R7920

REED INSTRUMENTS

Ultrasonic Thickness Gauge

WARRANTY 1 YEAR WARRANTY

Instruction Manual

REED Instruments

1-877-849-2127 | info@reedinstruments.com | www.reedinstruments.com

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Introduction

Thank you for purchasing your REED R7920 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 ISO9001 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, acrylic resin, red copper, brass, zinc, quartz glass, polyethylene, PVC, grey cast iron and nodular cast iron
- Easy-to-read backlit LCD display
- User selectable unit of measure (in/mm)
- Internal memory stores up to 300 measurements
- Displays sound velocity at the touch of a button
- User adjustable High/Low alarms
- Automatic material calibration
- Auto shut off and low battery indicator

Included

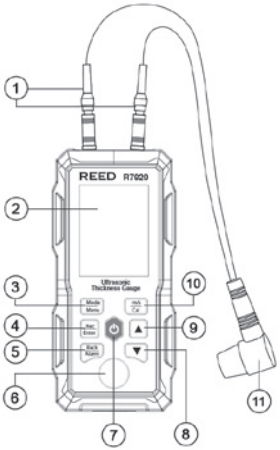
- Ultrasonic Thickness Gauge
- Ultrasonic Couplant Gel
- Probe
- 5-Step Calibration Block Probe
- USB Cable
- Carrying Case

Specifications

Measuring Range:	0.04 to 11.8" (1.00 to 300mm)
Accuracy:	<10mm: ±0.1mm ≥10mm: ±(1% rdg. +0.1mm)
Resolution:	0.1mm/0.01mm/0.01"
Velocity Range:	1000 to 9999m/s (0.039 to 0.394in/µs)
Compatible Materials:	Steel, cast iron, aluminum, acrylic resin, red copper, brass, zinc, quartz glass, polyethylene, PVC, grey cast iron and nodular cast iron
Display:	2.4" monochrome dot matrix screen
Backlight:	Yes
Probe Length:	3' (91cm)
Probe Diameter:	0.5" (12.7mm)
Internal Memory:	Yes (up to 300 readings)
Low Battery Indicator:	Yes
Power Supply:	Built-in lithium battery (3.7V 2000mAh)
Battery Life:	Approx. 16 hours (Fully Charged)
Product Certifications:	CE
Operating Temperature:	32 to 104°F (0 to 40°C)
Probe Operating Temperature:	32 to 104°F (0 to 40°C)
Operating Humidity Range:	20 to 80%
Storage Temperature:	14 to 122°F (-10 to 50°C)
Storage Humidity Range:	20 to 70%
Dimensions:	5.5 x 2.6 x 1.12" (140 x 66 x 28.5mm)
Weight:	6.17oz (175g)

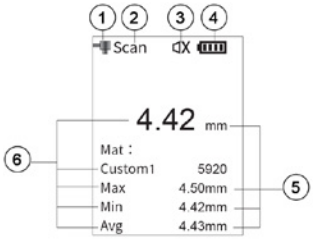
Instrument Description

1. Probe Connectors
2. LCD Display
3. Measurement Mode/ Menu Button
4. Record/Enter Button
5. Back/Alarm Toggle Button
6. Calibration Test Block
7. Power Button
8. Down Arrow
9. Up Arrow
10. Sound Velocity/ Calibration Button
11. Ultrasonic Sensor



Display Description

1. Coupling Indicator
2. Measurement Mode Indicator
3. Beep Status Indicator
4. Battery Indicator
5. Unit of Measure
6. Measurement/Sound Velocity Values



Operating Instructions

1. Insert the ultrasonic sensor into the probe connector sockets on the meter.
2. Press the **POWER** button to turn the meter ON. Press and hold the **POWER** button for approx. 2 seconds to turn the meter OFF.
3. The LCD will display the current set sound velocity.

