
Aeronavtika - Kroglasti drsni ležaji iz korozijsko odpornega jekla s samomazalno oblogo in z zvišano obremenitvijo pod nizkimi nihanji - Ozki tip - Mere in nosilnosti - 2. del: Colski tip

Aerospace series - Bearings, spherical plain, in corrosion resisting steel with self-lubricating liner elevated load under low oscillations - Narrow series - Dimensions and loads - Part 2: Inch series

Luft- und Raumfahrt - Gelenklager, aus korrosionsbeständigem Stahl mit selbstschmierender Beschichtung, hohe Belastung bei geringer Drehbewegung - Schmale Reihe - Maße und Belastungen - Teil 2: Inch Reihe

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Série aérospatiale - Rotules, en acier résistant à la corrosion à garniture autolubrifiante à charge élevée sous faibles oscillations - Série étroite - Dimensions et charges - Partie 2: Série en inches

Ta slovenski standard je istoveten z: EN 4538-2:2014

ICS:

49.035

Sestavni deli za letalsko in vesoljsko gradnjo

Components for aerospace construction

SIST EN 4538-2:2014

en,fr,de

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EUROPEAN STANDARD

EN 4538-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2014

ICS 49.035

English Version

**Aerospace series - Bearings, spherical plain, in corrosion
resisting steel with self-lubricating liner elevated load under low
oscillations - Narrow series - Dimensions and loads - Part 2: Inch
series**

Série aérospatiale - Rotules, en acier résistant à la
corrosion à garniture autolubrifiante à charge élevée sous
faibles oscillations - Série étroite - Dimensions et charges -
Partie 2: Série en inches

Luft- und Raumfahrt - Gelenklager, aus
korrosionsbeständigem Stahl mit selbstschmierender
Beschichtung, hohe Belastung bei geringer Drehbewegung
- Schmale Reihe - Maße und Belastungen - Teil 2: Inch
Reihe

This European Standard was approved by CEN on 21 March 2013.

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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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 4538-2:2014) 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 2015, and conflicting national standards shall be withdrawn at the latest by January 2015.

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.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 4538-2:2014 (E)**1 Scope**

This European Standard specifies the characteristics of spherical plain bearing in corrosion resistant steel, with self-lubricating liner, narrow series, elevated load under low oscillations applications.

They shall be used in the temperature range – 55 °C to 163 °C.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 (1.4125) — Hardened and tempered — Bars — $D_e \leq 150$ mm* ¹⁾

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 4540, *Aerospace series — Bearings, spherical plain, in corrosion resisting steel with self-lubricating liner elevated load under low oscillations — Technical specification*

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

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

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3 Symbols and definitions

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

Δ_{dmp} = single plane mean bore diameter deviation.

Δ_{ds} = 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.

1) Published as ASD-STAN Prestandard at the date of publication of this standard. <http://www.asd-stan.org/>

