



SLOVENSKI STANDARD SIST EN ISO 11970:2016

01-oktober-2016

Nadomešča:
SIST EN ISO 11970:2007

Popis in odobritev varilnih postopkov za proizvodno varjenje jeklenih ulitkov (ISO 11970:2016)

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

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

Descriptif et qualification d'un mode opératoire de soudage pour le soudage de production des aciers moulés (ISO 11970:2016)

Ta slovenski standard je istoveten z: EN ISO 11970:2016

ICS:

25.160.10	Varilni postopki in varjenje	Welding processes
77.140.80	Železni in jekleni ulitki	Iron and steel castings

SIST EN ISO 11970:2016

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 11970:2016

<https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016>

EUROPEAN STANDARD

EN ISO 11970

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2016

ICS 25.160.10; 77.140.80

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.

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.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

Contents	Page
European foreword.....	3

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 11970:2016
<https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016>

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.

Full STANDARD PREVIEW

(standard.iteh.ai)
Endorsement notice

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

<https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 11970:2016

<https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016>

INTERNATIONAL
STANDARD

ISO
11970

Second edition
2016-03-01

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

*Descriptif et qualification de modes opératoires de soudage pour le
soudage de production des aciers moulés*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 11970:2016](https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016)

<https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016>



Reference number
ISO 11970:2016(E)

© ISO 2016

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 11970:2016

<https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Preliminary welding procedure specification (pWPS)	2
5 Welding procedure qualification	2
6 Test piece	2
6.1 General.....	2
6.2 Shape and dimensions of test piece.....	2
6.3 Welding of sample.....	3
7 Examination and testing	5
7.1 Extent of testing.....	5
7.2 Location and cutting of test specimens.....	5
7.3 Non-destructive testing.....	5
7.4 Destructive test.....	7
7.4.1 Transverse (to weld groove) tensile test.....	7
7.4.2 Macro-examination.....	7
7.4.3 Micro-examination.....	7
7.4.4 Impact test.....	7
7.4.5 Hardness test.....	7
7.5 Qualification and retesting.....	8
7.6 Welder qualification.....	8
8 Range of qualification	8
8.1 General.....	8
8.2 Related to the manufacturer.....	8
8.3 Related to the material.....	9
8.3.1 Parent metal — Grouping system for cast steel grades.....	9
8.3.2 Parent metal thickness (range of qualification).....	10
8.4 Common to all welding procedures.....	10
8.4.1 Welding process.....	10
8.4.2 Welding positions.....	10
8.4.3 Type of joint.....	10
8.4.4 Filler metal.....	10
8.4.5 Type of current.....	10
8.4.6 Heat input.....	10
8.4.7 Preheat temperature.....	11
8.4.8 Interpass temperature.....	11
8.4.9 Post-weld heat treatment.....	11
8.5 Specific to process.....	11
8.5.1 Processes 111 [manual metal arc welding (metal arc welding with covered electrode); shielded metal arc welding] and 114 (self-shielded tubular-cored arc welding).....	11
8.5.2 Process 121 (submerged arc welding with one wire electrode).....	11
8.5.3 Processes 131 (metal-arc inert gas welding; MIG welding; gas metal arc welding), 135 (metal active gas welding; MAG welding; gas metal arc welding), 136 (tubular cored metal arc welding with active gas shield; flux cored arc welding) and 138 (MAG welding with metal cored electrode).....	11
8.5.4 Process 141 (Tungsten inert gas welding; TIG welding; gas tungsten arc welding).....	11
9 Welding procedure qualification record (WPQR)	11

ISO 11970:2016(E)

Annex A (informative) Record form (WPQR) welding procedure qualification — Test certificate	13
Annex B (normative) Details of weld test	14
Bibliography	16

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 11970:2016](https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016)

<https://standards.iteh.ai/catalog/standards/sist/b6117c1e-8a08-48d2-b90a-12e908aab5c5/sist-en-iso-11970-2016>

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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 \(standards.iteh.ai\)](http://Foreword - Supplementary information (standards.iteh.ai))

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.

12e908aab5c5/sist-en-iso-11970-2016