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**Wrought aluminium and aluminium  
alloys — Sheets, strips and plates —**

**Part 1:  
Technical conditions for inspection and  
delivery**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**  
*Aluminium et alliages d'aluminium corroyés — Tôles, bandes et tôles  
épaisses —  
Partie 1: Conditions techniques de contrôle et de livraison*

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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 6361-1 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 6361-1:1986), which has been technically revised.

ISO 6361 consists of the following parts, under the general title *Wrought aluminium and aluminium alloys — Sheets, strips and plates*:

- *Part 1: Technical conditions for inspection and delivery*
- *Part 2: Mechanical properties*
- *Part 3: Strips: Tolerances on shape and dimensions*
- *Part 4: Sheets and plates: Tolerances on shape and dimensions*
- *Part 5: Chemical composition*

# Wrought aluminium and aluminium alloys — Sheets, strips and plates —

## Part 1: Technical conditions for inspection and delivery

### 1 Scope

This part of ISO 6361 specifies the technical conditions for inspection and delivery of wrought aluminium and aluminium alloy sheets, strips and plates for general engineering applications.

It applies to flat-rolled products with a thickness over 0,15 mm up to and including 400 mm.

It does not directly apply to semi-finished rolled products in coiled form to be subjected to further rolling (reroll stock) or to special applications, such as aerospace, can stock, fin stock, etc.

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### 2 Normative references (standards.iteh.ai)

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 6361-2:2011, *Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 2: Mechanical properties*

ISO 6361-3:2011, *Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 3: Strips: Tolerances on shape and dimensions*

ISO 6361-4:2011, *Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 4: Sheets and plates: Tolerances on shape and dimensions*

ISO 6361-5:2011, *Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 5: Chemical composition*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7438, *Metallic materials — Bend test*

ISO 9591, *Corrosion of aluminium alloys — Determination of resistance to stress corrosion cracking*

ISO 11881, *Corrosion of metals and alloys — Exfoliation corrosion testing of aluminium alloys*

ASTM E34, *Standard Test Methods for Chemical Analysis of Aluminum and Aluminum-Base Alloys*

ASTM G34, *Standard Test Method for Exfoliation Corrosion Susceptibility in 2XXX and 7XXX Series Aluminum Alloys (EXCO Test)*

ASTM G47, *Standard Test Method for Determining Susceptibility to Stress-Corrosion Cracking of 2XXX and 7XXX Aluminum Alloy Products*

ASTM G66, *Standard Test Method for Visual Assessment of Exfoliation Corrosion Susceptibility of 5XXX Series Aluminum Alloys (ASSET Test)*

ASTM G67, *Standard Test Method for Determining the Susceptibility to Intergranular Corrosion of 5XXX Series Aluminum Alloys by Mass Loss After Exposure to Nitric Acid (NAMLT Test)*

ASTM E716, *Standard Practices for Sampling and Sample Preparation of Aluminum and Aluminum Alloys for Determination of Chemical Composition by Spectrochemical Analysis*

ASTM B557M, *Standard Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products [Metric]*

ASTM E607, *Standard Test Method for Atomic Emission Spectrometric Analysis Aluminum Alloys by the Point-to-Plane Technique, Nitrogen Atmosphere*

ASTM E1251, *Standard Test Method for Analysis of Aluminum and Aluminum Alloys by Atomic Emission Spectrometry*

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

EN 14242, *Aluminium and aluminium alloys — Chemical analysis — Inductively coupled plasma optical emission spectral analysis*

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### 3 Terms and definitions

ISO 6361-1:2011

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

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#### 3.1

##### sheet

rolled product that is rectangular in cross-section with nominal thickness less than 6 mm, but not less than 0,20 mm, and with slit, sheared or sawed edges

NOTE 1 A sheet can be supplied in a corrugated, embossed, coated, edge-conditioned or perforated form.

NOTE 2 A sheet between 3 mm and 6 mm is sometimes called “shate”.

NOTE 3 In some regions, the term “sheet” is only used for rolled products supplied in straight length; for coiled sheet, the term “strip” is used.

NOTE 4 In the USA, there is an overlap in the thickness range 0,15 mm to 0,20 mm defined for foil and sheet. Sheet products in this gauge range are supplied according to sheet product specifications.

#### 3.2

##### strip

flat-rolled product of rectangular cross-section with uniform thickness less than 6 mm, but not less than 0,20 mm, supplied in coils usually with trimmed edges, with thickness not exceeding one-tenth of the width

NOTE 1 Corrugated, embossed (with patterns, for example grooves, ribs, checkers, tears, buttons, lozenges), coated, edge conditioned and perforated products in this general form when derived from strip as defined above are classified as strip.

NOTE 2 Strip is sometimes called coil.

**3.3****plate**

rolled product that is rectangular in cross-section and with thickness not less than 6 mm with sheared or sawn edges

**3.4****inspection lot**

consignment, or a part thereof, submitted for inspection, comprising products of the same grade or alloy, form, temper, thickness or cross-section, and processed in the same manner

**3.5****heat-treatment batch****heat-treatment lot**

quantity of products of the same grade or alloy, form, thickness or cross-section and produced in the same way, heat-treated in one furnace load, or such products so solution-treated and subsequently precipitation-treated in one furnace load

NOTE 1 More than one solution-treatment lot may be included in a furnace load.

NOTE 2 For the heat-treatment in a continuous furnace, the products heat-treated during a period of time less than 8 h may be considered as belonging to the same heat-treatment lot. The limit of 8 h may be exceeded, in the case of a heavy plate solution-treated in a continuous furnace.

