



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 22825:2017

# Non-destructive testing of welds - Ultrasonic testing - Testing of welds in austenitic steels and nickel-based alloys (ISO 22825:2017)

## I.S. EN ISO 22825:2017

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## National Foreword

I.S. EN ISO 22825:2017 is the adopted Irish version of the European Document EN ISO 22825:2017, Non-destructive testing of welds - Ultrasonic testing - Testing of welds in austenitic steels and nickel-based alloys (ISO 22825:2017)

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EUROPEAN STANDARD

EN ISO 22825

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2017

ICS 25.160.40

Supersedes EN ISO 22825:2012

English Version

Non-destructive testing of welds - Ultrasonic testing -  
Testing of welds in austenitic steels and nickel-based  
alloys (ISO 22825:2017)

Essais non destructif des assemblages soudés -  
Contrôle par ultrasons - Contrôle des soudures en  
aciers austénitiques et en alliages à base nickel (ISO  
22825:2017)

Zerstörungsfreie Prüfung von Schweißverbindungen -  
Ultraschallprüfung - Prüfung von  
Schweißverbindungen in austenitischen Stählen und  
Nickellegierungen (ISO 22825:2017)

This European Standard was approved by CEN on 26 August 2017.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

**EN ISO 22825:2017 (E)**

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## **European foreword**

This document (EN ISO 22825:2017) has been prepared by Technical Committee ISO/TC 44 “Welding and allied processes” in collaboration with Technical Committee CEN/TC 121 “Welding and allied processes” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2018 and conflicting national standards shall be withdrawn at the latest by May 2018.

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

This document supersedes EN ISO 22825:2012.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### **Endorsement notice**

The text of ISO 22825:2017 has been approved by CEN as EN ISO 22825:2017 without any modification.

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# INTERNATIONAL STANDARD

**ISO**  
**22825**

Third edition  
2017-09

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## **Non-destructive testing of welds — Ultrasonic testing — Testing of welds in austenitic steels and nickel-based alloys**

*Essais non destructifs des assemblages soudés — Contrôle par  
ultrasons — Contrôle des soudures en aciers austénitiques et en  
alliages à base nickel*



Reference number  
ISO 22825:2017(E)

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**ISO 22825:2017(E)**



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## ISO 22825:2017(E)

### 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 5, *Testing and inspection of welds*.

This third edition cancels and replaces the second edition (ISO 22825:2012), which has been technically revised.

The main changes compared to the previous edition are as follows:

- correction of an incorrect equation;
- update of the normative references and the bibliography;
- editorial modifications in the whole document;
- inclusion of the phased array technique.

Requests for official interpretations of any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 5 via your national standards body. A complete listing of these bodies can be found at [www.iso.org](http://www.iso.org).

## Introduction

Welds in austenitic steel components and dissimilar metal welds are widely regarded as very difficult to test by ultrasound. The problems are mainly associated with unfavourable structure and grain size, as well as with different material properties which result in inhomogeneous and anisotropic mechanical and acoustic properties that contrast with the relatively homogeneous and isotropic behaviour in low-alloy steel welds.

Austenitic weld metal and other coarse-grained, anisotropic materials can significantly affect the propagation of ultrasound. In addition, beam distortion, unexpected reflections and wave mode conversions on the fusion line and/or columnar grains can occur. Therefore it can be difficult and sometimes impossible for ultrasonic waves to penetrate the weld metal.

Ultrasonic testing of these metals may require techniques that differ from conventional testing techniques. These special techniques often include the use of dual-element probes designed for refracted compression (longitudinal) waves or creeping waves rather than for conventional shear (transverse) waves.

In addition, it is necessary to produce representative reference blocks with welds in order to develop a testing procedure, set a preliminary sensitivity level, assess the procedure and demonstrate effectiveness before a definitive procedure is written. Material, weld preparation and welding procedure, as well as the geometry and surface condition of reference blocks are the same as for the component being tested.



# Non-destructive testing of welds — Ultrasonic testing — Testing of welds in austenitic steels and nickel-based alloys

## 1 Scope

This document specifies the approach to be followed when developing procedures for the ultrasonic testing of the following welds:

- welds in stainless steels;
- welds in nickel-based alloys;
- welds in duplex steels;
- dissimilar metal welds;
- austenitic welds.

The purposes of the testing can be very different, for example:

- for the assessment of quality level (manufacturing);
- for the detection of specific discontinuities induced in service.

Acceptance levels are not included in this document, but can be applied in accordance with the scope of the testing (see [4.1](#)).

The requirements of this document are applicable to both manual and mechanized testing.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 5577, *Non-destructive testing — Ultrasonic testing — Vocabulary*

ISO 7963, *Non-destructive testing — Ultrasonic testing — Specification for calibration block No. 2*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

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

EN 12668-2, *Non-destructive testing — Characterization and verification of ultrasonic examination equipment — Part 2: Probes*

EN 12668-3, *Non-destructive testing — Characterization and verification of ultrasonic examination equipment — Part 3: Combined equipment*

ISO 17635, *Non-destructive testing of welds — General rules for metallic materials*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5577, ISO 17635 and the following apply.

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