Initial Calibration

1. Select Single measurement mode by pressing the **MODE/MENU** button.
2. Place a small drop of coupling gel (R7950) on the 4mm calibration test block.
3. Press and hold the **m/s/Cal** button to enter calibration mode as confirmed by "Please Calibrate" on LCD display.
4. Place the sensor on the calibration test block while ensuring the coupling indicator appears on the display.
5. While continuing to hold the sensor on the calibration test block, press the **REC/ENTER** button when the reading has stabilized.
6. Depending on the selected unit of measure, either "0.16in" (or "4.0/4.00mm") and "finished!" will appear on the LCD display.
7. 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.

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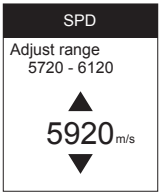
Selecting the Material Sound Velocity

1. While the meter is on, press the **m/s/CAL** button to enter the pre-loaded material sound velocities menu.
2. Press the ▲ and ▼ buttons to scroll through the pre-loaded material list.
3. Press the **REC/ENTER** button to confirm the material selection and press the ▲ and ▼ buttons to adjust the sound velocity of the material under test if required.



Note: Each material has an adjustment velocity range as shown below.

4. Press the **REC/ENTER** button again to confirm selection and resume normal operation.

Preparing the Measurement Surface

1. Clean dust, dirt or rust off the object, and remove any coatings (i.e. paint).
2. Smooth the surface of the object by grinding or polishing, alternatively, coupling gel with a high viscosity can also be used.

Important Note: In any ultrasonic measurement scenario, the shape and roughness of the desired test material are of great importance. Rough, uneven surfaces will prevent the ultrasonic sensor from seating properly against the surface, thus limiting the penetration of ultrasound through the material, resulting in unstable and therefore, unreliable measurements.

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Taking Thickness Measurements

1. Set the sound velocity on the meter (See the *Selecting the Material Sound Velocity* section for details).
2. Press the **MODE/MENU** button to select between Single and Continuous (Scan) measurement mode (See the *Measurement Methods* section for details).
3. Apply coupling gel on the material under test and place the sensor firmly against the desired measurement area.

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

4. Verify that the coupling indicator appears on the LCD display.
5. Read the measurement on the LCD display.
6. When the ultrasonic sensor is removed the value will stay on the LCD and the coupling indicator will disappear.
7. Press and hold the **REC/ENTER** button to save the measurement if applicable.

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 important that the ultrasonic sensor sits flat against the material.

Measurement Methods

There are four 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° with respect to the split face (Figure 1). Take the smaller of the two indicated values as the thickness of the material.

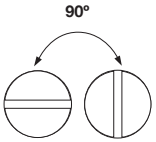

Figure 1

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3. **Multi-point measurement:** This method involves performing a number of measurements within a circle having a maximum diameter of about 1.18" (30mm) (Figure 2). Take the minimum indicated value as the thickness of the material.

Figure 2

4. **Continuous measurement (scan):** Continuous measurement method involves taking continuous measurements along a specified line according to the single measurement method, at intervals of 5mm or less (Figure 3). Take the minimum indicated value as the thickness of the material.

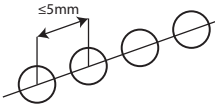

Figure 3

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. Select a test piece with a minimum wall thickness of 20.0mm.

1. Measure the test piece with a caliper or micrometer to confirm thickness.
2. Apply coupling gel on the material, place the sensor firmly against the desired measurement area.
3. Remove the ultrasonic sensor from the measurement area and adjust the measuring display until the actual thickness is met by pressing the ▲ and ▼ buttons and press the **REC/ENTER** button to confirm selection.
4. The LCD will now display the sound velocity of the test piece.
5. Press the **REC/ENTER** button to save the sound velocity.
6. At this point, the correct thickness measurement can be achieved by measuring the same material with the saved sound velocity.

Auto Power OFF

To preserve battery life, the meter is programmed to turn itself OFF after approximately 5 minutes of inactivity. To adjust the auto power off time, see the *Setting the Auto Power OFF Timer* section for details.

