SLOVENSKI STANDARD
SIST EN ISO 3690:2018

01-november-2018

Nadomešča:
SIST EN ISO 3690:2012

Varjenje in sorodne tehnike - Določevanje vodika v čistih varih pri obločnem varjenju (ISO 3690:2018)

Welding and allied processes - Determination of hydrogen content in arc weld metal (ISO 3690:2018)

Schweißen und verwandte Prozesse - Bestimmung des Wasserstoffgehaltes im Lichtbogenschweißgutl (ISO 3690:2018)

Soudage et techniques connexes - Détermination de la teneur en hydrogène dans le métal fondu pour le soudage à l'arcl (ISO 3690:2018)

Ta slovenski standard je istoveten z: **EN ISO 3690:2018**

ICS:

25.160.40	Varjeni spoji in vari	Welded joints and welds

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 3690

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ICS 25.160.40

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English Version

Welding and allied processes - Determination of hydrogen content in arc weld metal (ISO 3690:2018)

Soudage et techniques connexes - Détermination de la teneur en hydrogène dans le métal fondu pour le soudage à l'arc (ISO 3690:2018)

Schweißen und verwandte Prozesse - Bestimmung des Wasserstoffgehaltes im Lichtbogenschweißgut (ISO 3690:2018)

This European Standard was approved by CEN on 4 September 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 3690:2018) has been prepared by Technical Committee ISO/TC IIW "International Institute of Welding" 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of an identical text or by endorsement, at the latest by March 2019, and conflicting national standards shall be withdrawn at the latest by March 2019.

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.

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Endorsement notice

The text of ISO 3690:2018 has been approved by CEN as EN ISO 3690:2018 without any modification.

INTERNATIONAL STANDARD

ISO 3690

Fourth edition
2018-07

Welding and allied processes — Determination of hydrogen content in arc weld metal

Soudage et techniques connexes — Détermination de la teneur en hydrogène dans le métal fondu pour le soudage à l'arc

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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.

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).

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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.

This document was prepared by IIW, International Institute of Welding, Commission II.

Any feedback, question or request for official interpretation related to any aspect of this document should be directed to IIW via your national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This fourth edition cancels and replaces the third edition (ISO 3690:2012), which has been technically revised. The main changes compared to the previous edition are as follows:

— an additional specimen size D has been added;

— changes have been made in required diffusion times for high temperature tests, see 5.3.3.4, 5.3.4 and Table 5.

Welding and allied processes — Determination of hydrogen content in arc weld metal

1 Scope

This document specifies the sampling and analytical procedure for the determination of diffusible hydrogen in martensitic, bainitic, and ferritic steel weld metal arising from the welding of such steels using arc welding processes with filler material.

The techniques specified in this document include collection of diffusible hydrogen via displacement of mercury or collection into a headspace filled with an inert gas such as argon. The amount of hydrogen collected is determined by measuring the displaced volume in the former and by, for example, thermal conductivity in the latter.

The temperature for collection of diffusible hydrogen is controlled to avoid thermal activation of non-diffusible hydrogen.

NOTE Recommendations and restrictions in regard to older methods of measurement using glycerine are given in Annex B for any comparison work to these older methods.

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 14175, *Welding consumables — Gases and gas mixtures for fusion welding and allied processes*

ISO/TR 17671-1, *Welding — Recommendations for welding of metallic materials — Part 1: General guidance for arc welding*

ISO 80000-1:2009, *Quantities and units — Part 1: General*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Principle

Filler material is deposited on to a standard test coupon in a manner that ensures control of pertinent variables to produce a representative specimen for analysis. Subsequent storage and handling of the specimen is controlled to prevent premature loss of hydrogen. Finally, the specimen is transferred to a gas collection apparatus (mercury method) or to a suitable vessel filled with an inert gas (thermal conductivity method) and held for a period of time at a temperature sufficient to quantitatively release the diffusible hydrogen into an evacuated gas burette or into the inert gas headspace, respectively. The amount of hydrogen collected is determined by measuring the displaced volume (mercury method) or by thermal conductivity. Finally, quantification of the mass of deposited metal or volume of fused weld

metal enables calculations of diffusible hydrogen in deposited metal, H_D, or diffusible hydrogen in fused weld metal, H_F, to be made.

NOTE Annex C gives information on determination of accuracy of results when a method other than displacement of mercury or thermal conductivity detection is used for diffusible hydrogen analysis.

5 Test procedures

5.1 Production of weld specimens

5.1.1 Summary

The welding consumable to be tested is used to deposit a single weld bead, which is rapidly quenched and subsequently stored at −78 °C or lower until analysis. Cleaning and slag removal are performed on the chilled specimen.

5.1.2 Welding fixture

An example of a suitable welding fixture to provide uniform test pieces for the welding processes specified in 5.2 is shown in Figure 1. It is designed to hold the uniform test pieces securely in alignment during welding and, in particular, to ensure that unclamping upon completion of welding can be carried out in a single operation according to the conditions specified in 5.1.4 c). The surface temperature of the fixture shall be between ambient and 25 °C above ambient at the start of each test weld. The fixture may be water-cooled to decrease the cycle time. The temperature of the cooling water shall be controlled to prevent condensation of water on the surface of the fixture between test welds.

For all welding processes, the test piece assembly is clamped in the welding fixture using annealed copper foil as shown in Figure 1. The foil may be annealed repeatedly and quenched in water after each annealing. Oxide scale after annealing is removed by pickling with dilute nitric acid (10 % by volume) followed by washing with distilled water and drying.

