BRITISH STANDARD

BS EN
1592-4 : 1998

Aluminium and aluminium alloys — HF seam welded tubes

Part 4. Tolerances on dimensions and form for square, rectangular and shaped tubes

The European Standard EN 1592-4 : 1997 has the status of a British Standard

ICS 77.150.10

National foreword

This British Standard is the English language version of EN 1592-4 : 1997 published by the European Committee for Standardization (CEN). Together with BS EN 1592-1 : 1998, BS EN 1592-2 : 1998 and BS EN 1592-3 : 1998 it supersedes BS 4300-1 : 1967 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee NFE/35, Light metals and their alloys, to Subcommittee NFE/35/5, Wrought aluminium and aluminium alloys, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible 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 subcommittee 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 Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

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 title page, pages 2 to 6, an inside back cover and a back cover.

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English version

Aluminium and aluminium alloys — HF seam welded tubes — Part 4: Tolerances on dimensions and form for square, rectangular and shaped tubes

Aluminium et alliages d'aluminium — Tubes électrosoudés HF — Partie 4: Tolérances sur dimensions et forme des tubes à section carrée, rectangulaire ou profilée

Aluminium und Aluminiumlegierungen — HF-längsnahtgeschweißte Rohre — Teil 4: Grenzabmaße und Formtoleranzen für quadratische, rechteckige und geformte Rohre

This European Standard was approved by CEN on 19 September 1997.

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 1592-4 : 1997 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 132, Aluminium and aluminium alloys, the secretariat of which is held by AFNOR.

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 April 1998, and conflicting national standards shall be withdrawn at the latest by April 1998.

Within its programme of work, Technical Committee CEN/TC 132 entrusted CEN/TC 132/WG 12, HF seam welded tubes, to prepare the following standard:

EN 1592-4 *Aluminium and aluminium alloys — HF seam welded tubes — Part 4: Tolerances on dimensions and form for square, rectangular and shaped tubes*

This standard is part of a series of four standards. The other standards deal with:

EN 1592-1 *Aluminium and aluminium alloys — HF seam welded tubes — Part 1: Technical conditions for inspection and delivery*

EN 1592-2 *Aluminium and aluminium alloys — HF seam welded tubes — Part 2: Mechanical properties*

EN 1592-3 *Aluminium and aluminium alloys — HF seam welded tubes — Part 3: Tolerances on dimensions and form for circular tubes*

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.

Contents

1 Scope

This Part of EN 1592 specifies the tolerances on dimensions and form of square, rectangular and shaped HF seam welded tubes.

These tubes are manufactured from rolled aluminium alloy strip longitudinally welded in a continuous process by the passage of an electric current across the abutting edges without the addition of filler metal.

This standard also applies to tubes manufactured from aluminium alloy strip which is painted, lacquered or anodized prior to forming.

Technical conditions for inspection and delivery are specified in EN 1592-1.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places 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 latest edition of the publication referred to applies.

EN 1592-1 *Aluminium and aluminium alloys — HF seam welded tubes — Part 1 : Technical conditions for inspection and delivery*

3 Dimensions

The dimensions of tubes shall be designated by the two extreme outside dimensions and wall thickness.

4 Tolerances on dimensions

4.1 Dimensions across flats (tolerances excluding flatness)

The dimensions across flats shall be measured as shown in figure 1.

The tolerances on dimensions across flats shall be taken at position 1 and 2 in accordance with table 1.

Table 1. Tolerances on dimensions across flats excluding flatness

Dimensions in millimetres

Nominal dimensions B **or** H	**Tolerances**
B or $H \leq 15$	$\pm 0{,}08$
$15 < B$ or $H \leq 30$	$\pm 0{,}10$
$30 < B$ or $H \leq 50$	$\pm 0{,}12$
$50 < B$ or $H \leq 70$	$\pm 0{,}15$
$70 < B$ or H	$\pm 0{,}20$

For B or $H \leq 15$ mm, the measurements shall be taken using a micrometer with 1/100th millimetre graduations.