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Enabling/Disabling Alarm Setting

The R7920 will alarm when the measured value is beyond the pre-set limits. When the measurement is lower or higher than the pre-set standard value limit, the alarm will sound. To enter the alarm limits, see the *Setting the Alarm Thickness Limits* section for details.

Press and hold the **BACK/ALARM** button to turn the alarm function ON ( ) or OFF ( ).

Data Storage

When taking a measurement in single or continuous mode, press the **REC/ENTER** button to save the measurement if applicable.

Note: Each data record includes the current measurement, MAX, MIN, AVG values and material sound velocity. A maximum of 300 groups of data can be stored. While in the continuous measurement mode, the data can only be saved after the probe is removed from the test piece.

Clearing Measurements Results

When taking a measurement in single or continuous mode, press the **BACK/ALARM** button to clear the current measurements.

Note: Each data record includes the current measurement, MAX, MIN, AVG values and material sound velocity. While in the continuous measurement mode, the measurements can only be cleared after the probe is removed from the test piece.

Setup Mode

1. Press and hold the **MODE/MENU** button for 2 seconds to enter Setup Mode.
2. Use the ▲ and ▼arrows to scroll through the following parameters:

Parameter	Description
Material	Select the Material Under Test
Speed	Adjust Sound Velocity of the Material Under Test
Unit	Select Unit of Measure
Records	View/Delete Stored Data
Setting	Access Settings Menu
About	View Device Information
Reset	Reset to Factory Settings

3. Once the appropriate parameter has been selected, follow the instructions below.

Select the Material under Test

1. Press the **REC/ENTER** button when "Material" appears on the LCD.
2. Press the ▲ and ▼ buttons to scroll through the list of pre-loaded materials.
3. Press the **REC/ENTER** button to confirm selection and return to the Setup Menu screen.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

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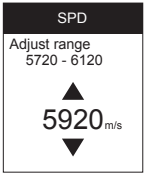
Adjusting the Sound Velocity of the Material under Test

1. Press the **REC/ENTER** button when "Speed" appears on the LCD.
2. Press the ▲ and ▼ buttons to adjust the sound velocity of the material under test if required.

Note: Each material has an adjustment velocity range as shown below.



3. Press the **REC/ENTER** button to confirm selection and return to the Setup Menu screen.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

Select Unit of Measure (in/mm)

1. Press the **REC/ENTER** button when "Unit" appears on the LCD.
2. Press the ▲ and ▼ buttons to select from 0.01in, 0.01mm and 0.1m units of measure.
3. Press the **REC/ENTER** button while in the setup menu screen to exit the Setup mode and resume normal operation.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

View/Delete Stored Data

1. Press the **REC/ENTER** button when "Records" appears on the LCD.
2. Press the ▲ and ▼ buttons to scroll through the following parameters within the stored data function:
   a) First Page
   b) Last Page
   c) Selected Item
   d) Delete the Item
   e) Delete All

Follow the instructions below to adjust each setting.
Note: If there is no data in the memory, the meter will display "No Records" and return to the menu screen.

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View from First/Last Page

1. Press the **REC/ENTER** button to enter the selected parameter.
2. Press the **REC/ENTER** button again to activate files to view.
3. Press the ▲ and ▼ buttons to scroll through the list of saved files.
4. Press the **REC/ENTER** button to see the details of the measured data.
5. While in the selected measurement data screen, press the ▲ and ▼ buttons to scroll through the measurement data screens for the other saved files.
6. Press the **BACK/ALARM** button three times to return to the stored data parameters screen.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

View from Selected Item

1. Press the **REC/ENTER** button to enter the selected parameter.
2. Press the **REC/ENTER** button again to skip to the required digit.
3. Press the ▲ and ▼ buttons until the desired value is reached.
4. Press the **REC/ENTER** button to confirm and skip to the next digit.
5. After each value has been selected and confirmed, the meter will automatically search for the data files matching the search criteria.
6. Press the **REC/ENTER** button again to activate files to view.
7. Press the ▲ and ▼ buttons to scroll through the list of saved files.
8. Press the **REC/ENTER** button to see the details of the measurement data.
9. While in the selected measurement data screen, press the ▲ and ▼ buttons to scroll through the measurement data screens for the other saved files.
10. Press the **BACK/ALARM** button three times to return to the stored data parameters screen.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

