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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 23900-2009

**Non-destructive testing -- Practice for measuring ultrasonic
velocity in materials**

无损检测 材料超声速度测量方法

(English Translation)

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Foreword

This revised standard adopts ASTM E494-05 "material ultrasonic velocity measurement methods" (in English).

This standard redrafted according to ASTM E494-05.

Taking into account China's national conditions, when using ASTM E494-05, we made some changes in this standard. About the technical differences are as follows.

- The Normative references to our standards;
- Remove ASTM E494-05 Chapter 5;
- Remove ASTM E494-05 Chapter 9;
- Remove ASTM E494-05 informative Appendix X1.

For ease of use, this standard also made the following editorial changes.

- "The method" be replaced by "this standard";
- Insert GB/T 1.1-2000 specified key words in Chapter 2;
- According to GB/T 1.1-2000 prescribed format requirements of appendix and part of the reg number re-done.

This standard Annex A, Annex B and Annex C is informative appendix.

The standard non-destructive testing by the National Standardization Technical Committee (SAC/TC56) and focal points.

This standard was drafted. Chinese Special Equipment Inspection and Research Institute.

Drafters of this standard. Shen Tian Gong, Wu Yan.

Non-destructive testing of materials for measuring ultrasonic velocity

1 Scope

This standard specifies the type A pulse reflection type ultrasonic flaw detection device to measure material ultrasonic velocity method.

This standard describes a supersonic velocity known reference material (test piece) adopted by the comparative method to measure the material being tested Supersonic speeds.

This standard is applicable between the two surfaces to a thickness greater than or equal to 5mm of solid material, and perpendicular to the direction of propagation of the ultrasonic energy the parallelism between $\pm 3^\circ$, and coupled with the ultrasonic probe surface roughness better than $3.2\mu\text{m}$.

Other specially developed ultrasound equipment, auxiliary equipment and special technology available to more accurate results. Appendix A lists the measurement of ultra Some other methods of acoustic velocity.

Note: The factors include changes in technology, equipment, material type, and operators who will cause changes in the speed indicator, sometimes even up to 5%. Due to the above Su integrated together affect the outcome expected to increase detection accuracy (probably less than 1% tolerance).

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

GB/T 12604.1 Terminology for nondestructive testing Ultrasonic testing (GB/T 12604.1-2005, ISO 5577:2000, Non-destructivetesting-Ultrasonicinspection-Vocabulary, IDT) JB/T 9214 A pulse reflection type ultrasonic flaw detection system performance test method

3 Terms and Definitions

Terms and definitions GB/T 12604.1 established apply to this standard.

4 Overview

In the solid can propagate several possible vibration modes. This standard relates to two kinds of propagation speed, namely the speed of longitudinal waves (v_p) and transverse Speed (v_s). When the sample in the direction perpendicular to the beam geometry and beam area much larger than the wavelength of the longitudinal wave velocity from a few specimens Geometry of. Shear wave propagating speed is substantially unaffected by the specimen geometry. The method covered by this standard applies only to routine Pulse reflection type ultrasonic flaw detection equipment.

5.1 Test Instruments

Any ultrasound machines are made of baseline emission (pulse) device, receiving device (echo amplifier) and A-scan display circuit , And it can produce, receive and display the ultrasonic signals. The instrument should be able to $\pm 0.5\text{mm}$ precision baseline readout A_k , A_l , A_t at the time along the A-scan, as (see definition in 6.1.5 and 6.2.5), and several other locations. For best accuracy, we should adopt the highest possible frequency, and at least be able to Showing 2 times, preferably 5 times the echo reflected from clear.

5.2 Probe

Contact method for the detection of the probe should be able to generate and receive the appropriate size, type and frequency of ultrasound. Longitudinal wave mode is used in direct contact with Compressional wave velocity measurements, direct contact with the shear wave velocity measurement mode is used.