
**Wrought aluminium and aluminium
alloys — Cold-drawn rods/bars, tubes
and wires —**

**Part 4:
Tolerances on form and dimensions
for drawn rectangular bars and wires**

*Aluminium et alliages d'aluminium corroyés — Barres, tubes et fils
étirés à froid —*

*Partie 4: Tolérances sur forme et dimensions pour barres
rectangulaires et fils étirés*

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Published in Switzerland

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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 third edition cancels and replaces the second edition (ISO 6363-4:2012), 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 6363 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 — Cold-drawn rods/bars, tubes and wires —

Part 4: Tolerances on form and dimensions for drawn rectangular bars and wires

1 Scope

This document specifies the tolerances on form and dimensions of wrought aluminium and aluminium alloy drawn rectangular bars and wires with thicknesses ranging from 2 mm up to and including 60 mm and widths up to and including 200 mm.

For wires, this document does not apply to electrical, welding and aeronautical purposes.

For drawn bars, 5.1 to 5.4 apply, and only 5.1 applies to drawn wires.

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 6363-1, *Wrought aluminium and aluminium alloys — Cold-drawn rods/bars, tubes and wires — 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 6363-1 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 whenever 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 | 1050, 1050A, 1070, 1080A, 1098, 1100, 1200, 1350 |
| Al-Mn system alloy | 3003, 3102, 3103, 3203 |
| Al-Mg system alloy | 5005, 5005A, 5050, 5051, 5051A |
| Al-Mg-Si system alloy | 6005, 6005A, 6005C, 6008, 6012, 6014, 6018, 6026, 6056, 6060, 6061, 6063, 6063A, 6065, 6081, 6082, 6101, 6101A, 6101B, 6110A, 6181, 6261, 6262, 6262A, 6351, 6360, 6463 |

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

| Alloy system | Alloy number |
|-----------------------|---|
| Al-Cu-Mg system alloy | 2007, 2011, 2011A, 2014, 2014A, 2017, 2017A, 2117, 2024, 2030, 2033, 2219 |
| Al-Mg system alloy | 5019, 5041, 5049, 5052, 5056, 5083, 5086, 5154, 5154A, 5251, 5454, 5754 |
| Al-Zn-Mg system alloy | 7003, 7005, 7020, 7021, 7022, 7049A, 7050, 7075, 7108, 7108A, 7204 |

5 Tolerances on form and dimensions

5.1 Tolerances on width and thickness

The tolerances on width and thickness shall be in accordance with [Tables 3](#) and [4](#).

The dimensions shall be measured without influence from the corner radii.

Table 3 — Tolerances on width and thickness for alloy Group I

Dimensions in millimetres

| Width ^a <i>b</i> | | Thickness <i>a</i> tolerances for thickness ranges ^a | | | | | |
|--------------------------------|------------|---|-----------------|------------------|------------------|------------------|------------------|
| Range | Tolerances | $2 \leq a \leq 6$ | $6 < a \leq 10$ | $10 < a \leq 18$ | $18 < a \leq 30$ | $30 < a \leq 40$ | $40 < a \leq 60$ |
| $b \leq 10$ | ±0,08 | ±0,06 | ±0,08 | — | — | — | — |
| $10 < b \leq 18$ | ±0,10 | ±0,06 | ±0,08 | ±0,10 | — | — | — |
| $18 < b \leq 30$ | ±0,15 | ±0,06 | ±0,08 | ±0,10 | ±0,15 | — | — |
| $30 < b \leq 50$ | ±0,20 | ±0,08 | ±0,10 | ±0,12 | ±0,15 | ±0,20 | — |
| $50 < b \leq 80$ | ±0,25 | ±0,10 | ±0,10 | ±0,12 | ±0,15 | ±0,20 | ±0,25 |
| $80 < b \leq 120$ | ±0,28 | — | ±0,12 | ±0,15 | ±0,20 | ±0,25 | ±0,30 |
| $120 < b \leq 160$ | ±0,32 | — | — | ±0,15 | ±0,20 | ±0,30 | ±0,35 |
| $160 < b \leq 200$ | ±0,35 | — | — | ±0,20 | ±0,25 | ±0,35 | ±0,40 |

^a If $b/a > 10$, the permissible tolerances shall be agreed upon.

