Nederlandse norm

NEN-EN-ISO 9013

Lassen en verwante processen. Kwaliteitsclassificatie en toleranties op de afmetingen voor thermisch gesneden oppervlakken (zuurstof/brandstof-gasvlam) (ISO 9013:1992)

Welding and allied processes. Quality classification and dimensional tolerances of thermal cut (oxygen/fuel gas flame) surface (ISO 9013:1992)

1e druk, april 1995
UDC 621.791

Als Nederlandse norm is aanvaard de internationale norm ISO 9013, 1e druk, 1992.

De European Committee for Standardization (CEN) heeft op 1995-01-09 een Europese norm (EN ISO 9013) aanvaard, waarbij de internationale norm ISO 9013, 1e druk, 1992, ongewijzigd is aangenomen.

De leden van de CEN hebben zich verplicht de Europese normen de status van nationale norm te geven. Met de publikatie van deze norm is het Nederlandse Normalistatie-instituut deze verplichting nagekomen.

Normcommissie 341 008 "Lassen en verwante processen"

Nederlands voorwoord

Voor de in deze norm vermelde andere normen bestaan in Nederland de volgende equivalenten:

Vermelde norm:	Nederlandse norm:	Titel:
ISO 1302:1978	-	-
ISO 4287-1	-	-
ISO 8015:1985	-	-

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 9013

March 1995

ICS 25.160.10

Descriptors: gas cutting, oxygen cutting, grades (quality), dimensional tolerances

English version

Welding and allied processes - Quality classification and dimensional tolerances of thermally cut (oxygen/fuel gas flame) surfaces (ISO 9013:1992)

Soudage et techniques connexes - Niveaux de qualité et tolérances dimensionnelles des surfaces découpées thermiquement (à la flamme d'oxygène/gaz de chauffe) (ISO 9013:1992)

Schweißen und verwandte Verfahren - Güteeinteilung und Maßtoleranzen für autogene Brennschnittflächen (ISO 9013: 1992)

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart.36 B-1050 Brussels

Ref. No. EN ISO 9013:1995 E

Foreword

This European Standard has been taken over by the Technical Committee CEN/TC 121 "Welding" from the work of ISO/TC 44 "Welding and allied processes" of the International Organization for Standardization (ISO).

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of an identical text or by endorsement, at the latest by September 1995 , and conflicting national standards shall be withdrawn at the latest by September 1995.

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

Endorsement notice

The text of the International Standard ISO 9013:1992 was approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO 9013

First edition
1992-09-15

Welding and allied processes — Quality classification and dimensional tolerances of thermally cut (oxygen/fuel gas flame) surfaces

Soudage et techniques connexes — Niveaux de qualité et tolérances dimensionnelles des surfaces découpées thermiquement (à la flamme d'oxygène/gaz de chauffe)

Reference number
ISO 9013:1992(E)

Foreword

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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.

International Standard ISO 9013 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Sub-Committee SC 8, *Gas welding equipment*.

Annex A of this International Standard is for information only.

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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Welding and allied processes — Quality classification and dimensional tolerances of thermally cut (oxygen/fuel gas flame) surfaces

1 Scope

This International Standard is valid for materials suitable for oxygen cutting and for workpiece thicknesses from 3 mm to 300 mm. It applies to cut metal surfaces produced by oxygen/fuel gas flame cutting and requires quality classification and dimensional tolerances.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1302:1978, *Technical drawings — Method of indicating surface texture on drawings.*

ISO 4287-1:—[1], *Surface roughness — Terminology — Part 1: Surface and its parameters.*

ISO 8015:1985, *Technical drawings — Fundamental tolerancing principle.*

3 Basis of process

3.1 Process

Oxygen cutting refers to those thermal cutting processes in which the cutting kerf is created such that

— the material in the kerf is primarily oxidized;

— oxidized products are driven out of the kerf by a high velocity oxygen jet.

