

# ULTRASONIC TESTING



**TOMTEC NDT MARINE SERVICES PTE LTD**

**ULTRASONIC TESTING (UT)** is a method of characterizing the thickness or internal structure of a test piece through the use of high frequency sound waves. The frequencies, or pitch, used for ultrasonic testing are many times higher than the limit of human hearing, most commonly in the range from 500 KHz to 20 MHz. Ultrasonic testing is very sensitive test method for detection of embedded linear discontinuities. Ultrasonic testing is faster and economical as compared to radiographic examination. Ultrasonic testing is completely non-destructive. The test piece does not have to be cut, sectioned, or exposed to damaging chemicals. Access to only one side is required, unlike measurement with mechanical thickness tools like calipers and micrometers. When a test has been properly set up, results are highly repeatable and reliable.



Ultrasonic Testing is often performed on steel and other metals, though it can be used on several other materials such as concrete, wood and composites. Thus, it is used in many industries such as automotive, constructions, transportations, manufacturing, marine aerospace etc. The only common engineering materials that are not suitable for ultrasonic testing with conventional equipment are wood and paper products.

Sound waves traveling through a material will reflect in predictable ways off of flaws such as cracks and voids. An ultrasonic flaw detector is an instrument that generates and

processes ultrasonic signals to create a waveform display that can be used by a trained operator to identify hidden flaws in a test piece. The operator identifies the characteristic reflection pattern from a good part, and then looks for changes in that reflection pattern that may indicate flaws.

The method can be performed on all types of materials and its applications include:

- ✓ Flaw detection such as inclusions, cracks and porosity – particularly for small flaws or flaws situated deep within a part
- ✓ Determining the thickness of test objects, particularly in erosion or corrosion monitoring
- ✓ Assessment of bond integrity.

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## Advantages

- ✓ Only one side surface needs to be accessible
- ✓ Provide quantitative analysis of the internal flaws such as width and depth of defects.
- ✓ Provide immediate results
- ✓ High sensitivity, permitting the detection of extremely small flaws
- ✓ Greater accuracies than other NDT methods
- ✓ Capable of portable or highly automation operation
- ✓ Capability of estimating size, orientation, shape and nature of defects
- ✓ High penetrating power which allows detection of flaws deep in the part
- ✓ Applicable to most materials
- ✓ Wide range of material thickness can be inspected.



At TOMTEC, we ensure that all our technicians are competent and certified to internationally recognized standards. TOMTEC performs Ultrasonic Testing in accordance with Class Requirements, Client specific requirements, AWS D1.1, ASME B31.1, ASME B31.3, API 1104, API 650, API RP 2X, ASTM A388, ASTM A745, ASTM E164, ASTM A609, ASTM E114, BS EN ISO 17640, BS EN 10160, BS EN 10306, BS EN 10308, ASME BPVC Section V – Article 4&5, and similar national and international standards.

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