SLOVENSKI STANDARD
SIST EN 2755:2009

01-november-2009

Aeronavtika - Ležaji, krogelni, drsni, iz korozijsko odpornega jekla s samomazalno oblogo - Serija za večje obremenitve pri temperaturi okolice - Tehnična specifikacija

Aerospace series - Bearings, spherical plain in corrosion resisting steel with self-lubricating liner - Elevated load at ambient temperature - Technical specification

Luft- und Raumfahrt - Gelenklager, aus korrosionsbeständigem Stahl mit selbstschmierender Beschichtung - Reihe hohe Belastungen bei Raumtemperatur - Technische Lieferbedingungen

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Série aérospatiale - Rotules, en acier résistant à la corrosion à garniture autolubrifiante - Série à charge élevée à température ambiante - Spécification technique

Ta slovenski standard je istoveten z: **EN 2755:2009**

ICS:

49.035	Sestavni deli za letalsko in vesoljsko gradnjo	Components for aerospace construction

SIST EN 2755:2009 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2755

July 2009

ICS 49.035

English Version

Aerospace series - Bearings, spherical plain in corrosion resisting steel with self-lubricating liner - Elevated load at ambient temperature - Technical specification

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Foreword

This document (EN 2755:2009) 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of an identical text or by endorsement, at the latest by January 2010, and conflicting national standards shall be withdrawn at the latest by January 2010.

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1 Scope

This standard specifies the required characteristics, inspection and test methods, qualification and acceptance conditions for spherical plain bearings in corrosion resisting steel, with self-lubricating liner, for elevated loads at ambient temperature intended for use in fixed or moving parts of the aircraft structure and control mechanisms.

This standard applies whenever referenced.

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 2064, *Aerospace series — Bearings spherical plain in corrosion resisting steel with self-lubricating liner — Technical specification*

EN 2584, *Aerospace series — Bearings, spherical plain in corrosion resisting steel with self-lubricating liner — Narrow series — Elevated loads at ambient temperature — Dimensions and loads*

EN 2585, *Aerospace series — Bearings, spherical plain in corrosion resisting steel with self-lubricating liner — Wide series — Elevated load at ambient temperature — Dimensions and loads*

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EN 3048, *Aerospace series — Bearings, spherical plain in corrosion resisting steel with self-lubricating liner — Light series — Elevated load at ambient temperature — Dimensions and loads*

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EN 4037, *Aerospace series — Bearings, spherical plain in corrosion resisting steel with self-lubricating liner, reduced starting torque — Light series — Dimensions and loads* [1]

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EN 4038, *Aerospace series — Bearings, spherical plain in corrosion resisting steel with self-lubricating liner reduced starting torque — Normal narrow series — Dimensions and loads* [1]

EN 4039, *Aerospace series — Bearings, spherical plain in corrosion resisting steel with self-lubricating liner reduced starting torque — Normal wide series — Dimensions and loads* [1]

EN 4040, *Aerospace series — Bearings, spherical plain in corrosion resisting steel with self-lubricating liner with wide inner ring — Elevated loads at ambient temperature — Dimensions and loads*

EN 4613, *Aerospace series — Spherical plain bearings in corrosion resisting steel with self-lubricating liner, narrow series — Dimensions and loads — Inch series* [1]

EN 4614, *Aerospace series — Spherical plain bearings in corrosion resisting steel with self-lubricating liner, wide series — Dimensions and loads — Inch series* [1]

EN 6096, *Aerospace series — Bearings, spherical plain, in corrosion resisting steel with self-lubricating liner, and extra wide inner ring — Dimensions and loads — Inch series*

EN 9100, *Aerospace series — Quality management systems — Requirements (based on ISO 9001:2000) and Quality systems — Model for quality assurance in design, development, production, installation and servicing (based on ISO 9001:1994)*

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[1] In preparation at the date of publication of this standard.

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EN 9133, *Aerospace series — Quality management systems — Qualification procedure for aerospace standard parts*

EN 10204, *Metallic products — Types of inspection documents*

ISO 11078, *Aircraft — De-icing/anti-icing fluids, ISO type II, III and IV*

TR 4475, *Aerospace series — Bearings and mechanical transmissions for airframe applications — Vocabulary* [2]

3 Terms and definitions

For the purposes of this document, the terms and definitions given in TR 4475 and the following apply.

3.1
spherical plain bearings with self-lubricating liner
spherical plain bearing consisting of two concentric rings between which is interposed a self-lubricating liner which is bonded or moulded onto the spherical inner surface or the spherical outer surface

3.2 Surface discontinuities

3.2.1
score, scratch
open surface defect

3.2.2
lap
surface defect where particles of metal or sharp edges are folded over and then rolled or forged into the surface

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3.2.3
seam
unwelded fold which appears as an open defect in the material

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3.3
starting torque at without load
torque required to start the rotation of the inner with the outer ring held stationary

3.4 Permissible static loads

3.4.1
radial
C_s
static load corresponding to a permissible unit pressure multiplied by the effective projected area in the radial direction, the inner ring being able to take any position within the limits of the tilting angle indicated in the product standard

3.4.2
axial
C_a
static load corresponding to a permissible unit pressure multiplied by the effective projected area in the axial direction

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

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3.5
dynamic radial
C_{25}
load which may be withstood by a bearing submitted to an oscillatory movement for a defined number and frequency of oscillation cycles without the dimensional or other characteristics deviating from the values permitted by the technical specification of the product

NOTE One oscillating cycle includes an angular displacement of the inner ring in relation to the outer ring from 0° to 25° then from 25° to – 25° and finally from – 25° to 0°.

