



SLOVENSKI STANDARD

SIST EN 2287:2017

01-november-2017

Nadomešča:
SIST EN 2287:2001

Aeronavtika - Drsne puše, navadno korozijsko odporno jeklo s samomazalno oblogo - Mere in nosilnosti

Aerospace series - Bushes, plain corrosion resisting steel with self-lubricating liner - Dimensions and loads

Luft- und Raumfahrt - Buchsen ohne Flansch aus korrosionsbeständigem Stahl mit selbstschmierender Beschichtung - Maße und Belastungen

Série aérospatiale - Bagues cylindriques en acier résistant à la corrosion à garniture autolubrifiante - Dimensions et charges

Ta slovenski standard je istoveten z: EN 2287:2017

ICS:

49.030.99 Drugi vezni elementi Other fasteners

SIST EN 2287:2017 **en,fr,de**

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EUROPEAN STANDARD

EN 2287

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2017

ICS 49.030.99

Supersedes EN 2287:1989

English Version

Aerospace series - Bush, plain, in corrosion resisting steel with self-lubricating liner - Dimensions and loads

Série aérospatiale - Bagues cylindriques en acier
résistant à la corrosion à garniture autolubrifiante -
Dimensions et charges

Luft- und Raumfahrt - Buchse ohne Flansch aus
korrosionsbeständigem Stahl mit selbstschmierender
Beschichtung - Maße und Belastungen

This European Standard was approved by CEN on 2 July 2017.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 2287:2017) 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 February 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 2287:1989.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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EN 2287:2017 (E)**1 Scope**

This European Standard specifies the characteristics of plain bushes in corrosion resisting steel with self-lubricating liner and the design recommendation of shafts and housings.

The bushes are intended for operation within the temperature range of 55 °C to 163 °C and assembly with an interference fit into fixed and moving aerospace parts.

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 2136, *Aerospaces — Steel FE-PM 42, 900 MPa ≤ R_m ≤ 1100 MPa, bars D_e ≤ 100 mm¹*)

EN 2311, *Aerospace series — Bushes with self-lubricating liners — Technical specification*

EN 2539, *Aerospace series — Steel FE-PM3801 (X5CrNiCu17-4) — Air melted — Solution annealed and precipitation treated — Bar, a or D ≤ 200 mm, R_m ≥ 965 MPa²*)

3 Required characteristics**3.1 Configuration - Dimensions - Masses**

Configuration: according to Figure 1.

Dimensions, masses: according to Figure 1 and Table 1.

3.2 Surface roughness

According to Figure 1.

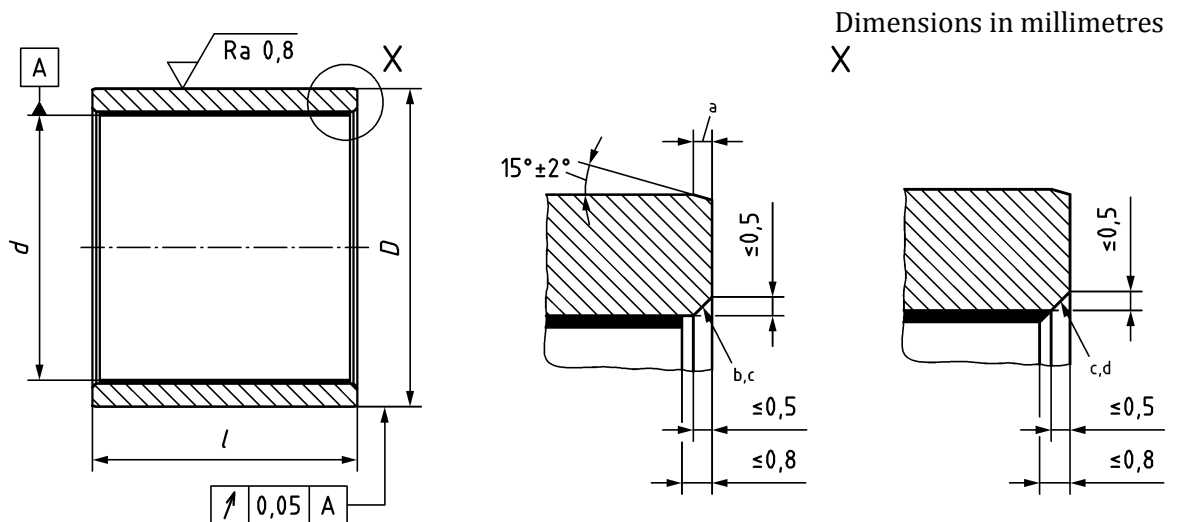
3.3 Materials

Bush: Steel according to EN 2136 or EN 2539.

