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

Part 4: Tolerances on form and dimensions for profiles

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

Partie 4: Tolérances sur forme et dimensions pour profilés

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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).

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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 6362-4:2012), which has been technically revised. The main changes are as follows:

— 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 4: Tolerances on form and dimensions for profiles

1 Scope

This document specifies the tolerances on dimensions and shape of wrought aluminium and aluminium alloy extruded profiles with a cross-section contained within a circumscribing circle not greater than 800 mm.

It is applicable to extruded profiles for general engineering applications only.

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 and the following 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/

3.1
circumscribing circle
smallest circle which encloses entirely the cross-section of the shape

Note 1 to entry: This dimension may have to be increased when shapes are subjected to corrections of the uneven thickness or in the case of hollow shapes for which the centre of the circumscribing circle needs to be considered, based on the void. These matters should be confirmed with the supplier beforehand as required.

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, 1100, 1200, 1350
Al-Mn system alloy	3021, 3003, 3102, 3103, 3203
Al-Mg system alloy	5005, 5005A, 5051A, 5251
Al-Mg-Si system alloy	6005, 6005A, 6005C, 6008, 6012, 6014, 6018, 6023, 6060, 6061, 6063, 6063A, 6065, 6081, 6082, 6182, 6101, 6101A, 6101B, 6106, 6110A, 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-Mg system alloy	5019, 5049, 5052, 5083, 5086, 5154A, 5454, 5754
Al-Cu-Mg system alloy	2007, 2014, 2014A, 2017, 2017A, 2024, 2030
Al-Zn-Mg system alloy	7204, 7003, 7005, 7020, 7021, 7022, 7049A, 7050, 7075, 7108, 7108A

5 Tolerances on form and dimensions

5.1 Dimensional tolerances

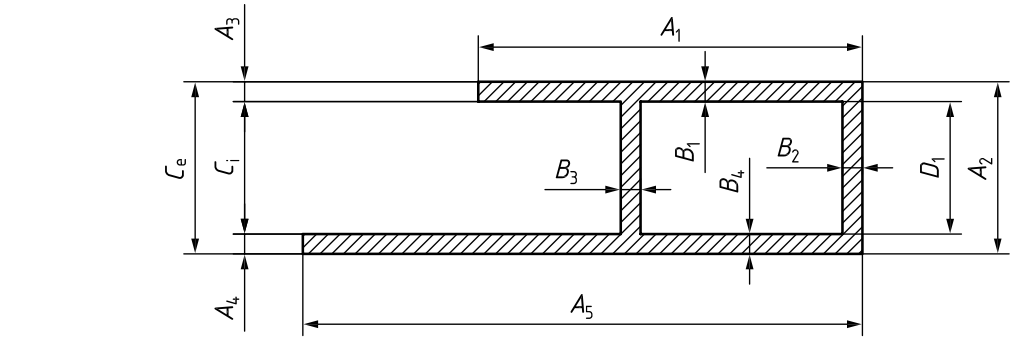
Tolerances on dimensions (see Figures 1 and 2) are specified in Tables 3 to 5.

The tolerances to be applied to the sectional dimensions as shown in Figure 1, where the nominal thickness of one wall is equal to or greater than three times the thickness of the other wall, *t*, shall be agreed between the purchaser and the supplier, see Figure 1 b) to e).

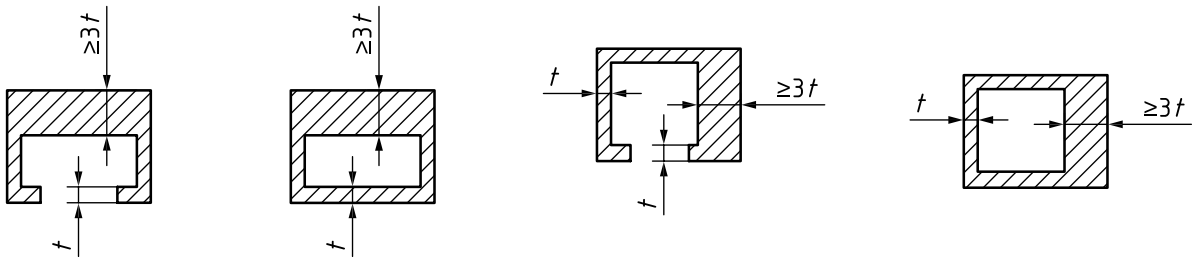
The purchaser should specify whether ordinary or special tolerances are required.

In the case of angled shapes as shown in Figure 3, the tolerances shall be decided not on the base of the length of dimension X, but on the base of the angle α (see 6.6).

