



SLOVENSKI STANDARD

SIST EN 2286:2001

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

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

<https://standards.iteh.ai/catalog/standards/sist/5a2777aa-3895-49f5-9ef1-828be0a8a880/sist-en-2286-2001>

Ta slovenski standard je istoveten z: **EN 2286:1989**

ICS:

49.025.20	Aluminij	Aluminium
49.030.99	Drugi vezni elementi	Other fasteners

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en

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EUROPEAN STANDARD
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Key words : Aeronautical industry, bush, aluminium alloy, liner, self-lubricating piece, dimension.

English Version

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

**Série aéronautique
 Bagues à épaulement
 en alliage d'aluminium
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This European Standard was accepted by CEN on 1988-11-03. CEN members are bound to comply with the requirements of CEN 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 Central Secretariat or to any CEN member.

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CEN members are the national standards organizations of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

Central Secretariat : Rue Bréderode 2, B-1000 Bruxelles

Brief history

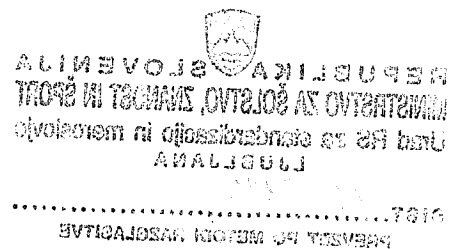
This European Standard has been prepared by the European Association of Aerospace Manufacturers (AECMA).

After inquiries and votes carried out in accordance with the rules of this Association, this Standard has successively received the approval of the National Associations and the Official Services of the member countries of AECMA, prior to its presentation to CEN.

According to the Common CEN/CENELEC Rules, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope

This standard specifies the characteristics of flanged bushes in aluminium alloy with self-lubricating liner and the design recommendation of shafts and housings.

2 Field of application

The bushes are intended for operation within the temperature range of -55 °C to +150 °C and assembly with an interference fit into fixed and moving aerospace parts.

3 References

- EN 2086, Aluminium alloy 2618A-T851 (Al-P11-T851) - Forged bars and slabs a \leq 150 mm - Aerospace series 1)
- EN 2101, Aerospace series - Chromic acid anodizing of aluminium and wrought aluminium alloys 1)
- EN 2284, Aerospace series - Sulphuric acid anodizing of aluminium and wrought aluminium alloys 1)
- EN 2311, Aerospace series - Bushes with self lubricating liners - Technical specification

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4 Required characteristics

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4.1 Configuration - Dimensions - Tolerances - Masses

[SIST EN 2286:2001](#)

Configuration : [see figure 1.](#) [/standards/iteh.ai/catalog/standards/sist/5a2777aa-3895-49f5-9ef1-828be0a8a880/sist-en-2286-2001](#)

Dimensions, tolerances and masses : [see figure 1 and table 1.](#)

Dimensions and tolerances apply after surface treatment.

4.2 Surface roughness

See figure 1.

4.3 Materials

Bush : Aluminium alloy EN 2086.

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

4.4 Surface treatment

Chromic acid anodizing EN 2101A.

Sulphuric acid anodizing EN 2284A.

1) Published as AECMA standard.

3,2/ (0,8/)

