



**SLOVENSKI STANDARD**  
**oSIST prEN ISO 18563-1:2013**  
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**Neporušitveno preskušanje - Ugotavljanje značilnosti in preverjanje ultrazvočne opreme faznih sistemov - 1. del: Naprave (ISO/DIS 18563-1:2013)**

Non-destructive testing - Characterization and verification of ultrasonic phased array systems - Part 1: Instruments (ISO/DIS 18563-1:2013)

Zerstörungsfreie Prüfung - Charakterisierung und Verifizierung der Ultraschall-Prüfausrüstung mit phasengesteuerten Arrays - Teil 1: Prüfgeräte (ISO/DIS 18563-1:2013)

Essais non destructifs - Caractérisation et vérification de l'appareillage de contrôle multi-élément par ultrasons - Partie 1 : Instruments (ISO/DIS 18563-1:2013)

**Ta slovenski standard je istoveten z: prEN ISO 18563-1**

**ICS:**

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**Non-destructive testing - Characterization and verification of  
ultrasonic phased array systems - Part 1: Instruments (ISO/DIS  
18563-1:2013)**

Essais non destructifs - Caractérisation et vérification de  
l'appareillage de contrôle multi-élément par ultrasons -  
Partie 1 : Instruments (ISO/DIS 18563-1:2013)

Zerstörungsfreie Prüfung - Charakterisierung und  
Verifizierung der Ultraschall-Prüfausrüstung mit  
phasengesteuerten Arrays - Teil 1: Prüfgeräte (ISO/DIS  
18563-1:2013)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 138.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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## Foreword

This document (prEN ISO 18563-1:2013) has been prepared by Technical Committee CEN/TC 138 "Non-destructive testing", the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 135 "Non-destructive testing".

This document is currently submitted to the parallel Enquiry.

### Endorsement notice

The text of ISO/DIS 18563-1:2013 has been approved by CEN as prEN ISO 18563-1:2013 without any modification.

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## DRAFT INTERNATIONAL STANDARD ISO/DIS 18563-1

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## Non-destructive testing — Characterization and verification of ultrasonic phased array equipment —

### Part 1: Instruments

*Essais non destructifs — Caractérisation et vérification de l'appareillage de contrôle multi-élément par ultrasons —*

*Partie 1: Instruments*

ICS 19.100

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#### ISO/CEN PARALLEL PROCESSING

This draft has been developed within the European Committee for Standardization (CEN), and processed under the **CEN-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

**To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.**

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18563-1 was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 3, and by Technical Committee CEN/TC 138, *Non-destructive testing* in collaboration.

ISO 18563 consists of the following parts, under the general title *Non-destructive testing — Characterization and verification of ultrasonic phased array equipment*:

- *Part 1: Instruments*
- *Part 2: Probes*
- *Part 3: Combined system*

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

## 1 Scope

This part of the standard identifies the functional characteristics of a multichannel ultrasonic phased array instrument, used for phased array probes, and provides methods for their measurement and verification.

This standard may partly be applicable to ultrasonic phased array instruments in automated systems but then other tests may be needed to ensure satisfactory performance. When the phased array instrument is a part of an automated system, the acceptance criteria may be modified by agreement between the parties involved.

The document gives the extent of the verification and defines acceptance criteria within a frequency range 0,5 MHz to 10 MHz.

The evaluation of these characteristics permits a well-defined description of the ultrasonic phased array instrument and comparability of instruments.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1330-4, *Non-destructive testing - Terminology Part 4: Terms used in ultrasonic testing*

EN 16018, *Non-destructive testing - Terminology - Terms used in ultrasonic testing with phased arrays*

EN ISO 2400, *Non-destructive testing - Ultrasonic examination - Specification for calibration block No. 1*

EN 12668-1, *Non-destructive testing - Characterization and verification of ultrasonic examination equipment - Part 1: Instruments*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1330-4, EN 12668-1, EN 16018 and the following apply.

### 3.1

**maximum number of channels that can be simultaneously activated**

maximum number of transmitting and/or receiving channels which can be used for one shot

### 3.2

**parallel phased array instrument**

phased array instrument featuring a “maximum number of channels that can be simultaneously activated” equal to the number of channels in the instrument

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Example : In a type 64/64 (or 64//), the number of channels that can be simultaneously activated is 64 and the number of channels of the instrument is 64.

**3.3 multiplexed phased array instrument**  
phased array instrument featuring a “maximum number of channels that can be simultaneously activated” smaller than the number of channels in the instrument and which are controlled by an internal multiplexing device

Example: In a type 16/64 multiplexed instrument, the number of channels that can be simultaneously activated is 16 and the number of channels available is 64, see Figure 1.

**3.4 time resolution of the phased array instrument**  
the inverse of the maximum digitisation frequency without processing

## 4 Symbols and abbreviated terms

**Table 1 – Symbols and abbreviations**

Symbol	Unit	Meaning
$A_{\min}$	%	Minimum amplitudes measured on a screen
$A_{\max}$	%	Maximum amplitudes measured on a screen
$A_0, A_n$	dB	Attenuator settings used during tests
$CT$	dB	<i>Cross-talk</i>
$f_0$	Hz	Centre frequency for each frequency range
$f_u$	Hz	Upper frequency limit at -3 dB
$f_l$	Hz	Lower frequency limit at -3 dB
$f_{\max}$	Hz	Frequency with the maximum amplitude in the frequency spectrum
$f_h$	Hz	Highest digitised frequency
$\Delta f$	Hz	Frequency bandwidth in each frequency range
FSH	%	Full screen height
$G_D$	dB	Dynamic range
$\Delta G$	dB	Channel gain variation
$G_i$	dB	Instrument gain on channel $i$
$I_{\max}$	A	Amplitude of the maximum current that can be driven by the proportional gate output
$H_R$	%	Reference screen height
$N_{\text{in}}$	$\sqrt{\text{V/Hz}}$	Noise per root bandwidth for receiver input
$R_A, R_B, R_I$	$\Omega$	Termination resistors
$S$	dB	Attenuator setting
$SRR$	Hz	Screen refresh rate
$\Delta t$	s	Time increment