



SLOVENSKI STANDARD
oSIST prEN 4157:2020

01-november-2020

Aeronavtika - Ušesna glava (vrh palice) s samoporavnavnimi (nihalnimi) dvorednimi krogličnimi ležaji in držaji z navoji iz jekla - Mere in obremenitve - Palčne mere

Aerospace series - Rod end, with self-aligning double row ball bearings and threaded shank in steel - Dimensions and loads - Inch series

Luft- und Raumfahrt - Ösenköpfe mit zweireihigem Pendelkugellager und Gewindeschaft aus Stahl - Maße und Belastungen; Inch-Reihe

(standards.iteh.ai)

Série aérospatiale - Embout à roulement à rotule sur deux rangées de billes et tige filetée en acier - Dimensions et charges, série en inches

<https://standards.iteh.ai/catalog/standards/sist/8193af9-7594-49f3-a7f1-e1fd741e913/osist-pren-4157-2020>

Ta slovenski standard je istoveten z: prEN 4157

ICS:

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

DRAFT
prEN 4157

September 2020

ICS

English Version

Aerospace series - Rod end, with self-aligning double row ball bearings and threaded shank in steel - Dimensions and loads, Inch series

Série aéronautique - Embout à roulement à rotule sur deux rangées de billes et tige filetée en acier - Dimensions et charges, série en inches

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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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

Contents

European foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms, definitions and symbols.....	4
3.1 Terms and definitions	4
3.2 Symbols.....	5
4 Requirements	5
4.1 Dimensions, tolerances and masses.....	5
4.2 Surface roughness.....	5
4.3 Materials.....	5
4.4 Surface treatment	5
4.5 Loads, starting torques and clearances.....	9
4.6 Retention of seals or shields	10
4.7 Temperature range and lubricant	10
5 Designation.....	10
6 Marking.....	11
7 Technical specification.....	11
8 Quality management systems.....	11
Bibliography.....	12

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European foreword

This document (prEN 4157:2020) 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-STAN, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

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prEN 4157:2020 (E)**1 Scope**

This document specifies the characteristics of adjustable rod-ends with self-aligning double row ball bearing and threaded shank in steel.

They consist of:

- a rod-end comprising:
 - either seals or shields;
 - an optional longitudinal groove for locking purpose;
- an inner ring with balls.

These rod-ends are intended for use with flight control rods or rods for aerospace structures.

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 2031, *Aerospace series - Steel 102Cr6 (1.2067) - Hardened and tempered - Bars*

EN 2067:1996, *Aerospace series - Rod ends with self-aligning ball bearings - Technical specification*

EN 2133, *Aerospace series - Cadmium plating of steels with specified tensile strength $\leq 1\ 450$ MPa, copper, copper alloys and nickel alloys*

EN 2135, *Aerospace series - Steel FE-PL61 - Carburized, hardened and tempered - Bar - $D_e \leq 40$ mm*

EN 2424, *Aerospace series - Marking of aerospace products*

ISO 3161, *Aerospace — UNJ threads — General requirements and limit dimensions*

TR 4475, *Bearings and mechanical transmissions for airframe applications — Vocabulary*¹

3 Terms, definitions and symbols**3.1 Terms and definitions**

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

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

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

NOTE The definitions of tolerances and clearances are given in ISO 1132-1.

¹ 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).

3.2 Symbols

Δ_{ds}	deviation of a single bore diameter;
Δ_{dmp}	single plane mean bore diameter deviation;
α	angular displacement permissible between inner and outer ring axis of a set of aligning bearing;
C_s	permissible static radial load;
$F_a \text{ max.}$	permissible static axial load.

4 Requirements

4.1 Dimensions, tolerances and masses

Configuration: see Figure 1.

Values: see Figure 1 and Table 1: values after cadmium plating.

4.2 Surface roughness

See Figure 1, values prior to cadmium plating.

Rolling elements and raceways: $R_a = 0,2 \mu\text{m}$ (8 μin).