Even when value Y in Figure 3 is equal to or greater than 75 % of value X, these tolerances are not applied to the dimension X or Z. The tolerances for X and Y shall conform to the column corresponding to space dimension Ci and Ce depending on the distance from the reference base.



a)

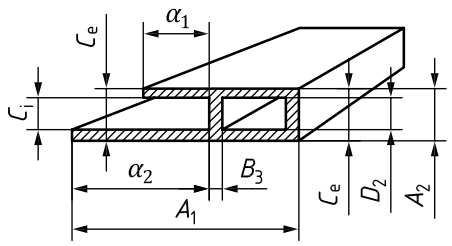


b) **c)** **d)** **e)**

Key

A_1 to A_5	dimensions of metallic parts except the thickness of wall surface at hollow place (B)
B_1 to B_4	thickness of wall surface at hollow place
C_e, C_i	dimensions of empty space at opening
D_1	dimensions of empty space at hollow place

Figure 1 — Sectional dimensions



Key

α_1, α_2	distance between specified point and root of let

Figure 2 — Definition of α_1, α_2 on sectional dimensions

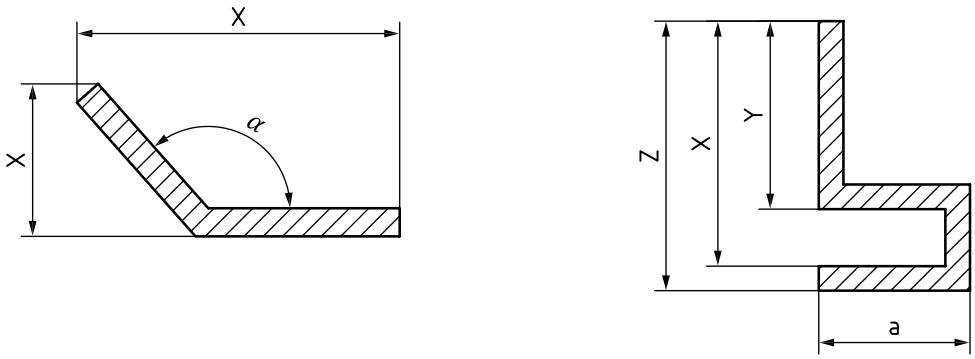


Figure 3 — Sectional dimensions

Table 3 — Tolerance (ordinary class) on sectional dimensions

Dimensions in millimetres

Diameter of circumscribing circle	Dimension at specified part	Tolerance[a]															
		Metallic part (where 75 % or more is metal)				**Hollow part** (where more than 25 % is hollow space, i.e. less than 75 % is metal) C_i or C_e[b]											
		Metallic part other than that in the right column A_1, A_2		**Thickness of wall surface at hollow part**[c] B		**Distance between specified point and root of let** α[d]											
		$5 < \alpha \leq 15$		$15 < \alpha \leq 30$		$30 < \alpha \leq 60$		$60 < \alpha \leq 100$		$100 < \alpha \leq 150$		$150 < \alpha \leq 200$					
	Alloy Group	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**
$250 \leq D$	$A \leq 3{,}20$	±0,23	±0,35	±15 % but ±2,3 max. ±0,38 min.	±20 % but ±3,4 max. ±0,57 min.	±0,33	±0,43	±0,38	±0,48	—	—	—	—	—	—	—	—
	$3{,}20 < A \leq 6{,}30$	±0,27	±0,42			±0,39	±0,53	±0,45	±0,58	±0,51	±0,64	—	—	—	—	—	—
	$6{,}30 < A \leq 12{,}50$	±0,30	±0,45			±0,47	±0,60	±0,51	±0,64	±0,58	±0,70	±0,61	±0,73	—	—	—	—
	$12{,}50 < A \leq 20{,}00$	±0,35	±0,54			±0,53	±0,69	±0,58	±0,73	±0,64	±0,80	±0,67	±0,83	—	—	—	—
	$20{,}00 < A \leq 25{,}00$	±0,38	±0,57			±0,60	±0,75	±0,64	±0,80	±0,70	±0,86	±0,77	±0,91	±0,89	±1,0	—	—
	$25{,}00 < A \leq 40{,}00$	±0,45	±0,69			±0,69	±0,90	±0,73	±0,93	±0,83	±1,0	±0,91	±1,1	±1,0	±1,2	—	—
	$40{,}00 < A \leq 50{,}00$	±0,54	±0,80			±0,79	±1,0	±0,83	±1,1	±0,99	±1,2	±1,1	±1,3	±1,2	±1,4	±1,4	±1,7
	$50{,}00 < A \leq 100{,}00$	±0,92	±1,4			±1,1	±1,5	±1,2	±1,6	±1,5	±1,9	±1,7	±2,1	±2,0	±2,4	±2,3	±2,7
	$100{,}00 < A \leq 150{,}00$	±1,3	±2,0			±1,5	±2,0	±1,6	±2,1	±2,0	±2,6	±2,4	±2,9	±2,8	±3,3	±3,2	±3,7
	$150{,}00 < A \leq 200{,}00$	±1,7	±2,5			±1,8	±2,5	±2,0	±2,7	±2,6	±3,3	±3,0	±3,7	±3,6	±4,2	±4,1	±4,7
