



SLOVENSKI STANDARD
SIST EN 3541:2001

01-januar-2001

Aerospace series - Rod ends, adjustable, self-aligning ball bearing with threaded shank - Dimensions, torques, clearances and loads

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Luft- und Raumfahrt - Einstellbare Ösenköpfe mit Pendelkugellager und Gewindeschaft - Maße, Momente, Lagerluft und Belastungen

Série aérospatiale - Embouts réglables a rotule sur billes et a tige filetée - Dimensions, couples, jeux et charges

[SIST EN 3541:2001](https://standards.iteh.ai/catalog/standards/sist/d9e23bce-3d16-4aca-b293-f241ebdae9f4/sist-en-3541-2001)

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Ta slovenski standard je istoveten z: EN 3541:1992

ICS:

49.035

Sestavni deli za letalsko in
vesoljsko gradnjo

Components for aerospace
construction

SIST EN 3541:2001

en

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EUROPEAN STANDARD

EN 3541:1992

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 1992

UDC 629.7.05:621.827.1:621.82.053.004.1:621.828

Descriptors: Aircraft industry, flight control, rod ends, end fitting with self-aligning ball bearing, threaded shank, dimensions, static loads

English version

**Aerospace series - Rod ends, adjustable,
self-aligning ball bearing with threaded shank -
Dimensions, torques, clearances and loads**

Série aérospatiale - Embouts réglables à rotule
sur billes et à tige fileté - Dimensions,
couples, jeux et charges

Luft- und Raumfahrt - Einstellbare Ösenköpfe
mit Pendelkugellager und Gewindeschaft - Maße,
Momente, Lagerluft und Belastungen

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SIST EN 3541:2001

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CEN

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

1 Scope

This standard specifies the characteristics of adjustable rod ends with self-aligning ball bearing and threaded shank. They consist of :

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

2 Field of application

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

They are intended to be used in the temperature range : $- 54\text{ °C}$ to $+ 150\text{ °C}$.

However, being lubricated with the following greases (see EN 2067) :

- Extreme pressure grease, type ester (code A), operating range $- 73\text{ °C}$ to $+ 121\text{ °C}$
- Extreme pressure grease, type synthetic hydrocarbon general usage (code B), operating range $- 54\text{ °C}$ to $+ 177\text{ °C}$

their field of application in the code A is limited to $+ 121\text{ °C}$.

3 Normative References

ISO 1132,	Rolling bearings - Tolerances - Definitions
ISO 3353,	Aerospace construction - Rolled threads - Runout and lead threads
ISO 5855-2,	Aerospace construction - MJ threads - Part 2. Limit dimensions for bolts and nuts
EN 2031,	Steel FE-PL31 - Hardened and tempered bars - Aerospace series ¹⁾
EN 2067,	Aerospace series - Rod ends, self-aligning ball bearing - Technical specification ²⁾
EN 2099,	Aerospace series - Steel FE-PL71 - Case hardening, hardened and tempered - Bars $D_e \leq 100\text{ mm}$ ³⁾
EN 2133,	Cadmium plating of steel with maximum specified tensile strength equal to or less than 1450 MPa and copper and copper alloys - Aerospace series ¹⁾
EN 2135,	Aerospace series - Steel FE-PL61 - Case hardening, hardened and tempered - Bars $D_e \leq 40\text{ mm}$ ²⁾ .

4 Symbols

Δ_{ds}	=	Deviation of a single bore diameter
Δ_{dmp}	=	Single plane mean bore diameter deviation
θ	=	Angular displacement permissible between inner and outer ring axis of a set of aligning bearing
Y_s	=	Axial load coefficient

5 Required characteristics

5.1 Dimensions - Tolerances - Masses

Configuration : see figure.

Dimensions, tolerances and masses : see figure and/or table 1 and 2 ; values after cadmium plating.

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

2) Published as AECMA pre-standard at the date of publication of the present standard

3) In preparation at the date of publication of the present standard.

5.2 Surface roughness

See figure, values prior to cadmium plating.

5.3 Loads, rotational starting torques and internal clearances

See table 2.

5.4 Materials

Rod end : steel EN 2135 or EN 2099 ; 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.

