SLOVENSKI STANDARD
oSIST prEN ISO 5577:2024

01-november-2024

Neporušitvene preiskave - Preskušanje z ultrazvokom - Slovar (ISO/DIS 5577:2024)

Non-destructive testing - Ultrasonic testing - Vocabulary (ISO/DIS 5577:2024)

Zerstörungsfreie Prüfung - Ultraschallprüfung - Begriffe (ISO/DIS 5577:2024)

Essais non destructifs - Contrôle par ultrasons - Vocabulaire (ISO/DIS 5577:2024)

Ta slovenski standard je istoveten z: **prEN ISO 5577**

ICS:

01.040.19	Preskušanje (Slovarji)	Testing (Vocabularies)
19.100	Neporušitveno preskušanje	Non-destructive testing

oSIST prEN ISO 5577:2024 **en,fr,de**

DRAFT International Standard

ISO/DIS 5577

Non-destructive testing — Ultrasonic testing — Vocabulary

Essais non destructifs — Contrôle par ultrasons — Vocabulaire

ICS: 19.100; 01.040.19

ISO/TC **135**/SC **3**

Secretariat: **DIN**

Voting begins on:
2024-09-05

Voting terminates on:
2024-11-28

This document is circulated as received from the committee secretariat.

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/DIS 5577:2024(en)

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Published in Switzerland

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Foreword

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC *135*, *Non-destructive testing*, Subcommittee SC 3, *Ultrasonic testing*.

This third edition cancels and replaces the second edition (ISO 5577:2017), which has been technically revised.

The main changes are as follows:

— terms pulse overshoot, main lobe, main beam, side lobe, diffraction, contact surface, echo amplitude, signal amplitude, full screen height were added,

— the term plate wave was replaced by Lamb wave,

— some definitions were modified.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Non-destructive testing — Ultrasonic testing — Vocabulary

1 Scope

This document defines the terms used in ultrasonic non-destructive testing and forms a common basis for standards and general use.

This document does not cover specific terms used in ultrasonic testing with arrays.

NOTE Terms used in ultrasonic testing with arrays are defined in ISO 23243.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in Clauses 4, 5, 6 and 7 for sound, test equipment and ultrasonic testing apply apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Terms and definitions related to frequencies, waves and pulses

4.1 Frequencies

4.1.1
frequency
number of cycles per second

Note 1 to entry: Expressed in Hertz (Hz).

4.1.2
nominal frequency
probe frequency
frequency (4.1.1) of the *probe* (6.2.1) as stated by the manufacturer

4.1.3
test frequency
effective ultrasonic frequency of a system used to test a material or object

4.1.4
frequency spectrum
distribution of *amplitude* (4.2.2) in relation to *frequency* (4.1.1)

Note 1 to entry: See Figure 1.

4.1.5
centre frequency
arithmetic mean of the upper and lower cut-off frequencies

Note 1 to entry: See Figure 1.

4.1.6
peak frequency
frequency (4.1.1) at which the maximum amplitude is observed

Note 1 to entry: See Figure 1.

