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

GB/T 27664.1-2026

Replacing GB/T 27664.1-2011

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

无损检测仪器 超声检测设备的性能与检验 第1部分：仪器

(English Translation)

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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 Part 1 of GB/T 27664, "Performance and Inspection of Ultrasonic Testing Equipment for Nondestructive Testing".

The following sections have been released.

---Part 1: Instruments;

---Part 2: Probe;

---Part 3: Combined Equipment.

This document replaces GB/T 27664.1-2011 "Performance and Inspection of Ultrasonic Testing Equipment for Nondestructive Testing - Part 1: Instruments" and is consistent with...

Compared with GB/T 27664.1-2011, apart from structural adjustments and editorial changes, the main technical changes are as follows.

a) The terms "amplifier frequency response," "amplifier broadband," "emit energy leakage suppression," and "calibrated decibel switch" have been removed.

"Dynamic range", "Frequency response of proportional gate output", "Time baseline shape", "Amplitude linearity", "Monitoring gate", "Monitoring threshold", "Proportional Output noise, proportional output, pulse width, pulse repetition frequency, pulse rise time, pulse back, proportional output rise time.

"Time", "Time-dependent gain", "Narrow pulse", "Suppression" and their definitions (see 3.1-3.4, 3.7, 3.11, 3.15 in the 2011 edition).

(March 16, March 18-25, March 28, March 30-32)

b) The terms "analog output," "transmit crosstalk," and "digital output" and their definitions have been added (see 3.1, 3.2, and 3.4);

c) The term "response time" and its definition have been changed (see 3.14, 3.27 of the 2011 edition);

d) The "General Requirements" have been amended (see Chapter 5, Chapter 5 of the 2011 edition);

e) The "Technical Requirements for Ultrasonic Testing Instruments" have been revised (see Chapter 6, Chapter 6 of the 2011 edition);

f) The performance requirements for ultrasonic testing equipment have been changed (see

Chapter 7, Chapter 7 of the 2011 edition);

g) Modified "Battery Operating Time", "Stability After Warm-up", "Stability Against Relative Voltage Changes", "Time Base Linearity", and "Dynamic Range and Maximum" settings.

"Large input voltage", "highest digitization frequency", "transmit pulse spectrum", "instantaneous resolution", "gate", etc. (see Chapter 8, 2011) Chapter 8 of the edition);

h) An "Acceptance Criteria" for "Physical Condition and Appearance" has been added (see 9.2.2);

i) "Stability" has been removed (see 9.3 in the 2011 version);

j) The detection content of the "Receiver" has been changed (see 9.4, 9.5 in the 2011 version).

This document is equivalent to ISO 22232-1:2020 "Nondestructive testing - Performance and inspection of ultrasonic testing equipment - Part 1: Instruments".

The following minimal editorial changes have been made to this document.

---To align with existing standards, the standard name has been changed to "Performance and Inspection of Ultrasonic Testing Equipment for Nondestructive Testing" (Standard No. 1).

Part. Instruments;

---There is one instance in the main text where the description is inconsistent with the original ENISO 22232-1:2020. This document incorporates the original text...

The following text has been modified according to actual circumstances; see footnote 1 in the main text for details.

---The unit for "V75" in the table of Chapter 4, "Symbols and Definitions," was "V," which was incorrect in the original text and has been corrected in this document;

---The reference to "Vmax" in Table 1 of Chapter 6, which was originally cited in "8.8.4.1", was incorrect and has been corrected in this document.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Testing Machines (SAC/TC122).

Introduction

Conventional ultrasonic testing instruments are typically based on the ultrasonic A-type pulse reflection method and have ultrasonic non-destructive testing functions such as defect quantification and localization.

GB/T 27664.1 "Nondestructive Testing Instruments - Performance and Inspection of Ultrasonic Testing Equipment - Part 1: Instruments" provides specifications for ultrasonic testing instruments.

Electrical performance testing methods and acceptance standards.

GB/T 27664 "Performance and Inspection of Ultrasonic Testing Equipment for Nondestructive Testing" is divided into the following three parts.

---Part 1: Instrumentation. The purpose is to clarify the performance characteristics of the A-type pulse ultrasonic testing instrument, its measurement methods, and acceptance procedures.

standard.

---Part 2: Probes. The purpose is to clarify the performance testing of ultrasonic probes after fabrication, including measurement methods and acceptance procedures.

standard.

---Part 3: Combined Equipment. The purpose is to illustrate the determination of the combination of an ultrasonic testing instrument and an ultrasonic probe using appropriate standard calibration blocks.

Measurement methods and acceptance criteria for working characteristics.

GB/T 27664, "Performance and Inspection of Ultrasonic Testing Equipment for Nondestructive Testing," consists of three independent parts that also complement each other, forming a comprehensive standard.

A complete standard system describes the measurement and verification methods for the performance of A-pulse ultrasonic testing instruments, probes, and combined systems.

Performance of non-destructive testing instruments and ultrasonic testing equipment
Inspection and Testing Part 1: Instruments

1 Scope

This document specifies the testing method for the electrical performance of Type A pulse digital ultrasonic testing instruments operating in the frequency range of 0.5MHz to 15MHz.

The methods and acceptance criteria are applicable to manual ultrasonic non-destructive