

ICS 25.160.40

CCS J 33



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

GB/T 43320-2023

**Non-destructive testing of welds - Ultrasonic testing - Use of
automated phased array technology for thin-walled steel
components**

焊缝无损检测 超声检测 薄壁钢构件自动相控阵技术的应用

(English Translation)

Issued on: November 27, 2023

Implemented on: June 1, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and Definitions	2
4 Detection level	2
5 Information required before testing	4
6 Personnel and equipment requirements	5
7 Test preparation	6
8 Base material testing	7
9 Range and sensitivity settings	7
10 Equipment Verification	10
11 Testing process procedure verification	10
12 Weld inspection	10
13 Data Storage	10
14 Phased Array Data Interpretation and Analysis	10
15 Test report	12
Appendix A (informative) Typical reference test block	14
Appendix NA (informative) Large curvature longitudinal weld reference test block	16
Reference	18

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents" Drafting:

This document is equivalent to ISO 20601:2018 "Application of automatic phased array technology for non-destructive testing of welds and ultrasonic testing of thin-walled steel components" use":

This document has made the following minimal editorial changes:

---Added source descriptions of some terms;

---Added 7:4 note;

---Added note 9:3:1;

---Added Appendix NA (informative) longitudinal weld reference test block:

Please note that some content in this document may be subject to patents: The publisher of this document assumes no responsibility for identifying patents:

1 Scope

This document describes the semi-automatic or fully automatic phased array ultrasonic testing of fusion joints of steel components with wall thicknesses of 3.2mm~8.0mm: So thick the thickness range is the typical thickness range where this detection technology is mainly used in boiler tube walls: When using inspection level D, the wall thickness can exceed the the specified minimum or maximum thickness of the component: This document applies to full penetration welded joints of simple geometries for plates, tubes and vessels in which the welding consumable and the base materials are all low-alloy steels and/or fine-grained steels:

Note: "Semi-automatic detection" includes fixed scanning devices (scanning racks and rulers, etc:), manually moving one or more probes, and the probe position is obtained by a position sensor:

"Fully automatic inspection" also includes mechanized scanning devices:

The material acoustic parameters specified in this document are based on the longitudinal wave sound speed of (5920 ± 50) m/s and the transverse wave sound speed of (3255 ± 30) m/s:

of steel: When detecting materials with different sound velocities, consider the influence of sound speed changes:

This document provides the capabilities and limitations of phased array inspection technology for the detection, location, quantification, and characterization of discontinuities in welded joints:

guidance: In manufacturing inspection and pre-service inspection, phased array technology can be used as a stand-alone technology or in conjunction with other non-destructive testing (NDT) methods:

method or technology:

This document specifies the following 2 testing levels:

---Detection level C, suitable for general situations;

---Detection level D, suitable for special situations/special applications:

This document provides an acceptance assessment of discontinuities based on:

---Height and length;

---Amplitude (equivalent size) and length;

---Judgement of acceptance/non-acceptance:

This document does not include discrete acceptance levels:

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, the dated quotations for undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document:

ISO 5577 Non-destructive testing ultrasonic testing terminology
(Non-destructive testing-Ultrasonic testing-Vocabulary) Note: GB/T 12604.1-2020
Non-destructive testing terminology Ultrasonic testing (ISO 5577:2017, MOD)
tion of NDT personnel) Note: GB/T 9445-2023 Qualification and certification of
non-destructive testing personnel (ISO 9712:2012, IDT) Ultrasonic
testing-Techniques, testing levels, and assessment) Note: GB/T 11345-2023 Ultrasonic testing
technology, testing levels and assessment for non-destructive testing of welds (ISO
17640:2018, IDT) ISO 18563-1 Performance and inspection of phased array ultrasonic
equipment for non-destructive testing Part 1: Instruments (Non-destructive tes-