SLOVENSKI STANDARD
SIST EN 2286:2017

01-julij-2017

Nadomešča:
SIST EN 2286:2001

Aeronavtika - Drsne puše s prirobnico iz aluminijeve zlitine s samomazalno oblogo - Mere in nosilnosti

Aerospace series - Bushes, flanged aluminium alloy, with self-lubricating liner - Dimensions and loads

Luft- und Raumfahrt - Buchsen mit Flansch aus Aluminium-Legierung mit selbstschmierender Beschichtung - Maße und Belastungen

Série aérospatiale - Bagues à épaulement en alliage d□aluminium à garniture autolubrifiante - Dimensions et charges

Ta slovenski standard je istoveten z: **EN 2286:2017**

ICS:

49.025.20	Aluminij	Aluminium
49.030.99	Drugi vezni elementi	Other fasteners

SIST EN 2286:2017 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2286

May 2017

ICS 49.030.99

Supersedes EN 2286:1989

English Version

Aerospace series - Bushes, flanged aluminium alloy, with self-lubricating liner - Dimensions and loads

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

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European foreword

This document (EN 2286:2017) 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 European 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of an identical text or by endorsement, at the latest by November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

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This document supersedes EN 2286:1989.

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1 Scope

This document specifies the characteristics of flanged bushes in aluminium alloy 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 121 °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 2086, *Aerospace series — Aluminium alloy AL-P2618A — T851 — Hand and die forgings — a ≤ 150 mm*

EN 2101, *Aerospace series — Chromic acid anodizing of aluminium and wrought aluminium alloys*

EN 2284, *Aerospace series — Sulphuric acid anodizing of aluminium and wrought aluminium alloys*

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

EN 2701, *Aerospace series — Aluminium alloy (2024) — Solution treated, water quench, cold worked and naturally aged (T3) — Drawn tube for structures — 0,6 ≤ a ≤ 12,5 mm*[1)]

EN 2704, *Aerospace series — Aluminium alloy AL-P2024 — AlCu4Mg1 — T3511 — Drawn bars — D_e ≤ 75 mm*[2)]

3 Required characteristics

3.1 Configuration — Dimensions — Masses

Configuration: according to Figure 1.

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

Dimensions apply after surface treatment.

3.2 Surface roughness

According to Figure 1.

3.3 Materials

Bush: Aluminium alloy according to EN 2086, EN 2701 or EN 2704.

