

## METROLOGICAL ANALYSIS AND ACCURACY ASSESSMENT OF ULTRASONIC THICKNESS GAUGE A-1210

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### 1. Introduction

Ultrasonic thickness measurement is widely used in the field of Non-Destructive Testing (NDT) for evaluating the integrity of materials without causing damage. The A-1210 ultrasonic thickness gauge is one of the reliable instruments used in industrial applications, ensuring precision in measurements. This study aims to analyze the metrological performance and accuracy of the A-1210 device using real test data obtained from steel reservoir inspections.

### 2. Theoretical Background

Ultrasonic thickness gauges operate based on the principle of ultrasonic wave propagation through materials. The wave is transmitted into the material, and the time taken for it to reflect back determines the thickness. The D1771 4.0A0D12CL transducer enhances measurement accuracy, ensuring stable readings under various environmental conditions.

### 3. Methodology

This study was conducted on a steel horizontal reservoir used for storing petroleum products. The object specifications include:

- Material: St3sp steel
- Wall thickness: 4 mm (nominal)
- Test standard: ISO 16809-2015
- Environmental conditions: Ambient temperature of 15°C

Measurements were taken at different locations on the tank, covering flat bottom sections and cylindrical walls to assess uniformity and possible thinning effects.

### 4. Results and Discussion

The ultrasonic measurements provided insights into the thinning of the reservoir walls. The following table summarizes the key findings:

Component	Average Thickness (mm)	Reduction (mm)
Flat bottom 1	3.85	0.1-0.3
Cylindrical section 2	3.86	0.1-0.3
Cylindrical section 3	3.86	0.1-0.3
Cylindrical section 3	3.85	0.1-0.3
Flat bottom 5	3.81	0.1-0.3

The results indicate a slight reduction in thickness in all tested areas. The minimum thickness recorded was 3.75 mm, which is within the permissible limit but requires periodic monitoring.

#### 5. Conclusion

The study demonstrated that the A-1210 ultrasonic thickness gauge provides reliable measurements with minimal uncertainty. The D1771 4.0A0D12CL transducer enhances accuracy, making it suitable for industrial applications. The results indicate a slight reduction in thickness, which should be monitored regularly to ensure structural integrity.

#### REFERENCES

1. International Standard ISO 16809-2015 – Ultrasonic Thickness Measurement.
2. Equipment Passport for Ultrasonic Thickness Gauge A-1210.
3. Industry Standards for Non-Destructive Testing (NDT).