
**Wrought aluminium and aluminium
alloys — Extruded rods/bars, tubes
and profiles —**

**Part 5:
Tolerances on form and dimensions
for round, square and hexagonal bars**

*Aluminium et alliages d'aluminium corroyés — Barres, tubes et
profilés filés —*

*Partie 5: Tolerances sur forme et dimensions pour barres rondes,
carrées et hexagonales*



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 6, *Wrought aluminium and aluminium alloys*.

This fourth edition cancels and replaces the third edition (ISO 6362-5:2012), which has been technically revised. The main changes are as follows:

- in [Clause 4](#), Table 1 has been separated into [Table 1](#) and [Table 2](#) by alloy group;
- in [Clause 4](#), alloy 6026 has been added to [Table 1](#) and alloy 2033 has been added to [Table 2](#);
- errors have been corrected and expressions modified throughout.

A list of all parts in the ISO 6362 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles —

Part 5:

Tolerances on form and dimensions for round, square and hexagonal bars

1 Scope

This document specifies the tolerances on dimensions and shape of the following:

- wrought aluminium and aluminium alloy extruded round bars, having diameters in the range from 8 mm up to 350 mm;
- wrought aluminium and aluminium alloy extruded square and hexagonal bars, having widths across flats in the range from 10 mm up to 220 mm.

It is applicable to extruded round, square and hexagonal bars.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6362-1, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 1: Technical conditions for inspection and delivery*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6362-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

4 Materials

Alloys mentioned in this document are listed in ISO 6362-7.

NOTE Four-digit numerical designations are completely identical with Registration of International Alloy Designations and Chemical Composition Limits for Wrought Aluminum and Wrought Aluminum Alloys (known as “Teal sheets”)^[1].

For the purposes of this document, wrought aluminium and aluminium alloys are divided into two groups, which correspond to varying difficulty when manufacturing the products.

The division of the most commonly alloys used in general engineering into Group I and Group II is specified in [Table 1](#) and [Table 2](#), respectively.

Grouping of other alloys is subject to agreement between the purchaser and the supplier.

Table 1 — Alloy Group I

Alloy system	Alloy number
Pure aluminium	1070, 1070A, 1060, 1050, 1050A, 1350, 1100, 1200
Al-Mn system alloy	3102, 3003, 3103
Al-Mg system alloy	5005, 5005A, 5051A, 5251
Al-Mg-Si system alloy	6101, 6101A, 6101B, 6005, 6005A, 6005C, 6026, 6110A, 6012, 6018, 6023, 6351, 6060, 6360, 6061, 6261, 6262, 6262A, 6063, 6063A, 6463, 6065, 6081, 6082, 6182

Table 2 — Alloy Group II (all aluminium alloys except those given in alloy Group I)

Alloy system	Alloy number
Al-Mg system alloy	5019, 5049, 5052, 5154A, 5454, 5754, 5056, 5083, 5086
Al-Cu-Mg system alloy	2007, 2011, 2011A, 2014, 2014A, 2017, 2017A, 2024, 2030, 2033
Al-Zn-Mg system alloy	7003, 7204, 7005, 7108, 7108A, 7020, 7021, 7022, 7049A, 7050, 7075

5 Tolerances on dimensions

5.1 Tolerances on diameter and width across flats

Tolerances on diameter and width across flats shall be in accordance with [Table 3](#).

Table 3 — Dimensional tolerances

Dimensions in millimetres

Diameter or width across flats b	Tolerances	
	Alloy Group I	Alloy Group II
$8 \leq b \leq 18$	$\pm 0,22$	$\pm 0,30$
$18 < b \leq 25$	$\pm 0,25$	$\pm 0,35$
$25 < b \leq 40$	$\pm 0,30$	$\pm 0,40$
$40 < b \leq 50$	$\pm 0,35$	$\pm 0,45$
$50 < b \leq 65$	$\pm 0,40$	$\pm 0,50$
$65 < b \leq 80$	$\pm 0,50$	$\pm 0,70$
$80 < b \leq 100$	$\pm 0,55$	$\pm 0,90$
$100 < b \leq 120$	$\pm 0,65$	$\pm 1,00$
$120 < b \leq 150$	$\pm 0,80$	$\pm 1,20$
$150 < b \leq 180$	$\pm 1,00$	$\pm 1,40$
$180 < b \leq 220$	$\pm 1,15$	$\pm 1,70$
$220 < b \leq 270$	$\pm 1,30$	$\pm 2,00$
$270 < b \leq 320$	$\pm 1,60$	$\pm 2,50$
$320 < b \leq 350$	$\pm 2,10$	$\pm 3,00$
When the tolerance is specified as either all plus or minus side, the value in this table shall be doubled.		

5.2 Circularity of round bars

Circularity is measured by the difference between the maximum and minimum diameters measured in the same cross-section.

The permissible circularity is included in the tolerances on diameter specified in [Table 3](#).

5.3 Corner radii of square and hexagonal bars

The maximum corner radii of square and hexagonal bars shall be in accordance with [Table 4](#).

Table 4 — Maximum corner radii

Dimensions in millimetres

Width across flats b	Maximum value of corner radii		
	Square cross-section		Hexagonal cross-section
	Alloy Group I	Alloy Group II	
$10 \leq b \leq 25$	1,0	1,5	1,5
$25 < b \leq 50$	1,5	2,0	2,0
$50 < b \leq 80$	2,0	3,0	3,0
$80 < b \leq 120$	2,5	3,0	3,0
$120 < b \leq 180$	2,5	4,0	4,0
$180 < b \leq 220$	3,5	5,0	5,0

5.4 Fixed-length tolerances

If fixed lengths are supplied, their permissible tolerances on fixed lengths are given in [Table 5](#).

