

**SLOVENSKI STANDARD**  
**SIST EN 2755:2022****01-januar-2022****Nadomešča:**  
**SIST EN 2755:2009**

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**Aeronavtika - Kroglasti drsni ležaj iz korozijsko odpornega jekla s samomazalno oblogo - Serija za večje obremenitve pri okoljski temperaturi - Tehnična specifikacija**

Aerospace series - Bearing, 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 - Rotule, 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 2755:2021****ICS:**

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

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

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

Série aérospatiale - Rotule, en acier résistant à la  
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korrosionsbeständigem Stahl mit selbstschmierender  
Beschichtung - Reihe hohe Belastungen bei  
Raumtemperatur - Technische Lieferbedingungen

This European Standard was approved by CEN on 12 July 2020.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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**EN 2755:2021 (E)****European foreword**

This document (EN 2755:2021) 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-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 May 2022, and conflicting national standards shall be withdrawn at the latest by May 2022.

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.

This document supersedes EN 2755:2009.

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, 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.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

## 1 Scope

This document specifies the required characteristics, inspection and test methods, qualification and acceptance conditions for a spherical plain bearing 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 document applies whenever referenced.

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

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*

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

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

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

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*

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

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

EN 9100, *Quality Management Systems — Requirements for Aviation, Space and Defence Organizations*

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

<sup>1</sup> Published as ASD-STAN Prestandard at the date of publication of this standard by AeroSpace and Defence Industries Association of Europe – Standardization (ASD-STAN) ([www.asd-stan.org](http://www.asd-stan.org)).

**EN 2755:2021 (E)**

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

TR 4475, *Aerospace series — Bearings and mechanical transmissions for airframe applications — Vocabulary*<sup>2</sup>

**3 Terms and definitions**

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

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

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

**3.1****spherical plain bearings with self-lubricating liner**

spherical plain bearings 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

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**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

**3.3****starting torque without load**

torque required to start the rotation of the inner with the outer ring held stationary

<sup>2</sup> 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](http://www.asd-stan.org)).



**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

**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 1 to entry: 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.

Table 1 (1 of 4)

Clause	Characteristic	Requirements	Inspection and test method	Qa	Ab
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

4.2	<b>Dimensions, tolerances</b>	In accordance with the product standard or design documentation.	<p>Suitable measuring instruments.</p> <p><b>Measurement of bore and outer diameter:</b></p> <ul style="list-style-type: none"> <li>— Rings with a width of <math>\leq 10</math> mm: in the centre plane;</li> <li>— Rings with a width of <math>&gt; 10</math> 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.</li> </ul> <p><b>Measurement of ring width:</b></p> <ul style="list-style-type: none"> <li>— The width of each ring (distance between the two faces) shall be verified at a minimum of four points.</li> </ul>	X	X
4.3	<b>Masses</b>	In accordance with the product standard or design documentation.	Suitable methods.	X	
4.4	<b>Marking</b>	<p>In accordance with the product standard or design documentation.</p> <p>It shall be legible and shall not adversely affect the material or the functioning of the bearing.</p>	Visual examination.	X	X
4.5	<b>Surface appearance</b>	<p>The bearings shall be visually free of surface discontinuities (examples: scratch, score, seam, lap) liable to have an adverse effect on their characteristics and endurance.</p> <p>The liner shall not contain contaminant products and shall not show broken or voided areas.</p> <p>Lubrication shall not be permitted.</p>			

4.5.1	Assembled bearings		Visual inspection using suitable methods.	X	X
4.5.2	Unassembled rings		Magnetic or dye penetrant inspection.	X	X
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

Table 1 (2 of 4)

Clause	Characteristic	Requirements	Inspection and test method	Q <sup>a</sup>	A <sup>b</sup>
4.9	Behaviour in rotation and tilt	Bearings shall be able to move freely within the angular limits specified in the product standard or design documentation.	Manual inspection.	X	X
4.10	Starting torque without load	<a href="https://standards.itech.ai/catalog/standards/sist/9400560e-0af0-4285-9dec-9df96a062b2c/sist-en-2755-2022">SIST EN 2755:2022</a>			
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 $\leq$ twice those listed in the product standard or design documentation.	Subject the bearing, during 4 h at the minimum temperature $\pm 5$ °C. Immediately after, measure the torque following 4.10.1.	X	

4.10.3	<b>After limit temperatures</b>	In accordance with Tables 2 and 3.	Subject the bearing, during 1 h at the minimum temperature $\pm 5$ °C, then 1 h at the maximum temperature $\pm 2$ °C. Repeat successively $\times 10$ this test. 4 h after these tests, measure the torque, at ambient temperature, following 4.10.1.	X	
4.11	<b>Conformity of spherical surface</b>	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	
		<p>For moulded liners:</p> <ul style="list-style-type: none"> <li>— the maximum liner thickness shall occur between C/10 position;</li> <li>— the minimum liner thickness shall be 0,20 mm.</li> </ul>	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.	X	

Table 1 (3 of 4)

Clause	Characteristic	Requirements	Inspection and test method	Q <sup>a</sup>	A <sup>b</sup>
			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.		

4.12	<b>Permissible static loads:</b> <ul style="list-style-type: none"> <li>— radial: <math>C_S</math></li> <li>— axial: <math>C_a</math></li> </ul>	<p>In accordance with the product standard or design documentation.</p> <p>No maximum total deflection greater than those listed in Table 4 and Table 5 under permissible static loads (<math>C_S</math>).</p> <p>After removing the loads, no permanent deformations greater than those listed in Table 4 and Table 5.</p>	See Annex A.	X	
4.13	<b>Ultimate static loads:</b> <ul style="list-style-type: none"> <li>— radial</li> <li>— axial</li> </ul>	After removing the loads, there shall be no cracks, no push out of the inner ring or deterioration of the bearing.	See Annex A.	X	
4.14	<b>Dynamic radial loads <math>C_{25}</math>:</b> <ul style="list-style-type: none"> <li>— at ambient temperature</li> <li>— at low temperature</li> <li>— at elevated temperature</li> <li>— at extended cycles. Type C or D.</li> </ul>	<p>In accordance with the product standard or design documentation.</p> <p>After the removal of the loads:</p> <ul style="list-style-type: none"> <li>— no metal-to-metal contact between inner and outer ring; <a href="https://standards.iteh.ai/catalog/standards/sist/9400560e-0af0-4285-9dec-911e2b7e-c555">SIST EN 2755:2022</a></li> <li>— the liner wear shall not exceed the values listed in Table 6;</li> <li>— the peel strength and the bond integrity shall conform with 4.16 and 4.17.</li> </ul> <p>At the end of the test, the starting torque under radial load shall be measured and shall conform with values listed in Tables 7 and 8.</p>	<p>See Annex B.</p> <p>Suitable processes and measuring instruments.</p>	X	