

TM-8811

REED INSTRUMENTS

Ultrasonic Thickness Gauge



Instruction Manual



REED Instruments

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Table of Contents

Introduction	3
Product Quality.....	3
Safety	3
Features.....	3
Specifications.....	4
Included.....	4
Instrument Description	5
Operating Instructions.....	6-12
<i>Initial Calibration</i>	6
<i>Material Mode Selection</i>	6-8
<i>Selecting Pre-loaded Materials</i>	6-7
<i>Measuring Procedure</i>	8
<i>Auto Power OFF</i>	8
<i>Setting the Sound Velocity for a Known Material</i>	8-10
<i>Determining the Sound Velocity for a Material with a Known Thickness</i>	10
<i>Measurement Methods</i>	11
<i>Maintenance</i>	12
<i>Cleaning the Test Piece</i>	12
<i>Protecting the Ultrasonic Sensor</i>	12
<i>Replacing the Ultrasonic Sensor</i>	12
Battery Replacement.....	12
Applications.....	12
Accessories and Replacement Parts	13
Product Care	13
Product Warranty	13
Product Disposal and Recycling	14
Product Support.....	14

Introduction

Thank you for purchasing your REED TM-8811 Ultrasonic Thickness Gauge. Please read the following instructions carefully before using your instrument. By following the steps outlined in this manual your meter will provide years of reliable service.

Product Quality

This product has been manufactured in an ISO 9001 facility and has been calibrated during the manufacturing process to meet stated product specifications. If a certificate of calibration is required please contact the nearest authorized REED distributor or authorized Service Center. Please note an additional fee for this service will apply.

Safety

Never attempt to repair or modify your instrument. Dismantling your product, other than for the purpose of replacing batteries, may cause damage that will not be covered under the manufacturer's warranty. Servicing should only be provided by an authorized service center.

Features

- Measures the thickness of steel, cast iron, aluminum, red copper, brass, zinc, quartz glass, polyethylene, PVC, grey cast iron and nodular cast iron
- Large, easy-to-read LCD display
- Displays sound velocity at the touch of a button
- Automatic material calibration
- User selectable unit of measure (in/mm)
- Low battery indicator

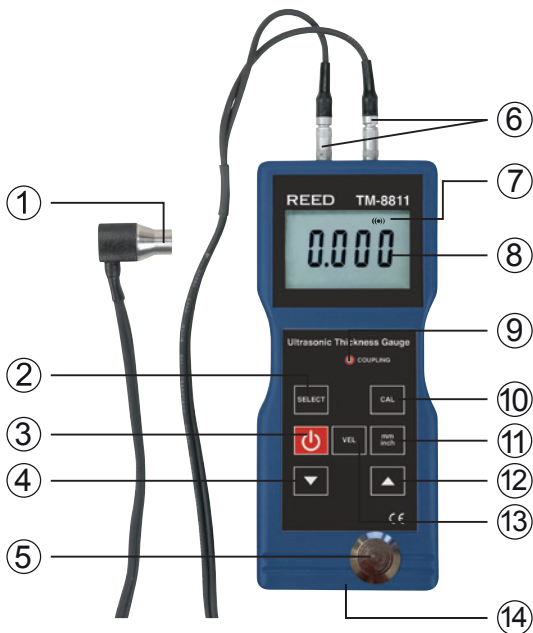
Specifications

Measuring Range:	0.05 to 7.9" (1.5 to 200mm)
Accuracy:	$\pm(0.5\% + 0.1\text{mm})$
Resolution:	0.001"/0.1mm
Velocity Range:	500 to 9000m/s
Compatible Materials:	Steel, cast iron, aluminum, red copper, zinc, quartz glass, polyethylene, PVC, grey cast iron and nodular cast iron
Sampling Time:	Less than 1 second
Display:	4-Digit, LCD
Probe Length:	3' (36")
Probe Diameter:	0.4" (10mm)
Low Battery Indicator:	Yes
Power Supply:	4 x AA Batteries
Product Certifications:	CE
Operating Temperature:	32 to 122°F (0 to 50°C)
Probe Operating Temperature:	32 to 104°F (0 to 40°C)
Storage Temperature:	-4 to 140°F (-20 to 60°C)
Operating Humidity Range:	20 to 80%
Dimensions:	6.3 x 2.7 x 1.25" (161 x 69 x 32mm)
Weight:	9oz (258g)

Included

- Ultrasonic Couplant Gel
- Probe
- Hard Carrying Case
- Batteries

Instrument Description



- | | |
|------------------------------|----------------------------|
| 1. Ultrasonic Sensor | 8. LCD Display |
| 2. Material Selection Button | 9. Coupling LED |
| 3. Power Button | 10. Calibration Button |
| 4. Up Arrow | 11. Unit of Measure Button |
| 5. Calibration Test Block | 12. Down Arrow |
| 6. Probe Connectors | 13. Velocity Button |
| 7. Coupling Indicator ((H)) | 14. Battery Cover (Back) |

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Operating Instructions

1. Insert the ultrasonic sensor into the probe connectors on the meter.
2. Press the Power button to turn the meter on.
3. The LCD will display "0" and the selected unit of measure.