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Delete by Group Range (Delete the Item)

1. Press the **REC/ENTER** button to enter the selected parameter.
2. Press the **REC/ENTER** button again to skip to the required digit.
3. Press the ▲ and ▼ buttons until the desired value is reached.
4. Press the **REC/ENTER** button to confirm and skip to the next digit.
5. After each value has been selected and confirmed, the meter will ask to confirm deletion of the specific group range.
6. Press the ▲ and ▼ buttons to select between "Yes" and "No".
7. Press the **REC/ENTER** button to confirm selection.
8. Press the **BACK/ALARM** button to return to the stored data parameters screen.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

Delete All

1. Press the **REC/ENTER** button to enter the selected parameter.
2. Press the ▲ and ▼ buttons to select between "Yes" and "No".
3. Press the **REC/ENTER** button to confirm selection.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

System Settings

1. Press the **REC/ENTER** button when "Settings" appears on the LCD.
2. Press the ▲ and ▼ buttons to scroll through the following parameters within the system settings function:
   a) Sound
   b) Backlight
   c) Power OFF
   d) Alarm

Follow the instructions below to adjust each setting.

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Enable or Disable the Audible Beep (Sound)

1. Press the **REC/ENTER** button when "Sound" appears on the LCD.
2. Press the ▲ and ▼ buttons to select between "Yes" and "No".
3. Press the **REC/ENTER** button to confirm selection.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

Setting the Backlight Timer

1. Press the **REC/ENTER** button when "Back light" appears on the LCD.
2. Press the ▲ and ▼ buttons to set the backlight timer between 60-180 seconds.
3. Press the **REC/ENTER** button to confirm selection.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

Setting the Auto Power OFF Timer

1. Press the **REC/ENTER** button when "Power off" appears on the LCD.
2. Press the ▲ and ▼ buttons to set the backlight timer between 120-300 seconds.
3. Press the **REC/ENTER** button to confirm selection.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

Setting Alarm Thickness Limits

1. Press the **REC/ENTER** button when "Alarm" appears on the LCD.
2. Press the ▲ and ▼ buttons to set the standard thickness value.
3. Press the **REC/ENTER** button to confirm selection and to set the allowable thickness limit.
4. Press the ▲ and ▼ buttons to set the thickness limit value.
5. Press the **REC/ENTER** button to confirm selection.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

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View Device Information

1. Press the **REC/ENTER** button when "About" appears on the LCD to view the device information.
2. Press the **BACK/ALARM** button to return to the Setup Menu screen.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

System Reset

1. Press the **REC/ENTER** button when "Reset" appears on the LCD.
2. Press the ▲ and ▼ buttons to select between "Yes" or "No".
3. Press the **REC/ENTER** button to confirm selection.

Note: At any time, press the **BACK/ALARM** button while in the setup menu screen to exit the Setup mode and resume normal operation.

Maintenance

Cleaning the Test Piece

After taking a measurement, clean the test pieces to prevent them from rusting. If the pieces are not to be 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:

- The same value is always displayed when measuring different thicknesses or;
- A measurement displays no value.

Charging the Battery

1. Connect the R7920 via the included cable to a USB port on a PC or into a wall outlet using a USB Power Adapter (not included) to charge the Li-ion battery.
2. Charge the meter until the battery indicator appears full.
3. Remove the charging cable.

Applications

- Monitoring and verifying pipes and pressure vessels
- Industrial manufacturing

Accessories and Replacement Parts

- **R7920-PROBE** 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

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.
- Charge 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.

Appendix A

Material Sound Velocities Table

Note: The sound velocities listed below are for reference only.