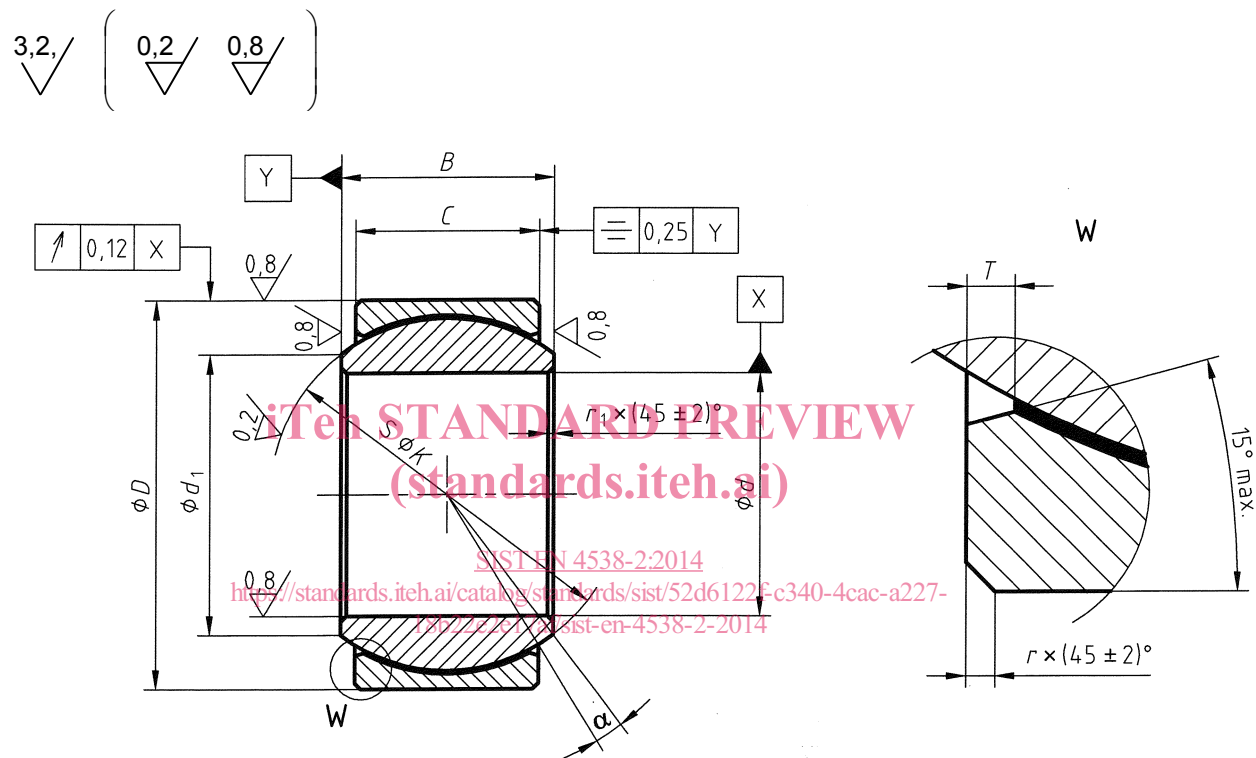
4 Required characteristics

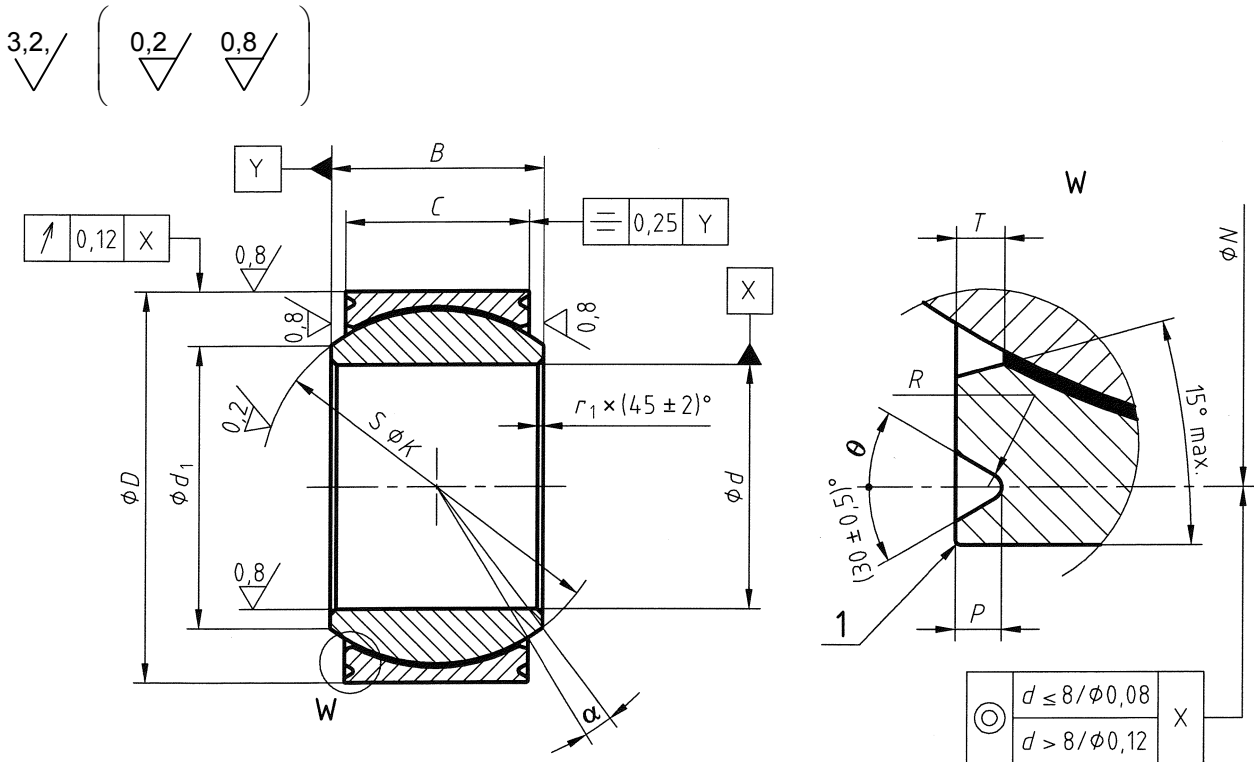
4.1 Configuration, dimensions, tolerances and masses

See Figures 1 and 2 and Table 1. The dimensions are expressed in millimetres and apply after surface treatment.

