

BS EN 851:2014



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Aluminium and aluminium alloys — Circle and circle stock for the production of culinary utensils — Specifications

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee NFE/35, Light metals and their alloys.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Amendments issued since publication

Date	Text affected
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English Version

Aluminium and aluminium alloys - Circle and circle stock for the production of culinary utensils - Specifications

Aluminium et alliages d'aluminium - Disques et ébauches pour disques pour applications culinaires - Spécifications

Aluminium und Aluminiumlegierungen - Ronden und Rondenvormaterial zur Herstellung von Küchengeschirr - Spezifikationen

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Foreword

This document (EN 851:2014) 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of an identical text or by endorsement, at the latest by October 2014 and conflicting national standards shall be withdrawn at the latest by October 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 851:1995.

With regard the previous version, Clause 2 Normative references was updated; no new alloys were added.

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1 Scope

This European Standard specifies the particular requirements for wrought aluminium and aluminium alloys in the form of circle or circle stock for culinary utensils applications.

This standard is applicable to:

- Circles made out of hot or cold rolled circles stock, with a thickness from 0,2 mm up to and including 12 mm and with a diameter from 100 mm up to and including 1 600 mm.

NOTE Circles with a diameter up to 1 000 mm can be produced by blanking.

- Hot or cold-rolled circle stock with a thickness from 0,2 mm up to and including 12 mm and with a width up to 1 600 mm.

This European Standard is not applicable to slugs for impact extrusions which are dealt with in other European Standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 485-1, *Aluminium and aluminium alloys – Sheet, strip and plate – Part 1: Technical conditions for inspection and delivery*

EN 485-2, *Aluminium and aluminium alloys - Sheet, strip and plate - Part 2: Mechanical properties*

EN 485-3, *Aluminium and aluminium alloys - Sheet, strip and plate - Part 3: Tolerances on dimensions and form for hot-rolled products*

EN 485-4, *Aluminium and aluminium alloys - Sheet, strip and plate - Part 4: Tolerances on shape and dimensions for cold-rolled products*

EN 515, *Aluminium and aluminium alloys - Wrought products - Temper designations*

EN 602, *Aluminium and aluminium alloys - Wrought products - Chemical composition of semi-finished products used for the fabrication of articles for use in contact with foodstuff*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

circle

circular flat product obtained by circular sawing or shearing, or by blanking of a flat rolled product with a uniform thickness over 0,20 mm

3.2

circle stock

flat rolled product of rectangular cross-section with uniform thickness over 0,20 mm, supplied in coils, sheets, or plates, usually with sheared or sawn edges, and intended to be sawn, sheared or blanked into flat shapes to be subsequently formed, drawn, etc.

Note 1 to entry: The thickness does not exceed one tenth of the width.

3.3

hot rolled circle and circle stock

circle or circle stock whose final thickness is obtained by hot rolling

3.4

cold rolled circle and circle stock

circle or circle stock whose final thickness is obtained by cold rolling

4 Technical conditions for inspection and delivery

4.1 General

All the provisions of EN 485-1 shall apply, except Clause 4 (orders and tenders) which is modified as follows:

4.2 Orders or tenders

The order or tender shall define the product required and shall contain the following information:

- a) the form and the type of product:
 - 1) the form of the product (circle and circle stock);
 - 2) the designation of the aluminium or aluminium alloy;
 - 3) when subsequent decorative anodising, anti-adhesive coating, enamelling, etc. by the customer is intended, this shall be expressly stated on the order. In all other cases, indication of the customer application is recommended;
- b) the metallurgical temper of the material for delivery according to EN 515 (degree of hardness or heat treatment condition) and, if different, the metallurgical temper for use;
- c) the number of this European Standard or Specification number, or where none exists, the properties agreed between purchaser and supplier;
- d) the dimensions and shape of the product as applicable:
 - 1) thickness;
 - 2) diameter of the circle;
 - 3) width of the strip, sheet, or plate;
 - 4) length of the sheet or plate;
 - 5) internal and external diameters of the coil;
- e) whether hot rolled or cold rolled tolerances apply;

- f) quantity:
 - 1) mass or number of pieces;
 - 2) tolerances on quantity if required;
- g) any requirements for inspection documents;
- h) any special requirements agreed between purchaser and supplier:
 - 1) marking of products;
 - 2) references to drawings, etc;
 - 3) any special test required (earring, etc.) and the corresponding acceptance limits;
- i) for products intended to be surface treated by the purchaser the order shall also contain the following information:
 - 1) the intended particular surface treatment (according to the relevant European Standard)
 - 2) the number of sides for which a good visual appearance is required and, if only one side, its position with respect to the strip (inside or outside of the coil) or the sheet, plate or circle (upside or downside).