Material	Description	
	in/µs	m/s
User define 1	0.233	5920
User define 2	0.233	5920
User define 3	0.233	5920
Aluminum	0.250	6340-6400
Steel, common	0.233	5920
Steel, stainless	0.226	5740
Brass	0.173	4399
Cooper	0.186	4720
Iron	0.233	5930
Cast Iron	0.173-0.229	4400-5820
Lead	0.094	2400
Nylon	0.105	2680
Silver	0.142	3607
Gold	0.128	3251
Zinc	0.164	4170
Titanium	0.236	5990
Tin	0.117	2960
Acrylic resin	0.109	2760
Epoxy resin	0.100	2540
Ice	0.157	3988
Nickel	0.222	5639

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Material	Description	
	in/µs	m/s
Plexiglass	0.106	2692
Porcelain	0.230	5842
PVC	0.094	2388
Quartz glass	0.222	5639
Rubber, vulcanized	0.091	2311

Measurements on Cylindrical Surfaces

When measuring cylindrical material, such as pipes or oil tubes, it is important to properly adjust the angle between the ultrasonic sensor's crosstalk interlayer plate and the axial line of the material being measured.

1. Couple the sensor with the material being measures.
2. Make the sensor's crosstalk interlayer plate perpendicular or parallel to the axial line of the material under test.
3. Shake the sensor vertically along the axial line of the material under test, the readouts displayed on screen will change regularly.
4. Use the minimum readout.

The standard for selecting the angle between the sensor's crosstalk interlayer plate and the axial line of the material under test depends on the curvature of the material under test. For a pipe with a large diameter the sensor's crosstalk interlayer plate should be perpendicular to the axial line of the material under test. For a pipe with small diameter, the sensor's crosstalk interlayer plate can be both parallel and perpendicular to the axial line of the material under test, and take the minimum readout as the thickness.

Measuring Compound Profiles

When the material being measured has a compound profile (such as a bend in a pipe), one can use the procedures to measure cylindrical surfaces. The exception is that one should have two analyses and get two results when the sensor's crosstalk interlayer plate is both parallel and perpendicular to the axial line of the material under test. Take the minimum readout as the material thickness.

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Measuring an Un-Parallel Surface

To get a satisfactory ultrasonic response, the other surface of the material under test must be parallel to or co-axial with the surface being measured, otherwise it will cause a measuring error or even provide no displayed reading.

Influence of Material's Temperature

Both the thickness and transmitting speed of ultrasonic waves are influenced by temperature. If there is a high requirement of measuring accuracy, please use one of the comparison methods listed below:

1. Use a test piece of the same material being measured, under the same temperature.
2. Obtain the temperature compensation coefficient.
3. Use this coefficient to correct the actual measurement of the material being tested.

Material with Large Attenuation

Material with porous and coarse particles (such as fibre) will cause a large scatter and energy attenuation in the ultrasonic wave. This will cause abnormal readings or provide no readings on the display (generally, the abnormal readings are less than the actual thickness). These type of materials cannot be measured by our ultrasonic thickness gauges.

Measuring Castings

Castings will cause large attenuations in sound energy due to coarse crystal particles and a not-so-dense structure. The attenuation is due to the material's scatter and absorption of sound energy. Coarse out-phase structures and coarse crystal particles will cause abnormal reflection (i.e. a grass-shaped or tree-shaped echo) resulting in errors in the readings. When the crystal particle is coarse, the anisotropy in flexibility in metal's crystallizing direction will be obvious. This results in difference in sound velocities in different directions, with the maximum difference being up to 5.5%. The compactness in different positions of the workpiece is different, which will also cause difference in sound velocity. All of these will produce inaccuracies in the measurements.

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While measuring castings pay attention to the following:

1. When measuring casting with an un-machined surface use engine oil, consistent grease, or water glass as a coupling gel.
2. Calibrate the sound velocity for the material under test with a standard test piece having the same material and measuring direction as that of the material being measured.
3. If necessary, take a 2-point calibration.

