BRITISH STANDARD

BS EN ISO
13920:1997

Welding — General tolerances for welded constructions — Dimensions for lengths and angles — Shape and position

The European Standard EN ISO 13920:1996 has the status of a British Standard

ICS 25.160

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee WEE/-/1, Briefing Committee for Welding where the following BSI Committees were represented:

WEE/1, Definitions and symbols for welding
WEE/2, Welding tests
WEE/6, Electric arc welding equipment
WEE/17, Metal-arc welding of steel
WEE/18, Gas welding and cutting appliances
WEE/19, Brazing and braze welding
WEE/21/7, Field welding of pipelines
WEE/36, Approval testing of welding procedures and welders
WEE/39, Welding consumables
WEE/40, Health and safety in welding
WEE/45, Welding of stainless steel

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on
15 January 1997

The following BSI references relate to the work on this standard:
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Contents

National foreword

This British Standard has been prepared by Technical Committee WEE/-/1 and is the English language version of EN ISO 13920:1996 *Welding — General tolerances for welded constructions — Dimensions for lengths and angles — Shape and position* published by the European Committee for Standardization (CEN). It is identical with ISO 13920:1996 published by the International Organization for Standardization (ISO).

EN ISO 13920 was produced as the result of international discussion in which the UK took an active part.

It has been assumed in the drafting of this British Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

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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, pages i and ii, the EN ISO title page, pages 2 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 13920

August 1996

ICS 25.160.00

Descriptors: Welding, welded construction, shape, position (location), dimensions, length, angles (geometry), dimensional tolerances, angular tolerances, tests

English version

Welding — General tolerances for welded constructions — Dimensions for lengths and angles — Shape and position

(ISO 13920:1996)

Soudage — Tolérances générales relatives aux constructions soudées — Dimensions des longueurs et angles — Formes et positions
(ISO 13920:1996)

Schweißen — Allgemeintoleranzen für Schweißkonstruktionen — Längen- und Winkelmaße — Form und Lage
(ISO 13920:1996)

This European Standard was approved by CEN on 1996-06-20. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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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

Foreword

The text of EN ISO 13920:1996 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 February 1997, and conflicting national standards shall be withdrawn at the latest by February 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of 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 and the United Kingdom.

Content

1 Scope

This European Standard specifies general tolerances for linear and angular dimensions and for shape and position of welded structures in four tolerance classes, these being based on customary workshop accuracy. The main criterion for the selection of a particular tolerance class should be the functional requirements which are to be met.

The applicable tolerances are always those which are stated in the drawing. Instead of specifying individual tolerances the tolerance classes according to this standard may be used.

General tolerances for linear and angular dimensions and for shape and position as specified in this standard apply for weldments, welding assemblies and welded structures etc.

Special provisions may be necessary for complex structures.

The specifications given in this standard are based on the principle of independency as specified in ISO 8015, according to which the dimensional and geometrical tolerances apply independently of each other.

Manufacturing documentation in which linear and angular dimensions or indications for shape and position are presented without individually indicated tolerances shall be deemed incomplete if there is no, or inadequate, reference to general tolerances. This does not apply to temporary dimensions.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate place in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the last edition of the publication referred to applies.

ISO/DIS 463, *Geometrical Product Specifications (GPS) — Dimensional measuring instruments; Dial gauges — Design and metrological requirements.*

prEN ISO 1101, *Technical drawings — Geometrical tolerancing Tolerances of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.* (ISO/DIS 1101:1995)

ISO 3599, *Vernier callipers reading to 0,1 and 0,05 mm.*

ISO 6906, *Vernier callipers reading to 0,02 mm.*

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

3 Definitions

For the purposes of this standard the definitions of prEN ISO 1101 apply.

4 General tolerances

4.1 Tolerances for linear dimensions

See Table 1.

Table 1 — Tolerances for linear dimensions

Range of nominal sizes l in mm											
Tolerance class	**2 to 30**	**Over 30 up to 120**	**Over 120 up to 400**	**Over 400 up to 1 000**	**Over 1 000 up to 2 000**	**Over 2 000 up to 4 000**	**Over 4 000 up to 8 000**	**Over 8 000 up to 12 000**	**Over 12 000 up to 16 000**	**Over 16 000 up to 20 000**	**Over 20 000**
	Tolerances t in mm										
A	± 1	± 1	± 1	± 2	± 3	± 4	± 5	± 6	± 7	± 8	± 9
B		± 2	± 2	± 3	± 4	± 6	± 8	± 10	± 12	± 14	± 16
C		± 3	± 4	± 6	± 8	± 11	± 14	± 18	± 21	± 24	± 27
D		± 4	± 7	± 9	± 12	± 16	± 21	± 27	± 32	± 36	± 40

4.2 Tolerances for angular dimensions

The length of the shorter angle leg shall be used to determine in accordance with Table 2 which tolerances are to apply. The length of the leg may also be assumed to extend to a specified reference point. In this case, the reference point concerned shall be indicated on the drawing.

