

JJF

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**Calibration Specification for Ultrasonic Thickness Instruments
(English Translation)**

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1 Scope

This Specification is applicable to the calibration of ultrasonic thickness instruments of which the resolution is 0.1mm and 0.01mm.

2 Normative references

This Specification referred to the following referenced documents.

JJF 1001-1998, General Terms in Metrology and Their Definitions

JJF 1059-1999, Evaluation and Expression of Uncertainty in Measurement

GB/T 12064.1-1999, Nondestructive testing terms - Ultrasonic testing

GB/T 11344-1989, Measuring thickness by ultrasonic pulse-echo contact method

When using this Specification, it shall use the currently valid versions of the above references.

3 Overview

The ultrasonic thickness instruments are mainly used to measure the wall thickness of hulls, oil and gas pipelines, high-pressure vessels, boilers as well as the thickness of large area sheet. The material to be tested can be metal materials such as steel, or non-metal materials such as plastic and nylon. The principle is that the instrument emits ultrasonic waves through the probe and reflects back to the test head after reaching the bottom

surface of the test piece.

Use a counter to accurately measure the time that ultrasonic waves travel

4.1 Repeatability

See Table 1 for instrument resolution specifications and corresponding repeatability requirements.

4.2 Indication error

See Table 1 for instrument resolution specifications and corresponding maximum allowable indication error.

4.3 Indication error of curved wall thickness measurement

See Table 2 for the instrument resolution specification and corresponding maximum allowable indication error.

4.6 Indication stability

See Table 3 for the instrument resolution specifications and corresponding indication stability requirements (the automatic shutdown type instrument does not conduct this calibration).

5 Calibration conditions

5.1

The calibration room temperature shall be $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$. The relative humidity shall be less than 65%RH.

5.2 The standard thickness blocks and standard round tubes used for

calibration instruments shall meet the technical requirements in Annex B and Annex C.

6 Calibration items and calibration methods

Before calibration, it is necessary to confirm that there are no defects in appearance and electromechanical functions that affect the calibration metrological characteristics.

6.1 Repeatability

After the instrument is turned on, operate the sound speed adjustment key or the sound speed dial to adjust the sound speed to 5900m/s. Return to the state of the instrument

measuring thickness.

6.2 Indication error

Conduct calibration according to the procedures specified by the instrument.

Measure the standard thickness blocks in Annex B one by one in the measuring range of the instrument.

6.3 Indication error of curved wall thickness measurement

Conduct calibration according to the procedures specified by the instrument (do not recalibrate if the probe is not replaced).

6.4 Fine adjustment range for thickness calibration

After the instrument calibration, keep the coupling state of the probe and thickness block unchanged. Continuously adjust the " " and " " keys of the instrument calibration (or rotate the fine adjustment knob for calibration thickness). The indication range of the instrument shall not be less than $\pm 1\text{mm}$.

7 Calibration result expression

After the instrument is calibrated, issue a calibration certificate. The calibration certificate shall include at least the information contained in Annex A.

8 Recalibration time interval

The recommended recalibration time interval is 1 year.

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