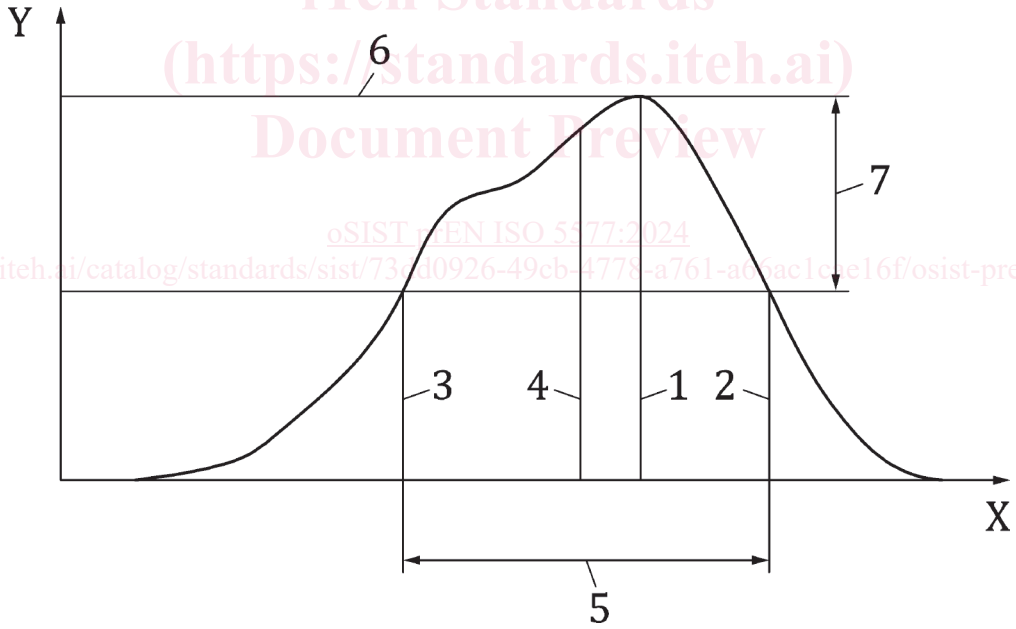
4.1.7
cut-off frequency
frequency (4.1.1) at which the *amplitude* (4.2.2) of the transmitted signal has dropped by a specified amount from the amplitude at *peak frequency* (4.1.6), for example, by 3 dB

Note 1 to entry: See Figure 1.

4.1.8
bandwidth
width of the *frequency spectrum* (4.1.4) between the upper and lower cut-off frequency

Note 1 to entry: See Figure 1.

4.1.9
relative bandwidth
ratio of the *bandwidth* (4.1.8) to the *centre frequency* (4.1.5), in per cent



Key

X	frequency	4	centre frequency
Y	amplitude	5	bandwidth at specified amplitude drop
1	peak frequency	6	peak amplitude
2	upper cut-off frequency	7	specified amplitude drop
3	lower cut-off frequency		

Figure 1 — Frequency spectrum and related terms

4.2 Waves and pulses

4.2.1
ultrasonic wave
any acoustic wave having a *frequency* (4.1.1) higher than the audible range of the human ear, generally taken as higher than 20 kHz

4.2.2
amplitude
absolute or relative measure of a sound wave's momentary magnitude

Note 1 to entry: The amplitude is not necessarily the maximum value, see *echo amplitude* (7.5.6).

4.2.3
phase
momentary condition of a vibration expressed as an arc measurement or an angle

4.2.4
wavelength
distance along the propagating direction between consecutive corresponding points of the same *phase* (4.2.3)

Note 1 to entry: See Figure 2.

4.2.5
wavefront
continuous surface joining all the most forward points of an *ultrasonic wave* (4.2.1) that have the same *phase* (4.2.3)

4.2.6
time of flight
TOF
time it takes an ultrasonic pulse to travel from the transmitter probe through the *test object* (7.2.2) to the receiver probe

4.2.7
pulse
electrical or ultrasonic signal of short duration

4.2.8
pulse amplitude
maximum amplitude of a *pulse* (4.2.7) (peak-to-peak)

Note 1 to entry: For rectified pulses (A-scan), baseline-to-peak.

4.2.9
pulse rise time
time taken for a *pulse amplitude* to change from a specified lower level to a specified upper level

4.2.10
pulse duration
time interval between the leading and trailing edges of a *pulse* (4.2.7) measured at a specified level below the peak amplitude

