

Thermal cutting — Classification of thermal cuts — Geometrical product specification and quality tolerances

The European Standard EN ISO 9013:2002, with the incorporation of amendment A1:2003 has the status of a British Standard

ICS 25.160.10

Confirmed July 2009

National foreword

This British Standard is the official English language version of EN ISO 9013:2002, including amendment A1:2003. It is identical with ISO 9013:2002. It supersedes BS EN ISO 9013:1995 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee WEE/18, Gas welding appliances, 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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, pages ii to iv, pages 1 to 25, the Annex ZA page, an inside back cover and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 11 November 2002

© BSI 5 February 2004

Amendments issued since publication

Amd. No.	Date	Comments
14615 Corrigendum No. 1	30 July 2003	Correcting the EN ISO foreword page and the Annex ZA page and incorporating the Annex ZB page
14956	5 February 2004	Modification to Foreword and deletion of Annex ZB

ISBN 0 580 40707 1

English version

**Thermal cutting - Classification of thermal cuts - Geometrical
product specification and quality tolerances (ISO 9013:2002)**
(includes amendment A1:2003)

Coupage thermique - Classification des coupes thermiques
- Spécification géométrique des produits et tolérances
relatives à la qualité (ISO 9013:2002)
(inclut l'amendement A1:2003)

Thermisches Schneiden - Einteilung thermischer Schnitte -
Geometrische Produktspezifikation und Qualität (ISO
9013:2002)
(enthält Änderung A1:2003)

This European Standard was approved by CEN on 19 August 2002, and amendment A1 was approved by CEN on 20 November 2003.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

This document (EN ISO 9013:2002) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS.

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 2003, and conflicting national standards shall be withdrawn at the latest by March 2003.

This document supersedes EN ISO 9013:1995.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 9013:2002 has been approved by CEN as EN ISO 9013:2002 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

Foreword to amendment A1

This document EN ISO 9013:2002/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 9013:2002 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.

INTERNATIONAL STANDARD

**ISO
9013**

Second edition
2002-09-15

Thermal cutting — Classification of thermal cuts — Geometrical product specification and quality tolerances

*Coupage thermique — Classification des coupes thermiques —
Spécification géométrique des produits et tolérances relatives à la qualité*



Reference number
ISO 9013:2002(E)

AVA Documents
Document Sharing Hub

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
3.1 General	2
3.2 Terms and definitions explained by figures	2
4 Symbols	7
5 Form and location tolerances	8
6 Determination of the quality of cut surfaces	8
6.1 General	8
6.2 Measuring	9
7 Quality of the cut surface	11
7.1 Characteristic values	11
7.2 Measuring ranges	12
8 Dimensional tolerances	15
8.1 General	15
8.2 Dimensional tolerances on parts without finishing	16
8.3 Dimensional tolerances on parts with finishing	17
9 Designation	18
10 Information in technical documentation	18
10.1 Indications of size	18
10.2 Indication of quality of cut surface and of tolerance class	18
Annex A (informative) Achievable cutting qualities for different cutting processes	20
Annex B (informative) Principles of process	23
Bibliography	25

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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 9013 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 8, *Equipment for gas welding, cutting and allied processes*.

This second edition cancels and replaces the first edition (ISO 9013:1992), which has been technically revised.

Annexes A and B of this International Standard are for information only.

Thermal cutting — Classification of thermal cuts — Geometrical product specification and quality tolerances

1 Scope

This International Standard applies to materials suitable for oxyfuel flame cutting, plasma cutting and laser cutting. It is applicable to flame cuts from 3 mm to 300 mm, plasma cuts from 1 mm to 150 mm and to laser cuts from 0,5 mm to 40 mm. This International Standard includes geometrical product specifications and quality tolerances.

The geometrical product specifications are applicable if reference to this International Standard is made in drawings or pertinent documents, e.g. delivery conditions.

If this International Standard is also to apply, by way of exception, to parts which are produced by different cutting processes (e.g. high-pressure water jet cutting), this has to be agreed upon separately.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1101:1983, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings*

ISO 1302:2002, *Geometrical Product Specifications (GPS) — Indication of surface texture in technical product documentation*

ISO 2553, *Welded, brazed and soldered joints — Symbolic representation on drawings*

ISO 3274, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments*

ISO 4287:1997, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

ISO 4288:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

ISO 8015, *Technical drawings — Fundamental tolerancing principle*

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

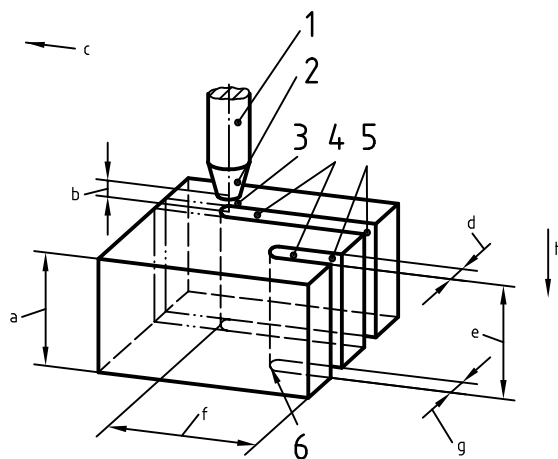
3.1 General

Nouns referring to the cutting operation will be formed by using the key word “cutting” (e.g. advance cutting direction); nouns referring to the cut carried out will be formed by using the key word “cut” (e.g. cut surface).