See Table 2 for the relevant tolerances.

Figure 1 to Figure 5 show examples of how the shorter angle leg, l, is represented.

Table 2 — Tolerances for angular dimensions

Tolerance class	Range of nominal sizes l in mm (length or shorter leg)		
	Up to 400	Over 400 up to 1 000	Over 1 000
	Tolerances Δα (in degrees and minutes)		
A	± 20′	± 15′	± 10′
B	± 45′	± 30′	± 20′
C	± 1°	± 45′	± 30′
D	± 1°30′	± 1°15′	± 1°
	Calculated and rounded tolerances t, in mm/m[a]		
A	± 6	± 4,5	± 3
B	± 13	± 9	± 6
C	± 18	± 13	± 9
D	± 26	± 22	± 18

[a] The value indicated in mm/m corresponds to the tangent value of the general tolerance. It is to be multiplied by the length, in m, of the shorter leg.

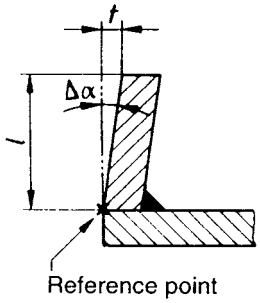

Figure 1

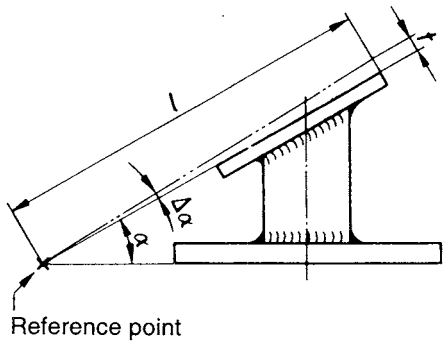

Figure 2

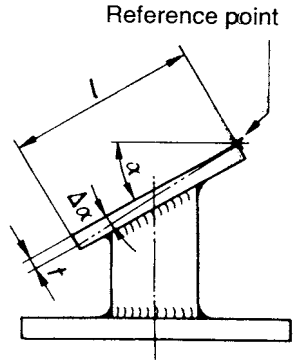

Figure 3

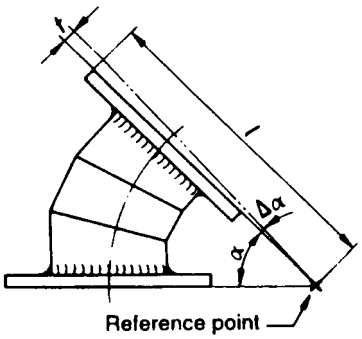

Figure 4

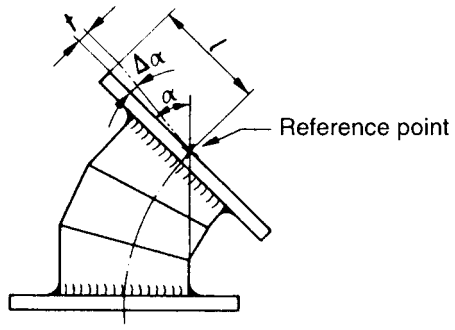

Figure 5

4.3 Straightness, flatness and parallelism tolerances

The straightness, flatness and parallelism tolerances as specified in the following Table 3 apply both for the overall dimensions of a weldment, a welding assembly, or a welded structure, and also for sections for which the dimensions are indicated.

Other tolerances of form and position, e.g. coaxiality and symmetry tolerances, have not been specified. If such tolerances are required for reasons of function, they shall be indicated on the drawings as specified in prEN ISO 1101.

5 Indications on drawings

The designation of the selected tolerance class as specified in Table 1 and Table 2 (e.g. EN ISO 13920-B) or its combination with a tolerance class as specified in Table 3 (e.g. EN ISO 13920-BE), shall be entered in the appropriate area on the drawing.

6 Testing

6.1 General

Testing and measuring devices used shall be suitable and accurate for their intended purpose.

— graduated steel straightedges;

— tape measures;

— straightedges;

— squares;

— vernier callipers (in accordance with ISO 1599 and ISO 6906);

— dial gauges (in accordance with ISO/DIS 463).

Other testing and measuring devices may be used by agreement.

The results of measurement may be influenced if they are obtained under unusual temperature or atmospheric conditions, e.g. large constructions in strong sun-light.

The actual size of an angle shall be determined by applying suitable measuring devices tangentially to the weldment, but away from the zone immediately influenced by the weld. The deviation shall be derived from the difference between the nominal size and the actual size. The angular deviation may be measured in degrees and minutes, or in millimetres.

6.2 Straightness

The edge of the weldment and the straightedge shall be aligned in such a way that the greatest distance between the straightedge and the actual surface is at its minimum. The distance between the edge and the straightedge shall be measured (example see Figure 6).

