SLOVENSKI STANDARD

SIST EN 2941:2008

01-junij-2008

Aeronavtika - Kovice iz nikljeve zlitine - Tehniļna specifikacija

Aerospace series - Nickel alloy rivets - Technical specification

Luft- und Raumfahrt - Niete aus Nickellegierung - Technische Lieferbedingungen

Série aérospatiale - Rivets en alliage de nickel - Spécification technique

Ta slovenski standard je istoveten z: **EN 2941:2008**

ICS:

49.030.60

SIST EN 2941:2008 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2941

March 2008

ICS 49.030.60

English Version

Aerospace series - Nickel alloy rivets - Technical specification

Série aérospatiale - Rivets en alliage de nickel - Spécification technique

Luft- und Raumfahrt - Niete aus Nickellegierung - Technische Lieferbedingungen

This European Standard was approved by CEN on 12 December 2007.

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.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 2941:2008: E

Contents

Page

Foreword

This document (EN 2941:2008) 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 September 2008, and conflicting national standards shall be withdrawn at the latest by September 2008.

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.

1 Scope

This standard specifies the performance and test requirements for solid rivets in the nickel alloys quoted below, intended for aerospace applications. It applies wherever it is specified in the document defining the rivet.

Its use, after agreement between the customer and the supplier, for solid rivets made from other materials, requires determination, case by case, of the minimum tensile and double shear loads.

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.

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*.

EN 2002-001, *Aerospace series — Metallic materials — Test methods — Part 001: Tensile testing at ambient temperature.*

EN 2002-7, *Aerospace series — Metallic materials — Test methods — Part 7: Hardness test.* [1)]

EN 2305 [2)], *Nickel base alloy NI-P11 — 540 MPa ≤ R_m ≤ 620 MPa — Bars and wires for rivets — Aerospace series.* [3)]

EN 3238, *Aerospace series — Metallic materials — Test method — Shear test for wires and rivets.* [4)]

EN 4371, *Aerospace series — Heat resisting alloy NI-PD9001 (NiCu31) — Non heat treated — Bar for rivets — D ≤ 10 mm.* [1)]

EN 4372, *Aerospace series — Heat resisting nickel alloy with copper NI-PD9001 (NiCu31) — Wire for solid rivets — D ≤ 10 mm.* [1)]

3 Terms and definitions

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

3.1
batch
for all tests, inspections and supplies, a batch of rivets is defined as follows: finished rivets of the same form, diameter and length, manufactured by the same process, made from one material, batch from the same heat treatment furnace with the same surface treatment, and deriving from the same wire coil and the same place of manufacture

The maximum mass of each batch is limited to 25 kg.

---

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

2) Inactive for new designation, see EN 4371 and EN 4372.

3) Published as ASD Standard at the date of publication of this standard.

4) In preparation at the date of publication of this standard.

3.2
rivet wire samples
for the test, each rivet batch shall be accompanied by rivet wire samples taken from each end of the coil used to manufacture the batch. The samples shall be submitted to the same heat treatment as the rivets of that batch

3.3
rivet samples
rivet samples intended for tests shall be chosen at random from each batch

4 Required characteristics

The rivets shall conform with the requirements of the document defining the rivet and those prescribed in Table 1. Inspections and tests are to be carried out by the rivet manufacturer.

Table 1 — Technical requirements and test methods

Subclause	Characteristics	Technical requirements	Inspection and test methods	Number of samples
4.1	**Materials**	Shall conform with the requirements of the material standard quoted in the document defining the rivet.	See material specification.	—
4.2	**Dimensions**	Shall conform with the requirements of the document defining the rivet.	Methods are at manufacturer's option. In case of dispute the projection method will be used as the reference method, using × 25 magnification for diameters up to 6 mm and × 10 for greater diameters. This inspection shall be carried out at three equidistant points around the rivet.	Table 2
4.3	**Heat treatment**	Shall conform with the condition of use defined in the material standard.	See 4.5.	—
4.4	**Surface treatment**	Shall be in conformity with the defining document	Methods are at manufacturer's option.	—
4.5	**Mechanical properties**	Shall be checked either by a double shear test or by a tensile test combined with a hardness test.	—	—
4.5.1	**Double shear**	Non-assembled rivets (i.e. without post-formed head) shall conform with the values specified in Table 4.	See EN 3238. If the rivets are not long enough for the double shear test, it shall be carried out on the wire samples.	Table 3
4.5.2	**Tension**	Rivet wire samples shall conform with the values specified in Table 5.	See EN 2002-001.	Table 3

continued

Table 1 — Technical requirements and test methods *(continued)*

Subclause	Characteristics	Technical requirements	Inspection and test methods	Number of samples
4.5.3	**Hardness**	Hardness values for rivet wire samples shall conform with the requirements of the corresponding material standard. Hardness values for rivets shall correspond with the rivet hardness values within a tolerance of ± 5 %.	Refer to EN 2002-7.	Table 3
4.5.4	**Upset test**	After upset the head of the rivets shall be free from cracks or folds when viewed at a magnification of × 10.	Rivets shall be placed in a test fixture substantially conforming to Figure 1a). The free end of the rivet shall be upset using a flat tool to obtain a head conforming to the requirements of Figure 1b).	Table 3 This test to be performed only at the request of the purchaser
4.6	**Surface condition, appearance**	Rivets shall be free from seams, burrs, laps, crevices, incrustations clefts, tooling marks, scores, cracks and other defect prejudicial to the use of the rivet.	Rivets shall be examined visually with or without magnification. Magnification is limited to × 6.	Table 2
4.7	**Identification and marking**	Each rivet shall be marked in conformity with the defining document, except for particular indications requested by the customer. No sharp edges or other defect detrimental to the correct setting of the rivet shall be present.	Visual examination.	—
4.8	**Packaging**	Rivets shall be delivered in strong and durable packages, capable of protecting them from physical and corrosive deterioration. Any particular or additional packaging requirements shall be specified in the order. If the rivets delivered come from different batches, each batch shall be packed and identified separately. Unless particularly specified in the order, the number of rivets in the same package is left to the manufacturer's discretion. However, maximum mass is 25 kg. A copy of the manufacturer's delivery note relating to the rivet batch shall be included in the package but may, on the other band, be sent separately on request.	—	—

continued

Table 1 — Technical requirements and test methods *(concluded)*

Subclause	Characteristics	Technical requirements	Inspection and test methods	Number of samples
4.9	**Labelling**	Durable external labels on the package shall contain the following information: – Identity block of the standard rivet; – Quantity (mass or number of rivets); – Customer's order number; – Manufacturer's identification, name and address; – Number of manufacturer's delivery note; – Manufacturer's batch number; – Manufacturer's inspection stamp. Labels attached to a secondary package shall include the following information as a minimum: – Identity block of the rivet; – Quantity; – Batch number; – Inspection stamp.	—	—

Table 2 — Sampling plan and acceptance level [5] non-destructive tests

Number of rivets in the batch	Number of rivets to be taken for the sampling batch	Maximum number of defective rivets in the sampling batch which permit acceptance of the batch [a]
151 to 280	32	3
281 to 500	50	5
501 to 1 200	80	7
1 201 to 3 200	125	10
3 201 to 10 000	200	14
10 001 to 35 000	315	21
35 001 to 150 000	500	21

[a] Defective rivets shall not be returned to the batch.

5) Sampling plan for normal inspection to ISO 2859-1 (AQL = 4 %).