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**Ta slovenski standard je istoveten z: EN 2116:2009**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 2116**

February 2009

ICS 49.025.20

English Version

## Aerospace series - Aluminium alloy 2017A-T42 - Wire for solid rivets - $D \leq 10$ mm

Série aérospatiale - Alliage d'aluminium 2017A-T42 - Fils pour rivets pleins -  $D \leq 10$  mm

Luft- und Raumfahrt - Aluminiumlegierung 2017A-T42 - Nietdrähte für Vollniete -  $D \leq 10$  mm

This European Standard was approved by CEN on 16 August 2008.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre 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 the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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: Avenue Marnix 17, B-1000 Brussels

**EN 2116:2009 (E)****Foreword**

This document (EN 2116:2009) 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of an identical text or by endorsement, at the latest by August 2009, and conflicting national standards shall be withdrawn at the latest by August 2009.

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, Bulgaria, 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 2017A-T42  
Wire for solid rivets  
 $D \leq 10$  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 2032-2, *Aerospace series — Metallic materials — Part 2: Coding of metallurgical condition in delivery condition*  
<http://standards.globalspec.com/stds/astm/docs/astm-4258-2009>  
<https://standards.globalspec.com/stds/astm/docs/astm-4258-2009>  
[192455ee9eb7/sist-en-2116-2009](https://standards.globalspec.com/stds/astm/docs/astm-4258-2009)

EN 2070-6, *Aerospace series — Aluminium and aluminium alloy wrought products — Technical specification — Part 6: Rivet wire*

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

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*<sup>1)</sup>

TR 2410, *Aerospace series — Metallic materials — Relationship between dimensional standards and material standards*<sup>2)</sup>

ASTM E112-96, *Standard test methods for determining average grain size*<sup>3)</sup>

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

2) Published as ASD Technical Report at the date of publication of this standard.

3) Published by: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959 USA.

## EN 2116:2009 (E)

|      |                                     |         |                           |     |     |      |      |      |      |         |        |       |    |
|------|-------------------------------------|---------|---------------------------|-----|-----|------|------|------|------|---------|--------|-------|----|
| 1    | Material designation                |         | Aluminium alloy 2017A-T42 |     |     |      |      |      |      |         |        |       |    |
| 2    | Chemical composition % <sup>a</sup> | Element | Si                        | Fe  | Cu  | Mn   | Mg   | Cr   | Zn   | Ti + Zr | Others |       | Al |
|      |                                     |         |                           |     |     |      |      |      |      |         | Each   | Total |    |
|      |                                     | min.    | 0,20                      | –   | 3,5 | 0,40 | 0,40 | –    | –    | –       | –      | –     | –  |
| max. | 0,8                                 | 0,7     | 4,5                       | 1,0 | 1,0 | 0,10 | 0,25 | 0,25 | 0,05 | 0,15    |        |       |    |
| 3    | Method of melting                   |         | –                         |     |     |      |      |      |      |         |        |       |    |
| 4.1  | Form                                |         | Wire                      |     |     |      |      |      |      |         |        |       |    |
| 4.2  | Method of production                |         | Cold drawn                |     |     |      |      |      |      |         |        |       |    |
| 4.3  | Limit dimension(s)                  | mm      | $D \leq 10$               |     |     |      |      |      |      |         |        |       |    |
| 5    | Technical specification             |         | EN 2070-6                 |     |     |      |      |      |      |         |        |       |    |

|     |                         |                  |  |  |  |  |  |  |  |  |  |
|-----|-------------------------|------------------|--|--|--|--|--|--|--|--|--|
| 6.1 | Delivery condition      | H14 <sup>b</sup> |  |  |  |  |  |  |  |  |  |
|     | Heat treatment          | –                |  |  |  |  |  |  |  |  |  |
| 6.2 | Delivery condition code | F <sup>c</sup>   |  |  |  |  |  |  |  |  |  |
| 7   | Use condition           | T42              |  |  |  |  |  |  |  |  |  |
|     | Heat treatment          | See line 29.     |  |  |  |  |  |  |  |  |  |

