



SLOVENSKI STANDARD
SIST EN 2070-4:2001
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Aerospace series - Aluminium and aluminium alloy wrought products - Technical specification - Part 4: Tube for structures

Aerospace series - Aluminium and aluminium alloy wrought products - Technical specification - Part 4: Tube for structures

Luft- und Raumfahrt - Halbzeug aus Aluminium und Aluminium-Knetlegierungen - Technische Lieferbedingungen - Teil 4: Konstruktionsrohre

Série aérospatiale - Demi-produits corroyés en aluminium et alliages d'aluminium - Spécification technique - Partie 4: Tubes pour application structurale

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ICS:

49.025.20 Aluminij Aluminium

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English version

**Aerospace series
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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to CEN Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat : Rue Bréderode 2, B-1000 Bruxelles

Brief history

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has successively received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

According to the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope and field of application

The present standard specifies the particular requirements of tubes for structures in aluminium or aluminium alloys, obtained by extrusion or extrusion and drawing.

This standard shall be used in conjunction with EN 2070-1.

2 References

- EN 2002-1, Aerospace series - Test methods for metallic materials - Part 1 - Tensile testing at ambient temperature 1)
- EN 2002-7, Aerospace series - Test methods for metallic materials - Part 7 - Hardness test 1)
- EN 2002-9, Aerospace series - Test methods for metallic materials - Part 9 - Tube drift expanding test 1)
- EN 2002-10, Aerospace series - Test methods for metallic materials - Part 10 - Tube flattening test 1)
- EN 2002-16, Aerospace series - Test methods for metallic materials - Part 16 - Dye penetrant testing 1)
- EN 2070-1, Aerospace series - Aluminium and aluminium alloy wrought products - Technical specification - Part 1 - General requirements.
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3 Manufacture

Unless otherwise specified, the method of manufacture to be employed shall be at the discretion of the manufacturer, however, the following requirements shall be observed :

- The use of bridge die process or die quenching is only permissible when agreed in writing between the manufacturer and purchaser.

1) In preparation

4 Batch

4.1 Batch definition

Batch definition shall conform to EN 2070-1 except that aggregation of casts is not permitted.

4.2 Batch size

The maximum size of the batch, proportional to the tube mass per metre is shown in table 1.

Table 1

| | | | |
|----------------------------------|-------------|------------------------|-------------|
| Mass per metre : ρ_r (kg/m) | $\leq 0,25$ | $0,25 < \rho_r \leq 1$ | > 1 |
| Size of the batch (kg) | ≤ 250 | ≤ 500 | ≤ 1000 |

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5 Dimensions

Dimensions and tolerances shall conform to the relevant semi-finished product standard or drawing. <https://standards.iteh.ai/catalog/standards/sist/4f2980ec-41df-48bf-92da-45130dbec7dc/sist-en-2070-4-2001>

The frequency of examination adopted by the manufacturer shall be sufficient to permit him to certify compliance with the requirements.

6 External defects

Unless otherwise required on the order or the inspection schedule, the condition of the internal and external surfaces of the tubes shall conform with table 2 and be determined by visual examination.

Dye penetrant testing may be applied in accordance with EN 2002-16, to verify the extent or existence of surface defects.

The frequency of examination adopted by the manufacturer shall be sufficient to permit him to certify compliance with the requirements of table 2.

Table 2

| Type of defect | Acceptance criteria |
|--|---|
| Score marks ¹⁾ | Allowable if defect depth $\leq 3\%$ of a ³⁾ and $\leq 0,3$ mm |
| Die pick-up ¹⁾ Smears ¹⁾ Superficial corrosion ¹⁾ | Minor defects not impeding product use are allowed |
| Embedded particles ¹⁾ | Not allowed after dressing |
| Handling damage ¹⁾ | Allowed if depth $\leq 3\%$ of a ³⁾ and $\leq 0,3$ mm |
| Blisters ²⁾ Cracks ²⁾ Extrusion stoppage and resumption marks ²⁾ | Rejected |
| <p>1) Dressing allowed provided dimensions remain within tolerances, surface appearance of the dressed zones shall be similar to that of the rest of the material.</p> <p>2) Dressing is not allowed.</p> <p>3) a = nominal thickness.</p> | |

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7 Tensile test

Tensile tests shall conform with EN 2002-1.

The number of tests per batch is specified in table 4. The total number of tests and the selection of tubes depend upon the method used for batch uniformity (see clause 8).

The test results shall meet the requirements of the material standard.

8 Batch uniformity

Batch uniformity of material delivered in the T... *) condition shall be demonstrated by one of the two following methods a) or b).

The method used shall be at the discretion of the manufacturer unless otherwise specified by the purchaser.

a) Tensile test carried out on each end of each selected tube. A minimum of two tubes shall be selected at random from each batch, these four tensile tests include those required by clause 7.

All tests shall meet the requirements of the material standard.

b) By hardness testing each end of each tube over 20 mm in diameter in accordance with EN 2002-7. The values obtained shall conform to the requirements of the material standard.

The tube of lowest hardness shall be selected for tensile testing in accordance with clause 7.

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9 Flattening test (standards.iteh.ai)

If required by the material standard a flattening test shall be carried out in the condition of supply in accordance to EN 2002-10. The frequency of tests is specified in table 4.

Retesting procedure for flattening test shall be as EN 2070-1, for tensile test.

10 Drift test

For circular tubes, if agreement has been obtained to manufacture the tubes by the bridge die process, one end of each extruded length shall be drift tested in accordance with EN 2002-9. The mandrel angle shall be $(74 \pm 1)^\circ$.

Testing shall continue until fracture occurs. Fracture shall be of the shear type mode i.e. at 45° to the radius; fracture along the radius shall be cause for rejection.

*) "Aluminum Association" designation

11 Coarse grain zone

Where specified on the order or in the inspection schedule, tubes shall be macrographically examined with respect to coarse grain zone.

The "capability clause" may be applied to this requirement.

12 Special tests

Special tests and inspection may be required by the purchaser (e.g. : internal stress, electrical conductivity, intergranular corrosion, micrographic structure, ...). In such cases, after agreement between purchaser and manufacturer, nature of test, methods, number and acceptance standards shall be specified on the order or in the inspection schedule.

13 Marking

Marking shall be in accordance with EN 2070-1.

If special tests in accordance with clause 12 are required the marking shall be defined and shall reflect these extra requirements.

The frequency of examination adopted by the manufacturer shall be sufficient to permit him to certify compliance with the requirements.

13.1 Unless otherwise agreed between manufacturer and purchaser and specified on the order or in the inspection schedule, the position of the marking for tubes whose diameter or greatest transverse dimensions is equal to or greater than 16 mm shall be in accordance with table 3.