4.2 Surface roughness

See Figures 1 and 2. The values are expressed in micrometres and apply before surface treatment.





Key

- 1 Break sharp corner 0,12 max.

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Figure 2 — Bearing with swaging groove, code R

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Table 1

Dimensions in millimetres

Code	d nom.	B 0 -0,06	C ± 0,1	D	Tolerances µm				d ₁ ^a min.	K ≈	N + 0,1 0	P 0 -0,2	R + 0,1 0	r 0,254 to 0,508	r ₁ 0,127 to 0,381	T max.	α ^b min.	θ ± 0,5	Mass g/piece ≈		
					Δ _{dmp}	Δ _{ds}	Δ _{Dmp}	Δ _{Ds}													
03	4,826	7,137	5,537	14,287	0 -13	0 -13	+ 3 -13	7,442	11,1	12,7	0,7	0,127 to 0,254	0,254 to 0,508	0,76	10°	20° min	9				
04	6,35	8,712	6,35	16,667				9,245	12,7	15,087											
05	7,937	9,525	7,137	19,05				0,9	0,508 to 0,762	0,889	9°	14									
06	9,525	10,312	7,925	20,637									12,065	15,875	18,08						
07	11,113	11,1	8,712	23,017				1,4	0,254 to 0,432	0,127 to 0,381	0,889	8°	22								
08	12,7	12,7	9,906	25,4										13,462	17,449	20,472 4					
09	14,288	14,275	11,1	27,78				1,5	0,254 to 0,508	0,127 to 0,381	1,01	8°	31								
10	15,875	15,875	12,7	30,163										15,24	19,837	22,250 4					
12	19,05	19,05	15,062	36,513				+ 3 -15	0,762 to 1,02	1,14	9°	30°	95								
14	22,225	22,225	17,856	39,687										17,018	22,225	24,638					
16	25,4	25,4	20,243	44,45				+ 3 -15	0,762 to 1,02	1,14	9°	30°	176								
20	31,75	27,762	23,926	50,8										24,892	34,125	36,525					
24	38,1	33,32	28,83	61,912				+ 3 -15	0,254 to 0,508	1,5	6°	405									
28	44,45	38,887	33,45	71,437									28,397	39,675	41,3						
											36,703	45,237	47,7								240
											47,5	57,15	58,85								405
								50,71	64	68,33								658			

^a Attention should be paid to the possible indentation of the support mountings by the inner ring bearing faces.

^b Maximum values for the user.

4.3 Loads and starting torques

See Table 2.

Table 2

Code	Permissible static loads		Permissible dynamic radial loads 25 000 cycles	Minimum projected surface area ^b	Starting torques
	kN				
	Radial C _s	Axial ^a C _s			
03	17,68	0,66	6,67	44,5	0,06 0,34
04	26,86	1,91	14,77	61,3	0,11 0,56
05	38,92	3,11	24,30	84,5	
06	46,88	4,89	29,37	97,6	
07	58,71	6,22	35,82	121	
08	79,62	9,34	46,28	161,2	
09	103,19	16,37	57,85	201,5	
10	135,67	20,99	73,20	270,9	
12	206,39	30,02	105,02	405,6	0,23 0,9
14	276,68	41,58	134,61	531,3	
16	365,64	54,09	169,10	712,4	0,40 1,50
20	405,00	78,00	200,27	978,9	
24	619,39	117,06	322,08	1 517,3	
28	1 274,32	151	448,90	1 994,8	

^a These values apply to bearings without staking groove. For bearings with staking groove, the push-out loads may be smaller than these values.

^b The projected surface area values are given to determine for each bearing size the duty cycle loads.

The duty cycles are defined in the technical specification EN 4540.

4.4 Materials and surface treatments

Inner ring: steel EN 2030, hardness 55 HRC to 62 HRC.

Outer ring: steel EN 3161, hardness 28 HRC to 37 HRC before swaging.

Liner: self-lubricating low friction wear resistant material consistent with the requirements of EN 4540.

4.5 Surface treatment on the inner ring

Surface treatment at the convenience of the bearing manufacturer to fulfil the requirements of the dimensional standard and of the technical specification (see ISO 8075).