



SLOVENSKI STANDARD
SIST EN 2588:2001
01-januar-2001

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

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

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

Série aérospatiale - Rotules lisses en acier résistant a la corrosion avec encoches d'assemblage - Dimensions et charges

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Ta slovenski standard je istoveten z: EN 2588:1988

ICS:

| | | |
|--------|--|---------------------------------------|
| 49.035 | Sestavni deli za letalsko in vesoljsko gradnjo | Components for aerospace construction |
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EUROPEAN STANDARD
 NORME EUROPÉENNE
 EUROPÄISCHE NORM

EN 2588

January 1988

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Key words : Aeronautical industry, plain bearing, spherical bearings, corrosion resisting steel, dimensions, static loads.

English version

**Aerospace series
 Bearings-spherical plain
 in corrosion resisting steel
 with assembly slots
 Dimensions and loads**

| | |
|---|--|
| <p>Série aérospatiale Rotules lisses en acier résistant à la corrosion avec encoches d'assemblage Dimensions et charges</p> | <p>Luft- und Raumfahrt Gelenklager aus korrosionsbeständigem Stahl mit Einführnuten Maße und Belastungen</p> |
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CEN

European Committee for Standardization
 Comité Européen de Normalisation
 Europäisches Komitee für Normung

Central Secretariat : Rue Bréderode 2, B—1000 Bruxelles

Brief history

This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After enquiries and votes carried out in accordance with the rules of this Association, this draft has successively received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to C.E.N.

According to the Common CEN/CENELEC Rules, following countries are bound to implement this European Standard:

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1 Scope

This standard specifies the characteristics of spherical plain bearings :

- without assembly slots
- with and without grease holes
- with and without lubrication grooves
- in corrosion resisting steel

intended for fixed and moveable structural elements in aircraft and their control mechanisms.

2 Field of application

The spherical plain bearings defined by this standard are to be used within the temperature range -54 to +150 °C.

However, because of lubrication with the following greases (see EN 2337) :

- ester type extreme pressure grease (code A) limits of use -73 to +121°C or
- synthetic hydrocarbon extreme pressure grease, for general purpose (code B) limits of use -54 to +177 °C ,

this field of application in the case of lubrication with grease A is limited to + 121 °C.

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In both cases one of the spherical surfaces shall be smeared with a dry film lubricant (anti-seize treatment).

3 References

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ISO 1132-1980, Rolling bearings - Tolerances - Definitions

EN 2030 , Steel FE-PM43 - Hardened and tempered - Bars $D \leq 150$ mm - Aerospace series

EN 2337 , Aerospace series 1) Spherical plain bearings - Technical specification

4 Symbols and definitions

The tolerance symbols and their definitions are in accordance with ISO 1132.

- Δ_{dmp} : difference between a single plane mean bore diameter and the nominal bore diameter
- Δ_{ds} : difference between a single bore diameter and the nominal bore diameter
- Δ_{Dmp} : difference between a single plane mean outside diameter and the nominal outside diameter
- Δ_{Ds} : difference between a single outside diameter and the nominal outside diameter
- α : maximum angle of tilt of the outer ring with respect to the inner ring with the spherical raceway of the outer ring being completely in contact with the inner ring.

1) In preparation.

5 Materials

Inner ring : Steel EN 2030 - Hardness : $55 \leq \text{HRC} \leq 62$

Outer ring : Steel EN 2030 - Hardness : $\geq 58 \text{ HRC}$

6 Required characteristics

6.1 Dimensions - Tolerances - Mass

The configuration shall conform with figures 1, 2, 3 and 4.

The dimensions, tolerances and mass shall conform with the values given in table 1.

6.2 Surface roughness

See figure 1.

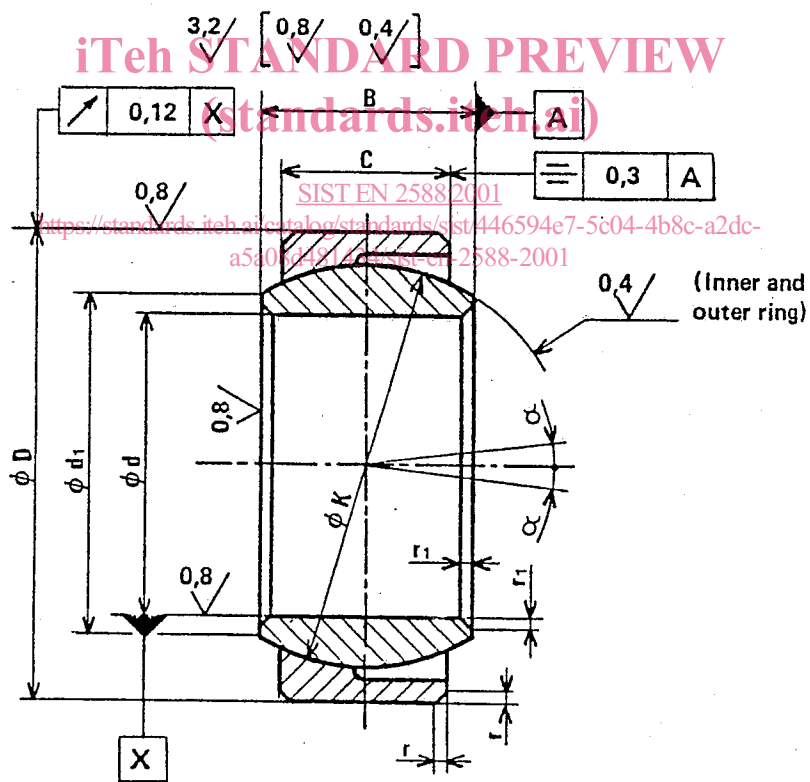
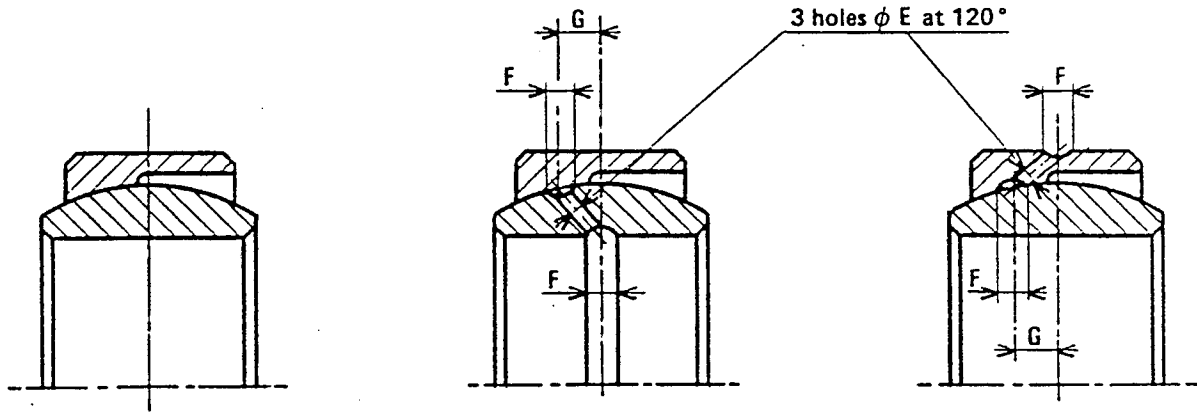