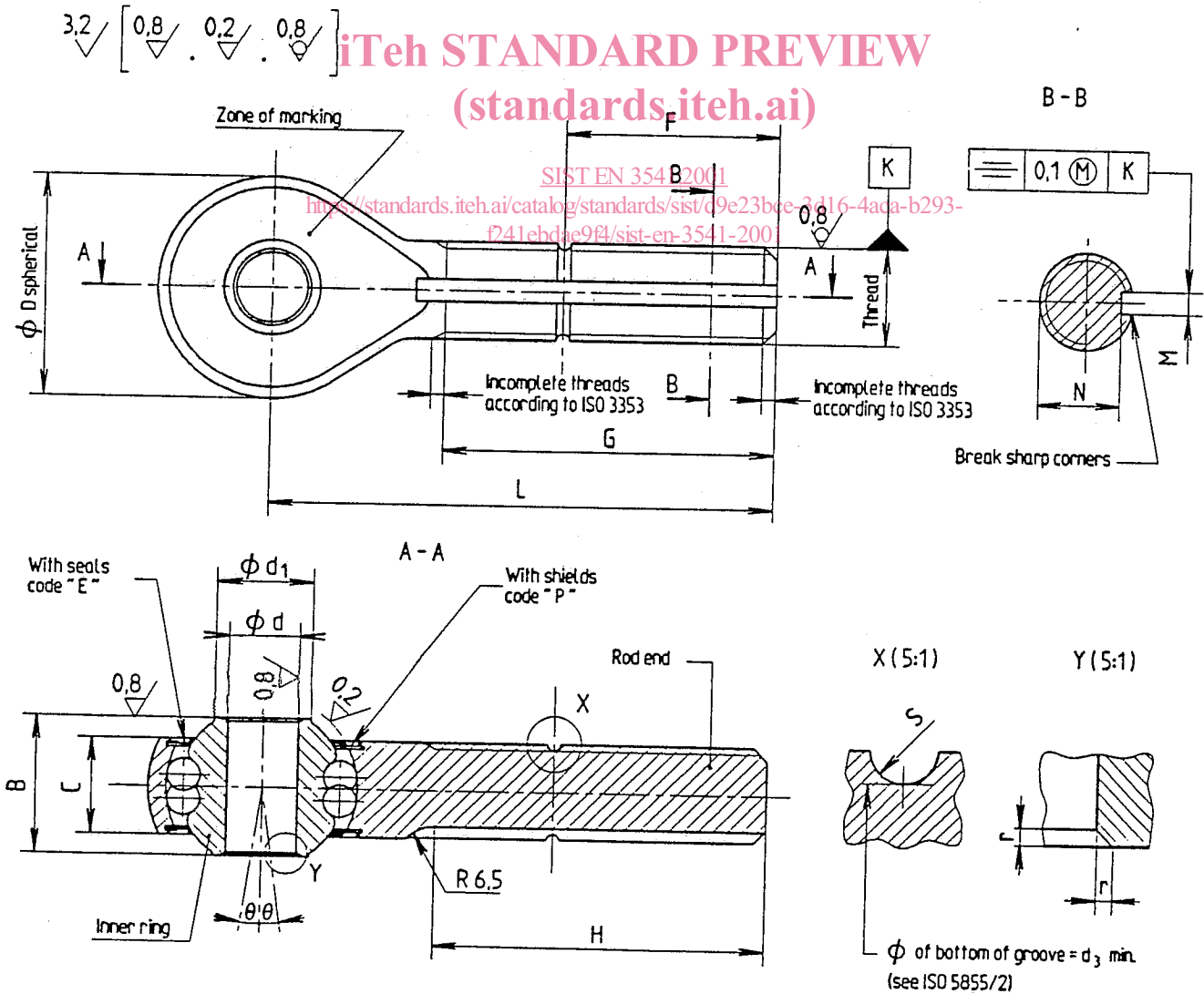
Balls : steel EN 2031.

Shields : corrosion resisting material.

Seals : polytetrafluoroethylene (PFTE) or glass fabric reinforced polytetrafluoroethylene (PFTE).

