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

GB/T 42399.1-2023

**Non-destructive testing instruments - Characterization and
verification of ultrasonic phased array equipment - Part 1:
Instruments**

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foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules for Standardization Documents" drafting.

This document is the first part of GB/T 42399 "Performance and Inspection of Phased Array Ultrasonic Equipment for Nondestructive Testing Instruments". GB/T 42399

The following parts have been published.

- Part 1. Instruments;
- Part 2. Probes;
- Part 3. Combined system.

This document is equivalent to ISO 18563-1:2022 "Performance and inspection of phased array ultrasonic equipment for non-destructive testing - Part 1. Instruments

Device".

This document has made the following minimal editorial changes.

--- In order to be consistent with the existing standard series, the name of the standard is changed to "Performance and Inspection of Phased Array Ultrasonic Equipment for Nondestructive Testing Instruments No.

Part 1. Instruments".

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

Like the A-type conventional detector, the phased array ultrasonic is based on the pulse reflection method for detection, and the same flaw quantitative and qualitative methods are used.

bit method. However, the phased array ultrasonic detector is a high-performance digital instrument, which can record the signal of the whole detection process.

The system can generate and display high-quality images projected in different directions,

so its unique measurement calibration and verification methods need to be specified.

Certainly. GB/T 42399 aims to pass the testing methods and acceptance criteria for phased array ultrasonic detectors including instruments, probes and combined systems

Standards are stipulated, so as to unify the technical requirements of products, so that they can be better applied in actual production and testing.

GB/T 42399 "Performance and Inspection of Phased Array Ultrasonic Equipment for Nondestructive Testing Instruments" is divided into the following three parts.

--- Part 1. Instruments. The purpose is to specify the detection frequency of multi-channel phased array ultrasound in the range of 0.5MHz~10MHz

The detection method and acceptance criteria of the main technical performance of the detector.

--- Part 2. Probes. The purpose is to specify the use of contact method or liquid immersion method, the center frequency range is 0.5MHz~10MHz

The detection methods and acceptance criteria for the main technical performance of phased array probes that need to be inspected after fabrication is completed.

--- Part 3. Combined system. The purpose is to specify the use of linear phased array probes, contact (with or without wedge) or water immersion, center

The performance detection method of phased array combination equipment (that is, connected instruments, probes and cables) with a frequency in the range of 0.5MHz~10MHz

laws and acceptance criteria.

The three parts of GB/T 42399 "Performance and Inspection of Phased Array Ultrasonic Equipment for Nondestructive Testing Instruments" are independent of each other, but they echo each other and form a

into a complete set of standards.

Non-destructive testing instrument phased array ultrasonic equipment

Performance and inspection part 1. instruments

1 Scope

This document specifies the performance characteristics of multi-channel phased-array ultrasonic detectors using phased-array probes and methods for their measurement and verification.

Part of the inspection methods in this document are applicable to phased array ultrasonic detectors in automatic inspection systems, but other tests are required as

Supplement to ensure its working performance. When the phased array ultrasonic detector is used in the automatic detection system, relevant parties can modify the specifications of this document according to the agreement

established acceptance criteria.

This document also partially applies to FMC instruments and TFM instruments.

This document applies to phased array ultrasonic detectors with a detection frequency in the range of 0.5MHz to 10.0MHz.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, dated references

For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

this document.

ISO 5577 Non-destructive testing ultrasonic testing vocabulary
(Non-destructivetesting-UltrasonicTesting-Vocabula-
ry)

Note. GB/T 12604.1-2020 Nondestructive Testing Terminology Ultrasonic Testing (ISO 5577:2017, MOD)

ISO 22232-1 Performance and inspection of ultrasonic testing equipment for non-destructive testing - Part 1.Instruments (Non-destructive arrays-Vocabulary)

3 Terms and Definitions

The terms and definitions defined in ISO 5577, ISO 22232-1 and ISO 23243 and the following apply to this document.

3.1

The maximum number of channels that can be used for transmit and/or receive in one trigger.

Note 1.A phased array ultrasonic detector whose maximum number of channels (see 3.1) can be activated simultaneously is equal to the number of instrument channels is represented as a parallel phased array ultrasonic detector.

3.2