4.3 Materials

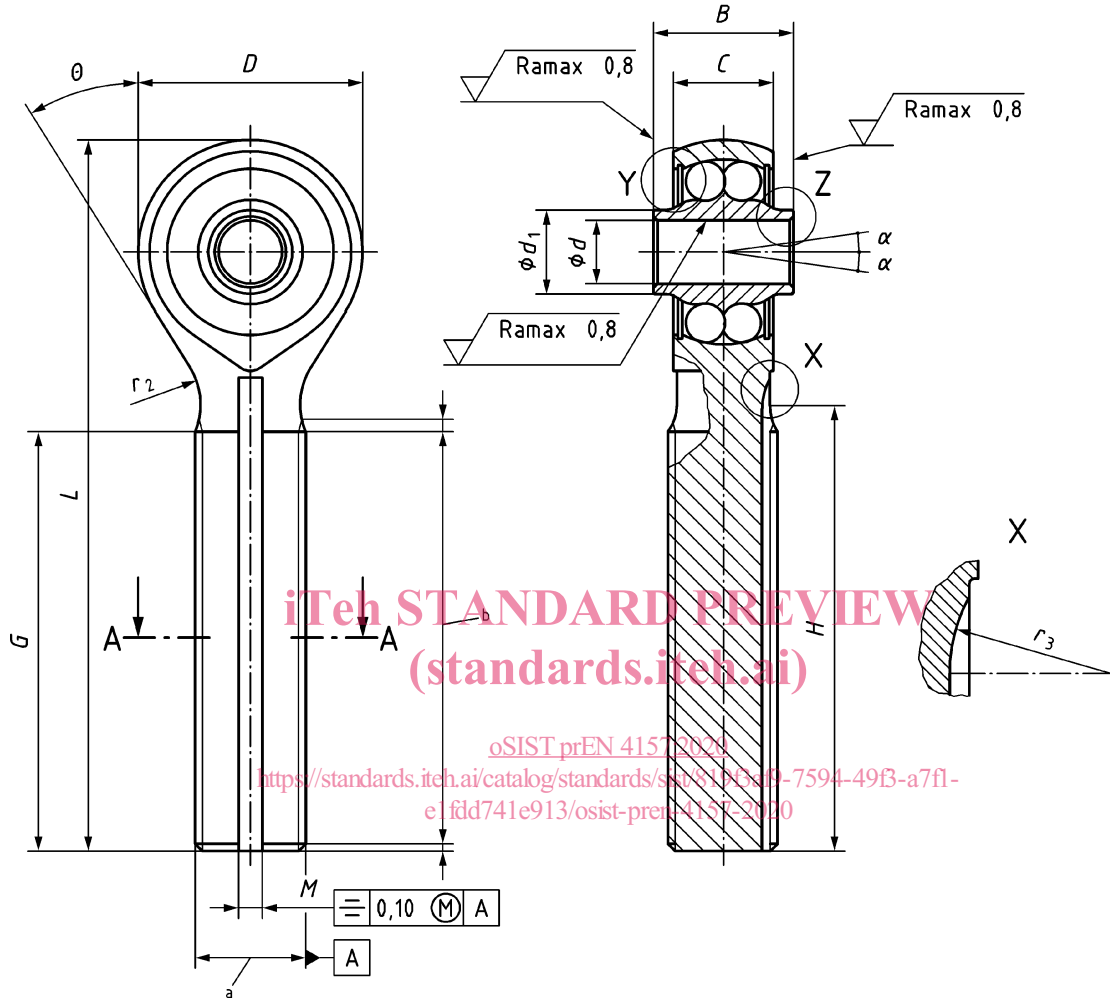
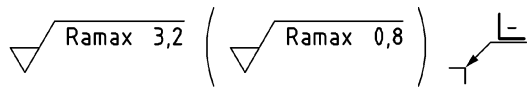
Rod-end:	Steel EN 2135; heat treated to obtain: — by case hardening, hardening and tempering a surface hardness of ≥ 58 HRC on the raceway; — by hardening and tempering a strength $R_m \geq 830$ MPa on the whole rod-end.
Inner ring:	Steel EN 2031.
Rolling elements:	Steel EN 2031.
Seals:	Polytetrafluoroethylene (PTFE) or glass reinforced fabric polytetrafluoroethylene (PTFE).
Shields:	Corrosion resisting material.
Retaining rings:	Corrosion resisting material.

