

JB

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JB/T 4730.3-2005

Replace part of JB 4730-1994

Nondestructive Testing of Pressure Equipment - Part 3: Ultrasonic Testing

承压设备无损检测 - 第 3 部分：超声检测

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Foreword

JB/T 4730.1~4730.6-2005 "Nondestructive Testing of Pressure Equipments" is consisted of six parts:

- Part 1: universal requirement;
- Part 2: radiation testing;
- Part 3: ultrasonic testing;
- Part 4: magnetic particle testing;
- Part 5: penetration testing;
- Part 6: vortexing testing

This Part is consisted of JB/T 4730.1~4730.6-2005 Part 3: ultrasonic testing. This Part is mainly revised on the basis of perennial domestic research findings and application experience, and by referring to ASME "Boiler & Pressure Vessel Code" V, JIS standard specification and professional feedback opinions. Compared with JB 4730-1984, this Part mainly makes the following major variation:

1 Modify the attenuation coefficient Formula for workpiece material with wall thickness of less than 3 times near-field region; add ultrasonic testing content of austenitic stainless steel, biphasic stainless steel plate, aluminum and aluminium alloy plates, iron and alloy iron plates; unify ultrasonic testing content of explosion and rolling clad steel plate.

2 Extend the ultrasonic testing scope of butt welding joint for the steel pressure equipment to 6mm~400mm, and make partial adjustment for ultrasonic testing block of butt welding joint; add ultrasonic testing classification content of butt welding joint for steel pressure equipment; add ultrasonic testing content of butt welding joint for T-shape soldered joint and austenitic stainless steel pressure equipment.

3 Add pipe for the steel pressure equipment and ultrasonic testing content of circumferential butt joint for the pressure pipeline with wall thickness of greater than or equal to 4mm and external column of 32mm~59mm, or wall thickness of 4mm~6mm and outside diameter of greater than or equal to 159mm; add ultrasonic testing content of aluminum and aluminium alloy circumferential butt welding joint with wall thickness of greater than or equal to 5mm and outside diameter of 80mm~159mm or wall thickness of 5mm~8mm and larger than or equal to 159mm.

4 Add ultrasonic testing content for the in-use pressure equipment.

Annex A to Annex L in this Part are normative; Annex M and Annex N are Informative.

This Part is proposed by China Standardization Committee on Boilers and Pressure Vessels (CSCBPV) (SAC/TC 262).

This Part is under the jurisdiction of China Standardization Committee on Boilers and Pressure Vessels (CSCBPV) (SAC/TC 262).

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Nondestructive testing of pressure equipment

Part 3: Ultrasonic Testing

1. Scope

This part of JB/T 4730 specifies the ultrasonic testing methods and quality classification requirements of pressure equipments through adopting A-type ultrasonic flaw detector to inspect the flaws of the workpiece.

This part is applicable to the ultrasonic testing of the raw material, spare parts and welded joints used by the metal-made pressure equipments, and it's also applicable to the ultrasonic testing of the in-service metal-made pressure equipments.

The ultrasonic testing of the support members and the structural members related to the pressure equipments also can refer to the provisions of this part for application.

2. Normative References

The following standards contain provisions which, through reference in this text, constitute the provisions of JB/T 4730.3. For dated reference, subsequent amendments (excluding amending error in the text) to, or revisions of, any of these publications do not be applied. However, the parties whose enter into agreement according to these specifications are encouraged to research whether the latest editions of these references are applied or not. For undated references, the latest edition of the normative document is applicable to this Part.

JB/T 4730.1 *Nondestructive Testing of Pressure Equipment-Part 1: General Requirements*

JB/T 7913-1995 *Fabrication and Calibration Method of Steel Reference Blocks Used in Ultrasonic Inspection*

JB/T 9214-1999 *Practice for Evaluating Performance Characteristics of A Scope Ultrasonic Pulse-echo Testing Systems*

JB/T 10061-1999 *General Technical Specifications for A-type Pulse-echo Supersonic Flaw Detector*

JB/T 10062-1999 *Testing Methods for Performance of Probes Used in Ultrasonic Flaw Detection*

3. General Requirements

3.1 ultrasonic testing personnel

The general requirements of the ultrasonic testing personnel shall comply with the relevant provisions of JB/T 4730.1.

3.2 testing equipment

3.2.1 The ultrasonic testing equipment shall be equipped with the product conformity certificate or eligible documentary evidence.

3.2.2 Defectoscope, probe and system performance

3.2.2.1 Defectoscope

A-type pulse-echo ultrasonic flaw detector is adopted; its working frequency ranges 0.5MHz~10MHz; the flaw detector shall have linear display at 80% of the full screen scope at minimum. The flaw detector shall have continuous adjustable attenuator 80dB or above; the stepping level $\leq 2\text{dB}$; accuracy $\pm 1\text{dB}$ error for every two neighboring 12dB; the maximum progressive error is less than 1dB. The horizontal linear error is not greater than 1%, while the vertical linear error is not greater than 5%. The rest indicators shall meet the provisions of JB/T 10061.

3.2.2.2 Probe

3.2.2.2.1 Generally, the wafer area shall not be greater than 500mm^2 , and the length of any side shall not be greater than 25mm in principle.

3.2.2.2.2 The axial line horizontal deviation angle of the uniline probe sound beam shall not be greater than 2° , while the vertical direction of the main sound beam shall not be any obvious double-peak.

3.2.2.3 The system performance of reflectoscope and probe

3.2.2.3.1 When reaching the maximum inspection sound path of the detected workpiece, the effective sensitivity surplus shall not be less than 10dB.

3.2.2.3.2 Error between the combination frequency of instrument/probe and the nominal frequency shall not be greater than $\pm 10\%$.



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