

SVENSK STANDARD

SS-EN ISO 17638:2016

Fastställt/Approved: 2016-11-22
Publicerad/Published: 2016-11-28
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 25.160.40

Oförstörande provning av svetsar – Magnetpulverprovning (ISO 17638:2016)

Non-destructive testing of welds – Magnetic particle testing (ISO 17638:2016)



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Denna standard ersätter SS-EN ISO 17638:2009, utgåva 1.

The European Standard EN ISO 17638:2016 has the status of a Swedish Standard. This document contains the official English version of EN ISO 17638:2016.

This standard supersedes the Swedish Standard SS-EN ISO 17638:2009, edition 1.

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

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EUROPEAN STANDARD

EN ISO 17638

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2016

ICS 25.160.40

Supersedes EN ISO 17638:2009

English Version

Non-destructive testing of welds - Magnetic particle testing (ISO 17638:2016)

Contrôle non destructif des assemblages soudés -
Magnétoscopie (ISO 17638:2016)

Zerstörungsfreie Prüfung von Schweißverbindungen -
Magnetpulverprüfung (ISO 17638:2016)

This European Standard was approved by CEN on 2 October 2016.

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 17638:2016) 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 2017, and conflicting national standards shall be withdrawn at the latest by May 2017.

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.

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Endorsement notice

The text of ISO 17638:2016 has been approved by CEN as EN ISO 17638:2016 without any modification.

Non-destructive testing of welds — Magnetic particle testing

1 Scope

This document specifies techniques for detection of surface imperfections in welds in ferromagnetic materials, including the heat affected zones, by means of magnetic particle testing. The techniques are suitable for most welding processes and joint configurations. Variations in the basic techniques that will provide a higher or lower test sensitivity are described in [Annex A](#).

This document does not specify acceptance levels of the indications. Further information on acceptance levels for indications may be found in ISO 23278 or in product or application standards.

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 3059, *Non-destructive testing — Penetrant testing and magnetic particle testing — Viewing conditions*

ISO 9934-1:2015, *Non-destructive testing — Magnetic particle testing — Part 1: General principles*

ISO 9934-2, *Non-destructive testing — Magnetic particle testing — Part 2: Detection media*

ISO 9934-3, *Non-destructive testing — Magnetic particle testing — Part 3: Equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12707 and ISO 17635 apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Safety precautions

Special consideration shall be given to toxic, inflammable and/or volatile materials, electrical safety and unfiltered UV radiation.

Magnetic particle testing often creates high magnetic fields close to the object under test and the magnetising equipment. Items sensitive to these fields should be excluded from such areas.

5 General

5.1 Information required prior to testing

Prior to testing, the following items shall be specified (where applicable):

- a) specific test procedure;
- b) certification requirements for NDT personnel;

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- c) extent of coverage;
- d) state of manufacture;
- e) testing techniques to be used;
- f) overall performance test;
- g) any demagnetization;
- h) acceptance level;
- i) action necessary for unacceptable indications.

5.2 Additional pre-test information

Prior to testing, the following additional information can also be required:

- a) type and designation of the parent and weld materials;
- b) welding process;
- c) location and extent of welds to be tested;
- d) joint preparation and dimensions;
- e) location and extent of any repairs;
- f) post-weld treatment (if any);
- g) surface conditions.

Operators may ask for further information that could be helpful in determining the nature of any indications detected.

5.3 Personnel qualification

Magnetic particle testing of welds and the evaluation of results for final acceptance shall be performed by qualified and capable personnel. It is recommended that personnel be qualified in accordance with ISO 9712 or an equivalent standard at an appropriate level in the relevant industry sector.

5.4 Surface conditions and preparation

Areas to be tested shall be dry unless appropriate products for wet surfaces are used. It may be necessary to improve the surface condition, e.g. by use of abrasive paper or local grinding to permit accurate interpretation of indications.

Any cleaning or surface preparation shall not be detrimental to the material, the surface finish or the magnetic testing media. Detection media shall be used within the temperature range limitations set by the manufacturer.

5.5 Magnetizing**5.5.1 Magnetizing equipment**

General magnetization requirements shall be in accordance with ISO 9934-1:2015, Clause 8.

Unless otherwise specified, for example, in an application standard, the following types of alternating current-magnetizing equipment shall be used:

- a) electromagnetic yokes;

- b) current flow equipment with prods;
- c) adjacent or threading conductors or coil techniques.

DC electromagnets and permanent magnets may only be used by agreement at the time of enquiry and order.

The magnetizing equipment shall conform to ISO 9934-3.

Where prods are used, precautions shall be taken to minimize overheating, burning or arcing at the contact tips. Removal of arc burns shall be carried out where necessary. The affected area shall be tested by a suitable method to ensure the integrity of the surface.

5.5.2 Verification of magnetization

For the verification of magnetization, see ISO 9934-1:2015, 8.2.

For structural steels in welds, a tangential field between 2 kA/m to 6 kA/m (r.m.s.) is recommended.

The adequacy of the surface flux density shall be established by one or more of the following methods:

- a) by testing a representative component containing fine natural or artificial discontinuities in the least favourable locations;
- b) measurement of the tangential field strength as close as possible to the surface using a Hall effect probe; the appropriate tangential field strength can be difficult to measure close to abrupt changes in the shape of a component or where flux leaves the surface of a component;
- c) calculation of the approximate current value in order to achieve the recommended tangential field strength; the calculation can be based on the current values specified in [Figure 5](#) and [Figure 6](#);
- d) by the use of other methods based on established principles.

Flux indicators (i.e. shim-type) placed in contact with the surface under test provide a guide to the magnitude and direction of the tangential field strength, but should not be used to verify that the tangential field strength is acceptable.

NOTE Information on b) is given in ISO 9934-3.

5.6 Application techniques

5.6.1 Field directions and testing area

The detectability of an imperfection depends on the angle of its major axis with respect to the direction of the magnetic field. This is explained for one direction of magnetization in [Figure 1](#).