

Welding — Electron and laser beam welded joints — Guidance on quality levels for imperfections —

Part 2: Aluminium and its weldable alloys

The European Standard EN ISO 13919-2:2001, with the incorporation of amendment A1:2003 has the status of a British Standard

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National foreword

This British Standard is the official English language version of EN ISO 13919-2:2001, including amendment A1:2003. It is identical with ISO 13919-2:2001.

The UK participation in its preparation was entrusted to Technical Committee WEE/47, Miscellaneous welding standards, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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English version

**Welding - Electron and laser beam welded joints - Guidance on
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weldable alloys (ISO 13919-2:2001)**

(includes amendment A1:2003)

Soudage - Assemblages soudés par faisceau d'électrons et
par faisceau laser - Guide des niveaux de qualité des
défauts - Partie 2 : Aluminium et ses alliages soudables
(ISO 13919-2:2001)
(inclut l'amendement A1:2003)

Schweißen - Elektronenstrahl- und Laserstrahl-
Schweißverbindungen - Richtlinie für Bewertungsgruppen
für Unregelmäßigkeiten - Teil 2: Aluminium und seine
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(enthält Änderung A1:2003)

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Foreword

The text of EN ISO 13919-2:2001 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

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 March 2002, and conflicting national standards shall be withdrawn at the latest by March 2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Foreword to amendment A1

This document EN ISO 13919-2:2001/A1:2003 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS, in collaboration with Technical Committee ISO/TC 44 "Welding and allied processes".

This Amendment to the European Standard EN ISO 13919-2:2001 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European standard should be used as a reference in the drafting of application codes and/or for other application standards. It may be used within a total quality system for the production of satisfactory 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 should be defined by the application standard or the responsible designer in conjunction with the manufacturer, user and/or other parties concerned. The level should be prescribed before the start of production, preferably at the inquiry or order stage. For special purposes, additional details may need to be prescribed.

The quality levels given in this standard are intended to provide basic reference data and are not specifically related to any particular application. They refer to welded joints and not the complete product or component itself. It is possible, therefore, for different quality levels to be applied to individual welded joints in the same product or component. Quality levels are listed in table 1.

Table 1 — Quality levels for weld imperfections

Level symbol	Quality level
D	Moderate
C	Intermediate
B	Stringent

The three quality levels are arbitrarily identified as D, C and B and are intended to cover the majority of practical applications.

If higher requirements are made on welds than compatible with the above levels (e.g. for dynamic loading) such welds may be machined or ground after welding in order to remove surface imperfections.

It would normally be hoped that for a particular welded joint the dimensional limits for imperfections could all be covered by specifying one quality level. In some cases, however, e.g. for certain types of aluminium or aluminium alloys and structures as well as for fatigue loading or leak tightness applications it may be necessary to specify different quality levels for different imperfections in the same welded joint or to include additional requirements.

The choice of quality level for any application should take account of design considerations, subsequent processing, e.g. surfacing, mode of stressing (e.g. static, dynamic), service conditions (e.g. temperature, environment), and consequences of failure. Economic factors are also important and should include not only the cost of welding but also that of inspection, test and repair.

Although this standard includes types of imperfections relevant to the electron and laser beam welding processes, 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 may require the use of one or more methods of non-destructive testing. The detection and sizing of imperfections is dependent on the inspection methods and the extent of testing specified in the application standard or contract.

This standard does not include details of recommended methods of detection and sizing and, therefore, it needs to be supplemented by requirements for examination, inspection and testing. It should be appreciated that methods of non-destructive examination may not be able to give the detection, characterisation and sizing necessary for use within certain types of imperfections shown in table 2.

Although this standard covers material thicknesses (penetration depths) from 1 mm and above for electron and laser beam welding, it should be noted that the permitted size for all types of imperfection has an absolute, upper limit.

Application for thicknesses above 50 mm for electron beam welding and 12 mm for laser beam welding is, for that reason, usually safe, but may be overly conservative and may require special precautions, such as weld bead dressing in order to comply with the limits for reinforcement and undercut. Attention should be paid to such precautions during approval testing of the welding procedure and alternative requirements may have to be specified, if necessary.

Application for thicknesses below 1 mm is possible, but the requirements may be overly conservative for certain types of imperfections.