3.6
adhesion of the liner
area where the adhesive bond is broken, or non existent, leaving a smooth and clean interface on the metallic surface

3.7
production batch
batch of products composed of elements which may come from more than one element batch but which are assembled in the same production series

4 Requirements characteristics, inspection and test method

See Table 1.

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Table 1

Clause	Characteristic	Requirements	Inspection and test method	Q [a]	A [b]
4.1	**Material**	In accordance with the product standard or design documentation.	Chemical analysis or certificate of compliance according to EN 10204, issued by semi-finished product manufacturer.	X	X
				X	X
4.2	**Dimensions, tolerances**	In accordance with the product standard or design documentation.	Suitable measuring instruments. **Measurement of bore and outer diameter:** — Rings with a width of ≤ 10 mm: in the centre plane; — Rings with a width of > 10 mm: in two planes parallel to the outer faces and at a distance of these faces of twice the maximum value of the ring chamfer. The minimum and maximum diameters shall be determined in each measuring plane. **Measurement of ring width:** — The width of each ring (distance between the two faces) shall be verified at a minimum of four points.	X	X
4.3	**Masses**	In accordance with the product standard or design documentation.	Suitable methods.	X	
4.4	**Marking**	In accordance with the product standard or design documentation. It shall be legible and shall not adversely affect the material or the functioning of the bearing.	Visual examination.	X	X
4.5	**Surface appearance**	The bearings shall be free of surface discontinuities liable to have an adverse effect on their characteristics and endurance. The liner shall not contain contaminant products and shall not show broken or voided areas. Lubrication shall not be permitted.			
4.5.1	**Assembled bearings**		Visual inspection using suitable methods.	X	X
4.5.2	**Unassembled rings**		Magnetic or dye penetrant inspection.	X	X

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Table 1 *(continued)*

Clause	Characteristic	Requirements	Inspection and test method	Q [a]	A [b]
4.6	**Hardness**	In accordance with the product standard or design documentation.	Suitable processes and measuring instruments.	X	X
4.7	**Surface roughness**	In accordance with the product standard or design documentation.	Suitable processes and measuring instruments.	X	X
4.8	**Surface treatment**	In accordance with the product standard or design documentation.	Visual inspection. As per surface treatment standard.	X	X
4.9	**Behaviour in rotation and tilt**	Bearings shall be able to move freely within the angular limits specified in the product standards or design documentation.	Manual inspection.	X	X
4.10	**Starting torque without load**				
4.10.1	**At ambient temperature**	In accordance with the product standard or design documentation.	Suitable processes and measuring instruments: — measurement of the starting torque shall be preceded by some rotations and a few turning movements by hand; — measure the torque, apply gradually to the inner ring, in both directions, with the outer ring held stationary. Read off the maximum value required to start up the inner ring.	X	X
4.10.2	**At low temperature**	Starting torque ≤ twice those listed in the product standard or design documentation.	Subject the bearing, during 4 h at the minimum temperature ± 5 °C. Immediately after, measure the torque following 4.10.1.	X	
4.10.3	**After limit temperatures**	In accordance with Tables 2 and 3.	Subject the bearing, during 1 h at the minimum temperature ± 5 °C, then 1 h at the maximum temperature ± 2 °C. Repeat successively × 10 this test. 4 h after these tests, measure the torque, at ambient temperature, following 4.10.1.	X	

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Table 1 *(continued)*

Clause	Characteristic	Requirements	Inspection and test method	Q [a]	A [b]
4.11	**Conformity of spherical surface**	For fabric type liners **no** difference between measurements obtained on spherical surfaces shall exceed 0,08 mm.	Clad the bearing in plastic material identical to that used for metallurgical mounts. Section the bearing on a diameter and normal to the race side face. Grind and polish the exposed surface. Measure distance '*t*', checked at a minimum of five points uniformly spaced around the spherical diameter with the aid of, for example, an optical dial indicator (see Figure 1).	X	
		For moulded liners: — the maximum liner thickness shall occur between *C*/10 position; — the minimum liner thickness shall be 0,20 mm.	Clad the bearing in plastic material identical to that used for metallurgical mounts. Section the bearing on a diameter and normal to the race side face. Grind and polish the exposed surface. Measure distance '*t*', checked at a minimum of five points uniformly spaced around the spherical diameter with the aid of, for example, an optical dial indicator (see Figure 1). The points shall include the midpoint and the *C*/10 positions.	X	
4.12	**Permissible static loads:** — **radial: C_s** — **axial: C_a**	In accordance with the product standard or design documentation. No maximum total deflection greater than those listed in Tables 4 and 5 under permissible static loads (C_s). After removing the loads, no permanent deformations greater than those listed in Tables 4 and 5.	See Annex A.	X	
4.13	**Ultimate static loads:** — **radial** — **axial**	After removing the loads, there shall be no cracks, no push out of the inner ring or deterioration of the bearing.	See Annex A.		

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