
Aeronavtika - Kroglasti drsni ležaj iz korozijsko odpornega jekla s samomazalno oblogo, z majhnim začetnim navorom in majhnim tornim količnikom, povišanimi delovnimi cikli pri nizkih oscilacijah v različnih obratovalnih pogojih, omejena serija - 1. del: Mere in nosilnosti za ozki tip

Aerospace series - Bearing, spherical plain, in corrosion resisting steel with self-lubricating liner, low starting torque and low friction coefficient, elevated duty cycles under low oscillations at different operating conditions, narrow series - Part 1: Dimensions and loads for narrow series

Luft- und Raumfahrt - Gelenklager aus korrosionsbeständigem Stahl mit selbstschmierender Beschichtung, geringem Losbrechmoment und niedrigem Reibungskoeffizient, hohe Anzahl an gering oszillierenden Belastungszyklen bei unterschiedlichen Einsatzbedingungen, schmale Reihe - Teil 1: Maße und Belastungen

Série aérospatiale - Rotules lisses en acier résistant à la corrosion à garniture autolubrifiante, faible couple de démarrage et faible coefficient de frottement, cycles d'endurance élevés sous faibles oscillations à différentes conditions de fonctionnement, série étroite - Partie 1 : Dimensions et charges

Ta slovenski standard je istoveten z: EN 4854-1:2019

ICS:

21.100.10	Drsni ležaji	Plain bearings
49.035	Sestavni deli za letalsko in vesoljsko gradnjo	Components for aerospace construction

SIST EN 4854-1:2020

en,fr,de

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EUROPEAN STANDARD

EN 4854-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2019

ICS 49.035

English Version

**Aerospace series - Bearing, spherical plain, in corrosion
resisting steel with self-lubricating liner, low starting
torque and low friction coefficient, elevated duty cycles
under low oscillations at different operating conditions,
narrow series - Part 1: Dimensions and loads for narrow
series**

Série aérospatiale - Rotules lisses en acier résistant à la corrosion à garniture autolubrifiante, faible couple de démarrage et faible coefficient de frottement, cycles d'endurance élevés sous faibles oscillations à différentes conditions de fonctionnement, série étroite
- Partie 1 : Dimensions et charges

Luft- und Raumfahrt - Gelenklager aus korrosionsbeständigem Stahl mit selbstschmierender Beschichtung, geringem Losbrechmoment und niedrigem Reibungskoeffizient, hohe Anzahl an gering oszillierenden Belastungszyklen bei unterschiedlichen Einsatzbedingungen, schmale Reihe - Teil 1: Maße und Belastungen

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This European Standard was approved by CEN on 12 November 2018.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

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

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European foreword

This document (EN 4854-1:2019) 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 April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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

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EN 4854-1:2019 (E)

1 Scope

This European standard specifies the characteristics of spherical plain bearings in corrosion resisting steel with self-lubricating liner, low starting torque and low friction coefficient, elevated duty cycles under low oscillations at different operating conditions, narrow series for aerospace applications.

These self-lubricating spherical plain bearings are intended for use in fixed or moving parts of the aircraft structure especially for control mechanism and operating systems. The bearings are designed to be subjected under low dynamic radial loads and slow rotations in the temperature range of -55°C to 120°C (-67°F to 248°F).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2030, *Aerospace series — Steel X105CrMo17 (1.3544) — Hardened and tempered — Bars — $D_e \leq 150$ mm*

EN 2133, *Aerospace series — Cadmium plating of steels with specified tensile strength $\leq 1\,450$ MPa, copper, copper alloys and nickel alloys*

EN 2424, *Aerospace series — Marking of aerospace products*

EN 3161, *Aerospace series — Steel FE-PM3801 (X5CrNiCu17-4) — Air melted, solution treated and precipitation treated, bar a or $D \leq 200$ mm, $R_m \geq 930$ MPa*

EN 4826, *Aerospace series — Zinc-Nickel (12% to 16% Ni) plating of steels with specified tensile strength $\leq 1\,450$ MPa, copper alloys, nickel alloys and aluminium alloys for parts and fasteners*

EN 4854-3, *Aerospace series — Bearing, spherical plain, in corrosion resisting steel with self-lubricating liner, low starting torque and low friction coefficient, elevated duty cycles under low oscillations at different operating conditions — Part 3: Technical specification*

ISO 1132-1:2000, *Rolling bearings — Tolerances — Part 1: Terms and definitions*

ISO 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

ISO 6811:1998, *Spherical plain bearings — Vocabulary*

ISO 8075, *Aerospace — Surface treatment of hardenable stainless steel parts*

ISO 12240-1:1998, *Spherical plain bearings — Part 1: Radical spherical plain bearings*

TR 4475, *Bearings and mechanical transmissions for airframe applications — Vocabulary*¹

AMS 2417, *Plating, Zinc-Nickel Alloy*²

¹ Published as ASD-STAN Technical Report at the date of publication of this standard by AeroSpace and Defence Industries Association of Europe – Standardization (ASD-STAN) (www.asd-stan.org).