For B or $H > 15$ mm, the measurements shall be taken using a calliper gauge with an accuracy of at least 1/50th of a millimetre.

All measurements shall be taken at least 100 mm from each end of the tube.

4.2 Thickness

The tolerances on thickness shall be in accordance with table 2.

Table 2. Tolerances on thickness

Dimensions in millimetres

Nominal thickness t	**Tolerances**
$0{,}6 \leq t \leq 1{,}0$	$\pm 0{,}05$
$1{,}0 < t \leq 2{,}5$	$\pm 0{,}08$

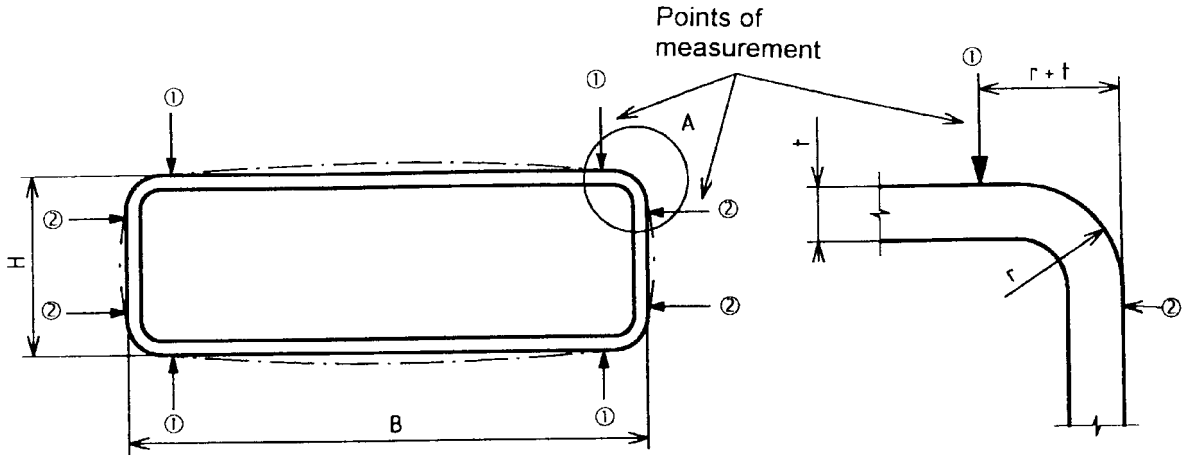

Figure 1. Dimensions across flats

These tolerances are not applicable to the weld fin and corner radii of square and rectangular tubes. Other thicknesses and tolerances are available by written agreement between producer and purchaser.

4.3 Length

Tubes shall be supplied in one of the following ways:

– random lengths, subject to a tolerance of ±100 mm;

– specified cut lengths with the tolerances in accordance with table 3.

Table 3. Tolerances on specified cut length

Dimensions in millimetres

Specified length L	**Tolerances**
$L < 1000$	±1,0
$1000 \leq L < 3000$	±1,5
$3000 \leq L < 7000$	±2,0
$7000 \leq L$	±3,0

In case of dispute the length shall be measured as shown in figure 2, the tube being placed on a flat surface with 90° angle plates abutted on each end. The measurement shall be taken across the total gap l between plates.

5 Tolerances on shape

5.1 Straightness

Deviation from straightness shall be measured as shown in figure 3.

The deviation F measured on any 1 m length taken at random along the length of the tube, shall not exceed 1,6 mm. The maximum deviation E, expressed in millimetres, measured over the entire length of the tube shall not exceed $1{,}6 \times L$ (in metres).

5.2 Flatness (convexity or concavity)

The deviation from flatness Y shall be measured as shown in figure 4.

The tolerances on flatness shall be in accordance with table 4.

All measurements shall be taken at least 100 mm from each end of the tube.