Table 4 — Tolerances on width and thickness for alloy Group II

Dimensions in millimetres

| Width ^a <i>b</i> | | Thickness <i>a</i> tolerances for thickness ranges ^a | | | | | |
|--------------------------------|------------|---|-----------------|------------------|------------------|------------------|------------------|
| Range | Tolerances | $2 \leq a \leq 6$ | $6 < a \leq 10$ | $10 < a \leq 18$ | $18 < a \leq 30$ | $30 < a \leq 40$ | $40 < a \leq 60$ |
| $b \leq 10$ | ±0,12 | ±0,09 | ±0,12 | — | — | — | — |
| $10 < b \leq 18$ | ±0,15 | ±0,09 | ±0,12 | ±0,15 | — | — | — |
| $18 < b \leq 30$ | ±0,23 | ±0,09 | ±0,12 | ±0,15 | ±0,23 | — | — |
| $30 < b \leq 50$ | ±0,30 | ±0,12 | ±0,15 | ±0,18 | ±0,23 | ±0,30 | — |
| $50 < b \leq 80$ | ±0,38 | ±0,15 | ±0,15 | ±0,18 | ±0,23 | ±0,30 | ±0,38 |
| $80 < b \leq 120$ | ±0,42 | — | ±0,18 | ±0,23 | ±0,30 | ±0,38 | ±0,45 |
| $120 < b \leq 160$ | ±0,48 | — | — | ±0,23 | ±0,30 | ±0,45 | ±0,53 |
| $160 < b \leq 200$ | ±0,53 | — | — | ±0,30 | ±0,38 | ±0,53 | ±0,60 |

^a If $b/a > 10$, the permissible tolerances shall be agreed upon.

5.2 Fixed-length tolerances

If fixed-length bars are ordered, their maximum permissible length tolerances shall be in accordance with [Table 5](#).

Table 5 — Fixed-length tolerances

Dimensions in millimetres

| Width <i>b</i> | Tolerances on fixed lengths | | | |
|--------------------|-----------------------------|-----------------------|--------------------------|--------------------------|
| | $L \leq 250$ | $250 < L \leq 1\ 000$ | $1\ 000 < L \leq 2\ 000$ | $2\ 000 < L \leq 5\ 000$ |
| $b \leq 30$ | +1 0 | +2 0 | +3 0 | +5 0 |
| $30 < b \leq 50$ | +2 0 | +3 0 | +4 0 | +6 0 |
| $50 < b \leq 120$ | +2,5 0 | +4 0 | +5 0 | +7 0 |
| $120 < b \leq 200$ | +3 0 | +5 0 | +6 0 | +8 0 |

5.3 Squareness of cut ends

Squareness of cut ends shall be within half of the fixed length tolerance range (see [Table 5](#)) for both fixed and random lengths. For example, for a fixed-length tolerance of $^{+2}_0$ mm, the squareness of cut ends shall be within 1 mm.

5.4 Corner radii

The corners of the bars shall be slightly rounded, but the corner radii shall not exceed the values specified in [Table 6](#).

Table 6 — Maximum corner radii

Dimensions in millimetres

| Thickness <i>a</i> | Maximum corner radii | |
|-----------------------|----------------------|----------------|
| | Alloy Group I | Alloy Group II |
| $a \leq 10$ | 0,4 | 0,6 |
| $10 < a \leq 40$ | 0,8 | 1,0 |
| $40 < a \leq 60$ | 1,5 | 2,0 |

5.5 Form tolerances

5.5.1 General

The maximum form tolerances specified in 5.5.2 to 5.5.4 apply to all tempers, except temper O and TX51.

Form tolerances are measured by placing the bar on a horizontal plate under its own mass as shown in Figures 1 to 3.

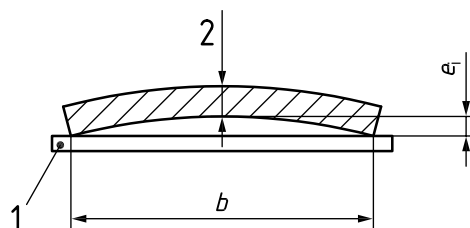
5.5.2 Flatness tolerances

The maximum allowable flatness tolerances, *e*, shall be in accordance with Table 7. The deviation from flatness, *e_i*, shall be measured in accordance with Figure 1.