Preventing Errors

Reference Test Pieces

To maintain high accuracy when taking measurements of different materials, it is important to use a standard test piece that resembles the material and conditions being measured. The ideal reference test pieces should be a group of test pieces with different thicknesses made of the same materials that is going to be measured. The test pieces can provide calibrating factors for the meter (such as the microstructure of the material, heat-treating condition, direction of particles, surface roughness, etc.). To meet the highest requirements of accuracy a set of reference test pieces are critical.

Under most situations satisfactory measuring accuracies can be met with only one reference test piece. This should be the same material and similar thickness to the material under test. Take an even-surfaced object, measure it by using a micrometer, then use it as a test piece.

For thin material, when its thickness is near to the low limit of the sensor's measuring range, use a test piece to determine the accurate low limit. Never measure a material with a thickness lower than the low limit.

When the material under test is thick, especially an alloy with complex internal structure, select a test piece similar to the object from a group of test pieces, to provide an idea of calibration.

For most casting and forging, their internal structures have some direction. In different directions, the sound velocity will experience some change. To solve this problem, the test piece should have an internal structure with same direction as that of the material under test, and the transmitting direction of sound wave in it should also be same as that of the material.

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Under certain circumstances, referring to a material speed-of-sound table can replace reference test pieces. The value in the speed-of-sound table may have some difference from the actual measured values due to difference in the material's physical and chemical characteristics. This is usually used for measuring low-carbon steel, and can only be taken as a rough measurement.

Ultra-thin Material

An error will occur when the thickness of a material under test is less than the low limit of the ultrasonic sensor. When necessary, measure the minimum limit thickness by comparing it with test pieces. When measuring an ultra-thin material, sometimes errors called "double refraction" may occur. This results in a displayed measuring reading that is twice the actual thickness of the material under test. Another error result is called "pulse envelop or cyclic leap". This results in the measured value being larger than the actual thickness. To prevent these kinds of errors repeat the measurement to confirm the results.

Rust, Corrosion, and Pits

Rust and pits on the surface of the object will cause irregular change in the measured reading. In extreme situations it will even cause no readings on the display. To avoid errors, orient the sensor's crosstalk interlayer plate in different directions to take multiple measurements.

Error in Identifying Material

If calibrating the meter with one material and then measure another material, an error will occur. Be careful in selecting the correct sound velocity.

Degradation of Probe

The surface of the probe is allyl resin. Over time its roughness will increase resulting in reduced sensitivity. If it is determined that this is the reason for the errors, grind the surface with sandpaper or oilstone to make it smooth again. If the readings are still not stable, the sensor must be replaced.

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Overlapped Material and Compound Material

It is impossible to measure uncoupled overlapped material because the ultrasonic wave can't pass through an uncoupled space. Since the ultrasonic wave can't transmit in a compound material in even speed, an ultrasonic thickness-gauge cannot be used to measure overlapped material and compound material.

Influence of Metal Surface Oxidation

Some metals can produce a dense oxidation layer on the surface, such as aluminum. Even though the layer is in close contact with the substrate and provides no obvious interface, the ultrasonic wave will have different transmitting speeds in these two materials which will cause an error. In addition, different thicknesses in oxidation layers will cause different errors. Make a reference piece from a batch of objects by measuring with a micrometer or calliper, and using it to calibrate the instrument.

Abnormal Readout of Thickness

The operator should be able to identify an abnormal measuring reading. Generally the rust, corrosion, pit, and internal defect of the material under test will cause abnormal measuring readings.

Utilization and Selection of a Coupling Gel (R7950)

Coupling gel is used for transmitting high-frequency energy between the ultrasonic gel and the material under test. If the type of gel or utilization is wrong, or the utilization it will cause an error. For most applications a single droplet of coupling gel coated evenly is sufficient. When measuring a smooth surface use a gel with low viscosity (such as the coupling gel provided or light engine oil). When measuring a coarse object surface, vertical surface or top surface, use a gel with high viscosity (such as glycerin grease, consistent grease, and lubricating grease, etc.).

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.

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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