INTERNATIONAL STANDARD

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# Aluminium and aluminium alloys — Foil and thin strip — Dimensional tolerances

*Aluminium et alliages d'aluminium — Feuilles et bandes minces — Tolérances dimensionnelles*

Reference number
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# Contents

Page

# Foreword

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ISO 7271 was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 6, *Wrought aluminium and aluminium alloys*.

This second edition cancels and replaces the first edition (ISO 7271:1982), which has been technically revised.

# Aluminium and aluminium alloys — Foil and thin strip — Dimensional tolerances

## 1 Scope

This International Standard specifies dimensional tolerances for aluminium and aluminium alloy foil and thin strip for general purposes.

It is applicable to the following types of product, shipped in rolls:

— double-rolled foil, of aluminium or aluminium alloys having a minimum mass fraction of aluminium of 98 %, with one side matt and the other side bright, and of thicknesses in the range 0,006 mm (6 µm) to 0,050 mm (50 µm) inclusive;

— single-rolled foil and thin strip, of aluminium or aluminium alloys having a minimum mass fraction of aluminium of 98 % or of alloys shown in Annex A or similar, with both sides the same, and of thicknesses in the range 0,021 mm (21 µm) to 0,200 mm (200 µm).

NOTE According to the conventions in use in different countries, the limit of the thickness range can be different.

The most commonly used general engineering alloys for foil are specified in Annex A.

## 2 Preferred thicknesses

Preferred thicknesses apply to double-rolled foil only, see Table 1.

**Table 1 — Preferred thicknesses**

| Nominal thickness | | Covering area[a] | Nominal thickness | | Covering area[a] |
|---|---|---|---|---|---|
| mm | µm | $m^2/kg$ | mm | µm | $m^2/kg$ |
| 0,006 | 6 | 61,7 | 0,018 | 18 | 20,6 |
| 0,007 | 7 | 52,9 | 0,020 | 20 | 18,5 |
| 0,008 | 8 | 46,3 | 0,022 | 22 | 16,8 |
| 0,009 | 9 | 41,2 | 0,025 | 25 | 14,8 |
| 0,010 | 10 | 37,0 | 0,028 | 28 | 13,2 |
| 0,011 | 11 | 33,7 | 0,030 | 30 | 12,3 |
| 0,012 | 12 | 30,9 | 0,035 | 35 | 10,6 |
| 0,014 | 14 | 26,5 | 0,040 | 40 | 9,3 |
| 0,016 | 16 | 23,1 | 0,045 | 45 | 8,2 |
| | | | 0,050 | 50 | 7,4 |

[a] Calculated on the basis of a density of 2 700 $kg/m^3$.

Covering areas for other values of density are calculated using the following equation:

$$a = \frac{1}{d \times t}$$

where

$a$ is the covering area, in square metres per kilogram;

$t$ is the thickness, in metres;

$d$ is the density, in kilograms per cubic metre.

NOTE The density, $d$, can be obtained by looking up the international alloy designations given in Table A.1.

# 3 Thickness tolerances

## 3.1 General

The thickness tolerances given in Table 2 refer to the intended thickness, i.e. to the thickness that is fixed on the rolling mill.

**Table 2 — Thickness tolerances**

| Size of batch<br>kg | Tolerance on average thickness |
|---|---|
| ≤10 000 | ±10 % |
| >10 000 | ±8 % |

## 3.2 Average thicknesses

The determination of average thicknesses shall be carried out by a method in which more than 50 % of the measurements shall be within ±5 % of the average.

Rolls of the same nominal thicknesses, of the same width, of the same minimum purity or alloy, of the same condition, and of the same consignment (or considered as such) shall form one batch.

## 3.3 Point thicknesses

### 3.3.1 General

The point thickness is ±10 % of the nominal thickness.

Measurement shall be carried out by a method in which more than 50 % of the measurements shall be within ±5 % of the average.

In case of dispute, the following gravimetric method, based on weighing a sample of known area, shall be used for arbitration purposes.

### 3.3.2 Description of the weighing method

For the test sample, cut an area $A$ of approximately 1 $dm^2$, either square or circular. Degrease the sample, if necessary, in a suitable solvent and weigh on a laboratory balance with an accuracy of equal to or better than 1 mg.

The dimensions of the sample (sides of square or diameter of circle) shall be measured with an accuracy of equal to or better than ±0,1 mm.

Gauge shall be calculated according to the following equation:

$$E = \frac{M}{10 \times A \times D}$$

where

$E$ is the gauge, in micrometres;

$M$ is the mass, in milligrams;

$D$ is the density, in grams per cubic centimetre;

$A$ is the area, in square decimetres.

NOTE The density, $D$, can be obtained by looking up the international alloy designations given in Table A.1.

## 4 Width tolerances

Width tolerances are given in Table 3.

**Table 3 — Width tolerances**

Dimensions in millimetres

| Width | Width tolerance (for all thicknesses) | | |
|---|---|---|---|
| | symmetrical | all plus | all minus |
| ≤1 000 | ±1 | $^{+2}_{0}$ | $^{0}_{-2}$ |
| >1 000 | ±2 | $^{+4}_{0}$ | $^{0}_{-4}$ |

## 5 Ordering information

The order shall include the following information:

— quantity, in kilograms;

— minimum mass fraction of aluminium or alloy designation;

— temper (hard, soft or intermediate);

— thickness, in millimetres or micrometres, and tolerance and, if specified, point thickness;

— width, in millimetres (type of tolerance, if necessary);

— surface aspect (indication of whether the bright or matt side is to be on the outside);

— dimension of rolls (length, in metres, or outside diameter, in millimetres);

— type and inside diameter of the core, in millimetres (with or without slot);

— length of core (if different from the width of the rolls).

# Annex A
(normative)

# Alloy group for foil

The most commonly used general engineering alloys for foil are specified in Table A.1.

**Table A.1 — Alloy group for foil**

| Alloy designation[a] |
|---|
| 1050, 1050A, 1070, 1085, 1100, 1145, 1200, 1230A, 1235 |
| 3003, 3103, 3004, 3005, 3105 |
| 5005, 5052 |
| 8006, 8008, 8011, 8011A, 8111, 8014, 8021, 8021B, 8079 |

[a] 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”).

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