4.4 Surface treatment

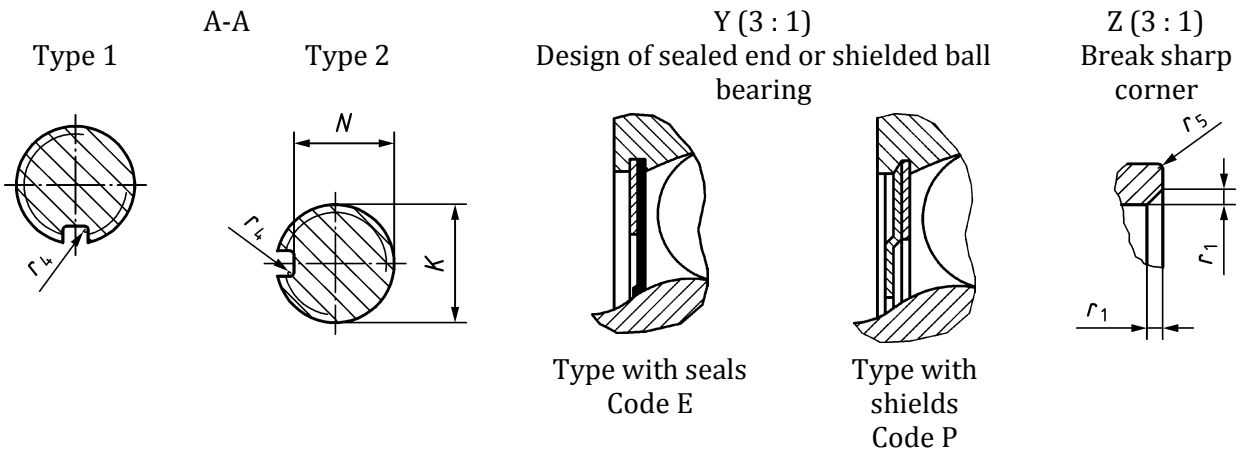
Rod-end body: All outer surfaces with the exception of the raceway, cadmium plating and chromating as per EN 2133, 10 μm to 20 μm (400 μin to 800 μin).
Exception: threads, coat thickness 5 μm to 10 μm (200 μin to 400 μin).

Break sharp edges and corners and remove all burrs and slivers

Dimensions in millimetres/inches



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Key

- a Thread
- b Conforms to ISO 3353.

NOTE The installation of seals and shields is at manufacturer's option.

Figure 1

Table 1 — Dimensions and tolerances

Dimensions in millimetres/(inches)