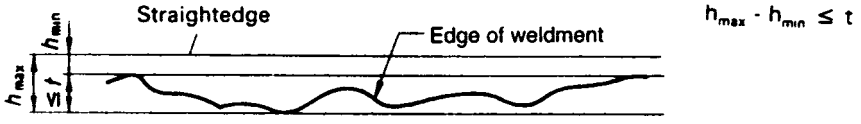

Figure 6 — Straightness test

Table 3 — Straightness, flatness and parallelism tolerances

Range of nominal sizes l in mm (relates to longer side of the surface)										
Tolerance class	Over 30 up to 120	Over 120 up to 400	Over 400 up to 1 000	Over 1 000 up to 2 000	Over 2 000 up to 4 000	Over 4 000 up to 8 000	Over 8 000 up to 12 000	Over 12 000 up to 16 000	Over 16 000 up to 20 000	Over 20 000
	Tolerances t in mm									
E	0,5	1	1,5	2	3	4	5	6	7	8
F	1	1,5	3	4,5	6	8	10	12	14	16
G	1,5	3	5,5	9	11	16	20	22	25	25
H	2,5	5	9	14	18	26	32	36	40	40

6.3 Flatness

The actual surface of the weldment and the measuring plane shall be aligned to each other in such a way that the greatest distance between the measuring plane and the actual surface is at its minimum. This may be effected, for example, with the aid of optical devices, tubular water levels, span wires, floor plates, surface plates, and machine beds.

The distances between the actual surface and the measuring plane shall be measured (example see Figure 7).

6.4 Parallelism

The reference surface shall be aligned parallel to the reference plane.

A measuring plane shall be established parallel to the reference plane and apart from the weldment, using the measuring devices referred to in **6.3**. The distances between the actual surface and the measuring plane shall be measured (example see Figure 8).

7 Non-conformities

A decision on the acceptance of components not complying with this standard may be made on the basis of the suitability for their intended purpose.

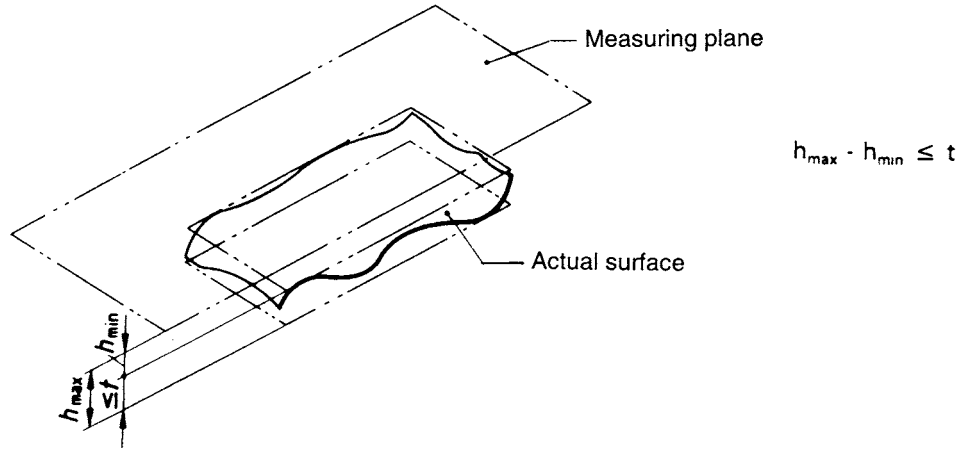

Figure 7 — Flatness test

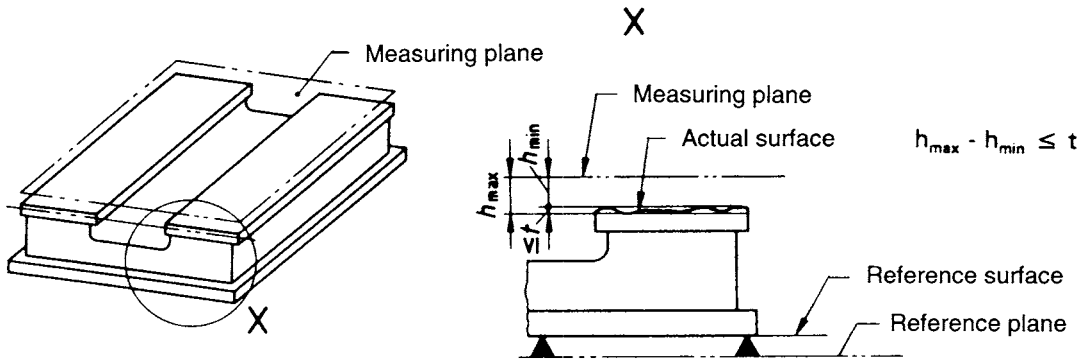

Figure 8 — Parallelism test

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List of references

See national foreword.

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