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

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

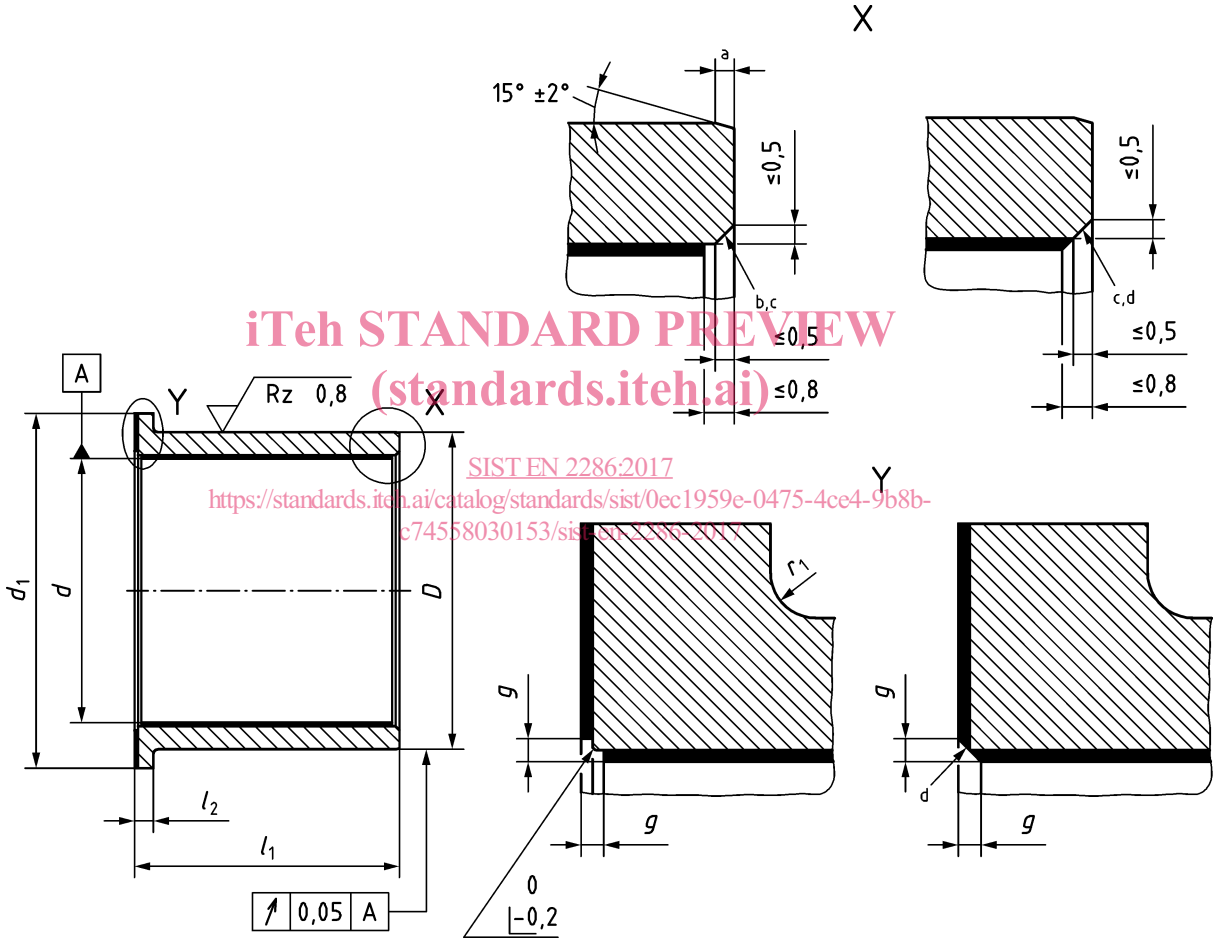
2) Published as ASD-STAN Prestandard at the date of publication of this European Standard. http://www.asd-stan.org/

3.4 Surface treatment

Table 1 — Surface treatment

Treatment	Remarks	Code
Chromic acid anodizing according to EN 2101 Type A or Sulphuric acid anodizing according to EN 2284 Type A.	Pre-treatment for painting	no code
Chromic acid anodizing according to EN 2101 Type B or Sulphuric acid anodizing according to EN 2284 Type B.	Corrosion – Protection	R

Dimensions in millimetres



Key

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

Figure 1 — Configuration and dimensions

Table 2 — Dimensions and tolerances

Dimensions in millimetres

Ø d		Ø D		Ø d_1	g	L_2	r_1	L $-0,1$ $-0,4$											
Nominal size	Tolerances µm	Nominal size	Tolerances µm	0 −0,25			0 −0,15	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	12	0,65 to 0,90	1,5	0,1 to 0,4	1,0*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	+27 +5	12	+29 +18	14				1,3	1,6*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10		14		16				1,5	1,9	2,3*	–	–	–	–	–	–	–	–	–	–	–	–	–
12	+33 +6	16		22			0,5 to 0,8	2,3	2,7*	3,2	3,7*	–	–	–	–	–	–	–	–	–	–	–	–
15		19	+35 +22	25				–	3,3	3,8*	4,5	5,0*	–	–	–	–	–	–	–	–	–	–	–
16		20		26				–	3,4	4,1	4,7	5,7	6,0	–	–	–	–	–	–	–	–	–	–
18		22		28				–	–	4,6	5,3	6,3	–	7,4	–	–	–	–	–	–	–	–	–
20	+40 +7	25		30	0,95 to 1,20			–	–	5,9	6,9*	8,4	–	–	11,0*	–	–	–	–	–	–	–	–
22		26		32				–	–	–	6,3	7,6*	–	–	9,7	10,6*	–	–	–	–	–	–	–
25		30		35				–	–	–	8,4	10,3*	–	–	13,3	14,5	16,4*	–	–	–	–	–	–
28		34	+42 +26	40		2,5		–	–	–	–	14,9	–	–	19,0	20,6	23,1	25,4	–	–	–	–	–
30		36		42				–	–	–	–	15,8	–	–	20,3*	22,0	24,6	–	29,1*	–	–	–	–
32	+48 +9	38		44				–	–	–	–	16,7	–	–	21,4	23,3	26,1	–	30,8	32,6	–	–	–
35		42		47											26,5*	28,9	32,5	–	38,5	–	44,5*	–	–
40		48		52											33,6		41,4		49,0*	–	57,1	64,0*	–
45		52	+51 +32	57													40,8		48,3	–	56,0*	63,5	71,0*
50		58		62													50,7		60,3	–	69,9	79,6*	89,2

