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SIST EN 3339:2009

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EUROPEAN STANDARD

EN 3339

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2006

ICS 49.025.20

English Version

Aerospace series - Aluminium alloy AL-P7010- - T76 - Die forgings - a ≤ 200 mmSérie aérospatiale - Alliage d'aluminium AL-P7010- - T76 -
Pièces matricées - a ≤ 200 mmLuft- und Raumfahrt - Aluminiumlegierung AL-P7010- - T76
- Gesenkschmiedestücke - a ≤ 200 mm

This European Standard was approved by CEN on 5 October 2006.

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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 the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG**Management Centre: rue de Stassart, 36 B-1050 Brussels**

Foreword

This document (EN 3339:2006) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

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

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of an identical text or by endorsement, at the latest by June 2007, and conflicting national standards shall be withdrawn at the latest by June 2007.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This standard is part of the series of EN metallic material standards for aerospace applications. The general organization of this series is described in EN 4258.

This standard has been prepared in accordance with EN 4500-2.

1 Scope

This standard specifies the requirements relating to:

Aluminium alloy AL-P7010-
T76
Die forgings
 $a \leq 200$ mm

for aerospace applications.

2 Normative references

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.

EN 2082-3, *Aerospace series — Aluminium alloy forging stock and forgings — Technical specification — Part 3: Pre-production and production forgings.*

EN 4258, *Aerospace series — Metallic materials — General organization of standardization — Links between types of EN standards and their use.*

EN 4287, *Aerospace series — Aluminium alloy AL-P7010 — Forging stock.*

EN 4500-2, *Aerospace series — Metallic materials — Rules for drafting and presentation of material standards — Part 2: Specific rules for aluminium, aluminium alloys and magnesium alloys.*¹⁾

EN 4527, *Aerospace series — Aluminium and aluminium alloy products — Test methods — Determining susceptibility to stress-corrosion cracking.*¹⁾

1) Published as ASD Prestandard at the date of publication of this standard.

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| | | | | | | | | | | | | | | | |
|------|-------------------------|---------|-----------------------------------|------|-----|------|------|-----|------|------|------|------|--------|-------|----|
| 1 | Material designation | | Aluminium alloy AL-P7010- | | | | | | | | | | | | |
| 2 | Chemical composition % | Element | Si | Fe | Cu | Mn | Mg | Cr | Ni | Zn | Zr | Ti | Others | | Al |
| | | | | | | | | | | | | | Each | Total | |
| | | min. | – | – | 1,5 | – | 2,1 | – | – | – | 5,7 | 0,10 | – | – | – |
| max. | 0,12 | 0,15 | 2,0 | 0,10 | 2,6 | 0,05 | 0,05 | 6,7 | 0,16 | 0,06 | 0,05 | 0,15 | | | |
| 3 | Method of melting | | – | | | | | | | | | | | | |
| 4.1 | Form | | Die forgings | | | | | | | | | | | | |
| 4.2 | Method of production | | Forged from forging stock EN 4287 | | | | | | | | | | | | |
| 4.3 | Limit dimension(s) | mm | $a \leq 200$ | | | | | | | | | | | | |
| 5 | Technical specification | | EN 2082-3 | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|-----|-------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 6.1 | Delivery condition | | T76 | | | | | | | | | | | | |
| | Heat treatment | | $470\text{ °C} \leq \theta \leq 480\text{ °C} / \text{WQ } \theta \leq 80\text{ °C}^a$ $+ 110\text{ °C} \leq \theta \leq 120\text{ °C} / 8\text{ h} \leq t \leq 24\text{ h}^b$ $+ 170\text{ °C} \leq \theta \leq 180\text{ °C} / 6\text{ h} \leq t \leq 16\text{ h}^b$ | | | | | | | | | | | | |
| 6.2 | Delivery condition code | | U | | | | | | | | | | | | |
| 7 | Use condition | | T76 | | | | | | | | | | | | |
| | Heat treatment | | Delivery condition | | | | | | | | | | | | |