Diameter d				B	C	$\varnothing D$	$\varnothing d_1$	G^a	H	K	L	M	N	r_1	r_2	r_3	r_4	α^{oc}	θ°	Type	Mass ≈ g/piece (lb/piece)	
Code	Nominal	Tolerance																				
		Δ_{dmp}	Δ_{ds}	II0 -0,127 II(0 -0,005)	±0,127 (±0.005)	±0,254 (±0.010)	min.	±0,508 (±0.020)	±0,508 (±0.020)	Type of thread UNJF - 3A ^b	±0,254 (±0.010)	+0,127 II0 (+0,005 II 10)	II0 -0,127 II(0 -0,005)		±0,254 (±0.010)	±0,254 (±0.010)			min	max.		
01	6,350 (0.250 0)	II0 -0,008 II(0 -0,0003)	II0 -0,013 II(0 -0,0005)	14,00 (0.551)	±0,127 (±0.005)	±0,254 (±0.010)	8,4 (0.33)	27,0 (1.06)	29,3 (1.15)	6,350-28 0.250 0-28	54,00 (2.126)	1,57 (0.062)	5,11 (0.201)	0,3 to 0,5 (0.01 to 0.02)	7,0 (0.28)	6,48 (0.255)	0,13 to 0,38 (0.005 to 0.015)	8		32	1	37 (82)
02								37,0 (1.46)	39,3 (1.55)	7,938-24 0.312 5-24		6,60 (0.260)	6,0 (0.24)		41 (90)							
03								52,0 (2.05)	54,3 (2.14)	9,525-24 0.375 0-24		7,90 (0.311)	5,0 (0.20)		46 (101)							
04								59,0 (2.32)	61,3 (2.41)	11,113-20 0.437 5-20		9,40 (0.370)	7,0 (0.28)		56 (123)							
05								63,0 (2.48)	65,3 (2.57)	12,700-20 0.500 0-20		11,07 (0.436)	6,0 (0.24)		73 (161)							
06								63,0 (2.48)	65,3 (2.57)	14,288-18 0.562 5-18		12,14 (0.478)	7,0 (0.28)		77 (170)							
07								63,0 (2.48)	65,3 (2.57)	15,875-18 0.625 0-18		13,74 (0.541)	7,0 (0.28)		98 (216)							
10	7,938 (0.312 5)	II0 -0,008 II(0 -0,0003)	II0 -0,013 II(0 -0,0005)	15,00 (0.591)	±0,127 (±0.005)	±0,254 (±0.010)	10,8 (0.43)	37,0 (1.46)	39,3 (1.55)	7,938-24 0.312 5-24	60,00 (2.362)	1,57 (0.062)	6,60 (0.260)	0,3 to 0,8 (0.01 to 0.03)	5,0 (0.20)	6,48 (0.255)	0,13 to 0,38 (0.005 to 0.015)	8		35	2	60 (132)
11								42,0 (1.65)	44,3 (1.74)	9,525-24 0.375 0-24	7,90 (0.311)	64 (141)										
12								52,0 (2.05)	54,3 (2.14)	11,113-20 0.437 5-20	9,40 (0.370)	71 (157)										
13								59,0 (2.32)	61,3 (2.41)	12,700-20 0.500 0-20	11,07 (0.436)	86 (190)										
14								63,0 (2.48)	65,3 (2.57)	14,288-18 0.562 5-18	12,14 (0.478)	103 (227)										
15								63,0 (2.48)	65,3 (2.57)	15,875-18 0.625 0-18	13,74 (0.541)	114 (251)										

prEN 4157:2020 (E)

Code	Diameter <i>d</i>		<i>B</i> III0 -0,127 I(0 -0,005)	<i>C</i> ±0,127 (±0.005)	$\varnothing D$ ±0,254 (±0.010)	$\varnothing d_1$ min.	<i>G</i> ^a ±0,508 (±0.020)	<i>H</i> ±0,508 (±0.020)	<i>K</i> Type of thread UNJF - 3A ^b	<i>L</i> ±0,254 (±0.010)	<i>M</i> +0,127 III0 I(0 +0,005 II 10)	<i>N</i> III0 -0,127 I(0 -0,005)	<i>r</i> ₁	<i>r</i> ₂ ±0,254 (±0.010)	<i>r</i> ₃ ±0,254 (±0.010)	<i>r</i> ₄	$\alpha^{\circ c}$ min	θ° max.	Type e	Mass ≈ g/piece (lb/piec e)	
	Nominal	Tolerance																			
20	9,525 (0.375 0)	III0 -0,008 I(0 -0,0003)	III0 -0,013 I(0 -0,0005)	20,00 (0.787)	14,00 (0.551)	32,00 (1.260)	13,8 (0.54)	37,0 (1.46)	39,3 (1.55)	9,525-24 0.375 0-24	62,00 (2.441)	2,36 (0.093)	0,3 to 0,8 (0.01 to 0.03)	5,0 (0.20)	6,48 (0.255)	0,13 to 0,38 (0.00 5 to 0.015)	8	35	1	94 (207)	
21								42,0 (1.65)	44,3 (1.74)	11,113-20 0.437 5-20	67,00 (2.638)									9,40 (0.370)	106 (234)
22								52,0 (2.05)	54,3 (2.14)	12,700-20 0.500 0-20	75,00 (2.953)									11,07 (0.436)	122 (270)
23								48,0 (1.89)	50,3 (1.98)	14,288-18 0.562 5-18	73,00 (2.874)									12,14 (0.478)	132 (291)
24								63,0 (2.48)	65,3 (2.57)	15,875-18 0.625 0-18	85,00 (3.346)									13,74 (0.541)	144 (317)

^a *G* = minimum length of usable thread.

^b Thread rolled as per ISO 3161.

^c Maximum value for the user.

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