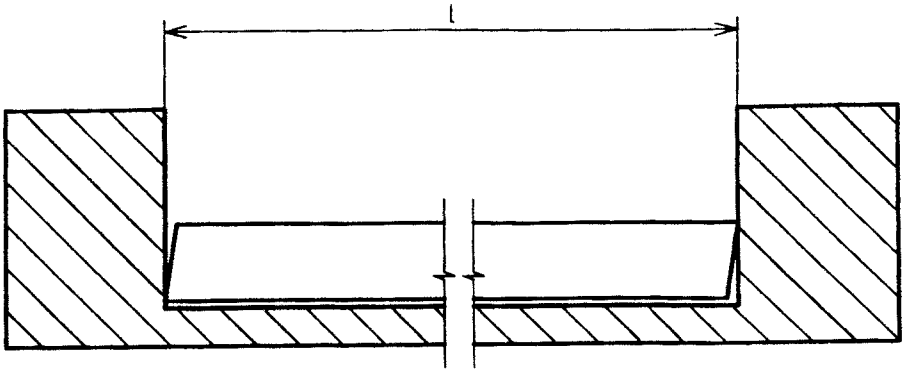

Figure 2. Length measurement

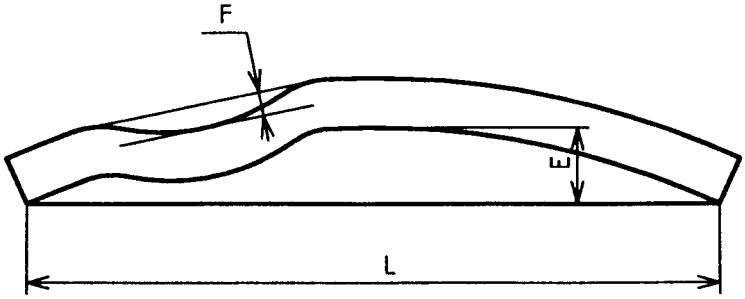

Figure 3. Measurement of deviation from straightness

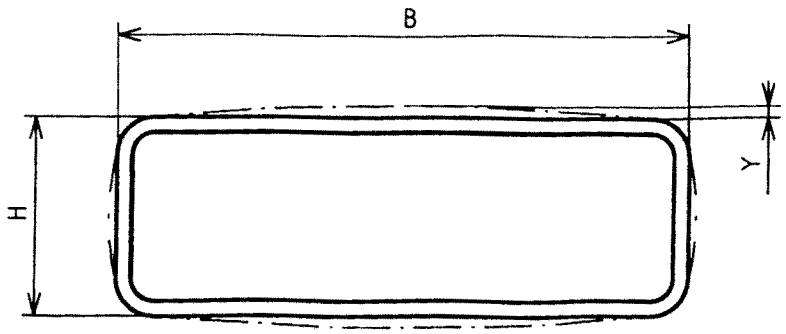

Figure 4. Measurement of deviation from flatness

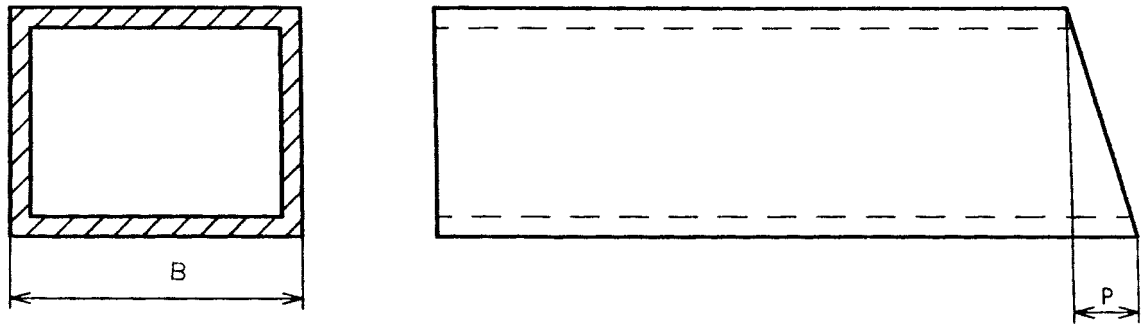

Figure 5. Measurement of deviation from perpendicularity

Table 4. Tolerances on flatness (convexity or concavity)