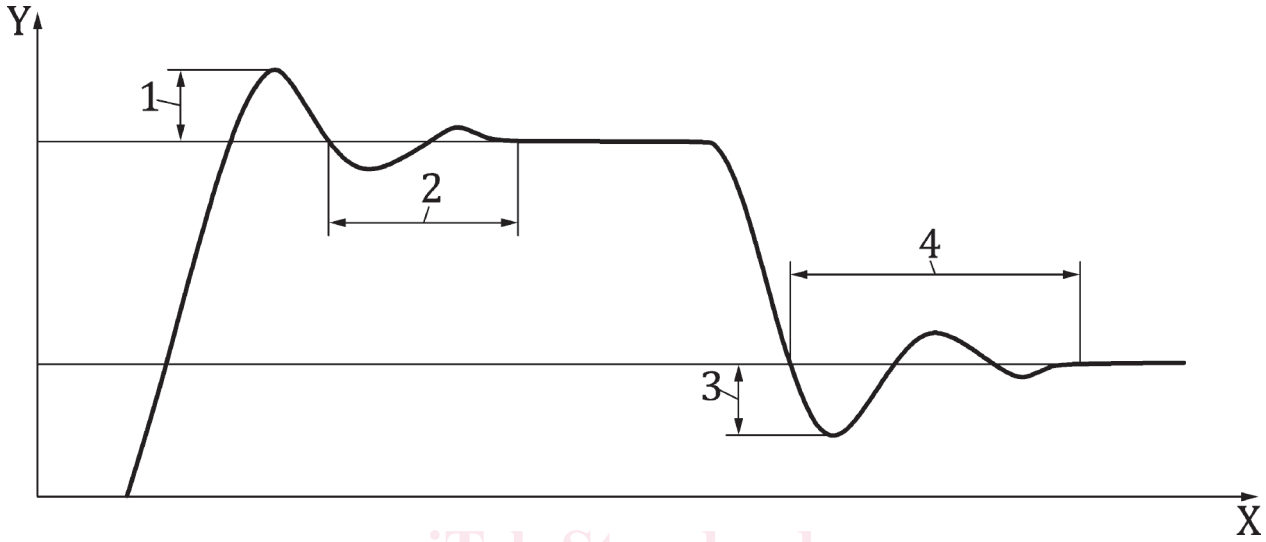
4.2.11
pulse shape
diagramatic representation of the *amplitude* (4.2.2) of a *pulse* (4.2.7) as a function of time

4.2.12
pulse envelope
contour of a *pulse shape* (4.2.11) including all the peaks in terms of *amplitude* (4.2.2) and time

4.2.13
pulse energy
total energy within a *pulse* (4.2.7)

4.2.14
pulse overshoot
undesirable voltage peak at the rising or falling edge of a *pulse* (4.2.7)

Note 1 to entry: See Figure 2.



Key

X time
Y amplitude
1 pulse overshoot at raising edge
2 pulse reverberation at raising edge
3 pulse overshoot at falling edge
4 pulse reverberation at falling edge

Figure 2 — Pulse overshoot and pulse reverberation

4.2.15
pulse reverberation
vibration time after the rising or the falling edge of a *pulse* (4.2.7)

Note 1 to entry: See Figure 2.

4.2.16
broad-band pulse
pulse (4.2.7) in which the *relative bandwidth* (4.1.9) is ≥65 %

4.2.17
medium-band pulse
pulse (4.2.7) in which the *relative bandwidth* (4.1.9) is >35 % and <65 %

4.2.18
narrow-band pulse
pulse (4.2.7) in which the *relative bandwidth* (4.1.9) is ≤35 %

4.2.19
pulse repetition frequency
PRF
number of *transmitter pulses* (6.1.3) generated per second, expressed in Hertz (Hz)

4.3 Types of ultrasonic waves

4.3.1
longitudinal wave
compression wave
wave in which the direction of displacement of particles is in the same direction as the propagation of the wave

Note 1 to entry: See Figure 3 a).

4.3.2
transverse wave
shear wave
wave in which the direction of displacement of particles is perpendicular to the direction of the propagation of the wave

Note 1 to entry: See Figure 3 b).