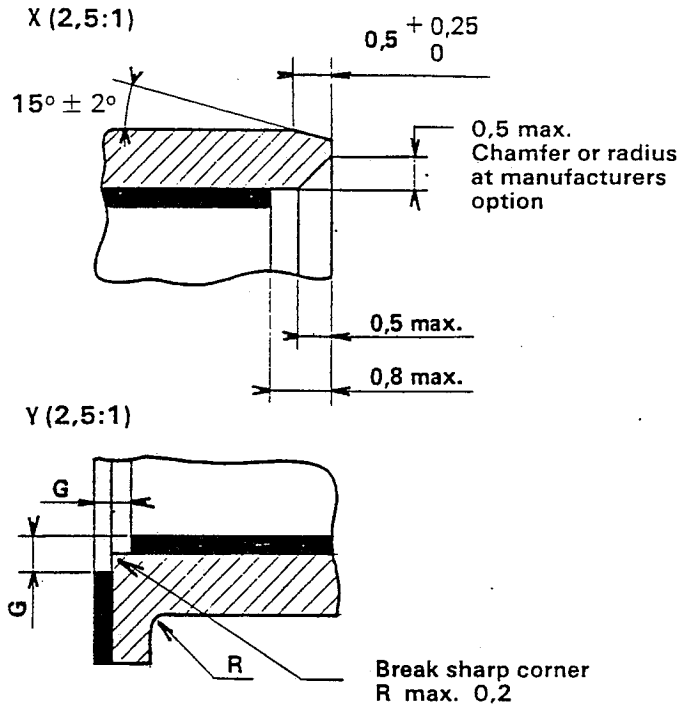
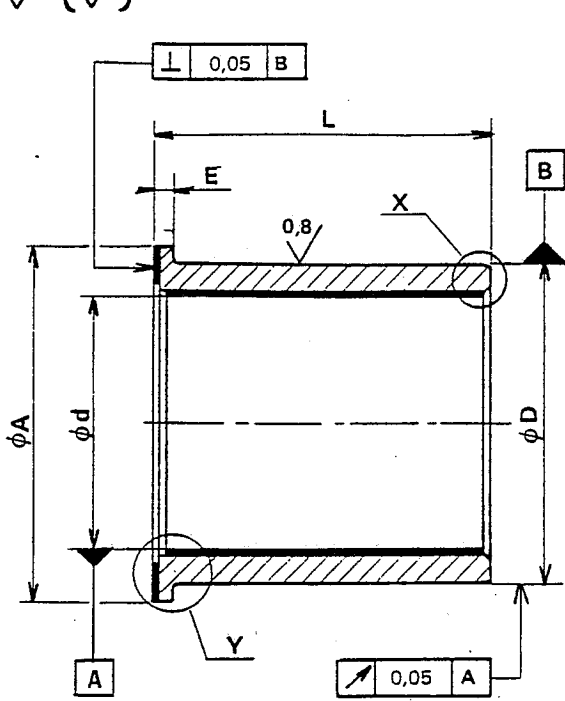


Figure 1

Table 1

Dimensions in millimetres

d		D		A	E	G	R	L																				
Nom	Tol µm	Nom	Tol µm					0 -0,25	0 -0,15	≈	0,1	0,4	6	8	10	12	15	16	18	20	22	25	28	30	32	35	40	45
6	+22 +4	10	+24 +15	12	1,5	0,5	0,1	1,0*																				
8	+27 +5	12	+29 +18	14				1,3	1,6*																			
10		14		16				0,4	1,5	1,9	2,3*																	
12		16		22				2,3	2,7*	3,2	3,7*																	
15	+33 +6	19		25				3,3	3,8*	4,5	5,0*																	
16		20		26				3,4	4,1	4,7	5,7	6,0																
18		22	+35 -22	28					4,6	5,3	6,3	7,4																
20		25		30					5,9	6,9*	8,4		11,0*															
22		26		32						6,3	7,6*		9,7	10,6*														
25	+40 +7	30		35				0,5	8,4	10,3*		13,3	14,5	16,4*														
28		34		40	1,0	0,8		14,9		19,0	20,6	23,1	25,4															
30		36		42			0,8		15,8		20,3*	22,0	24,6		29,1*													
32		38	+42 +26	44					16,7		21,4	23,3	26,1	30,8	32,6													
35		42		47			2,5				26,5*	28,9	32,5	38,5		44,5*												
40	+48 +9	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	98,8*											

Mass in kg/1000 pieces ≈

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

Table 2

d mm	L mm	Permissible radial load		Permissible axial static load Ca 3) kN	d mm	L mm	Permissible radial load		Permissible axial static load Ca 3) kN		
		Static Cs 1) kN	Dynamic C ₂₅ 2) kN				Static Cs 1) kN	Dynamic C ₂₅ 2) 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	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	135,7	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			20	111,8	93,3			
	15	37,9	31,6			35	25	147,8	123,4		
	16	41,2	34,3				30	183,9	153,5		
18	10	24,1	20,1	35			219,9	183,6	119		
	12	31,5	26,3	40	20		127,7	106,6			
	15	42,6	35,5		25		168,9	141,0			
	18	53,8	44,8		30	210,1	175,4				
20	10	26,8	22,4		49	35	251,3	209,8	131,8		
	12	35,0	29,2	45		40	292,5	244,2			
	15	47,4	39,6			25	190,0	158,7			
	20	68,0	56,8			30	236,4	197,4			
22	12	38,5	32,2		52,8	35	282,7	236,1	144,6		
	15	52,1	43,5	40		329,1	274,8				
	20	74,8	62,4	50		45	375,4	313,5			
	22	83,8	70,0			25	211,2	176,3			
25	12	43,8	28,0		58,6	30	262,7	219,3			
	15	59,2	49,4			35	314,2	262,3			
	20	85,0	71,0	40		365,7	305,3				
	22	95,3	79,6	45		417,2	391,3				
	25	110,7	92,4	50		468,7	391,3				