Dimensions in millimetres

Nominal dimensions B **or** H	**Limit deviation** Y
B or $H \leq 15$	$\pm 0{,}05$
$15 < B$ or $H \leq 30$	$\pm 0{,}10$
$30 < B$ or $H \leq 50$	$\pm 0{,}20$
$50 < B$ or $H \leq 70$	$\pm 0{,}30$
B or $H > 70$	$\pm 0{,}40$

5.3 Perpendicularity of cut ends

The deviation from perpendicularity of the cut ends shall be measured as shown in figure 5.

The tolerances from perpendicularity shall be in accordance with table 5.

Table 5. Tolerances on perpendicularity of cut ends

Dimensions in millimetres

Nominal width B	**Tolerance** P
$5 \leq B \leq 10$	0,075
$10 < B \leq 15$	0,10
$15 < B \leq 30$	0,20
$30 < B \leq 50$	0,35
$50 < B \leq 70$	0,50
$B > 70$	0,75

For specific cut length orders, this deviation shall be included in the tolerance over the total length (see **4.3**).

5.4 Twist

Twist shall be measured on a 1 m section at any position along the length of the tube (see figure 6). The twist tolerances shall be in accordance with table 6.

Table 6. Twist tolerances

Dimensions in millimetres

Nominal width B	Twist tolerance	
	per 1 000 mm of length	over the total length
$5 \leq B \leq 10$	0,15	0,7
$10 < B \leq 15$	0,20	1,2
$15 < B \leq 30$	0,40	2
$30 < B \leq 50$	0,7	3,5
$50 < B \leq 70$	1,0	5
$B > 70$	1,5	7,5

5.5 External radii

Unless otherwise stated on the order the tolerance on external radii of square and rectangular sections are $\pm$0,5 mm.

5.6 Deburring

Tubes shall not be supplied deburred (i.e. minimal end burrs which do not adversely affect the end use shall be permissible).

5.7 Weld fins

The external weld fin shall be removed completely (i.e. flush with the outside surface of the tube).

The position of the weld fin shall be as specified by the producer.

5.8 Shaped welded tubes

Shaped welded tubes shall be produced to the purchaser's specifications with tolerances in accordance with **4.1** measured across outside dimensions.

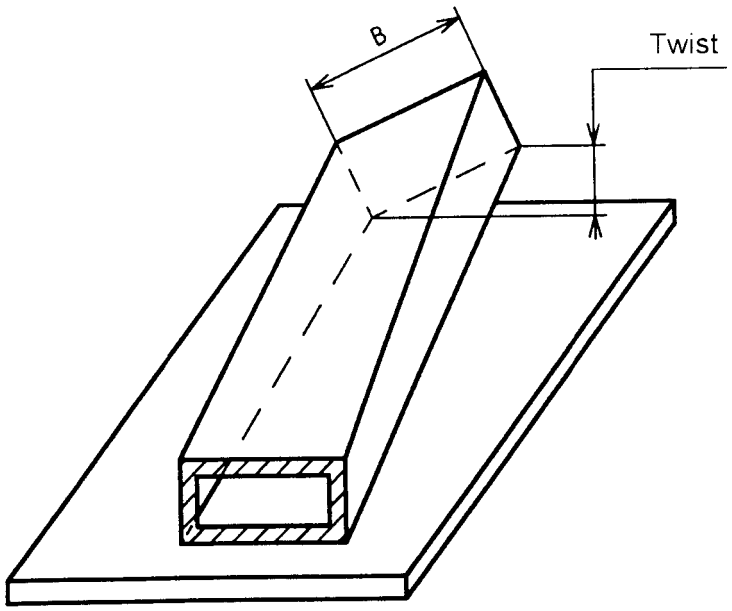

Figure 6. Measurement of twist

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