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6811:1998 and TR 4475 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Symbols and abbreviations

For the purpose of this document following symbols according to ISO 1132-1:2000, ISO 12240-1:1998, TR 4475 and the following apply:

- Δ_{dmp} = deviation of mean bore diameter in a single plane
- Δ_{Dmp} = deviation of mean outside diameter in a single plane
- Δ_{ds} = deviation of a single bore diameter
- Δ_{Ds} = deviation of a single outside diameter
- C_a = permissible (limit) static axial load
- C_s = permissible (limit) static radial load
- C_{dyn} = permissible (limit) dynamic radial load
- G_a = Axial internal clearance is the arithmetical mean of the axial distances through which one of the rings may be displaced under the influence of a defined test load relative to the other, from one eccentric extreme position to the diametrically opposite extreme position.
- G_r = Radial internal clearance is the arithmetical mean of the radial distances through which one of the rings may be displaced under the influence of a defined test load relative to the other, from one eccentric extreme position to the diametrically opposite extreme position.

EN 4854-1:2019 (E)

5 Requirements

5.1 Configuration, dimensions, tolerances and mass

Dimensions, tolerances and mass according to the related figures and tables. Dimensions and tolerances are expressed in millimetres (inches) and apply after surface treatment.

- Code S: without swaging groove (Figure 1 and Table 1)
- Code R: with swaging groove (Figure 2 and Table 2)

General tolerances shall be ISO 2768-m in accordance with ISO 2768-1.

5.2 Surface roughness

According to Figure 1 and Figure 2. Dimensions of the surface roughness are expressed in micrometres (micro inches) and apply before surface treatment.

5.3 Material

Inner ring (ball): Steel per EN 2030, hardness 55 HRC to 62 HRC

Outer ring (race): Steel per EN 3161, hardness 28 HRC to 37 HRC before swaging

Liner: Self-lubricating and wear resistant material with low friction coefficient consistent with the requirements of EN 4854-3

For alternative materials see TR 4661.

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5.4 Surface treatment

Code T:

- inner ring (ball): according to ISO 8075;
- outer ring (race): Zink-Nickel plating per EN 4826 Type 2 (AMS 2417, Type 2 Grade B as alternative).

Without swaging groove code S: Surface treatment according to ISO 8075 for inner ring before swaging. Zink-Nickel plating of outer ring: 8 µm to 16 µm (0.000 3 in to 0.000 6 in) according to EN 4826 Type 2 (AMS 2417, Type 2 Grade B as alternative).

Required area, see Figure 1 (both end surfaces up to the chamfer at manufacturer's option).

With swaging groove code R: Surface treatment according to ISO 8075 for inner ring before swaging. Zink-Nickel plating of outer ring: 8 µm to 16 µm (0.000 3 in to 0.000 6 in) according to EN 4826 Type 2 (AMS 2417, Type 2 Grade B as alternative).

Required area, see Figure 2 (both end surfaces up to the swaging grooves at manufacturer's option).

Code P:

- inner ring (ball): according to ISO 8075;
- outer ring (race): cadmium plating per EN 2133.

Without swaging groove code S: Surface treatment according to ISO 8075 for inner ring before swaging. Cadmium plating of outer ring: 5 μm to 8 μm (0.000 2 in to 0.000 3 in) according to EN 2133.

Required area, see Figure 1 (both end surfaces up to the chamfer at manufacturer's option), followed by chromating.

With swaging groove code R: Surface treatment according to ISO 8075 for inner ring before swaging. Cadmium plating of outer ring: 5 μm to 8 μm (0.000 2 in to 0.000 3 in) according to EN 2133.

Required area, see Figure 2 (both end surfaces up to the swaging grooves at manufacturer's option), followed by chromating.

For alternative surface treatments see TR 4661.

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