Specification and qualification of welding procedures for production welding of steel castings (ISO 11970:2016)

EESTI STANDARDIKESKUS
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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 11970:2016 sisaldab Euroopa standardi EN ISO 11970:2016 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 11970:2016 consists of the English text of the European standard EN ISO 11970:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 30.03.2016.	Date of Availability of the European standard is 30.03.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 25.160.10, 77.140.80

EUROPEAN STANDARD

NORME EUROPÉENNE

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Supersedes EN ISO 11970:2007

English Version

Specification and qualification of welding procedures for production welding of steel castings (ISO 11970:2016)

Descriptif et qualification de modes opératoires de soudage pour le soudage de production des aciers moulés (ISO 11970:2016)

Anforderungen und Anerkennung von Schweißverfahren für das Produktionsschweißen von Stahlguss (ISO 11970:2016)

This European Standard was approved by CEN on 10 January 2016.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (EN ISO 11970:2016) has been prepared by Technical Committee ISO/TC 17 " Steel" in collaboration with Technical Committee ECISS/TC 111 “Steel castings and forgings” the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.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 ISO 11970:2007.

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 11970:2016 has been approved by CEN as EN ISO 11970:2016 without any modification.

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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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 17, *Steel*, Subcommittee SC 11, *Steel castings*.

This second edition cancels and replaces the first edition (ISO 11970:2001), which has been technically revised. In particular, Figures 1, 2 and 3 have been redrawn to clarify labels.

Introduction

All welding procedure qualifications for production welding of steel castings are intended to be in accordance with this International Standard.

Previous procedure qualifications that conform to the range of qualification of Clause 8 are valid under this International Standard.

Where additional tests have to be carried out to complete the qualification, it is only necessary to perform the additional tests to the requirements of Clauses 6 and 7.

Specification and qualification of welding procedures for production welding of steel castings

1 Scope

This International Standard specifies how a welding procedure specification (WPS) for production welding of steel castings is qualified.

It defines the conditions for the execution of welding procedure qualification tests and the limits of validity of a qualified welding procedure for all practical welding operations within the range of essential variables.

Tests are intended to be carried out in accordance with this International Standard unless additional tests are specified by the purchaser or by agreement between the contracting parties.

This International Standard applies to the arc welding of steel castings. The principles of this International Standard can be applied to other fusion welding processes subject to agreement between the contracting parties.

In the case of specific service, material or manufacturing conditions, tests more comprehensive than those specified by this International Standard can be specified by the purchaser, in order to gain more information, e.g. longitudinal weld tensile tests, bend tests, chemical analyses, ferrite determination in austenitic stainless steels, elongation, Charpy "V" impact tests, and radiography.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to 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 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

ISO 857-1, *Welding and allied processes — Vocabulary — Part 1: Metal welding processes*

ISO 4136, *Destructive tests on welds in metallic materials — Transverse tensile test*

ISO 4969, *Steel — Macroscopic examination by etching with strong mineral acids*

ISO 4986, *Steel castings — Magnetic particle inspection*

ISO 4987, *Steel castings — Liquid penetrant inspection*

ISO 4992-1, *Steel castings — Ultrasonic examination — Part 1: Steel castings for general purposes*

ISO 4992-2, *Steel castings — Ultrasonic examination — Part 2: Steel castings for highly stressed components*

ISO 4993, *Steel and iron castings – Radiographic inspection*

ISO 5817, *Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections*

ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method*

ISO 6892-1, *Metallic materials – Tensile testing – Part 1: Method of test at room temperature*

ISO 9016, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*

ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO 15612, *Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 857-1 and ISO 15607 and the following apply.

3.1
production welding
any welding carried out during manufacturing before final delivery to the purchaser

3.1.1
joint welding
production welding used to weld cast components together or weld cast components to wrought steels

3.1.2
finishing welding
production welding carried out in order to ensure the agreed quality of the casting

3.2
repair welding
welding carried out after delivery to the end user, i.e. after the casting has been in service

4 Preliminary welding procedure specification (pWPS)

A preliminary welding procedure specification shall be prepared. It shall specify the range of all the relevant parameters in accordance with ISO 15612.

5 Welding procedure qualification

The making and testing of test specimens representing the type and the position of welding used in production shall be in accordance with Clauses 6 and 7.

The welder who undertakes the welding procedure test satisfactorily in accordance with this International Standard is qualified for the appropriate range of qualification according to ISO 9606-1. Additional welders shall be qualified in accordance with 7.6.

6 Test piece

6.1 General

The test piece shall be in accordance with those shown in Figures 1, 2, 3, and 4.

Dimensions in the figures are for information only and may be adjusted to meet production and testing requirements.

6.2 Shape and dimensions of test piece

Additional test pieces, or longer test pieces than the minimum size may be prepared in order to allow for extra and/or retesting specimens (in accordance with 7.5).