Table 7 — Flatness tolerances

Dimensions in millimetres

| Width <i>b</i> | Flatness tolerance <i>e</i> |
|--------------------|--------------------------------|
| $b \leq 30$ | 0,2 |
| $30 < b \leq 50$ | 0,3 |
| $50 < b \leq 80$ | 0,4 |
| $80 < b \leq 120$ | 0,6 |
| $120 < b \leq 200$ | 0,9 |



Key

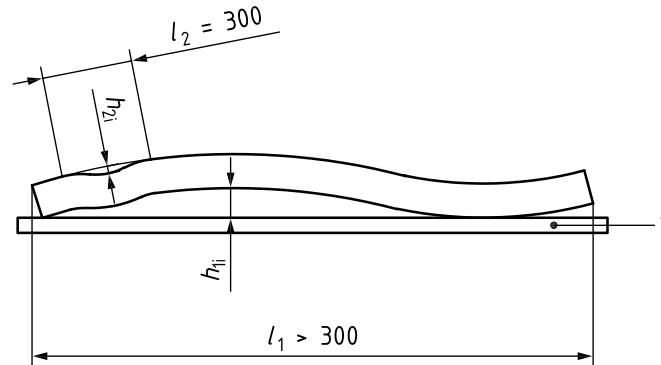
- 1 base plate
- 2 thickness
- b* width
- e_i* deviation from flatness

Figure 1 — Measurement of deviation from flatness

5.5.3 Straightness tolerances

The maximum allowable straightness tolerance, h , for the total length, l , shall be 2 mm per 1 000 mm of length (see Figure 2). In addition, h_2 shall not exceed 0,6 mm for each section of 300 mm length (l_2).

Dimensions in millimetres



Key

1 base plate

Figure 2 — Measurement of deviation from straightness

5.5.4 Twist tolerance

The maximum allowable twist tolerances shall be in accordance with Table 8.

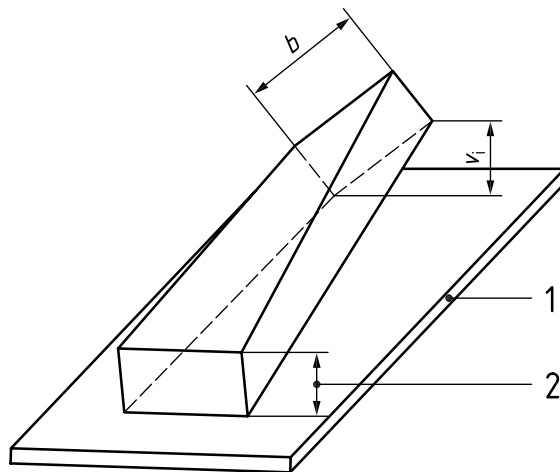
The twist, v_i , shall be measured as shown in Figure 3.

For rectangular bars with width less than 10 mm, the twist tolerances shall be agreed between the purchaser and the supplier.

Table 8 — Twist tolerances

Dimensions in millimetres

| Width b | Twist tolerances | |
|---------------------|------------------------|-----------------------|
| | v | |
| | Per 1 000 mm of length | Over the total length |
| | | $L \leq 5\,000$ |
| $10 \leq b \leq 30$ | 1,5 | 3 |
| $30 < b \leq 50$ | 2 | 5 |
| $50 < b \leq 120$ | 3 | 7 |
| $120 < b \leq 200$ | 4 | 10 |



- Key**
- 1 base plate
 - 2 thickness
 - b* width
 - v_i twist

Figure 3 — Measurement of twist

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5.5.5 Squareness tolerances

Squareness tolerances are specified in [Table 9](#).

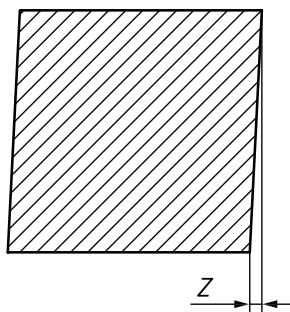
The deviation from square shall be measured as shown in [Figure 4](#).

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Table 9 — Squareness tolerances

Dimensions in millimetres

| Thickness <i>a</i> | Maximum deviation from square <i>Z</i> |
|-----------------------|---|
| $2 \leq a \leq 60$ | $0,005 \times a$ |



- Key**
- Z* maximum deviation from square

Figure 4 — Measurement of deviation from square