Initial Calibration

1. Place a small drop of coupling gel (R7950) on the 5mm calibration test block.
2. Press the **CAL** button and "CAL" will appear on the display.
3. Place the sensor on the calibration test block while ensuring the coupling indicator ((●)) appears on the display and the coupling LED turns on.
4. Depending on the selected unit of measure either "5.0 mm" (or "0.197 in") and "CAL" will flash interchangeably on the display.
5. While continuing to hold the sensor on the calibration test block, press **CAL** again to save.
6. Calibration is now complete and the ultrasonic sensor can now be removed from the calibration test block.

Note: Results from the calibration procedure will automatically save in the meter. It is not necessary to calibrate the meter each time the unit is powered on unless measurements appear to be inaccurate. The calibration procedure confirms both the meter and ultrasonic sensor are functioning properly.

Material Mode Selection

Selecting Pre-loaded Materials

The meter has been pre-loaded with 11 common materials to allow for quick setup and testing. In order to select the appropriate setting, follow steps 1 through 4 below.

1. While the meter is on, press the **SELECT** button.
2. The display will either indicate "CdXX" or "XXXX". "Cd" stands for code and "XX" is the pre-loaded material number which ranges from 1 to 11 as shown in the table below.

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3. "XXXX" is a 4-digit number that represents the sound velocity of the material that can be adjusted by the user (For entering and adjusting Sound Velocity please see "Setting the Sound Velocity for a known Material").

No.	Code	Material
1	Cd01	Steel
2	Cd02	Cast Iron
3	Cd03	Aluminum
4	Cd04	Copper
5	Cd05	Brass
6	Cd06	Zinc
7	Cd07	Quartz / Glass
8	Cd08	Polyethylene
9	Cd09	PVC
10	Cd10	Gray Cast Iron
11	Cd11	Nodular Cast Iron
12	XXXX	User Defined Sound Velocity

4. Press the ▲ or ▼ arrows to select the desired material code. Press the **SELECT** button to confirm your selection. The display will show "0" confirming the material has been selected. If you select a material code without confirming the selection the meter will automatically resume normal operation after a few seconds.

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Measuring Procedure

Once the material has been selected, follow steps 1 through 4 below to perform a measurement.

1. While the meter is on, press the **mm/inch** button to select the correct unit of measure.
2. After applying coupling gel on the material, place the sensor firmly against the desired measurement area.

Note: For most applications a single droplet of coupling gel is sufficient.

3. Verify that the Coupling Indicator ((●)) appears on the display and the coupling LED light turns on.
4. The LCD will display the measured value and will hold this value until a new measurement is taken or until the unit is turned off.

Note: If the coupling indicator ((●)) does not appear on the display, or the measured values appear to be erratic, verify that there is an adequate amount of coupling gel in between the ultrasonic sensor and the material under test. It is also important that the ultrasonic sensor sits flat against the material.

Auto Power Off

To preserve battery life, the meter is programmed to turn off after approximately 1 minute of inactivity.

Setting the Sound Velocity for a Known Material

If the material under test is not pre-loaded, the sound velocity of the material under test can be entered. To enter the appropriate sound velocity, follow steps 1 through 9 below.

1. While the meter is on, press the **SELECT** button.
2. The display will either indicate "CdXX" or "XXXX".
3. Press the ▲ or ▼ arrows to scroll through the material codes until you see the 4-digit value.
4. This 4-digit number represents the last set sound velocity of a material.

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5. Press the **SELECT** button to confirm your selection. The display will show "0" confirming the material has been selected. If you select a material code without confirming the selection the instrument will automatically resume normal operation after a few seconds.
6. Press the **VEL** button and the display will show the last saved sound velocity measurement.
7. The sound velocity can be adjusted by pressing the ▲ or ▼ arrows to match the sound velocity for the material under test as shown in the table below.

