
**Aeronavtika – Ležaji, krogelni, drsni, iz korozijsko odpornega jekla z utorom –
Mere in nosilnosti**

Aerospace series - Bearings, spherical plain in steel with assembly slots - Dimensions
and loads

Luft- und Raumfahrt - Gelenklager aus Stahl mit Einführnuten - Maße und Belastungen

Série aérospatiale - Rotules lisses en acier avec encoches d'assemblage - Dimensions
et charges

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English Version

Aerospace series - Bearings, spherical plain in steel with
assembly slots - Dimensions and loads

Série aérospatiale - Rotules lisses en acier avec encoches
d'assemblage - Dimensions et charges

Luft- und Raumfahrt - Gelenklager aus Stahl mit Einführnut
- Maße und Belastungen

This European Standard was approved by CEN on 26 October 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents	Page
Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Symbols and abbreviations	5
5 Required characteristics	5
6 Designation	9
7 Marking	9
8 Technical specification	9

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SIST EN 2336:2006
<https://standards.iteh.ai/catalog/standards/sist/5423d09b-dc56-4a12-8bb9-21ea876912cb/sist-en-2336-2006>

Foreword

This European Standard (EN 2336:2005) has been prepared by the European Association of Aerospace Manufacturers - Standardization (AECMA-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 AECMA, 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 June 2006, and conflicting national standards shall be withdrawn at the latest by June 2006.

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.

This European Standard supersedes EN 2336:1988.

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

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1 Scope

This standard specifies the characteristics of spherical plain bearings in steel, with assembly slots, with or without lubrication holes and grooves, intended for use in fixed or moving parts of aircraft structure and control mechanisms.

They may be used in the temperature range from – 54 °C to 150 °C.

However, as they are lubricated with the following greases (see EN 2337):

- ester type very high pressure grease (code letter A), operating range from – 73 °C to 121 °C or,
- synthetic hydrocarbon type very high pressure grease general purpose (code letter B), operating range from – 54 °C to 177 °C.

Their field of application when lubricated with grease code letter A is limited to 121 °C.

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 1132-1, *Rolling bearings – Tolerances – Part 1: Terms and definitions*.

EN 2031, *Steel FE-PL31 – Hardened and tempered – Bars – Aerospace series*. ¹⁾

EN 2337, *Aerospace series – Spherical plain bearings – Technical specification*.

EN 2424, *Aerospace series – Marking of aerospace products*.

EN 2491, *Aerospace series – Molybdenum disulphide dry lubricants – Coating methods*.

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in ISO 1132-1 apply.

¹⁾ Published as AECMA Standard at the date of publication of this standard.

4 Symbols and abbreviations

The following symbols for tolerances are used:

Δ_{amp} : single plane mean bore diameter deviation

Δ_{ts} : deviation of a single bore diameter

Δ_{Dmp} : single plane mean outside diameter deviation

Δ_{Ds} : deviation of a single outside diameter

α : angle of tilt of the outer ring with respect to the inner ring, the spherical surface of the outer ring being completely in contact with the inner ring

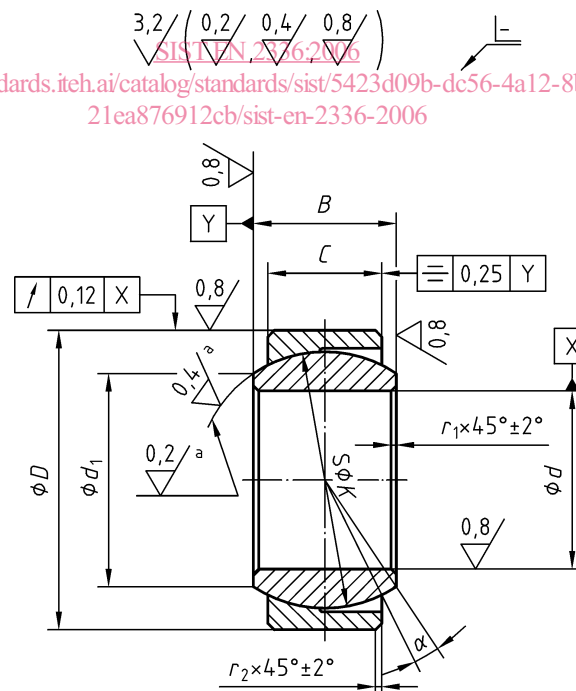
5 Required characteristics

5.1 Configuration, dimensions and masses

According to Figures 1 and 2 and Tables 1 and 2. The dimensions are expressed in millimetres and apply after surface treatment.