3.2 Terms and definitions explained by figures

NOTE Figure 1 indicates the terms related to the cutting process of the work piece after the cutting process has started, Figure 2 indicates the terms for the finished work piece. Figure 3 shows a straight cut and Figure 4 a contour cut.

3.2.1 Terms on the started work piece

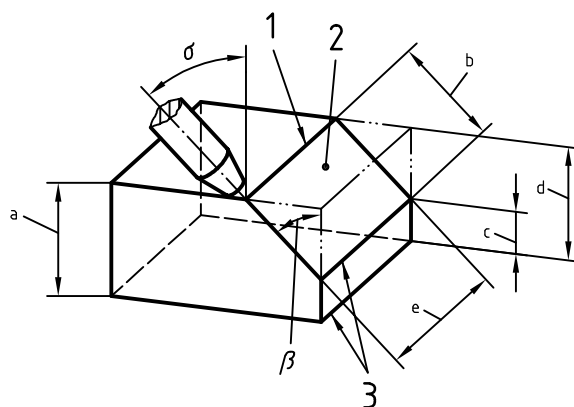


Key

- 1 Torch
- 2 Nozzle
- 3 Beam/flame/arc
- 4 Kerf
- 5 Start of cut
- 6 End of cut
- a Work piece thickness
- b Nozzle distance
- c Advance direction
- d Top kerf width
- e Cut thickness
- f Length of cut
- g Bottom kerf width
- h Cutting direction

Figure 1 — Terms related to the cutting process of the work piece

3.2.2 Terms on the finished work piece

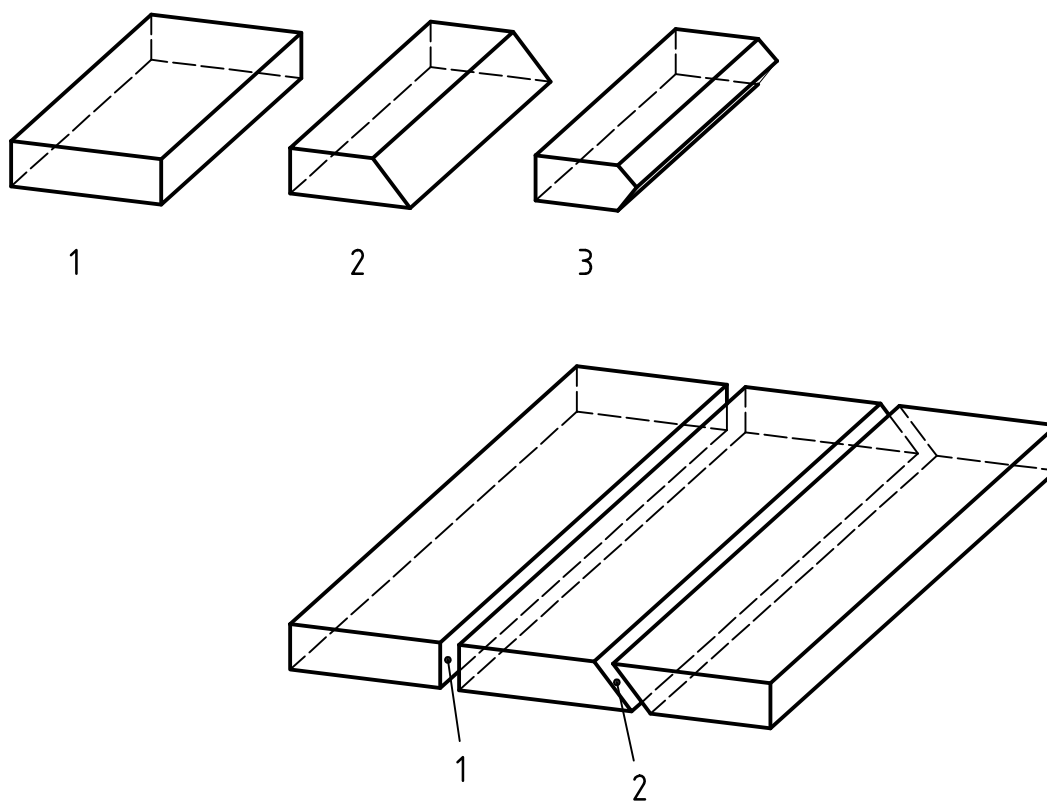


Key

- | | | | |
|---|-------------------|---|--|
| 1 | Upper edge of cut | a | Work piece thickness |
| 2 | Cut surface | b | Cut thickness (first possibility) |
| 3 | Lower edge of cut | c | Depth of root face/cut thickness (first possibility) |
| | | d | Cut thickness (second possibility) |
| | | e | Length of cut |

Figure 2 — Terms on the finished work piece

3.2.3 Cutting types



Key

- | | | | |
|---|--------------|---|--------------------|
| 1 | Vertical cut | 3 | Bevel cut (double) |
| 2 | Bevel cut | | |

Figure 3 — Straight cut