3.2 Prerequisites

The material shall be heated at the point of reaction to a temperature at which it reacts spontaneously with oxygen (ignition temperature). The process shall deliver sufficient thermal energy such that areas of the material in the cutting direction are heated up to this ignition temperature. The ignition temperature shall be below the melting temperature of the material. Cutting slag shall be liquid enough to be driven out of the cutting kerf by the oxygen jet.

3.3 Material

The prerequisites given in 3.2 are fulfilled by pure iron, low-alloyed and some alloyed steels as well as by titanium and some titanium alloys. The cutting process is detrimentally affected by alloying elements, except manganese, and increasingly so with increasing content of the alloying element e.g. chromium, carbon, molybdenum or silicon. Therefore, among others, high-alloyed CrNi-steels or silicon steels and cast iron cannot be oxygen cut without special steps. These materials can be cut with other thermal cutting processes, e.g. by metal powder oxygen cutting or plasma arc cutting.

4 Designation

The designation of a flame cut surface shall comprise the following information in the order given:

a) description block, e.g. "flame cut";

b) a reference to this International Standard;

1) To be published. (Revision of ISO 4287-1:1984)

c) the indication of quality containing perpendicularity and angularity tolerance and permissible ten point height of irregularity according to 5.1 or 5.2;

d) the indication of tolerance class according to clause 6.

EXAMPLE

An oxygen flame cut surface with quality I and tolerance class A is designated as follows:

Flame cut ISO 9013 - IA

5 Quality of flame cut edge (face)

5.1 Factors and explanations

For the classification of quality of flame cut edges (faces), the following factors are used:

a) perpendicularity tolerance, u (see figure 1) or angularity tolerance, u (see figure 2);

b) ten point height of irregularities, R_{y5} (see figure 3).

The following factors may be used for visual evaluation:

c) drag, n (see figure 4);

d) melting of top edge, r (see figure 5).

Perpendicularity or angularity tolerance, u, is the distance between two parallel straight lines (contacting lines) that limit the cut face profile at the theoretically correct angle (i.e. at 90° for square edge cuts).

The contacting lines are situated in a plane normal to both the workpiece surface and to the cut face.

The perpendicularity tolerance and the angularity tolerance include deviations from straightness and flatness.

Ten point height of irregularities, R_{y5}, is the mean of the absolute values of the heights of the five highest profile peaks and the depths of the five deepest profile valleys within the sampling length (from ISO 4287-1).

Drag, n, is the projected distance between the two edges of a drag line in the direction of cutting (see figure 4).

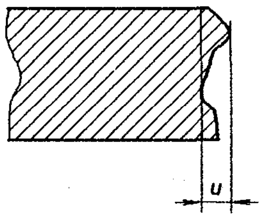


Figure 1 — Perpendicularity tolerance

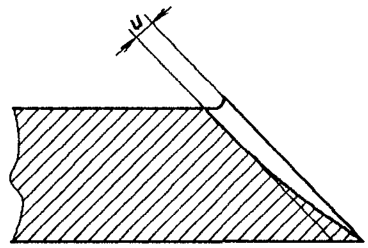
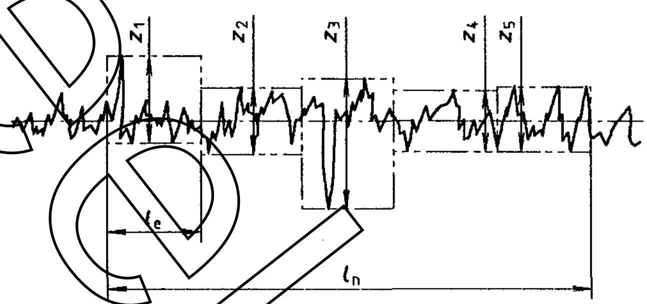


Figure 2 — Angularity tolerance



KEY

l_n is the roughness sampling length

Z_1 to Z_5 are individual profile departures

l_e is the individual sampling length (one fifth of l_n)

