SVENSK STANDARD
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Oförstörande provning av svetsar – Induktiv provning av svetsar med utvärdering av komplexa plan (ISO 17643:2015)

Non-destructive testing of welds – Eddy current examination of welds by complex plane analysis (ISO 17643:2015)

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Europastandarden EN ISO 17643:2015 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 17643:2015.

Denna standard ersätter SS-EN 1711, utgåva 1 och SS-EN 1711/A1:2004, utgåva 1.

The European Standard EN ISO 17643:2015 has the status of a Swedish Standard. This document contains the official English version of EN ISO 17643:2015.

This standard supersedes the Swedish Standard SS-EN 1711, edition 1 and SS-EN 1711/A1:2004, edition 1.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Oförstörande provning, SIS/TK 125.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 17643

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Supersedes EN 1711:2000

English Version

Non-destructive testing of welds - Eddy current examination of welds by complex plane analysis (ISO 17643:2015)

Contrôle non destructif des assemblages soudés - Contrôle par courants de Foucault des assemblages soudés par analyse des signaux dans le plan complexe (ISO 17643:2015)

Zerstörungsfreie Prüfung von Schweißverbindungen - Wirbelstromprüfung von Schweißverbindungen durch Vektorauswertung (ISO 17643:2015)

This European Standard was approved by CEN on 20 June 2015.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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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European foreword

This document (EN ISO 17643:2015) has been prepared by ISO/TC 44 “Welding and allied processes“ in collaboration with Technical Committee CEN/TC 121 “Welding” 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 March 2016, and conflicting national standards shall be withdrawn at the latest by March 2016.

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

This document supersedes EN 1711:2000.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 17643:2015 has been approved by CEN as EN ISO 17643:2015 without any modification.

Non-destructive testing of welds — Eddy current testing of welds by complex-plane analysis

1 Scope

This International Standard defines eddy current testing techniques for detection of surface breaking and near surface planar discontinuities, mainly in ferritic materials (weld material, heat-affected zones, base material).

Eddy current testing can also be specified for use with non-ferritic materials, for example in an application standard.

The techniques can be applied to coated and uncoated objects during fabrication and in service, both onshore and offshore.

Eddy current testing can be carried out on all accessible surfaces and on welds of almost any configuration.

Unless otherwise specified at specific items in this International Standard, the general principles of ISO 15549 apply.

NOTE Eddy current testing is usually performed in the as-welded condition. However, the accuracy of the results can be affected by very rough surface finishes.

2 Normative references

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

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

ISO 12718, *Non-destructive testing — Eddy current testing — Vocabulary*

ISO 15548-1, *Non-destructive testing — Equipment for eddy current examination — Part 1: Instrument characteristics and verification*

ISO 15548-2, *Non-destructive testing — Equipment for eddy current examination — Part 2: Probe characteristics and verification*

ISO 15548-3, *Non-destructive testing — Equipment for eddy current examination — Part 3: System characteristics and verification*

ISO 15549, *Non-destructive testing — Eddy current testing — General principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12718 apply.

4 Personnel qualification

Non-destructive testing shall be performed by qualified and capable personnel. It is recommended that personnel are qualified in accordance with ISO 9712 or an equivalent standard at an appropriate level in the relevant industry sector.

5 Written procedures

If a written procedure is required, it should be prepared in accordance with ISO 15549. Otherwise, the procedures detailed in this International Standard shall be followed.

6 General applications

6.1 Essential variables

Prior to eddy current testing, the following essential items shall be specified in accordance with ISO 15549:

— certification of testing personnel;

— testing plan;

— testing equipment;

— calibration of the equipment;

— calibration blocks;

— acceptance criteria;

— recording of indications;

— reporting format;

— actions necessary for non-acceptable indications.

6.2 Additional information

Prior to eddy current testing, the following information should be specified. Further information may be necessary for determination of the nature of the discontinuities and the composition or grade of the base material:

— type of filler metal;

— location and extent of welds to be tested;

— weld surface geometry;

— surface conditions;

— coating type and thickness.

6.3 Surface conditions

Eddy current testing can be used to detect surface cracks through non-metallic coatings up to a thickness of 2 mm. For coating thicknesses greater than 2 mm, the sensitivity of the test method shall be demonstrated in advance before eddy current testing is used.

NOTE 1 Eddy current testing is dependent on close contact between the probe and the test surface. For effective eddy current testing of welds, it should be noted that local adverse weld form, excessive weld spatter, scale, rust and loose paint can influence sensitivity by separating the probe from the test object and by inducing noisy responses.

NOTE 2 It should be noted that some types of conductive coating, such as thermally sprayed aluminium and lead, can seriously influence the results as they can deposit electrically conductive metallic material in cracks open to the surface. Cracks covered with such a metallic deposit are not always indicated by this method.

6.4 Equipment

6.4.1 Instrumentation (excluding probe)

6.4.1.1 General

The instrument used for eddy current testing in accordance with this International Standard shall be capable of analysis and display in the complex plane. The amplitude and phase of eddy current signals shall be measurable.

6.4.1.2 Frequency

The eddy current instrumentation shall be able to operate at a selected frequency within the range 1 kHz to 1 MHz.

6.4.1.3 Signal display

The display shall include the facility to freeze eddy current signals on screen until reset by the operator. The trace shall be clearly visible under all lighting conditions expected during testing.

6.4.1.4 Phase control

The phase control shall be able to give complete rotation of displayed signals (360 °) in steps of no more than 10 ° each.

6.4.2 Surface probes

6.4.2.1 Probes for measuring coating thickness and material evaluation relative to calibration block

The probe shall operate in the absolute mode at a selected frequency in the range from 1 kHz to 1 MHz. All the probes shall be clearly marked with their operating frequency range.

6.4.2.2 Probes for testing of welds

For testing of ferritic welds, probes specially designed for this purpose shall be used.

The coils assembly shall be orthogonal, tangential or equivalent.

The electrical connection shall enable differential measurements which are characterized by having a minimal dependency on continuous or small variations in conductivity, permeability and lift-off in the welded and heat-affected zones.

The diameter of the probe shall be selected relative to the geometry of the component under test. Such probes shall be able to operate when covered by a thin layer of non-metallic wear-resistant material over the active face. If the probe is used with a cover, then the cover shall always be in place during calibration. The probe shall operate at a selected frequency in the range from 100 kHz to 1 MHz

6.4.3 Accessories

6.4.3.1 Calibration block

A calibration block, of the same type of material as the component to be examined, shall be used. It shall have EDM (electric discharge machined) notches of 0,5 mm, 1,0 mm, and 2,0 mm depth, unless otherwise specified, for example in an application standard. The tolerance on the notch depth shall be ± 0,1 mm. The recommended width of the notches is ≤ 0,2 mm. An example of a calibration block is shown in Figure 1.