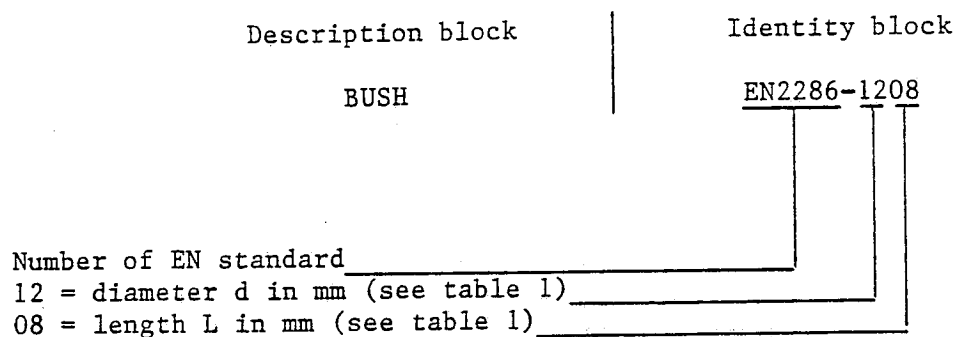
1) $C_s = 0,206d (L - 1,2 - R \text{ max.} - E \text{ max.}) \text{ kN}$.
Values of R max. and E max. derived from the values of R and E given in table 1.

2) Definitions for C_{25} and ultimate static loads, see EN 2311.

3) $C_a = 0,16 [(A - 1,5)^2 - (d + 2,5)^2] \text{ kN}$.

5 Designation

Each bush shall only be designated as in the following example :



Notes :

- 1 The number of characters is constant, zero (0) is inserted at the left of the figure when the diameter d or length L is less than 10.
- 2 If necessary the originators code I9005 may be introduced between the description block and the identity block.

6 Marking

In addition to the manufacturer's own marking each bush and its package shall be marked with the identity block specified in clause 5 of this standard.

Marking position and method are at manufacturer's option, and shall not have any detrimental effect on the bush.

7 Technical specification

Bushes supplied to this standard shall conform with the requirements of technical specification EN 2311.

The loads given in table 2 of this standard are only applicable under the conditions given in EN 2311.

8 Design recommendation

Bushes defined by this standard are intended to be installed by interference fit methods (see figure 2). Therefore, the loads given in table 2 can only be insured if the following mounting is applied.

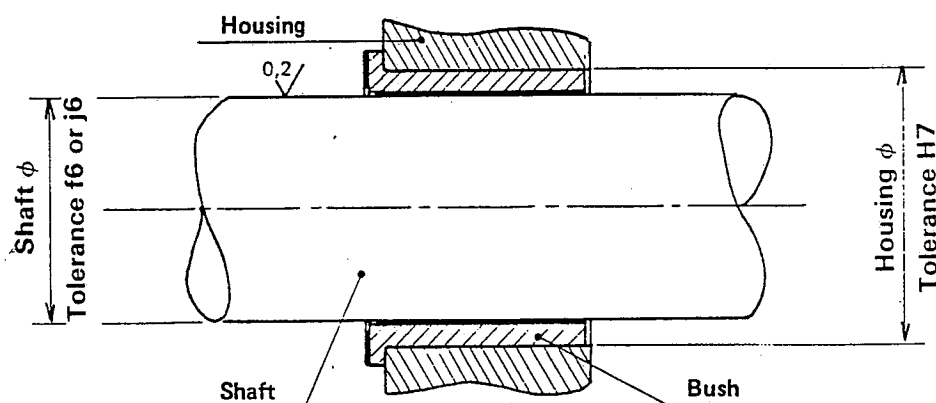


Figure 2

Hardness of the shaft : 45 HRC

Surface roughness of the shaft : See figure 2

The reduction in bore diameter d (see figure 1) due to interference fit of the bush in the housing has been taken into account when selecting tolerances for the shaft : f6 (clearance fit) or j6 (transition fit).