Only bushes whose masses lie within the bold lines are standard.

The recommended sizes are indicated by *.

Table 3 — Loads

Ø d mm	L_1 mm	Permissible radial load		Permissible axial static load	Ø d mm	L_1 mm	Permissible radial load		Permissible axial static load
		Static C_s [a] kN	Dynamic C_{25} [b] kN	C_a [c] kN			Static C_s [a] kN	Dynamic C_{25} [b] kN	C_a [c] kN
6	6	3,6	3,0	6,1	28	15	60,6	50,6	88,3
8	6	4,8	4,0	7,4		20	89,4	74,6	
	8	8,1	6,8			22	100,9	84,3	
10	6	6,0	5,0	8,6		25	118,2	98,5	
	8	10,1	8,4			28	135,6	113,0	
	10	14,2	11,9		30	15	64,9	54,2	93,4
12	6	6,2	5,2	33,6		20	95,8	80,0	
	8	11,1	9,3			22	108,2	90,3	
	10	16,1	13,4			25	126,7	105,8	
	12	21,0	17,6			30	157,6	131,6	
15	8	13,9	11,6	39,4	32	15	69,2	57,8	98,6
	10	20,1	16,8			20	102,2	85,3	
	12	26,3	21,9			22	115,4	96,3	
	15	35,5	29,7			25	135,1	112,8	
16	8	14,8	12,4	41,3		30	168,1	140,1	
	10	21,4	17,9			32	181,3	151,1	
	12	28,0	23,4		35	20	111,8	93,3	106,2
	15	37,9	31,6			22	126,2	105,4	
	16	41,2	34,3			25	147,8	123,4	
18	10	24,1	20,1	45,1		30	183,9	153,5	
	12	31,5	26,3			35	219,9	183,6	
	15	42,6	35,5		40	20	127,7	106,6	119
	18	53,8	44,8			25	168,9	141,0	
20	10	26,8	22,4	49		30	210,1	175,4	
	12	35,0	29,2			35	251,3	209,8	
	15	47,4	39,6			40	292,5	244,2	
	20	68,0	56,8		45	25	190,0	158,7	131,8
22	12	38,5	32,2	52,8		30	236,4	197,4	
	15	52,1	43,5			35	282,7	236,1	
	20	74,8	62,4			40	329,1	274,8	
	22	83,8	70,0			45	375,4	313,5	
25	12	43,8	28,0	58,6	50	25	211,2	176,3	144,6
	15	59,2	49,4			30	262,7	219,3	
	20	85,0	71,0			35	314,2	262,3	
	22	95,3	79,6			40	365,7	305,3	
	25	110,7	92,4			45	417,2	347,6	
—						50	468,7	390,5	

[a] $C_s = 0{,}206\ d\ (L_1 - 1{,}2 - r_1 \text{ max.} - L_2 \text{ max.})$ [kN] – based on a unit pressure of 206 MPa.
Values of r_1 max. and L_2 max. derived from the values of r_1 and L_2 given in Table 1.

[b] $C_{25} = \frac{C_s}{1{,}2}$ [kN]

[c] $C_a = 0{,}16\ [(d_1 - 1{,}5)^2 - (d + 2{,}5)^2]$ [kN]

Definitions of all loads are given in EN 2311.