	$200{,}00 < A \leq 250{,}00$	±2,1	±3,1			±2,1	±3,0	±2,4	±3,2	±3,2	±4,0	±3,7	±4,5	±4,3	±5,4	±4,9	±5,7
$250 < D \leq 800$	$A \leq 3{,}20$	±0,54	±0,80	±20 % but ±3,4 max. ±0,57 min.	±20 % but ±3,4 max. ±0,95 min.	±0,64	±0,90	±0,69	±0,93	—	—	—	—	—	—	—	—
	$3{,}20 < A \leq 6{,}30$	±0,57	±0,84			±0,67	±0,92	±0,76	±1,0	±0,89	±1,1	—	—	—	—	—	—
	$6{,}30 < A \leq 12{,}50$	±0,62	±0,92			±0,71	±0,99	±0,82	±1,1	±0,95	±1,2	±1,5	±1,7	—	—	—	—
	$12{,}50 < A \leq 20{,}00$	±0,65	±0,96			±0,78	±1,1	±0,93	±1,2	±1,3	±1,6	±1,7	±2,0	—	—	—	—
	$20{,}00 < A \leq 25{,}00$	±0,69	±1,0			±0,81	±1,1	±1,0	±1,3	±1,6	±1,8	±2,0	±2,3	±2,7	±2,9	—	—
	$25{,}00 < A \leq 40{,}00$	±0,72	±1,1			±0,85	±1,2	±1,2	±1,5	±1,9	±2,2	±2,3	±2,6	±3,0	±3,2	—	—
	$40{,}00 < A \leq 50{,}00$	±0,92	±1,4			±1,2	±1,6	±1,5	±1,9	±2,2	±2,6	±2,6	±3,0	±3,3	±3,6	±4,6	±4,9
	$50{,}00 < A \leq 100{,}00$	±1,3	±2,0			±1,6	±2,2	±1,8	±2,4	±2,5	±3,1	±2,9	±3,4	±3,6	±4,1	±4,9	±5,4
	$100{,}00 < A \leq 150{,}00$	±1,7	±2,5			±1,9	±2,7	±2,2	±2,9	±2,9	±3,6	±3,2	±3,9	±3,8	±4,5	±5,2	±5,8
	$150{,}00 < A \leq 200{,}00$	±2,1	±3,1			±2,3	±3,2	±2,5	±3,5	±3,2	±4,0	±3,5	±4,3	±4,1	±4,9	±5,4	±6,2
	$200{,}00 < A \leq 250{,}00$	±2,4	±3,7			±2,6	±3,8	±2,9	±4,0	±3,5	±4,5	±3,8	±4,7	±4,4	±5,4	±5,7	±6,6

Table 3 *(continued)*

Diameter of circumscribing circle	Dimension at specified part	Tolerance[a]															
		Metallic part (where 75 % or more is metal)				**Hollow part** (where more than 25 % is hollow space, i.e. less than 75 % is metal) C_i or C_e[b]											
		Metallic part other than that in the right column A_1, A_2		**Thickness of wall surface at hollow part**[c] B		**Distance between specified point and root of let** α[d]											
						$5 < \alpha \leq 15$		$15 < \alpha \leq 30$		$30 < \alpha \leq 60$		$60 < \alpha \leq 100$		$100 < \alpha \leq 150$		$150 < \alpha \leq 200$	
	Alloy Group	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**
$250 < D \leq 800$	$250{,}00 < A \leq 300{,}00$	±2,8	±4,2	±20 % but ±3,4 max. ±0,57 min.	±20 % but ±3,4 max. ±0,95 min.	±3,0	±4,3	±3,2	±4,5	±3,8	±5,0	±4,1	±5,2	±4,7	±5,8	±6,0	±7,0
	$300{,}00 < A \leq 350{,}00$	±3,2	±4,8			±3,3	±4,8	±3,6	±5,0	±4,1	±5,5	±4,4	±5,6	±5,0	±6,3	±6,2	±7,4
	$350{,}00 < A \leq 400{,}00$	±3,6	±5,4			±3,7	±5,4	±3,9	±5,5	±4,5	±5,9	±4,7	±6,0	±5,3	±6,7	±6,5	±7,8
	$400{,}00 < A \leq 450{,}00$	±4,0	±5,9			±4,1	±5,9	±4,3	±6,0	±4,8	±6,4	±5,0	±6,5	±5,6	±7,2	±6,8	±8,2
	$450{,}00 < A \leq 500{,}00$	±4,4	±6,5			±4,4	±6,4	±4,6	±6,5	±5,1	±6,9	±5,3	±6,9	±5,9	±7,6	±7,1	±8,6
	$500{,}00 < A \leq 550{,}00$	±4,7	±7,1			±4,8	±7,0	±4,9	±7,1	±5,4	±7,4	±5,6	±7,4	±6,2	±8,1	±7,3	±9,0
	$550{,}00 < A \leq 800{,}00$	±5,1	±7,7			±5,1	±7,5	±5,3	±7,6	±5,7	±7,8	±5,8	±7,8	±6,5	±8,5	±7,6	±9,4

