# Exploring the Technology Behind Omniscan SX: A Comprehensive Overview of its Functionality and Applications"

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## Introduction

Omniscan SX is a cutting-edge technology used in various industries, such as healthcare, aerospace, and energy, to identify and detect internal material defects. It works by using ultrasonic waves to penetrate through the object being inspected, producing images that can be analyzed to determine the presence of any cracks, corrosion, or other defects. It is known for its exceptional imaging capabilities, ease of use, and versatility. It utilizes advanced signal processing algorithms, coupled with a sophisticated user interface, to provide precise and accurate imaging of the internal structure of materials.

One of the key features of the Omniscan SX is its ability to generate high-resolution images of the inspected material, allowing inspectors to detect even the most minor defects with great precision. The device also can adapt to different materials and inspection conditions, making it an ideal tool for various applications.

The specific test that will be conducted is the UT thickness test, a widely used non-destructive testing method for measuring the thickness of various materials, including aluminum block. Using the Omniscan SX Olympus for this test  provides accurate and reliable thickness measurements. The device emits ultrasonic waves that penetrate the material and bounce back to the receiver, providing information on the thickness of the material.


## Process for a UT thickness test

Choose the suitable probe: In this case, the Olympus 5L24-NW2 standard phased array probe will be utilized.

Apply a coupling agent: To ensure proper contact between the probe and the reference block, apply a coupling agent such as gel or water; water is used in this scenario.

Set up the instrument: Power on the Omniscan SX and follow the manufacturer's instructions for setup. Choose the appropriate inspection mode and configure the instrument settings, including probe frequency, angle, and gain.

Calibrate the instrument: Calibrate the instrument using a reference block made of similar material and thickness as the test object. Adjust sensitivity and zero settings to achieve the desired signal response from the reference block. Next, perform a thickness calibration with a known-thickness calibration block to guarantee accurate thickness measurements.

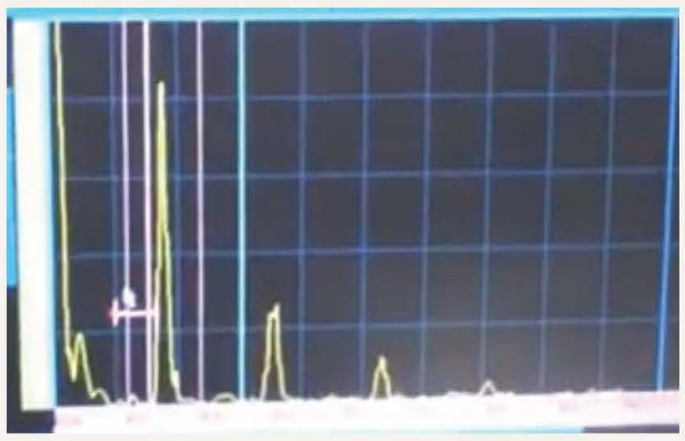
Scan the reference block: Position the probe on the reference block's surface and scan the target area. The Omniscan SX will display real-time thickness measurements as the probe moves across the material.

Interpret the results: Examine the thickness measurements to ensure they fall within the expected range. Further inspection or analysis may be required for any areas of concern.
Document the results: Record the results of the UT thickness test performed on the reference block, ensuring consistency and reliability in the testing process.

## OBJECTIVES

- understand what the omniscan sx is
- understand  how  it works
- preform a UT thickness test


A reference block similar to this one was tested to detect the thickness measurements



Type A-Scan showing how the reference block corresponds with the actual dimensions

## RESULTS

The thickness measurements were taken along a 4-inch long section of the aluminum block.
The measurements ranged from 0.45 inches to 0.55 inches, with an average thickness of 0.50 inches.
The thickness measurements were within the acceptable range for this block, indicating that the material was of uniform thickness and free from any major defects or anomalies.
The signal response was consistent with the expected response for this material, and there were no indications of delamination, cracks, or other defects.
The inspection was successful, and the results were recorded in a report for future reference.

## Conclusion

In conclusion, the Omniscan SX is a versatile and powerful tool that enables accurate and reliable non-destructive testing of various materials. Its cutting-edge technology allows for exceptional imaging capabilities and adaptability to different materials and inspection conditions, making it an invaluable asset in the healthcare, aerospace, and energy industries.

The UT thickness test conducted using the Omniscan SX Olympus and the Olympus 5L24-NW2 probe demonstrated the instrument's ability to provide accurate thickness measurements of an aluminum reference block. After carefully selecting the appropriate probe, applying a coupling agent, setting up the instrument, calibrating it, scanning the reference block, and interpreting the results, the test confirmed the uniform thickness and absence of major defects in the material

Although the UT thickness test demonstrates the capabilities of the Omniscan SX, it is important to note that this application barely scratches the surface of the instrument's full potential. The Omniscan SX is equipped with a range of features and functionalities that make it an invaluable tool for numerous advanced inspection and analysis tasks across various industries.

For example, an exciting capability of the Omniscan SX is the Time-of-Flight Diffraction (TOFD) technique, which detects and sizes cracks and weld defects. TOFD measures the time taken for an ultrasonic wave to travel from the transmitter to the receiver, allowing for accurate detection of material flaws.

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**Related literature**

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