Material	Sound Velocity	
	(m/s)	(inch/μs)
Aluminum	6320 to 6400	0.250
Zinc	4170	0.164
Silver	3607	0.142
Gold	3251	0.128
Tin	2960	0.117
Steel, Common	5920	0.233
Steel, Stainless	5740	0.226
Brass	4399	0.173
Copper	4720	0.186
Iron	5930	0.233
Case Iron	4400 to 5820	0.173 to 0.229
Lead	2400	0.094
Nylon	2680	0.105
Titanium	5990	0.236
SUS	5970	0.240
Epoxy Resin	2540	0.100
Ice	3988	0.222

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Material	Sound Velocity	
	(m/s)	(inch/ μ s)
Plexiglass	2692	0.106
Grey Cast	4600	0.180
Porcelain	5842	0.230
Glass (Quartz)	5570	0.220
Polystyrene	2337	0.092
PVC	2388	0.094
Quartz Glass	5639	0.222
Rubber, Vulcanized	2311	0.091
Teflon	1422	0.058
Water	1473	0.058

- Press the ▲ or ▼ arrows to adjust the sound velocity value by 10m/s. Press and hold the ▲ or ▼ arrows to adjust the sound velocity value by 100m/s.
- Press the **VEL** button to confirm your selection. The display will show "0" confirming the sound velocity has been set. If you set a sound velocity without confirming the selection the meter will automatically resume normal operation after a few seconds.

Determining the Sound Velocity for a Material with a Known Thickness

The sound velocity of a material can be measured using a test piece with a known thickness. In order to determine the sound velocity follow steps 1 through 3 below.

- Measure the test piece with a caliper or micrometer to confirm the thickness.
- Repeat steps 3 through 9 from the "Setting the Sound Velocity for a Known Material" section above.
- Once the sound velocity has been set, proceed with testing.

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Measurement Methods

There are three base measurement methods:

1. Single measurement method: This method involves measuring the thickness at a single point.
2. Double measurement method: This method involves performing two thickness measurements near a single spot rotating the ultrasonic sensor from 0 to 90° respectively, with respect to the split face (Fig.1). Take the smaller of the two indicated values as the thickness of the material.

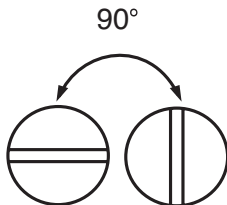


Fig 1

3. Multi-point measurement: This method involves performing a number of measurements within a circle having a maximum diameter of about 1.18" (30mm). Take the minimum indicated value as the thickness of the material.

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Maintenance

Cleaning the Test Piece

After taking a measurement, clean the test pieces to prevent them from rusting. If the pieces are not being used for a long period of time coat them with oil to prevent rust.

Protecting the Ultrasonic Sensor

Be sure to clean the ultrasonic sensor and cable after each use. Grease, oil and dust will cause the cable to dry out and shorten life expectancy. The temperature of the surface being measured should not exceed 140°F (60°C).

Replacing the Ultrasonic Sensor

The degradation and wear of the probe's interlayer plate will influence measurements. Replace the probe when the following occurs:

1. If it always displays the same value when measuring different thicknesses
2. When a measurement displays no value

Battery Replacement

1. When the low battery symbol appears on the display, replace the batteries.
2. Remove the battery cover on the back and insert 4 x "AA" batteries.

Applications

- Monitoring and verifying pipes and pressure vessels
- Industrial manufacturing

Accessories and Replacement Parts

- **TM-8811PROBE** Replacement Probe
- **R7950** Ultrasonic Couplant Gel
- **R7950/12** Ultrasonic Couplant Gel, Pack of 12
- **R7950/5L** Ultrasonic Couplant Gel, 5L
- **R9060** 5-Step Calibration Block
- **R8888** Deluxe Hard Carrying Case
- **CA-52A** Soft Carrying Case

Don't see your part listed here? For a complete list of all accessories and replacement parts visit your product page on www.reedinstruments.com.

Product Care

To keep your instrument in good working order we recommend the following:

- Store your product in a clean, dry place.
- Change the battery as needed.
- If your instrument isn't being used for a period of one month or longer please remove the battery.
- Clean your product and accessories with biodegradable cleaner. Do not spray the cleaner directly on the instrument. Use on external parts only.

Product Warranty

REED Instruments guarantees this instrument to be free of defects in material or workmanship for a period of one (1) year from date of shipment. During the warranty period, REED Instruments will repair or replace, at no charge, products or parts of a product that proves to be defective because of improper material or workmanship, under normal use and maintenance. REED Instruments total liability is limited to repair or replacement of the product. REED Instruments shall not be liable for damages to goods, property, or persons due to improper use or through attempts to utilize the instrument under conditions which exceed the designed capabilities. In order to begin the warranty service process, please contact us by phone at 1-877-849-2127 or by email at info@reedinstruments.com to discuss the claim and determine the appropriate steps to process the warranty.

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Product Disposal and Recycling



Please follow local laws and regulations when disposing or recycling your instrument. Your product contains electronic components and must be disposed of separately from standard waste products.

Product Support

If you have any questions on your product, please contact your authorized REED distributor or REED Instruments Customer Service by phone at 1-877-849-2127 or by email at info@reedinstruments.com.

Please visit www.REEDInstruments.com for the most up-to-date manuals, datasheets, product guides and software.

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