Liner: Self-lubricating wear resistant material consistent with the requirements of EN 2311.

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

2) Published as ASD-STAN Prestandard at the date of publication of this standard.

**Key**

- a 0,50 mm to 0,75 mm
- b chamfer machined before bonding
- c chamfer or radius at manufacturer's option
- d chamfer machined after bonding

Figure 1
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Table 1

Dimensions in millimetres

d		D		l -0,1/-0,4																				
Nominal size	Tolerances μm	Nominal size	Tolerances μm	6	8	10	12	15	16	18	20	22	25	28	30	32	35	40	45	50				
				Mass in kg/1 000 pieces .																				
6	+22 +4	10	+24 +15	2,4*																				
8	+27	12	+29 +18	3,0	4,0*																			
10	+5	14		3,5	4,7	5,9*																		
12	+33 +6	16	+35 +22	4,1	5,5*	6,9	8,3*																	
15		19		6,7	8,4*	10,1	12,6*																	
16		20		7,1	8,9	10,7	13,4	14,3																
18		22		9,9	11,8	14,8		17,8																
20	+40 +7	25	+42 +26		13,9	16,7*	20,9				27,8*													
22		26		14,2	17,8*	21,9	23,7	26,1*																
25		30		20,4	25,5*	34,0	37,4	42,5*																
28		34		34,5		46,0*	50,6	57,5	64,4															
30	36	36,7		49,0	53,8	61,2	73,4*																	
32	+48 +9	38	+51 +32	39,0	51,9	57,1	64,9	77,90	83,1															
35		42		66,6*	73,5	83,6		100,3		117,0*														
40		48		87,0		103,8		130,0*		152,2	174,0*													
45		52		105,0		126,0		147,0*	168,0	189,0*														
50	58	133,5		160,2		186,9	214,0*	240,3	267,0*															

Only bushes whose masses lie within the bold lines are standard.
The recommended sizes are indicated by *.

Table 2

d	l	Permissible radial load		d	l	Permissible radial load		d	l	Permissible radial load	
		Static C_s^a kN	Dynamic C_{25}^b kN			Static C_s^a kN	Dynamic C_{25}^b kN			Static C_s^a kN	Dynamic C_{25}^b kN
6	6	10,3	4,1	20	15	111,8	44,7	32	30	385,3	153,8
8	6	13,8	5,5		20	20	154,8		61,8	32	412,8
	10	8	20,6	8,3	22	12	94,6	37,7	35	20	270,9
6		17,2	6,8	15		123,0	49,1	22		301,0	120,2
8		25,8	10,3	20		170,3	68,0	25		346,0	138,2
10	34,4	13,8	22	189,2		75,5	30	421,4		168,3	
12	6	20,6	8,3	25	12	107,5	42,9	35		496,7	198,3
	8	31,0	12,3		15	139,8	55,8	40		20	309,6
	10	41,3	16,5		20	193,5	77,3		25	395,6	157,9
	12	51,6	20,6		22	215,0	85,8		30	481,6	192,3
15	8	38,7	15,4	25	247,3	98,8	35		567,6	226,6	
	10	51,6	20,6	28	15	156,5	62,5	40	653,6	260,9	
	12	64,5	25,8		20	216,7	86,5	45	740,0	296,0	
	15	83,9	33,5		22	240,8	96,2	25	445,1	177,7	
16	8	41,3	16,5		25	276,9	110,6	30	531,6	213,6	
	10	55,0	22,0	28	313,0	125,0	35	618,1	249,1		
	12	68,8	27,5	30	15	167,7	66,9	40	704,6	284,6	
	15	89,4	35,7		20	232,2	92,7	45	791,1	320,1	
	16	96,3	38,4		22	258,0	103,0	50	25	494,5	197,4
	18	10	61,9		24,8	25	296,7		118,4	30	602,0
12		77,4	30,9		30	361,2	144,2		35	709,5	283,3
15		100,6	40,2		32	15	178,9		71,4	40	817,0
18		123,8	49,4	20		247,7	98,9	45	924,5	369,1	
20	10	68,8	27,5	22		275,2	109,8	50	1032,0	412,0	
	12	86,0	34,3	25		315,5	126,3				

^a $C_s = 0,43 d (l \& 2)$ [kN] - Based on a unit pressure of 430 MPa.
^b $C_{25} = \frac{C_s}{2,5}$ [kN]
 Definitions of all loads are given in EN 2311.