Figure 3 — Ten point height of irregularities

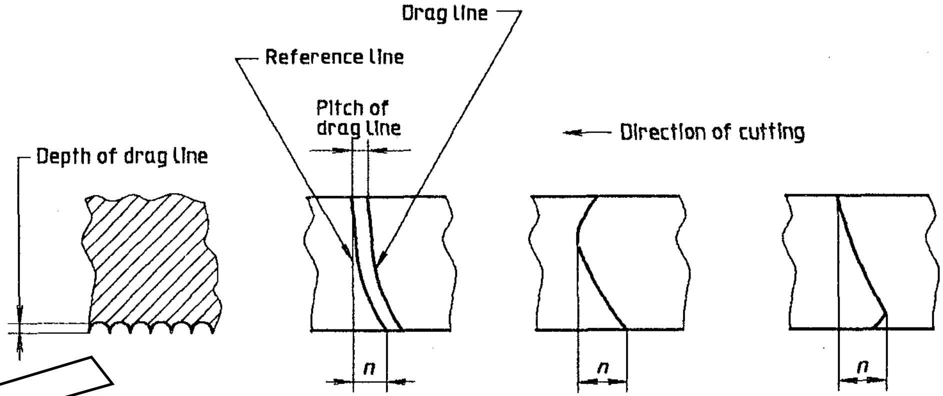


Figure 4 — Drag line

Melting of the top edge, *r*, is the factor characterizing the shape of the top edge of a cut, such as a sharp edge, a rounded edge with overhang or a train of fused beads with overhang (see figure 5).

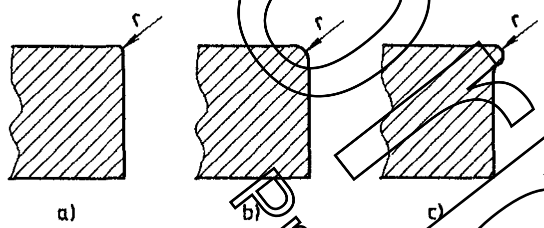


Figure 5 — Melting of top edge

The cut face profile used for the definition of perpendicularity tolerance and angularity tolerance shall be reduced by the value of Δa as given in table 1 from both the top and the bottom of the cut face (see figure 6).

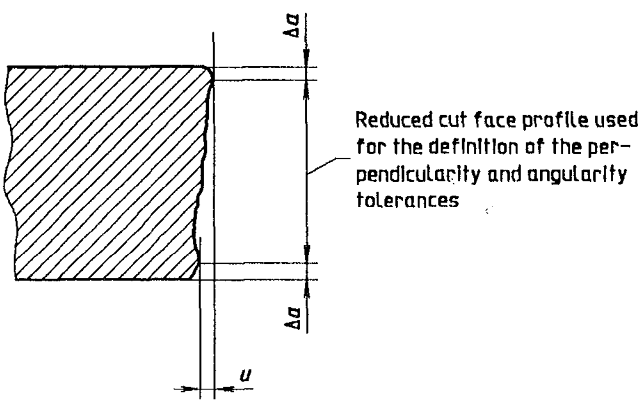


Figure 6 — Definition of measuring area for perpendicularity and angularity tolerances

Table 1 — Values of Δa for various cutting thicknesses, a

Dimensions in millimetres

Cutting thickness, a	Δa
$3 \leqslant a \leqslant 6$	0,3
$6 < a \leqslant 10$	0,6
$10 < a \leqslant 20$	1,0
$20 < a \leqslant 40$	1,5
$40 < a \leqslant 100$	2,0
$100 < a \leqslant 150$	3,0
$150 < a \leqslant 200$	5,0
$200 < a \leqslant 250$	8,0
$250 < a \leqslant 300$	10,0

Individual defects, e.g. gougings, are not considered for the definition of quality grades in this International Standard.

In the case of multiple bevel cutting, e.g. for single-V, double-V, or double bevel cuts or K-cuts, each cutting surface is to be classified separately.

For a classification of the quality of cut surfaces in accordance with table 2, the reduction of the profile for the perpendicularity and angularity tolerance u and for the permissable ten point height of irregularities R_{y5} as described above is not necessary. The definition, however, has been maintained to point out the possibility of achieving these very small deviations and also in order to demonstrate the capabilities of the process.

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