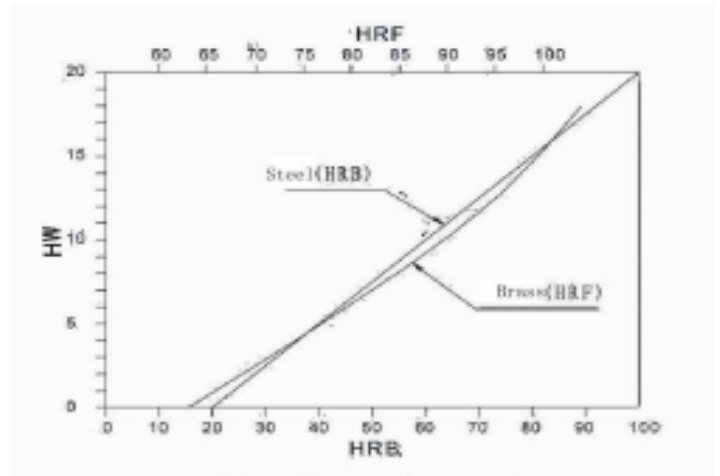


Fig. 8 W-BB75 Series Hardness Conversion Curve

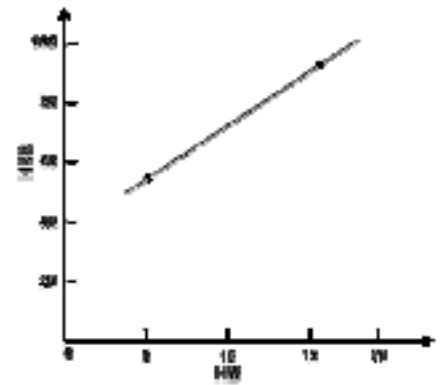


Fig. 9 W-B92 Series Hardness Conversion Curve