5.5 Surface treatment

Rod end : all surfaces except for the raceway cadmium plated according to EN 2133, $7 \mu\text{m}$ to $20 \mu\text{m}$ except threads $5 \mu\text{m}$ to $10 \mu\text{m}$; chromate passivation optional.



Figure

NOTE : The circumferential groove and the longitudinal groove over the distance F shall be painted red.

Table 1

Dimensions in millimetres

Code	d		B 0 -0,12	C +0,1 0	D +0,2 0	d ₁ min.	r +0,3 -0,2	θ min. degrees	Thread 1) designation	F 2) min.	G 3) min.	H +0,5 0	L ±0,5	M +0,1 0	N 0 -0,1	S	
	Nominal diameter	Tolerances (μm) Δ _{dmp} Δ _{ds}															
05	5	0 -8	+ 2 -10	12	8,5	20,5	7,6	0,5	8	MJ 8 × 1,00 - 4h6h	18	33	33	48	1,6	6,6	0,7
06	6			14	10,0	22,5	8,6			22	37	37	54	2,4	8,0	0,8	
08	8			15	28,5	11,1	25			42	42	62	10,2		0,8		
10	10			20	14,0	32,0	13,6			31	48	48	73	3,2	12,2	1,0	

1) Thread : ISO 5855 - Part 2 ; method of manufacture : rolled.
2) F = minimum length of engaged threads : included thickness of lock washer and height of nut.
3) G = minimum length of useful threads.

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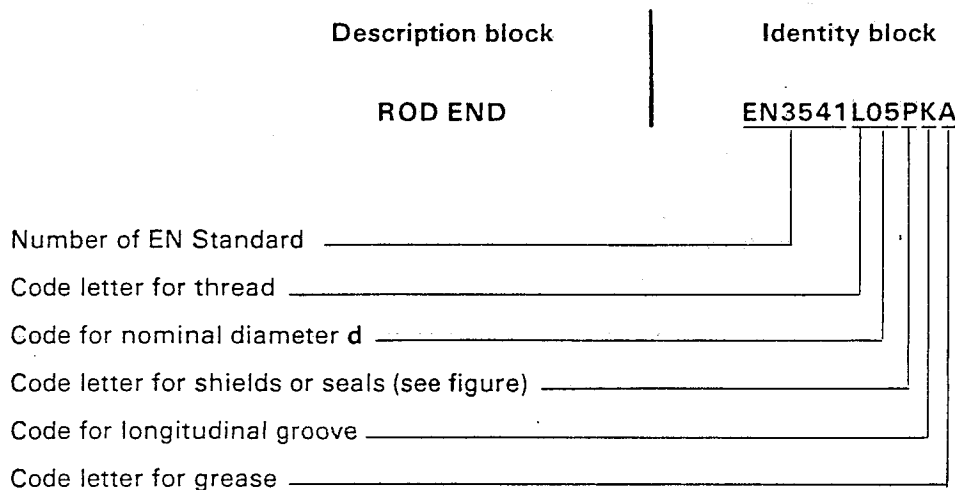
Table 2
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Code	Permissible static radial load C _s 1) (kN)	Rotational starting torque SIST EN 3541 (mN.m)		Internal clearance max. (mm)		Mass ≈ g
		with seals	with shields	radial	axial	
05	4,70	2	1	0,02	0,08	35
06	6,75	4	2			60
08	8,90	10	5			85
10	14,00	12	7			130

1) $F_a \text{ max.} = \frac{C_s}{Y_s}$ where $Y_s = 3,2$; $F_a \text{ max.}$ and C_s are defined in EN 2067.

6 Designation

Each rod end shall only be designated as in the following example :



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where the following codes are applied :

- L = left hand thread
- R = right hand thread
- K = with groove <https://standards.iteh.ai/catalog/standards/sist/d9e23bce-3d16-4aca-b293-f241ebdae9f4/sist-en-3541-2001>
- T = without groove
- A = ester type grease
- B = synthetic hydrocarbon grease

NOTE : If necessary, the originator code I9005 may be introduced between the description block and identity block.

7 Marking

In addition to the manufacturer's own marking, each rod end shall be marked (see figure) using the identity block specified in clause 6.

8 Technical specification

See EN 2067.