5 Mechanical properties

5.1 General

The mechanical properties shall conform to the requirements specified in EN 485-2.

5.2 Earing

When applications, such as deep drawing and spinning require a limited level of earing, the maximum acceptable level shall be agreed between purchaser and supplier, recognising that test results may be dependent on testing procedures.

6 Tolerances on dimensions and form

6.1 General

Tolerances on dimensions and form shall conform to EN 485-3 and EN 485-4, with the amendments and additions given in 6.2 to 6.5.

6.2 Diameter

Tolerances on diameters for circle shall conform to Table 1. These tolerances include the tolerances on roundness.

NOTE For circle obtained by blanking, the recommended standard diameters are:

- From 100 mm up to 500 mm nominal diameter : every multiple of 5;

- Over 500 mm up to 1 000 mm nominal diameter: every multiple of 10.

6.3 Thickness

Tolerances on thickness for hot rolled circle and circle stock shall conform to Table 2.

Tolerances on thickness for cold rolled circle and circle stock shall conform to Table 3. The partition into group I and group II of most common materials which may be used for the present application, in conformance with EN 602, shall be as shown in Table 4.

6.4 Tolerances on flatness for circle

Tolerances on flatness for circles, expressed as a percentage of the diameter D and/or the measured chord length L , shall conform to Table 5.

Deviation from flatness d , resulting from arching or buckling, shall be measured as shown in Figures 1 and 2, using a lightweight straightedge and a feeler gauge, dial gauge or scale, while the circle is resting on a horizontal base plate, concave side upwards.

Two measurements shall be carried out with the straight edge respectively parallel and perpendicular to the rolling direction.

6.5 Edge burr tolerances for circle

The edge burr shall not be detachable under slight pressure with the thumb, in order not to induce mechanical defects on the surface during the subsequent forming operations (deep drawing, spinning, etc.).

It is recommended that the height of the total burr as measured from the flat surface of the circle (see Figure 3) should not exceed:

- 0,2 mm for thicknesses up to 2 mm;
- 10 % of the nominal thickness for thickness above 2 mm.

7 Other requirements

Particular surface roughness requirements may be agreed between supplier and customer. In that case, the maximum acceptable roughness shall be specified as well as the method of measurement, according to an appropriate standard or specification, and the location and number of measuring points.

Table 1 — Tolerances on diameter

Dimensions in millimetres

Specified thickness		Method of production	Diameter tolerances for specified diameter ^a		
over	up to		up to 600	over 600 up to 1 000	over 1 000 up to 1 600
0,2	4,0	Blanking	± 0,3	± 0,3	-
		circular sawing or shearing	+ 3 0	+ 4 0	+ 7 0
4,0	6,0	Blanking	± 0,5	± 0,5	-
		circular sawing or shearing	+ 4 0	+ 5 0	+ 8 0
6,0	12,0	Blanking	± 0,7	± 0,7	-
		circular sawing or shearing	+ 4 0	+ 5 0	+ 8 0

^a These tolerances include the tolerances on roundness.

Table 2 — Thickness tolerances for hot rolled circle and circle stock

Dimensions in millimetres

Specified thickness		Thickness tolerance for specified diameter or width	
over	up to	up to 1 250	over 1 250 up to 1 600
2,5	4,0	± 0,28	± 0,28
4,0	5,0	± 0,30	± 0,30
5,0	6,0	± 0,32	± 0,32
6,0	8,0	± 0,35	± 0,35
8,0	10,0	± 0,40	± 0,45
10,0	12,0	± 0,45	± 0,55

Table 3 — Thickness tolerances for cold-rolled circle and circle stock

Dimensions in millimetres

Specified thickness		Thickness tolerances for specified diameter or width ^a					
over	up to	up to 1 000		over 1 000 up to 1 250		over 1 250 up to 1 600	
		Group I	Group II	Group I	Group II	Group I	Group II
0,2	0,5	± 0,02	± 0,03	± 0,03	± 0,03	± 0,04	± 0,05
0,5	0,6	± 0,03	± 0,03	± 0,04	± 0,04	± 0,05	± 0,06
0,6	0,8	± 0,03	± 0,04	± 0,04	± 0,04	± 0,05	± 0,07
0,8	1,0	± 0,04	± 0,04	± 0,05	± 0,05	± 0,06	± 0,07
1,0	1,2	± 0,04	± 0,05	± 0,06	± 0,07	± 0,07	± 0,08
1,2	1,5	± 0,04	± 0,05	± 0,07	± 0,08	± 0,09	± 0,10
1,5	1,8	± 0,05	± 0,06	± 0,08	± 0,09	± 0,10	
1,8	2,0	± 0,05	± 0,06	± 0,10		± 0,10	
2,0	2,5	± 0,06	± 0,07	± 0,10		± 0,10	
2,5	3,0	± 0,07	± 0,08	± 0,12		± 0,13	
3,0	3,5	± 0,10		± 0,13		± 0,13	
3,5	4,0	± 0,11		± 0,15		± 0,17	
4,0	5,0	± 0,15		± 0,20		± 0,20	
5,0	6,0	± 0,20		± 0,22		± 0,24	
6,0	8,0	± 0,24		± 0,26		± 0,28	