Figure 1



Code E : without grease hole or lubrication groove .

Figure 2

Code F : with grease holes in and lubrication grooves on the inner ring

Figure 3

Code G : with grease holes and lubrication grooves on the outer ring

Figure 4

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Dimensions in millimetres

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| Code | Nom. | B h11 | C 0 -0,25 | D | Tolerances μm | | | | d min. | E $\pm 0,2$ | F $\pm 0,2$ | G $+0,1$ 0 | K \approx | r | r ₁ | α min. degree | Mass \approx g | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|----------|-----------------|-----|--------------------------|-----------------|--------------|--------------|-----------|------------------|------------------|------------------|----------------|------------------|------------------|----------------------------|------------------------|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|-----|----|------------------|------------------|----|---|----|-----|-----|----|------------------|------------------|----|---|----|-----|-----|----|------------------|------------------|----|---|
| | | | | | Δd_{mp} | ΔD_{mp} | Δd_s | ΔD_s | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 05 | 5 | 6 | 4 | 14 | 0 -8 | 0 -8 | +2 -10 | +5 -13 | 7 | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06 | 6 | 6 | 4 | 14 | | | | | 8 | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 08 | 8 | 8 | 5 | 16 | | | | | 10 | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 10 | 9 | 6 | 19 | | | | | 13 | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 12 | 10 | 7 | 22 | | | | | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 15 | 12 | 9 | 26 | | | | | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | 17 | 14 | 10 | 30 | | | | | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | |
| 20 | 20 | 16 | 12 | 35 | | | | | 24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | |
| 25 | 25 | 20 | 16 | 42 | | | | | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 |
| 30 | 30 | 22 | 18 | 47 | | | | | 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 35 | 25 | 20 | 55 | 39 | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 40 | 28 | 22 | 62 | 45 | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45 | 45 | 32 | 25 | 68 | 50 | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 50 | 35 | 28 | 75 | 55 | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | 60 | 44 | 36 | 90 | 66 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70 | 70 | 49 | 40 | 105 | 77 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | 80 | 55 | 45 | 120 | 88 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1) | 2,2 | 2,2 | 10 | 0,3 to 0,8 | 0,3 to 0,6 | 13 | 4 | | | | | | | | | | | | | | | | | | | | |

1) Without greases hole or lubrication groove.

6.3 Loads and clearances

They shall conform with the values indicated in table 2.

Table 2

| d Code | Permissible static loads kN | | Internal axial clearance μm | | Internal radial clearance max. μm | |
|-----------|--------------------------------|-------------------|---|-------------------|---|-------------------|
| | Radial C_s 1) | Axial C_a 2) | Normal Code N | Reduced Code P | Normal Code N | Reduced Code P |
| 05 | 12 | 0,68 | 30 to 60 | 1 to 30 | 15 | 8 |
| 06 | 16 | 0,90 | | | | |
| 08 | 26 | 1,50 | | | | |
| 10 | 45 | 2,30 | | | | |
| 12 | 60 | 3,20 | | | | |
| 15 | 90 | 5,55 | | | | |
| 17 | 110 | 6,95 | | | | |
| 20 | 160 | 9,85 | | | | |
| 25 | 270 | 18,15 | | | | |
| 30 | 380 | 25,16 | | | | |
| 35 | 500 | 30 | 40 to 80 | 1 to 40 | 20 | 10 |
| 40 | 630 | 36,66 | | | | |
| 45 | 820 | 48,10 | | | | |
| 50 | 1000 | 60,96 | | | | |
| 60 | 1600 | 102,76 | 50 to 100 | 1 to 50 | 25 | 15 |
| 70 | 2000 | 127,80 | | | | |
| 80 | 2600 | 182,80 | | | | |

1) These loads can only be applied at 90° with respect to the opening of the slots.
2) These loads shall be applied in the direction of the unslotted face of the outer ring.