

<b>STN</b>	<b>Zváranie</b> <b>Zvarové spoje zhotovené elektrónovým a laserovým zváraním</b> <b>Návod na určovanie stupňov kvality</b> <b>Časť 1: Oceľ, nikel, titán a ich zliatiny (ISO 13919-1: 2019)</b>	<b>STN</b> <b>EN ISO 13919-1</b>  05 0335
------------	--	--

Electron and laser-beam welded joints - Requirements and recommendations on quality levels for imperfections - Part 1: Steel, nickel, titanium and their alloys (ISO 13919-1:2019)

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 04/20

Obsahuje: EN ISO 13919-1:2019, ISO 13919-1:2019

Oznámením tejto normy sa ruší  
STN EN ISO 13919-1 (05 0335) z februára 2002

**130352**



EUROPEAN STANDARD

**EN ISO 13919-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2019

ICS 25.160.40

Supersedes EN ISO 13919-1:1996

English Version

**Electron and laser-beam welded joints - Requirements and recommendations on quality levels for imperfections - Part 1: Steel, nickel, titanium and their alloys (ISO 13919-1:2019)**

Assemblages soudés par faisceau d'électrons et par faisceau laser - Exigences et recommandations sur les niveaux de qualité des défauts - Partie 1: Acier, nickel, titane et leurs alliages (ISO 13919-1:2019)

Elektronen- und Laserstrahl-Schweißverbindungen - Leitfaden für Bewertungsgruppen für Unregelmäßigkeiten - Teil 1: Stahl, Nickel, Titan und seine Legierungen (ISO 13919-1:2019)

This European Standard was approved by CEN on 21 October 2019.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels**

**EN ISO 13919-1:2019 (E)**

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

## **European foreword**

This document (EN ISO 13919-1:2019) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" 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 May 2020, and conflicting national standards shall be withdrawn at the latest by May 2020.

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.

This document supersedes EN ISO 13919-1:1996.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## **Endorsement notice**

The text of ISO 13919-1:2019 has been approved by CEN as EN ISO 13919-1:2019 without any modification.

**INTERNATIONAL  
STANDARD**

**ISO  
13919-1**

Second edition  
2019-10

---

---

**Electron and laser-beam welded  
joints — Requirements and  
recommendations on quality levels for  
imperfections —**

**Part 1:  
Steel, nickel, titanium and their alloys**

*Assemblages soudés par faisceau d'électrons et par faisceau laser —  
Exigences et recommandations sur les niveaux de qualité des  
défauts —*

*Partie 1: Acier, nickel, titane et leurs alliages*



Reference number  
ISO 13919-1:2019(E)

© ISO 2019

**ISO 13919-1:2019(E)****COPYRIGHT PROTECTED DOCUMENT**

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Symbols (and abbreviated terms)</b> .....	<b>2</b>
<b>5 Assessment of imperfections (adapted to ISO 5817 and ISO 12932)</b> .....	<b>2</b>
<b>Annex A (informative) Examples of determination of percentage (%) porosity</b> .....	<b>12</b>
<b>Annex B (informative) Additional information for use of this document</b> .....	<b>14</b>
<b>Bibliography</b> .....	<b>15</b>



# ISO 13919-1:2019(E)

## 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](http://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](http://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 of 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 [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Quality management in the field of welding*.

This second edition cancels and replaces the first edition (ISO 13919-1:1996) which has been technically revised.

The main changes compared to the previous edition are as follows:

- the text has been editorial revised;
- the normative references have been updated;
- reference to ISO 6520-1 has been added to bring the document in line with ISO 5817.

A list of all parts in the ISO 13919 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html). Official interpretations of TC 44 documents, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

## Introduction

This document is intended to be used as a reference in drafting application codes and/or other application standards. It contains a simplified selection of laser and electron beam welding imperfections based on the designations given in ISO 6520-1.

Limits on some of the individual imperfections described in ISO 6520-1 have been prescribed directly whereas some have been grouped together. The basic numerical referencing system from ISO 6520-1 has been used.

The quality levels given in this document provide basic reference data and are not specifically related to any particular application. They refer to the types of welded joint in fabrication and not to the complete product or component itself. Therefore, it is possible that different quality levels are applied to individual welded joints in the same product or component.

It would normally be expected that, for a particular welded joint, the dimensional limits for imperfections can all be covered by specifying one quality level. In some cases, it can be necessary to specify different quality levels for different imperfections in the same welded joint.

The choice of quality level for any application is expected to take account of design considerations, subsequent processing (e.g. surfacing), mode of stressing (e.g. static, dynamic), service requirements and conditions (e.g. temperature, pressure or vacuum levels, environment) and consequences of failure. These considerations may lead to the need to include additional requirements on weld quality outside of those referred to in this document. Economic factors are also important and are intended to include not only the cost of welding, but also of inspection, test and repair.

Although this document includes types of imperfection relevant to the beam welding processes given in the scope, only those which are applicable to the process and application in question need to be considered.

Imperfections are quoted in terms of their actual dimensions, and their detection and evaluation can require the use of one or more methods of non-destructive testing. The detection and sizing of imperfections are dependent on the inspection methods and the extent of testing specified in the application standard or contract.

The values given for imperfections are for welds produced using normal welding practice. More stringent requirements as stated in quality level B can include the need for additional manufacturing processes, e.g. grinding, dressing.



# Electron and laser-beam welded joints — Requirements and recommendations on quality levels for imperfections —

## Part 1: Steel, nickel, titanium and their alloys

### 1 Scope

This document gives requirements and recommendations on levels of imperfections in electron and laser-beam welded joints in steel, nickel, titanium and their alloys. Three levels are given in such a way as to permit application for a wide range of welded fabrications. Quality level B corresponds to the highest requirement of the finished weld. The levels refer to production quality and not to the fitness-for-purpose of the product manufactured.

This document applies to electron and laser beam welding of:

- steel, nickel, titanium and their alloys;
- all types of welds welded with or without additional filler wire;
- materials equal to or above 0,5 mm thickness for electron and laser beam welding.

The purpose of this document is to define the dimensions of typical imperfections which can be expected in normal fabrication. It can be used within a quality system for the production of welded joints. It provides three sets of dimensional values from which a selection can be made for a particular application. The quality level necessary in each case is defined by the application standard or the responsible designer in conjunction with the manufacturer, user and/or other parties concerned. The quality level is expected to be prescribed prior to the start of production, preferably at the enquiry or order stage. For special purposes, additional details may need to be prescribed.

When significant deviations from the joint geometries and dimensions stated in this document are present in the welded product, it is necessary to evaluate to what extent the provisions of this document can apply.

Metallurgical aspects, e.g. grain size, hardness are not covered by this document.

This document does not address the methods used for the detection of imperfections. This document is directly applicable to visual examination of welds and does not include details of recommended methods of detection or sizing by other non-destructive means. There are difficulties in using these limits to establish appropriate criteria applicable to non-destructive testing methods, such as ultrasonic, radiographic and penetrant testing, and they can need to be supplemented by additional requirements for inspection, examination and testing.

### 2 Normative references

There are no normative references in this document.

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**