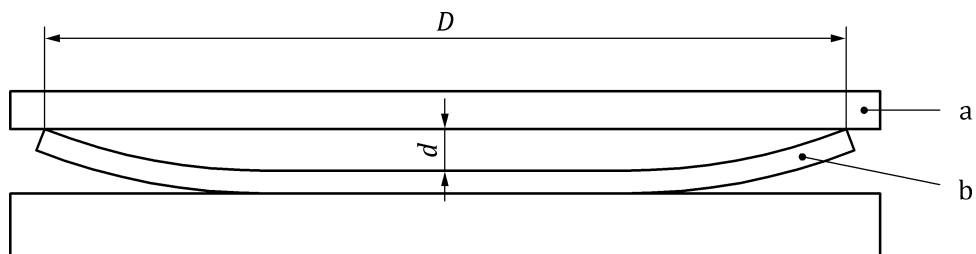
^a When measuring the thickness, a zone 10 mm wide from the edges of the product shall be disregarded.

Table 4 — Material groups

Group I	EN AW-1080A, EN AW-1070A, EN AW-1050A, EN AW-1200 EN AW-3003, EN AW-3103, EN AW-3005, EN AW-3105A EN AW-4006, EN AW-4007 EN AW-5005, EN AW-5050 EN AW-8011A
Group II	EN AW-3004, EN AW-3104 EN AW-5049, EN AW-5251, EN AW-5052, EN AW-5154A EN AW-5454, EN AW-5754

Table 5 — Circle - Flatness tolerances

Specified thickness mm		Maximum total deviation d_{\max} / D %	Maximum partial deviation (for a chord of at least 300 mm) d_{\max} / D %
Over	Up to		
0,2	0,5	By agreement	By agreement
0,5	3,0	0,4	0,5
3,0	6,0	0,4	0,4
6,0	12,0	0,3	0,4

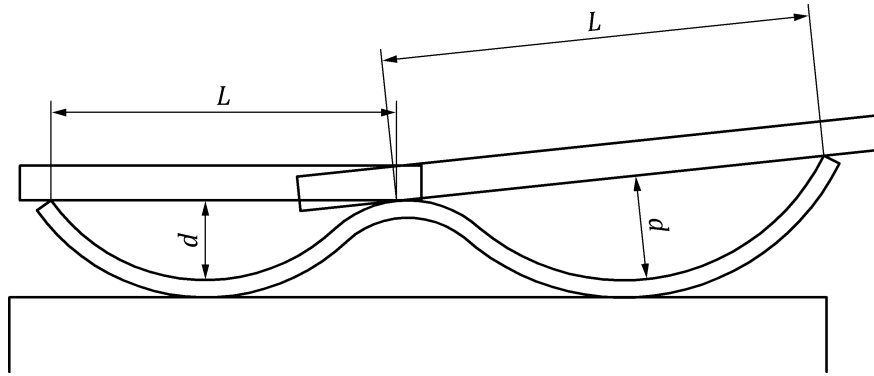


Key

- a** straightedge
- b** circle
- d* deviation from flatness
- D* diameter of circle

For further details see 6.4.

Figure 1 — Arch

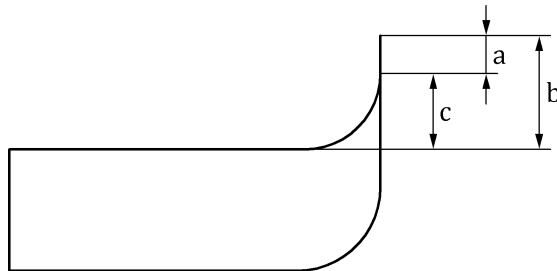


Key

- d deviation from flatness
- L length of buckle (chord)

For further details see 6.4.

Figure 2 — Buckle



Key

- a sliver
- b total burr
- c raised edge

For further details see 6.5.

Figure 3 — Edge burr

Bibliography

- [1] EN 573-3, *Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products*
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- [4] Arrêté du 27 août 1987 relatif aux matériaux et objets en aluminium ou en alliages d'aluminium au contact des denrées, produits et boissons alimentaires
- [5] Decreto 18 aprile 2007 n. 76, Regolamento recante la disciplina igienica dei materiali e degli oggetti di alluminio e di leghe di alluminio destinati a venire a contatto con gli alimenti Code for Good Manufacturing Practices for the European Aluminium Industry, April 2012

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