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**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 47013.3-2023

Replacing NB/T 47013.3-2015

**Nondestructive testing of pressure equipments - 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

This document was issued on 28 December 2023 by the National Energy Administration of the PRC and takes effect on 28 June 2024.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 77.040.20, Chinese classification H 26.

It replaces NB/T 47013.3-2015, which is superseded.

This document was drafted in accordance with the rules given in GB/T 1.1-2020, Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

This document is Part 3 of NB/T 47013, Nondestructive testing of pressure equipments.

The following parts of NB/T 47013 have already been issued:

Part 1: General requirements;

Part 2: Radiographic testing;

Part 3: Ultrasonic testing;

Part 4: Magnetic particle testing;

Part 5: Penetrant testing;

Part 6: Eddy current testing;

Part 7: Visual testing;

Part 8: Leak testing;

Part 9: Acoustic emission testing;

Part 10: Time of flight diffraction ultrasonic testing;

Part 11: Digital radiographic imaging testing;

Part 12: Magnetic flux leakage testing;

Part 13: Pulsed eddy current testing;

Part 14: Computed radiographic testing;

Part 15: Phased array ultrasonic testing.

This document replaces NB/T 47013.3-2015, Nondestructive testing of pressure equipments - Part 3: Ultrasonic testing. In addition to structural adjustments and editorial changes, the following main technical changes have been made with respect to NB/T 47013.3-2015:

- a) it has been made clear that reference blocks comprise general-purpose reference blocks and special reference blocks, and the applicable scope of each has been specified;
- b) the requirements for process validation and the methods of process validation have been further clarified;
- c) the applicable range of the ultrasonic testing of plates for pressure equipment has been adjusted, being extended from the range 6 mm to 250 mm to any thickness greater than or equal to 6 mm;
- d) the applicable range for longitudinal butt joints of pressure equipment has been enlarged, changing from an inside-to-outside diameter ratio greater than or equal to 65 percent to an inside-to-outside diameter ratio greater than or equal to 60 percent;
- e) a method for measuring the wall thickness of clad steel plates for pressure equipment has been added;
- f) Annex E, Ultrasonic angle-probe testing method and quality grading for ring-shaped and cylindrical forgings of carbon steel and low alloy steel used in pressure equipment, has been revised as a whole: its applicable range has been enlarged, the reference blocks and the reference reflectors have been modified, and the testing method has been modified;
- g) Annex F, Ultrasonic angle-probe testing method for austenitic stainless steel ring-shaped and cylindrical forgings used in pressure equipment, has been revised as a whole: its applicable range has been enlarged and the testing method has been modified;
- h) Annex I, Ultrasonic testing method and quality grading for welded butt joints of austenitic stainless steel and nickel-based alloy in pressure equipment, has been revised as a whole: its applicable range has been enlarged, the reference blocks have been modified, testing technique levels have been added, and testing methods for longitudinal flaws and for

transverse flaws have been specified;

i) a new informative Annex U, Ultrasonic testing methods for pressure equipment using imaging techniques, has been added, providing testing methods for recordable ultrasonic testing.

This document was proposed by and is under the jurisdiction of the National Technical Committee on Boilers and Pressure Vessels of Standardization Administration of China (SAC/TC 262).

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The successive editions of this document and of the documents it replaces are as follows:

JB 4730-1994;

JB/T 4730.3-2005;

NB/T 47013.3-2015.

1 Scope

NB/T 47013.3-2023 is Part 3 of the Chinese standard for non-destructive testing of pressure equipment, and it governs ultrasonic testing. The NB/T 47013 series is the reference an inspector applies to pressure vessels, boilers and pressure piping in China, and this part is the one that decides whether a weld or a forging is accepted on the evidence of an ultrasonic examination. It replaces the 2015 edition. The document fixes the qualification of the personnel who perform and evaluate the test, the equipment and its verification - flaw detectors, probes, cables and reference blocks - and the calibration performed before and during the examination. It then sets out the techniques themselves: contact pulse-echo testing of butt and corner welds in plate, pipe and nozzle geometries, testing of forgings, castings and bolting, thickness measurement, and the specialised