Table 5 — Fixed-length tolerance

Dimensions in millimetres

Diameter or width across flats b	Tolerances on fixed lengths		
	$L \leq 2\,000$	$2\,000 < L \leq 5\,000$	$5\,000 < L \leq 8\,000$
$8 \leq b \leq 100$	$\begin{smallmatrix} +5 \\ 0 \end{smallmatrix}$	$\begin{smallmatrix} +7 \\ 0 \end{smallmatrix}$	$\begin{smallmatrix} +10 \\ 0 \end{smallmatrix}$
$100 < b \leq 220$	$\begin{smallmatrix} +7 \\ 0 \end{smallmatrix}$	$\begin{smallmatrix} +9 \\ 0 \end{smallmatrix}$	$\begin{smallmatrix} +12 \\ 0 \end{smallmatrix}$
$220 < b \leq 350$	$\begin{smallmatrix} +8 \\ 0 \end{smallmatrix}$	$\begin{smallmatrix} +11 \\ 0 \end{smallmatrix}$	$\begin{smallmatrix} +14 \\ 0 \end{smallmatrix}$

5.5 Squareness of cut ends

The squareness of cut ends shall be within half of the fixed-length tolerance range specified in [Table 5](#) for both fixed and random lengths. For example, for a fixed-length tolerance of $\begin{smallmatrix} +10 \\ 0 \end{smallmatrix}$ mm, the squareness of cut ends shall be within 5 mm.

6 Tolerances on form

6.1 General

The form tolerances specified in [6.2](#) to [6.4](#) apply to all tempers, except tempers H111, H112, O and TX510.

The deviation shall be measured with the bar supported on a horizontal base-plate, such that the deviation is minimized by the mass of the bar.

6.2 Straightness tolerances

The straightness tolerances shall be in accordance with [Table 6](#).

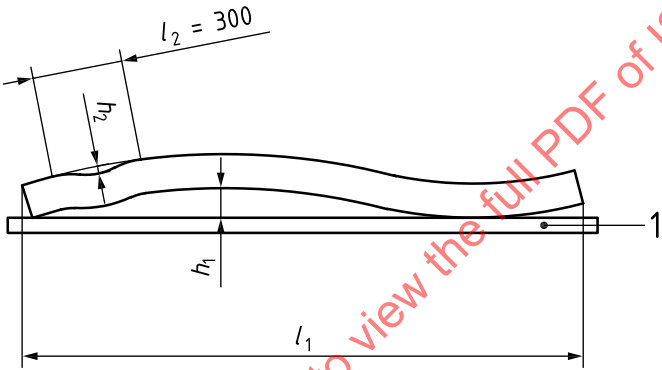
Table 6 — Straightness tolerances

Dimensions in millimetres

Width b	Straightness tolerances	
	Per 1 000 mm of total length (l_1) h_1	In any 300 mm (l_2) h_2
$8 \leq b \leq 80$	2	0,8
$80 < b \leq 120$	2	1,0
$120 < b \leq 220$	3	1,5
$220 < b \leq 350$	6	3

The deviations from straightness h_1 and h_2 shall be measured as shown in [Figure 1](#), with the bar placed on a horizontal base-plate so that its mass decreases the deviation.

Dimensions in millimetres



Key
1 base-plate

Figure 1 — Measurement of deviation from straightness

6.3 Convexity/concavity

The convexity/concavity for bars shall be included within the tolerances on width across flats.

6.4 Twist tolerances

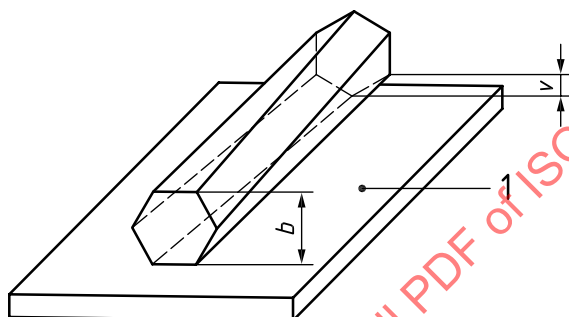
Twist tolerances shall be in accordance with [Table 7](#).

The twist v shall be measured in accordance with [Figure 2](#).

Table 7 — Twist tolerances

Dimensions in millimetres

Width across flats b	Twist tolerances v			
	Square cross-section		Hexagonal cross-section	
	Per 1 000 mm of length	5 000 or less of the total length	Per 1 000 mm of length	5 000 or less of the total length
$10 \leq b \leq 30$	1	3	1	1,5
$30 < b \leq 50$	1,5	4	1,5	2,5
$50 < b \leq 120$	2	5	2	3
$120 < b \leq 220$	3	6	2,5	4

**Key**

- b width
 v measurement position of twist
 1 base-plate

Figure 2 — Measurement of twist

6.5 Squareness for square bars

Squareness tolerances are specified in [Table 8](#).

The deviation from square shall be measured as shown in [Figure 3](#).

Table 8 — Squareness tolerances

Dimensions in millimetres

Width across flats b	Maximum deviation from square z
$10 \leq b \leq 100$	$0,01 \times b$
$100 < b \leq 180$	1,0
$180 < b \leq 220$	1,5