SLOVENSKI STANDARD
SIST EN ISO 3690:2012

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Nadomešča:
SIST EN ISO 3690:2001

Varjenje in sorodni postopki - Določevanje vodika v čistih varih pri obločnem varjenju (ISO 3690:2012)

Welding and allied processes - Determination of hydrogen content in arc weld metal (ISO 3690:2012)

Schweißen und verwandte Prozesse - Verfahren zur Bestimmung des Wasserstoffgehaltes im Lichtbogenschweißgut (ISO 3690:2012)

Soudage et techniques connexes - Détermination de la teneur en hydrogène dans le soudage à l'arc des métaux (ISO 3690:2012)

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25.160.40	Varjeni spoji in vari	Welded joints

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Welding and allied processes - Determination of hydrogen content in arc weld metal (ISO 3690:2012)

Soudage et techniques connexes - Détermination de la teneur en hydrogène dans le métal fondu pour le soudage à l'arc (ISO 3690:2012)

Schweißen und verwandte Prozesse - Bestimmen des Wasserstoffgehaltes im Lichtbogenschweißgut (ISO 3690:2012)

This European Standard was approved by CEN on 2 March 2012.

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Contents

Page

Foreword.....3

Foreword

This document (EN ISO 3690:2012) has been prepared by IIW “International Institute of Welding” 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of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

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 ISO 3690:2000.

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Endorsement notice

The text of ISO 3690:2012 has been approved by CEN as a EN ISO 3690:2012 without any modification.

INTERNATIONAL STANDARD

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2012-03-15

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2012-05-01

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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Contents

Page

Foreword iv

1 Scope 1

2 Normative references 1

3 Principle 1

4 Test procedures 2
4.1 Production of weld specimens 2
4.2 Welding procedures for the production of weld specimens 6
4.3 Measurement of hydrogen in the test weld 13
4.4 Measurement of total hydrogen content in the weld metal — Rapid methods 19
4.5 Rounding procedure 19

Annex A (informative) **Recommendations and restrictions in regard to older methods of measurement using mercury** 20

Annex B (informative) **Recommendations and restrictions in regard to older methods of measurement using glycerin** 21

Annex C (informative) **Accuracy and reproducibility** 22

Bibliography 23

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.

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ISO 3690 was prepared by the International Institute of Welding, recognized as an international standardizing body in the field of welding in accordance with Council Resolution 42/1999.

This third edition cancels and replaces the second edition (ISO 3690:2000), which has been technically revised.

Requests for official interpretations of any aspect of this International Standard should be directed to the ISO Central Secretariat, who will forward them to the IIW Secretariat for an official response.

This corrected version of ISO 3690:2012 incorporates the following corrections:

a) to comply with ISO quality documentation, references to Commission II and to TC 44/SC 3 have been removed from paragraph 5 of this foreword;

b) the quality of Figures 1 and 3 has been improved in terms of resolution and presentation.

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

1 Scope

This International Standard 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 metal.

The techniques specified in this International Standard 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.

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.

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, *Quantities and units — Part 1: General*

3 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.

4 Test procedures

4.1 Production of weld specimens

4.1.1 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.

4.1.2 Welding fixture

An example of a suitable welding fixture to provide uniform test pieces for the welding processes specified in 4.2 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 4.1.4 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.