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Characteristics

| | | | | | | | | | | | | | | | | | | |
|-----|------------------------------------|------------|----------------|------------|------------|-------------------|------------|------------|--------------------|------------|------------|--------------------|------------|------------|--------------------|------------|------------|------------|
| 8.1 | Test sample(s) | | See EN 2082-3. | | | | | | | | | | | | | | | |
| 8.2 | Test piece(s) | | See EN 2082-3. | | | | | | | | | | | | | | | |
| 8.3 | Heat treatment | | Use condition | | | | | | | | | | | | | | | |
| 9 | Dimensions concerned | mm | ≤ 80 | | | $80 < a \leq 100$ | | | $100 < a \leq 120$ | | | $120 < a \leq 160$ | | | $160 < a \leq 200$ | | | |
| 10 | Thickness of cladding on each face | % | – | | | – | | | – | | | – | | | – | | | |
| 11 | Direction of test piece | | L | LT | ST | L | LT | ST | L | LT | ST | L | LT | ST | L | LT | ST | |
| 12 | Temperature | θ | °C | Ambient | | | Ambient | | | Ambient | | | Ambient | | | Ambient | | |
| 13 | Proof stress | $R_{p0,2}$ | MPa | ≥ 470 | ≥ 460 | ≥ 450 | ≥ 440 | ≥ 435 | ≥ 435 | ≥ 435 | ≥ 430 | ≥ 430 | ≥ 430 | ≥ 425 | ≥ 425 | ≥ 415 | ≥ 400 | ≥ 390 |
| 14 | T Strength | R_m | MPa | ≥ 530 | ≥ 520 | ≥ 510 | ≥ 500 | ≥ 495 | ≥ 490 | ≥ 495 | ≥ 490 | ≥ 485 | ≥ 490 | ≥ 485 | ≥ 480 | ≥ 470 | ≥ 460 | ≥ 450 |
| 15 | Elongation | A | % | ≥ 8 | ≥ 6 | $\geq 3,5$ | ≥ 8 | ≥ 6 | $\geq 3,5$ | ≥ 8 | ≥ 6 | $\geq 3,5$ | ≥ 6 | ≥ 5 | $\geq 3,5$ | ≥ 5 | ≥ 4 | ≥ 3 |
| 16 | Reduction of area | Z | % | – | | | | | | | | | | | | | | |
| 17 | Hardness | | – | | | | | | | | | | | | | | | |
| 18 | Shear strength | R_c | MPa | – | | | | | | | | | | | | | | |
| 19 | Bending | k | – | – | | | | | | | | | | | | | | |
| 20 | Impact strength | | – | | | | | | | | | | | | | | | |
| 21 | Temperature | θ | °C | – | | | | | | | | | | | | | | |
| 22 | Time | | h | – | | | | | | | | | | | | | | |
| 23 | Stress | σ_a | MPa | – | | | | | | | | | | | | | | |
| 24 | Elongation | a | % | – | | | | | | | | | | | | | | |
| 25 | Rupture stress | σ_R | MPa | – | | | | | | | | | | | | | | |
| 26 | Elongation at rupture | A | % | – | | | | | | | | | | | | | | |
| 27 | Notes (see line 98) | | a, b | | | | | | | | | | | | | | | |

| | | | | | | |
|----|---------------------------------|----------------------|---|---|-----------------------|-----------------------|
| 32 | Electrical conductivity | – | See EN 2082-3. | | | |
| | | 3 | Measurement on the surface of the sample from which tensile specimens are taken. | | | |
| | | 7 | $\gamma \geq 22,0$ MS/m | Acceptable | | |
| | | | $21,0$ MS/m $\leq \gamma < 22,0$ MS/m | Acceptable if $R_{p0,2} L \leq R_{p0,2} L \text{ min. }^c + 70$ MPa or if stress corrosion test is acceptable | | |
| | | $\gamma < 21,0$ MS/m | Not acceptable | | | |
| 39 | Stress corrosion | 1 | EN 4527 | | | |
| | | 2 | The "capability clause" applies or as per line 32 | | | |
| | | 3 | $a \geq 25$ mm | | | |
| | | 4 | ST | | | |
| | | 6 | $\sigma = 175$ MPa | | | |
| | | 7 | $t \geq 20$ d | | | |
| 40 | Fracture toughness (K_{1C}) | – | See EN 2082-3. | | | |
| | | 7 | Dimensions (mm) | L-T MPa \sqrt{m} | T-L MPa \sqrt{m} | S-L MPa \sqrt{m} |
| | | | $a \leq 100$ | ≥ 25 | ≥ 24 | ≥ 22 |
| | | | $100 < a \leq 150$ | ≥ 25 | ≥ 22 | ≥ 21 |
| | | $150 < a \leq 200$ | ≥ 25 | ≥ 21 | ≥ 20 | |
| 44 | External defects | – | See EN 2082-3. | | | |
| 51 | Macrostructure | – | See EN 2082-3. | | | |
| 61 | Internal defects | – | See EN 2082-3. | | | |
| 82 | Batch uniformity | – | See EN 2082-3. | | | |
| | | 7 | Electrical conductivity | See EN 2082-3. | | |
| | | | Hardness | HB | 155 (Typical value) | |
| | | | $\delta \leq 20$ per product | $\Delta \leq 30$ per batch | | |
| 95 | Marking inspection | – | See EN 2082-3. | | | |
| 96 | Dimensional inspection | – | See EN 2082-3. | | | |
| 98 | Notes | – | <p>^a The use of quench additives or higher quenchant temperature shall be subject to agreement between manufacturer and purchaser.</p> <p>^b Artificial ageing may be carried out using the following alternative single stage method: heating to a temperature of 170 °C $\leq \theta \leq 180$ °C at a rate not exceeding 20 °C / h and soaking at this temperature for 6 h $\leq t \leq 16$ h.</p> <p>^c If L specimen cannot be cut, LT specimen shall be used by agreement between manufacturer and purchaser.</p> | | | |
| 99 | Typical use | – | | | | |

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| 100 | - | Product qualification | - | Qualification programme to be agreed between manufacturer and purchaser. |
|---|---|-----------------------|---|--|
| <p data-bbox="464 981 1123 1093">iTeh STANDARD PREVIEW (standards.iteh.ai)</p> <p data-bbox="432 1131 1158 1223"><u>SIST EN 3339:2009</u> https://standards.iteh.ai/catalog/standards/sist/dcd16b0b-06b0-4f13-9bc0-ac1cf251065/sist-en-3339-2009</p> | | | | |