## Ultrasonic Thickness Gauge

# VA8041

# Operation Manual

# Contents

## Ⅰ. Preface

Please read the following information carefully before using the meter. The ultrasonic thickness gauge has been designed to measure the material thickness that callipers can't measure, such as boiler, pressure vessels, armor of tank, ship hulls, glass wall, tubes and so on.

## Ⅱ. Safety information According to European Union's CE safety norms.

Please use it according to the following condition.

Environment conditions:

- Ambient temperature: -10~ +50℃ (+14~ +122℉)
- Storage and transport temperature: -40~+70℃ (-40~+158℉)

Maintenance & Save:

Do not clear the meter using alcohol and impregnate. If you do not use it for a long time, please take out the batteries and place the instrument in a dry surrounding.

## Ⅲ. Functions & Features

- Measuring thickness of various good ultrasonic wave conductors as steel, aluminum, copper, glass etc.

- Ultrasonic wave velocity or thickness display.
- Manual material selection.
- Ultrasonic wave velocity adjustable.
- Thickness unit “mm” or “inch” optional.
- Ultrasonic wave velocity testing.
- Coupling state display.
- Shut down manually or automatically.
- Low battery voltage indication.
- Buit-in calibration metal block (4.0mm).
- Software calibrating to insure high reliability.

## Ⅳ. Specifications

- The meter has been designed according to EC directive: 89/336/EEC.
- Ultrasonic wave frequency：5MHz.
- Digital display：4 digital.
- Measurement range：1.2mm~220mm (steel).
- Tubes measurement：minimum dia. 20mm*3mm.
- Ultrasonic wave velocity：1000~9999 M/ S.
- Resolution： 0.1mm.
- Accuracy： ±(1%H+0.1mm).
- Measurement rate：0.6 second.

- Power supply: 7# alkaline cell , 1.5V*3 .
- Operating temperature: -10～+50℃（+14~ +122℉）
- Storage temperature： -40～+70℃（−40 ~+158℉）
- Dimensions： (L)× (W)× (H) mm.
- Weight ： approx g (including battery and probe).
- Accessories：probe, coupling paste, operating manual, batteries.

## Ⅴ. Mounting battery and probe

Remove the battery cover on the back and put in three 1.5V 7＃ alkaline batteries according to the mark on the shell to insure putting batteries in correctly, then close the battery cover. Insert two plugs of the probe into two sockets on the top of the meter.

## Ⅵ. The method of usage

1. Press button "**On/Off** " , the meter selects material 1 automatically , and displays the velocity of ultrasonic wave in material 1.

2. Press button "**Select**" to choose a material you will measure. A number displays on the bottom of the screen to indicate the material. The numbers correspond to the

materials listed in table (1). Smear a little of coupling paste on the surface of the measured object, put the probe on and press it. A coupling symbol would appear If coupling is all right. Synchronously the thickness of the measured object would display instead of ultrasonic wave velocity. If coupling isn't good, the coupling symbol will not appear and can not get thickness.

Table(1)

| Digit | Material | Ultrasonic wave speed |
|---|---|---|
| 1 | Iron | 5900 M/S |
| 2 | Aluminum | 6320 M/S |
| 3 | Copper | 4700 M/S |
| 4 | Brass | 4430 M/S |
| 5 | Gold | 3240 M/S |
| 6 | Silver | 3600 M/S |
| 7 | Zinc | 4170 M/S |
| 8 | Stannum | 3320 M/S |
| 9 | Glass | 5850 M/S |
| 10 | Plastic | 2250 M/S |
| 11 | Toughened tile | 5580 M/S |

| | | |
|---|---|---|
| 12 | Water(20° C) | 1480 M/S |
| 13 | Material a | 6500（user adjusting） |
| 14 | Material b | 5500（user adjusting） |
| 15 | Material c | 4500（user adjusting） |
| 16 | Material d | 3500（user adjusting） |
| 17 | Material e | 2500（user adjusting） |

3. When take the probe out from object, the coupling symbol disappears, but thickness keeps displaying.
4. At the state of displaying thickness and do not measure, Press button "**mm/inch**", thickness unit "mm" changes into "inch" or contrarily.
5. At the state of displaying thickness and do not measure, press button "**Select**" to display ultrasonic wave speed, thickness will disappear.
6. Material a~e (digit 13~17) are offered to user to set own material. Press button ▲ or ▼, its velocity is adjustable.
7. If user do not know the ultrasonic wave velocity of own material, can test it by oneself：

A. Make a block with measured material (the more thick the block, the more exact the result is), measure its thickness by a callipers carefully.

B. **Select** anyone of material a~e, and measure its thickness by the probe. When the digits of thickness display steady , take the probe out from the block.

C. Press button ▲ or ▼ to change the digits untill it is equal to the value measured by the callipers.

D. Press button "**Select**" ,the ultrasonic wave velocity of user's material will appear. When shut the meter down, the ultrasonic wave velocity will be saved into a memory.

8. To set power off :

When the meter is working, pressing button **On/Off** will get shutdown immediately.

9. Automatic shutdown

When the meter is working , and stop to press button for five minutes, shutdown will occur automatically.

## Ⅶ. Calibrating the meter

When changing a new probe, or the probe is abrased or the meter is used for a long time, you need to calibrate

the meter by yourself, the method is follow：

Power on the meter, smear a little of coupling paste on the surface of the metal block buit-in the shell of the meter. Put the probe on and press it, when coupling symbol appears, press button “**Adjust**” for two seconds, four bars appear on the screen. Keep to press the probe, button “**Adjust**” can release. You can see the bars disappear gradually.Finally “4.0 mm” displays, the meter will be calibrated.

## Ⅷ. Notices

1. The ultrasonic wave velocity listed in Table(1) is for reference. Because the component of your material may not be identical with that listed in Table(1), had better make sample block to test the wave velocity in it.
2. Poriferous matter, or uncompacted material isn’t a good ultrasonic wave conductor, can not be measured by the meter. Casting has large crystals, if its surface is rough, it is difficult for us to test thickness by the meter.
3. When measuring thickness under 2.5mm, sometimes an error named as “double refraction” may occur. Another error is named as “ pulse envelope or cycle jump”. They

bring on a bigger result than actual thickness. So when measuring thin object, should do it repeatedly to look for the least value. If necessary, make an thin block to compare measuring result.

4. Rough surface may affect test, Burnish it by sand paper, and then measure.
5. When the surface has thick paint, scrape it off and then measure.
6. Coupling paste is necessary for test, it can eject air out off the gap between the probe and the object to get ultrasonic wave to pass. For slippery surface as glass, water can replace coupling paste. For rough surface, more viscous coupling paste must be used, such as lubricating oil.
7. To measure tubular object, Smear more coupling paste, get the direction of sound insulation board in the probe perpendicular to axes of the tube, rolling the probe along the axes back and forth slowly. When the coupling symbol appear, look for the minimum value. For small tube (diameter =20mm), if it's thickness is less than 3mm, the result of measurement is wrong.

8. For rough surface, don't press the probe when turning it or slipping it , to protect the probe.

9. When battery voltage is too low to work, a battery symbol appears on the screen. It reminds you to change new batteries.

10. When you do not use the meter for a long time, please take out batteries to avoid damaging the meter by electrolyte.

11. Don't store the meter in a high temperature or wet place.

12. After power off, to turn power on again, wait for two seconds.

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