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

Part 5:

**Round, square and hexagonal bars —
Tolerances on shape and dimensions**

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*Aluminium et alliages d'aluminium corroyés — Barres, tubes et
profils fileés —*

*Partie 5: Barres rondes, carrées et hexagonales — Tolérances sur
forme et dimensions*

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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

ISO 6362-5 was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 6, *Wrought aluminium and aluminium alloys*.

This third edition cancels and replaces the second edition (ISO 6362-5:2001), which has been technically revised.

ISO 6362 consists of the following parts, under the general title *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles*:

- Part 1: *Technical conditions for inspection and delivery*
- Part 2: *Mechanical properties*
- Part 3: *Extruded rectangular bars — Tolerances on shape and dimensions*
- Part 4: *Profiles — Tolerances on shape and dimensions*
- Part 5: *Round, square and hexagonal bars — Tolerances on shape and dimensions*
- Part 6: *Round, square, rectangular and hexagonal tubes — Tolerances on shape and dimensions*
- Part 7: *Chemical composition*

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

Part 5: Round, square and hexagonal bars — Tolerances on shape and dimensions

1 Scope

This part of ISO 6362 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 applies to extruded round, square and hexagonal bars.

2 Normative references

The following referenced documents are indispensable for the application 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.

4 Materials

For the purposes of this part of ISO 6362, wrought aluminium and aluminium alloys are divided into two groups, which correspond to varying difficulty when manufacturing the products.

The division into group I and group II of the most commonly used general engineering alloys is specified in Table 1.

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

Table 1 — Alloy group

Group I	1070, 1070A, 1060, 1050, 1050A, 1350, 1100, 1200 3102, 3003, 3103 5005, 5005A, 5051A, 5251 6101, 6101A, 6101B, 6005, 6005A, 6005C, 6110A, 6012, 6018, 6023, 6351, 6060, 6360, 6061, 6261, 6262, 6262A, 6063, 6063A, 6463, 6065, 6081, 6082, 6182
Group II	2007, 2011, 2011A, 2014, 2014A, 2017, 2017A, 2024, 2030 5019, 5049, 5052, 5154A, 5454, 5754, 5056, 5083, 5086 7003, 7204, 7005, 7108, 7108A, 7020, 7021, 7022, 7049A, 7050, 7075
NOTE The four-digit numbers listed are taken from the Registration of International Alloy Designations and Chemical Composition Limits for Wrought Aluminium Alloys, published by the Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, VA 22209, USA (known as "Teal Sheets").	

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 2.

Table 2 — Dimensional tolerances

iTech STANDARD PREVIEW Dimensions in millimetres

Diameter or width across flats <i>b</i>	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 2.

5.3 Corner radii of square and hexagonal bars

The maximum corner radii of square and hexagonal bars shall be in accordance with Table 3.

Table 3 — Maximum corner radii

Dimensions in millimetres

Width across flats b	Maximum value of corner radii		
	Alloy group I	Alloy group II	Hexagonal cross-section
$10 \leq b \leq 25$	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, it shall be agreed between the supplier and purchaser. The permissible tolerances on fixed lengths are given in Table 4.

Table 4— Fixed-length tolerance

Dimensions in millimetres

Diameter or width across flats b	Tolerances on fixed lengths		
	$L \leq 2\ 000$	$2\ 000 < L \leq 5\ 000$	$5\ 000 < L \leq 8\ 000$
$8 \leq b \leq 100$	$\begin{matrix} +5 \\ 0 \end{matrix}$	$\begin{matrix} +7 \\ 0 \end{matrix}$	$\begin{matrix} +10 \\ 0 \end{matrix}$
$100 < b \leq 200$	$\begin{matrix} +7 \\ 0 \end{matrix}$	$\begin{matrix} +9 \\ 0 \end{matrix}$	$\begin{matrix} +12 \\ 0 \end{matrix}$
$200 < b \leq 350$	$\begin{matrix} +8 \\ 0 \end{matrix}$	$\begin{matrix} +11 \\ 0 \end{matrix}$	$\begin{matrix} +14 \\ 0 \end{matrix}$

5.5 Squareness of cut ends

The squareness of cut ends shall be within half of the fixed-length tolerance range specified in Table 4 for both fixed and random lengths. For example, for a fixed-length tolerance of $\begin{matrix} +10 \\ 0 \end{matrix}$ mm, the squareness of cut ends shall be within 5 mm.

6 Tolerances on shape

6.1 General

The form tolerances specified in 6.2 to 6.4 apply to all tempers, except tempers 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 5.

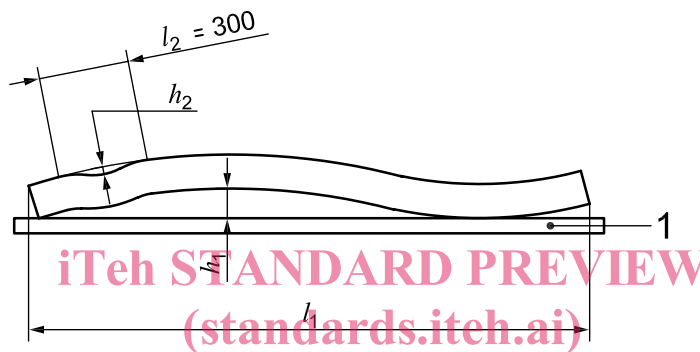
Table 5 — Straightness tolerances

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

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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

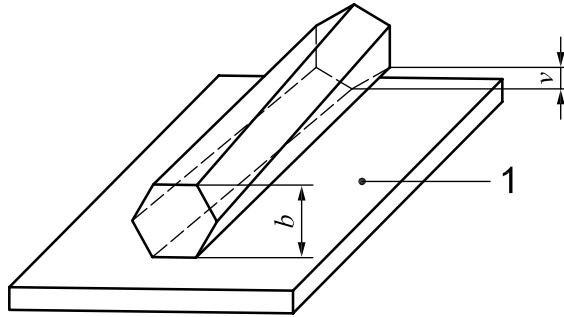
Twist tolerances shall be in accordance with Table 6.

The twist v shall be measured in accordance with Figure 2.

Table 6 — Twist tolerances

Dimensions in millimetres

Width across flats b	Twist tolerances v			
	Square cross-section		Hexagonal cross-section	
	Per 1 000 mm of length	Over the total length	Per 1 000 mm of length	Over 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

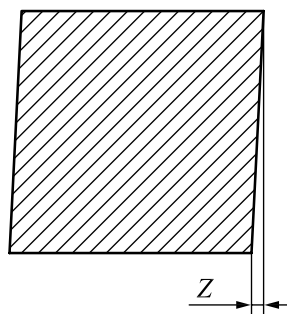
Squareness tolerances are specified in Table 7.

The deviation from square shall be measured as shown in Figure 3.

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Table 7 — Squareness tolerances
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Dimensions in millimetres

Width across flats <i>b</i>	Maximum deviation from square <i>z</i>
$10 \leq b \leq 100$	$0,01 \times b$
$100 < b \leq 180$	1,0
$180 < b \leq 240$	1,5



Key

- Z* deviation

Figure 3 — Measurement of deviation from square (cross-section)