

# ISO 22232-1:2020 (E)

## Non-destructive testing — Characterization and verification of ultrasonic test equipment — Part 1: Instruments

---

### Contents

	Foreword
1	Scope
2	Normative references
3	Terms and definitions
4	Symbols
5	General requirements of conformity
6	Manufacturer's technical specification for ultrasonic instruments
7	Performance requirements for ultrasonic instruments
8	Group 1 tests
8.1	Equipment required for group 1 tests
8.2	Battery operational time
8.2.1	Procedure
8.2.2	Acceptance criterion
8.3	Stability after warm-up time
8.3.1	Procedure
8.3.2	Acceptance criteria
8.4	Stability against temperature
8.4.1	Procedure
8.4.2	Acceptance criterion
8.5	Stability against voltage variation
8.5.1	Procedure
8.5.2	Acceptance criterion
8.6	Time base deviation
8.6.1	Procedure
8.6.2	Acceptance criterion
8.7	Transmitter pulse parameters
8.7.1	General
8.7.2	Pulse repetition frequency
8.7.2.1	Procedure
8.7.2.2	Acceptance criterion
8.7.3	Effective output impedance
8.7.3.1	Procedure
8.7.3.2	Acceptance criterion
8.8	Receiver
8.8.1	General
8.8.2	Cross talk from transmitter to receiver during transmission
8.8.2.1	Procedure
8.8.2.2	Acceptance criterion
8.8.3	Dead time after transmitter pulse
8.8.3.1	Procedure
8.8.3.2	Acceptance criterion
8.8.4	Dynamic range and maximum input voltage
8.8.4.1	Procedure
8.8.4.2	Acceptance criteria
8.8.5	Receiver input impedance

- 8.8.5.1 Procedure
- 8.8.5.2 Acceptance criterion
- 8.8.6 Time-corrected gain (TCG)
- 8.8.6.1 Procedure
- 8.8.6.2 Acceptance criterion
- 8.9 Gates
- 8.9.1 General
- 8.9.2 Gates with value output
  - 8.9.2.1 Linearity of the amplitude in the gate
    - 8.9.2.1.1 Procedure
    - 8.9.2.1.2 Acceptance criterion
  - 8.9.2.2 Linearity of time of flight in the gate
    - 8.9.2.2.1 Procedure
    - 8.9.2.2.2 Acceptance criterion
- 8.9.3 Gates with analogue output
  - 8.9.3.1 Impedance of analogue output
    - 8.9.3.1.1 Procedure
    - 8.9.3.1.2 Acceptance criterion
  - 8.9.3.2 Linearity of analogue output
    - 8.9.3.2.1 Procedure
    - 8.9.3.2.2 Acceptance criterion
  - 8.9.3.3 Influence of the signal position within the gate
    - 8.9.3.3.1 Procedure
    - 8.9.3.3.2 Acceptance criterion
- 8.9.3.4 Rise time, fall time, delay time and hold time of analogue output
  - 8.9.3.4.1 Procedure
  - 8.9.3.4.2 Acceptance criterion
- 8.9.4 Gates with alarm output
  - 8.9.4.1 General
  - 8.9.4.2 Response threshold and switching hysteresis
    - 8.9.4.2.1 Procedure
    - 8.9.4.2.2 Acceptance criteria
  - 8.9.4.3 Delay time and hold time of the gate alarm
    - 8.9.4.3.1 Procedure
    - 8.9.4.3.2 Acceptance criteria
- 8.10 Highest digitized frequency
  - 8.10.1 Procedure
    - 8.10.1.1 General
    - 8.10.1.2 Method A
    - 8.10.1.3 Method B
  - 8.10.2 Acceptance criterion
- 8.11 Response time of digital ultrasonic instruments
  - 8.11.1 General
  - 8.11.2 Procedure
  - 8.11.3 Acceptance criterion

**9 Group 2 tests**

- 9.1 Equipment required for group 2 tests
- 9.2 Physical state and external aspects
  - 9.2.1 Procedure
  - 9.2.2 Acceptance criterion
- 9.3 Transmitter voltage, pulse rise time and duration
  - 9.3.1 Procedure
  - 9.3.2 Acceptance criteria
- 9.4 Receiver
  - 9.4.1 General
  - 9.4.2 Frequency response
    - 9.4.2.1 Procedure
    - 9.4.2.2 Acceptance criteria
  - 9.4.3 Noise level
    - 9.4.3.1 Procedure
    - 9.4.3.2 Method A
    - 9.4.3.3 Method B
    - 9.4.3.4 Acceptance criterion

- 9.4.4**      **Gain linearity**
- 9.4.4.1**    **Procedure**
- 9.4.4.2**    **Acceptance criteria**
- 9.4.5**      **Vertical display linearity**
- 9.4.5.1**    **Procedure**
- 9.4.5.2**    **Acceptance criteria**

**Annex A (normative) Special conditions for ultrasonic instruments with logarithmic amplifiers**

- A.1**        **General**
- A.2**        **Basic requirements**
- A.2.1**      **Measuring accuracy**
- A.2.2**      **Vertical linearity**
- A.2.3**      **Tests**

**Page count: 40**