

Ultrasonic echography (B-Scan)

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Principle

The fundamental principles concerning the generation of ultrasonic B-scan images (brightness representation of the reflection amplitudes) are demonstrated with the aid of a simple test object. The experiment is executed with an ultrasonic echoscope in the pulse echo mode and the object is scanned manually. Then, the image quality and the most important image defects will be assessed.

Benefits

- Exciting experiment to teach the basics of ultrasound imaging (echography)
- Diversified experiment with several measurement methods
- With the same setup A-scans can be performed
- Experiment setup can be upgraded for additional experiments in medical imaging and for echoscopy applications in material sciences
- Detailed experiment guide available

Tasks

1. Measure the 3 edge lengths of the test block with a vernier caliper and determine the time of flight of the sound for the various edge lengths of the test block with the aid of the measurement software.
2. Calculate the sound velocity of the test block material and switch the measurement software (A-scan mode) to depth measurement.
3. Produce two B-scans, one with the 1 MHz probe and one with the 2 MHz probe, with the aid of the measurement software (B-scan mode).
4. Measure the depth and width of the echoes in the resulting images.
5. Characterise the quality of the images in terms of their resolution and defects.

Learning objectives

- Sound velocity
- Reflection coefficient
- Ultrasonic echography
- A-scan
- B-scan
- Greyscale display
- Resolution
- Zone of focus
- Image artefacts

Scope of delivery

Basic Set Ultrasonic Echography II	13924-99	1
Vernier calliper stainless steel 0-157mm, 1/20	03010-00	1
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Ruler, plastic, 200 mm	09937-01	1