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Standards

Irish Standard
I.S. EN ISO 3690:2012

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

I.S. EN ISO 3690:2012

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English Version

**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)

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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of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.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.

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

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**INTERNATIONAL
STANDARD**

**ISO
3690**

Third edition
2012-03-15

**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.

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.

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.

ISO 3690 was prepared by International Institute of Welding, Commission II, *Arc welding and filler metals*, recognized as an international standardizing body in the field of welding in accordance with Council Resolution 42/1999, in collaboration with Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 3, *Welding consumables*.

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.

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.

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