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Characteristics  
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|     |                                    |            |   |                         |  |  |  |                                 |                         |  |  |  |  |
|-----|------------------------------------|------------|---|-------------------------|--|--|--|---------------------------------|-------------------------|--|--|--|--|
| 8.1 | Test sample(s)                     |            | See EN 2070-6.  |                         |  |  |  |                                 |                         |  |  |  |  |
| 8.2 | Test piece(s)                      |            | See EN 2070-6.<br><a href="https://standards.iteh.ai/catalog/standards/sist/831d0bf2-4388-4d33-b9e2-2116-2009">https://standards.iteh.ai/catalog/standards/sist/831d0bf2-4388-4d33-b9e2-2116-2009</a> |                         |  |  |  |                                 |                         |  |  |  |  |
| 8.3 | Heat treatment                     |            | Delivery condition (see line 6.1)   |                         |  |  |  | Use condition T42 (see line 29) |                         |  |  |  |  |
| 9   | Dimensions concerned               | mm         | $D \leq 10$   |                         |  |  |  |                                 |                         |  |  |  |  |
| 10  | Thickness of cladding on each face | %          | –   |                         |  |  |  |                                 |                         |  |  |  |  |
| 11  | Direction of test piece            |            | L   |                         |  |  |  |                                 |                         |  |  |  |  |
| 12  | Temperature                        | $\theta$   | °C  | Ambient                 |  |  |  |                                 |                         |  |  |  |  |
| 13  | Proof stress                       | $R_{p0,2}$ | MPa   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 14  | T Strength                         | $R_m$      | MPa   | $210 \leq R_m \leq 310$ |  |  |  |                                 | $\geq 400$              |  |  |  |  |
| 15  | Elongation                         | A          | %   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 16  | Reduction of area                  | Z          | %   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 17  | Hardness                           |            | –   |                         |  |  |  |                                 |                         |  |  |  |  |
| 18  | Shear strength                     | $R_c$      | MPa   | –                       |  |  |  |                                 | $260 \leq R_c \leq 290$ |  |  |  |  |
| 19  | Bending                            | k          | –   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 20  | Impact strength                    |            | –   |                         |  |  |  |                                 |                         |  |  |  |  |
| 21  | Temperature                        | $\theta$   | °C  | –                       |  |  |  |                                 |                         |  |  |  |  |
| 22  | Time                               |            | h   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 23  | Stress                             | $\sigma_a$ | MPa   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 24  | Elongation                         | a          | %   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 25  | Rupture stress                     | $\sigma_R$ | MPa   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 26  | Elongation at rupture              | A          | %   | –                       |  |  |  |                                 |                         |  |  |  |  |
| 27  | Notes (see line 98)                |            | a, b, c   |                         |  |  |  |                                 |                         |  |  |  |  |

|   |                          |   |   |
|---|--------------------------|---|---|
| 29  | Reference heat treatment | – | Delivery condition<br>+<br>(495 ± 5) °C = 30 min / WQ $\theta \leq 40$ °C<br>Quench delay = 10 s<br>+ $\theta = \text{ambient}$ / $t \geq 5$ d  |
| 34  | Grain size               | 1 | ASTM E112-96  |
|   |                          | 2 | One sample per batch  |
|   |                          | 4 | Full cross-section taken transversely through the wire.   |
|   |                          | 7 | $G \geq 5$  |
| 44  | External defects         | – | See EN 2070-6.  |
| <p><b>iTeh STANDARD PREVIEW</b><br/>(standards.iteh.ai)</p> <p>SIST EN 2116:2009<br/> <a href="https://standards.iteh.ai/catalog/standards/sist/83fd6bf2-4388-4d33-b9e2-192455ee9eb7/sist-en-2116-2009">https://standards.iteh.ai/catalog/standards/sist/83fd6bf2-4388-4d33-b9e2-192455ee9eb7/sist-en-2116-2009</a></p> |                          |   |   |
| 95  | Marking inspection       | – | See EN 2070-6.  |
| 96  | Dimensional inspection   | – | See EN 2070-6.  |
|   |                          | 1 | Measuring equipment and procedures suitable for the tolerances shall be used.   |
|   |                          | 7 | Dimensions and tolerances shall conform to the requirements of the order or the relevant standard given in TR 2410.   |
| 98  | Notes                    | – | <p><sup>a</sup> In accordance with Handbook from Aluminium Association International Alloy Designation and Composition Limits and Wrought Aluminium and Wrought Aluminium Alloys.</p> <p><sup>b</sup> Instead of H14 it is also acceptable to use either H13 or H15.</p> <p><sup>c</sup> See EN 2032-2.</p> |
| 99  | Typical use              | – | –   |

## EN 2116:2009 (E)

|  |   |                       |   |   |
|--|---|-----------------------|---|---|
| 100  | - | Product qualification | - | - |
| Qualification programme to be agreed between manufacturer and purchaser.   |   |                       |   |   |
| <p data-bbox="464 987 1123 1093"><b>iTeh STANDARD PREVIEW</b><br/><b>(standards.iteh.ai)</b></p> <p data-bbox="432 1133 1155 1223">SIST EN 2116:2009<br/><a href="https://standards.iteh.ai/catalog/standards/sist/83fd6bf2-4388-4d33-b9e2-192455ee9eb7/sist-en-2116-2009">https://standards.iteh.ai/catalog/standards/sist/83fd6bf2-4388-4d33-b9e2-192455ee9eb7/sist-en-2116-2009</a></p> |   |                       |   |   |