**3.6****sample**

one or more products taken from an inspection lot

**3.7****specimen**

one or more pieces taken from each product in the sample, for the purpose of producing test pieces

**3.8****test piece**

piece taken from each specimen and suitably prepared for the test

**3.9****test**

operation to which the test piece is subjected in order to measure or classify a property

**4 Orders or tenders**

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

## a) type and form of product:

- designation of the aluminium or aluminium alloy;
- form of the product (sheet, strip, plate, etc.);

## b) metallurgical temper (degree of hardness or heat treatment condition) of the material for delivery and, if different, metallurgical temper for use;

## c) number of this part of ISO 6361 or specification number, or, where none exists, properties agreed between the supplier and the purchaser;

## d) dimensions and shape of the product (thickness, width, length, diameter of the coil);

## e) tolerances of the dimensions and form, with reference to the appropriate part of ISO 6361;

- f) quantity;
- g) any requirements for certificates of conformity, test and/or analysis;
- h) any special requirements agreed between the supplier and the purchaser (for example drawings).

## **5 Requirements**

### **5.1 Production and manufacturing processes**

Unless otherwise specified in the order, the production and manufacturing processes shall be left to the discretion of the producer. Unless it is explicitly stated otherwise in the order, no obligation shall be placed on the producer to use the same processes for subsequent and similar orders.

### **5.2 Quality control**

The supplier shall be responsible for the performances of all inspection and tests required by the relevant International Standard or specification, prior to shipment of the product. If the purchaser wishes to inspect the product at the supplier's works, he shall notify the supplier at the time of placing the order.

### **5.3 Chemical composition**

The chemical composition shall comply with the requirements specified in ISO 6361-5.

If the purchaser requires content limits for elements not specified in ISO 6361-5, these limits shall be stated in the order document.

### **5.4 Mechanical properties**

The mechanical properties shall be in conformity with those specified in ISO 6361-2 or those agreed upon between the supplier and the purchaser and stated on the order.

### **5.5 Corrosion behaviour**

Products made of 5XXX alloys with nominal magnesium content equal to or higher than 3 % in the H116 and H321 tempers shall be capable of exhibiting no evidence of exfoliation corrosion when subjected to the ASTM G66 accelerated exfoliation corrosion susceptibility test and/or intergranular corrosion susceptibility according to ASTM G67.

Plate exhibit, made of alloys 7010 and 7075 in the T73 and T7351 tempers and over 25 mm in thickness, shall exhibit no evidence of stress-corrosion cracking when tested in accordance with ASTM G47 or with ISO 9591.

Products made of alloys 7010 and 7075 in the tempers T76 and T7651 shall exhibit evidence of exfoliation corrosion below grade EB only, as defined in ASTM G34 or ISO 11881, when subjected to the test specified in 6.2.8.2.

Plate exhibit, made of alloys 7050 in the T7451 and T7651 tempers and over 20 mm in thickness, shall exhibit no evidence of stress-corrosion cracking when tested. The test method is given in the footnotes of Table 57 in ISO 6361-2:2011.

### **5.6 Surface finish**

The products shall be free from defects detrimental to their use. Whilst an operation designed to mask a fault is not permitted, the elimination of a superficial fault is permissible, provided that the dimensional tolerances continue to be observed.



## 5.7 Dimensional tolerances

The dimensions and form tolerances shall be in conformity with ISO 6361-3 for strip and ISO 6361-4 for sheet, or with the International Standard agreed between the supplier and the purchaser and stated on the order.

Unless otherwise agreed, the purchaser may only reject those products having dimensions not complying with the specified tolerances.

## 6 Test procedure

### 6.1 Sampling

#### 6.1.1 Chemical analysis

The specimens for chemical analysis shall be taken at the time of casting. Their shape and conditions of production (mould design, cooling rate, mass, etc.) shall be so designed that their composition is homogeneous, and shall be suitable for the method of analysis.

#### 6.1.2 Specimens for mechanical testing

##### 6.1.2.1 Location and size

Specimens shall be taken from samples in such a way that it is possible to orientate the test pieces in relation to the product, as specified in 6.1.2.2.

The specimens shall be large enough to allow the manufacture of sufficient test pieces for the required tests, and for any retests which may be required.

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##### 6.1.2.2 Orientation of specimens

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Normally, tests in the transverse (or long transverse for plate) direction are required. If the width is insufficient (less than 300 mm) to obtain a transverse specimen, then tests in the longitudinal direction are permitted.

##### 6.1.2.3 Identification of specimens

Each specimen shall be marked in such a manner that, after removal, it is still possible to identify the product from which it was taken and its location and orientation. If, during the course of subsequent operations, removal of the markings cannot be avoided, new markings shall be made before the originals are removed.

##### 6.1.2.4 Preparation of specimens

Specimens shall be taken from the sample after completion of all the mechanical and heat treatments that the product has to undergo before delivery, and which may influence the mechanical properties of the metal. In cases where this is not possible, the sample or specimens may be taken at an earlier stage, but they shall be subjected to the same treatment as that to which it is intended to submit the product concerned.

**NOTE** If the purchaser intends to convert the material to a final temper which is different from the "as supplied" temper, then additional testing can be requested by the purchaser in order to satisfy himself that the material is capable of meeting the specified properties of the final temper. It is only necessary for the supplier to confirm that selected samples, heat-treated using the supplier's laboratory conditions, meet the properties specified for the final temper required by the purchaser.

Cutting shall be carried out in such a manner that it does not change the characteristics of the part prepared. Thus, the dimensions of the specimens shall provide an adequate machining allowance to permit removal of the zone affected by cutting.