Dimensional tolerances for the space portions of hollow parts shall be as given in Table 5 (column *D*).

When either only a minus or plus side tolerance is specified, the value in this table shall be doubled.

[a] When the dimensional tolerance is not made equal at the plus side and minus side, determine the value in the column corresponding to the centre of allowable range, and use this value as a standard to decide the tolerance.

[b] If the purchaser and the supplier agree, the outside dimension C_e may be specified instead of the inside dimension C_i.

[c] This is applicable when the space volume enveloped with hollow part is 70 mm^2 or larger. If less than 70 mm^2, employ column *A*.

[d] If 5 mm or under, employ column *A*.

Table 4 — Tolerance (special class) on sectional dimensions

Dimensions in millimetres

Diameter of circum-scribing circle	Dimension at specified part	Tolerance[a]															
		Metallic part (where 75 % or more is metal)				**Hollow part** (where more than 25 % is hollow space, i.e. less than 75 % is metal) C_i or C_e[b]											
		Metallic part other than that in the right column A_1, A_2		**Thickness of wall surface at hollow part**[c] B		**Distance between specified point and root of let** α[d]											
		$5 < \alpha \leq 15$		$15 < \alpha \leq 30$		$30 < \alpha \leq 60$		$60 < \alpha \leq 100$		$100 < \alpha \leq 150$		$150 < \alpha \leq 200$					
	Alloy Group	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**
$250 \leq D$	$A \leq 3{,}20$	±0,15	±0,23	±10 % but ±1,50 max. ±0,25 min.	±15 % but ±2,30 max. ±0,38 min.	±0,25	±0,33	±0,30	±0,38	—	—	—	—	—	—	—	—
	$3{,}20 < A \leq 6{,}30$	±0,18	±0,28			±0,30	±0,41	±0,36	±0,46	±0,41	±0,50	—	—	—	—	—	—
	$6{,}30 < A \leq 12{,}50$	±0,20	±0,30			±0,36	±0,46	±0,41	±0,50	±0,46	±0,56	±0,50	±0,60	—	—	—	—
	$12{,}50 < A \leq 20{,}00$	±0,23	±0,36			±0,41	±0,52	±0,46	±0,58	±0,50	±0,64	±0,56	±0,70	—	—	—	—
	$20{,}00 < A \leq 25{,}00$	±0,25	±0,38			±0,46	±0,58	±0,50	±0,64	±0,56	±0,70	±0,64	±0,76	±0,76	±0,88	—	—
	$25{,}00 < A \leq 40{,}00$	±0,30	±0,46			±0,54	±0,68	±0,58	±0,74	±0,66	±0,80	±0,76	±0,92	±0,88	±1,05	—	—
	$40{,}00 < A \leq 50{,}00$	±0,36	±0,54			±0,60	±0,78	±0,66	±0,84	±0,78	±0,96	±0,92	±1,10	±1,05	±1,25	±1,25	±1,45
	$50{,}00 < A \leq 100{,}00$	±0,60	±0,90			±0,86	±1,15	±0,96	±1,25	±1,20	±1,50	±1,45	±1,75	±1,70	±2,05	±2,05	±2,35
	$100{,}00 < A \leq 150{,}00$	±0,86	±1,30			±1,10	±1,55	±1,25	±1,70	±1,65	±2,05	±2,00	±2,40	±2,40	±2,80	±2,80	±3,25
	$150{,}00 < A \leq 200{,}00$	±1,10	±1,70			±1,35	±1,95	±1,55	±2,15	±2,10	±2,65	±2,50	±3,05	±3,05	±3,60	±3,55	±4,10
	$200{,}00 < A \leq 250{,}00$	±1,35	±2,05			±1,65	±2,30	±1,90	±2,55	±2,50	±3,25	±3,05	±3,75	±3,70	±4,60	±4,30	±5,00