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

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

**iTeh STANDARD PREVIEW**

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

*Partie 1: Conditions techniques de contrôle et de livraison  
ISO 6362-1:2012*

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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 6362-1 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 6362-1:1986), which has been technically revised.

ISO 6362 consists of the following parts, under the general title *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles*:

- Part 1: *Technical conditions for inspection and delivery*
- Part 2: *Mechanical properties*
- Part 3: *Extruded rectangular bars — Tolerances on shape and dimensions*
- Part 4: *Profiles — Tolerances on shape and dimensions*
- Part 5: *Round, square and hexagonal bars — Tolerances on shape and dimensions*
- Part 6: *Round, square, rectangular and hexagonal tubes — Tolerances on shape and dimensions*
- Part 7: *Chemical composition*

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

## Part 1: Technical conditions for inspection and delivery

### 1 Scope

This part of ISO 6362 specifies the technical conditions for inspection and delivery of wrought aluminium and aluminium alloy rods/bars, tubes and profiles for general engineering applications.

It applies to extruded products, but does not apply to the following:

- forging stock;
- extruded precision profiles in alloys A6060 and A6063;
- products delivered in coils;
- coiled tubes cut to lengths.

### 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 6362-2, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 2: Mechanical properties*

ISO 6362-3, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 3: Extruded rectangular bars — Tolerances on shape and dimensions*

ISO 6362-4, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 4: Profiles — Tolerances on shape and dimensions*

ISO 6362-5, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 5: Round, square and hexagonal bars — Tolerances on shape and dimensions*

ISO 6362-6, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 6: Round, square, rectangular and hexagonal tubes — Tolerances on shape and dimensions*

ISO 6362-7, *Wrought aluminium and aluminium alloys — Extruded rods/bars, tubes and profiles — Part 7: 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*

EN 2004-1, *Aerospace series — Test methods for aluminium and aluminium alloy products — Part 1: Determination of electrical conductivity of wrought aluminium alloys*

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

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

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

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

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

ASTME1251, *Standard Test Method for Analysis of Aluminum and Aluminum Alloys by Atomic Emission Spectrometry*

### 3 Terms and definitions

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

#### 3.1

##### **rod/bar**

solid wrought product of uniform cross-section along its whole length, supplied in straight lengths

NOTE 1 Rod is normally less than 6 mm in diameter or minor dimension.

NOTE 2 In North America, the minimum diameter of a rod is 9,525 mm (0,375 in). Below this limit the product is called wire.

NOTE 3 The cross-sections are in the shape of circles, squares, rectangles or regular hexagons. Products with a square, rectangular or hexagonal cross-section may have corners rounded along their whole length.

NOTE 4 For rectangular bars, the thickness exceeds one-tenth of the width. The term “rectangular bar” includes “flattened circles” and “modified rectangles”, of which two opposite sides are convex arcs, the other two sides being straight, of equal length and parallel.

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#### 3.2

##### **tube**

hollow wrought product of uniform cross-section with only one enclosed void along its whole length, and with a uniform wall thickness, supplied in straight lengths or in coiled form, provided the inner and outer cross-sections are concentric and have the same form and orientation

NOTE The cross-sections are in the shape of circles, squares, rectangles or regular hexagons. Hollow products with square, rectangular or regular hexagonal cross-sections may have corners rounded along their whole length.

#### 3.3

##### **profile**

wrought product of uniform cross-section along its whole length, with a cross-section other than rod/bar, tube, sheet or strip, supplied in straight lengths or in coiled form and where the product is long in relation to its cross-sectional dimensions

NOTE According to the form of its cross-section, it is called:

- a) hollow profile: the cross-section includes either one enclosed void, provided that the cross-section is other than tube, or more than one enclosed void;
- b) solid profile: the cross-section does not include any enclosed void.

#### 3.4

##### **inspection lot**

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

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

quantity of products with an identical set of criteria, e.g. 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.

**3.6****sample**

either a quantity of molten metal, product or products which are used for the production of specimens

**3.7****test 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 test specimen and suitably prepared for the test

**3.9****test**

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

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**4 Orders or tenders**

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

- a) the type and form of product:
- the designation of the aluminium or aluminium alloy;
  - the form of the product (rod/bar, tube, profile, etc.);
- b) the metallurgical temper of the material for delivery (degree of hardness or heat-treatment condition) and, if different, the metallurgical temper for use;
- c) the number of this International Standard or specification number, or, where none exists, the properties agreed between the supplier and the purchaser;
- d) the dimensions and shape of the product (thickness, width, length, diameter); and/or reference to a drawing defining the product;
- e) tolerances of the dimensions and form, with reference to the appropriate International Standard;
- 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, specification or customer requests, 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 6362-7.

If the purchaser requires content limits for elements not specified in ISO 6362-7, 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 6362-2 or those agreed upon between the supplier and purchaser and stated in the order.

## 5.5 Surface finish

The products shall be free from defects detrimental to its required use and performance. Whilst an operation designed to mask a fault is not permitted, the elimination of a superficial fault is permissible, provided that the dimensional tolerances remain.

## 5.6 Dimensional tolerances

The dimensions and form tolerances shall be

- in accordance with ISO 6362-3 for extruded rectangular bars;
- in accordance with ISO 6362-4 for extruded profiles;
- in accordance with ISO 6362-5 for extruded round, square and hexagonal bars;
- in accordance with ISO 6362-6 for extruded tubes;
- or otherwise as agreed between the supplier and purchaser and stated in the order.

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

## 5.7 Stress corrosion cracking resistance

The products of alloy 7075, in tempers T73, T73510, T73511, for thicknesses equal to or greater than 20 mm, shall exhibit no evidence of stress corrosion cracking when tested in accordance with ISO 9591 in the transverse direction at a stress level of the specified  $R_{p0,2}$ .

If such testing is required, it shall be specified in the order document.

## 6 Test procedure

### 6.1 Production of specimens

#### 6.1.1 Specimens for chemical analysis

The specimens for chemical analysis shall be cast from molten metal samples 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 be suitable for the method of analysis according to ASTM E34, ASTM E607, ASTM E716, ASTM E1251 or EN 14242.

## 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 manufacture of sufficient test pieces for the required tests, and for any retests which may be required.

### 6.1.2.2 Orientation of specimens

Specimens shall generally be taken in the longitudinal direction, unless otherwise agreed upon between the supplier and purchaser and stated in the order.

### 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 may 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 supplier 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.

Specimens shall not be machined or treated in any way by which their mechanical properties may be altered. Any straightening required shall be carried out with great care, preferably by hand.

### 6.1.2.5 Number of specimens

Unless otherwise specified, the minimum number of specimens shall be as follows:

- for products having a nominal mass up to and including 1 kg per linear metre (1 kg/m), one specimen shall be taken for each lot of 1 000 kg or part thereof;
- for products having a nominal mass greater than 1 kg/m up to and including 5 kg/m, one specimen shall be taken for each lot of 2 000 kg or part thereof;
- for products having a nominal weight greater than 5 kg/m, one specimen shall be taken for each lot of 3 000 kg or part thereof.

Not less than one representative specimen shall be taken from any given inspection or heat-treatment lot.