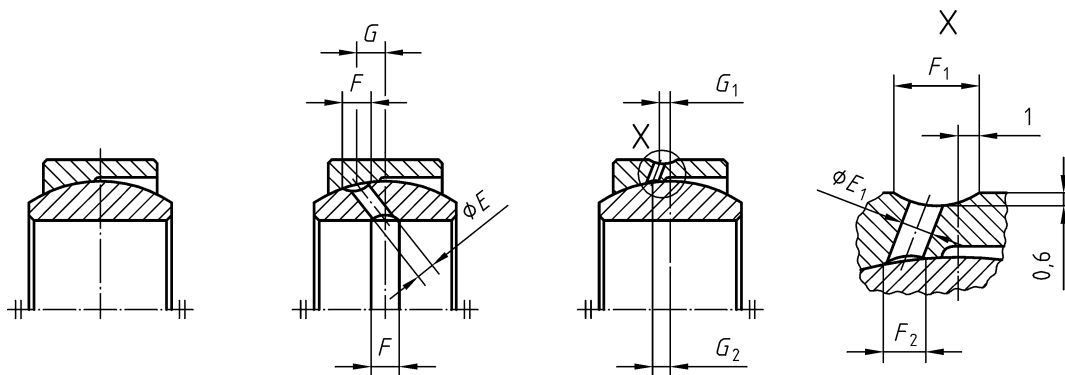
5.2 Surface roughness

According to Figure 1. The values are expressed in micrometres and apply before surface treatment.



^a 0,4 for spherical surface with dry-film lubricant; 0,2 for non-coated surface

Figure 1

**Code letter E:**

Bearing without lubrication
holes and groove

Code letter F:

Bearing with lubrication
holes and groove on
inner ring

Code letter G:

Bearing with lubrication holes and
groove on outer ring

Figure 2**Table 1**

d		B	C	D	Tolerances μm				d_1	K	r_1	r_2	α°	Mass
code number	nom.	0 - 0,06	0 - 0,25		Δ_{imp}	Δ_{ws}	Δ_{imp}	Δ_{ps}	min.	\approx			min. ^a	g \approx
05	5	6	4	14	0 - 8	- 2 - 10	0 - 8	+ 6 + 13	8	10	0,3 to 0,6	0,4 to 0,7	13	4
06	6								10	13				
08	8	8	5	16	0 - 8	+ 3 - 11	0 - 9	+ 6 + 15	13	16	0,5 to 0,8	0,5 to 0,8	15	7
10	10	9	6	19					15	18			12	11
12	12	10	7	22					18	22			11	15
15	15	12	9	26					20	25			8	28
17	17	14	10	30	0 - 10	+ 3 - 13	0 - 11	+ 8 + 19	24	29	0,7 to 1,1	0,9 to 1,3	10	44
20	20	16	12	35					29	36			9	60
25	25	20	16	42					34	41			7	105
30	30	22	18	47					39	47			6	145
35	35	25	20	55	0 - 12	+ 3 - 15	0 - 13	+ 10 + 23	45	53	1,2 to 1,7	1,4 to 1,8	7	210
40	40	28	22	62					50	60				285
45	45	32	25	68					55	66				420
50	50	35	28	75					66	80				515
60	60	44	36	90	0 - 15	+ 4 - 19	0 - 15	+ 13 + 28	77	92	1,2 to 1,7	1,4 to 1,8	6	1 050
70	70	49	40	105					88	105				1 510
80	80	55	45	120										2 250

^a Maximum values for the user

Table 2

<i>d</i>		<i>E</i> ^a	<i>E</i> ₁ ^a	<i>F</i>	<i>F</i> ₁	<i>F</i> ₂	<i>G</i>	<i>G</i> ₁	<i>G</i> ₂	
code number	nom.	± 0,2	± 0,2	± 0,2	± 0,2	± 0,2	+ 0,1 0	+ 0,1 0	+ 0,1 0	
05	5	Without lubrication holes and groove								
06	6									
08	8									
10	10									
12	12									
15	15	1,5	1,5	2,8	3	2	2,2	1	1,75	
17	17	2		2,9			2,5		2	
20	20						3			
25	25	2,5	2	4	4	2,5	4	1,5	2,5	
30	30						2,5		3	4,5
35	35									5
40	40		3		5,5	2				
45	45				6,2		3,5			
50	50				7		4			
60	60	3	3	4,5	4	9	2,5	5		
70	70			5		8	10	3,5	5,5	
80	80						12		7,5	

^a Three holes at intervals of 120° on the periphery.

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^a Three holes at intervals of 120° on the periphery.

5.3 Clearances and loads

See Table 3.