4.3.3
Rayleigh wave
surface wave
wave which propagates on the surface of a test object with an effective penetration depth of less than one *wavelength* (4.2.4)

4.3.4
creeping wave
wave generated around the first critical angle of incidence and propagating along the surface like a longitudinal wave with a slightly lower velocity than the longitudinal wave, interacting with the surface and partially transforming into a transverse wave going into the volume of the test object

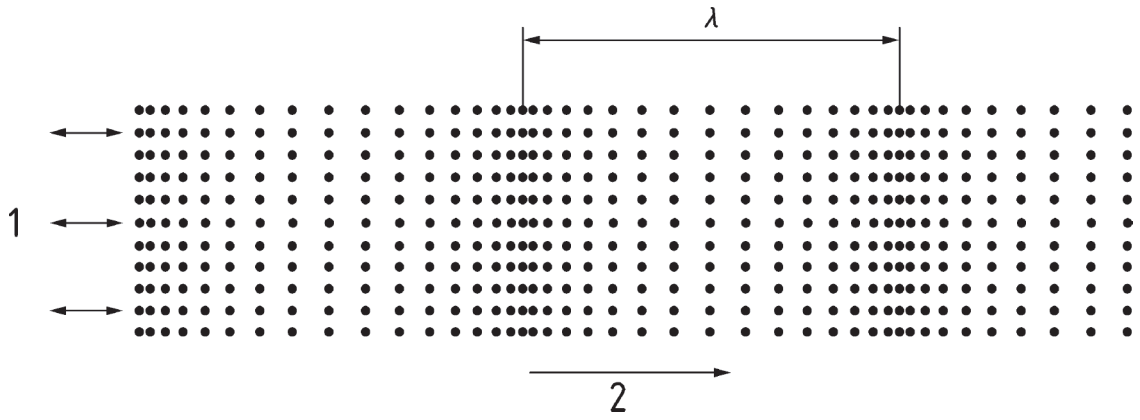
Note 1 to entry: It is neither influenced by the test object's surface conditions, nor does the wave follow undulations on the surface.

4.3.5
Lamb wave
wave which propagates within the whole thickness of a plate and which can only be generated at particular values of angle of incidence, *frequency* (4.1.1) and plate thickness

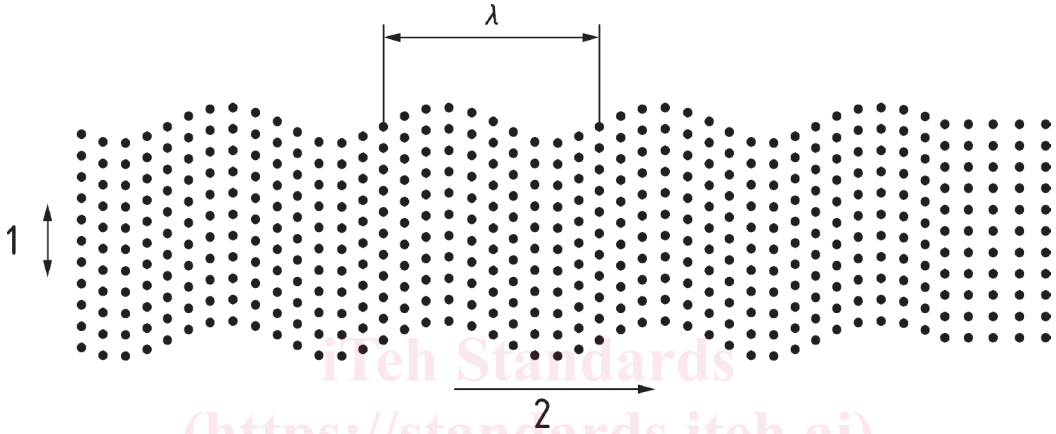
4.3.6
plane wave
wave with a planar wave front

4.3.7
cylindrical wave
wave with a cylindrical wave front

4.3.8
spherical wave
wave with a spherical wave front



a) Longitudinal wave; compression wave



b) Transverse wave; shear wave

Key

1 direction of oscillation
2 direction of propagation
λ wavelength

Figure 3 — Types of waves

5 Terms related to sound

5.1 Sound generation and reception

5.1.1
transducer
active element of a *probe* (6.2.1) which converts electrical energy into sound energy and vice versa

5.1.2
piezoelectric transducer
transducer (5.1.1) made from piezoelectric material

Note 1 to entry: Because the first piezoelectric transducers were cut from a quartz crystal, up to now transducers often misleadingly are called crystals.

5.1.3
composite transducer
plate consisting of piezoelectric ceramic rods embedded in a polymer matrix