SLOVENSKI STANDARD
SIST EN 2288:2019

01-maj-2019

Nadomešča:
SIST EN 2288:2001

Aeronavtika - Puše s prirobnico iz korozijsko odpornega jekla s samomazalno oblogo - Mere in obremenitve

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

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

Série aérospatiale - Bague à épaulement, en acier resistant à la corrosion, à garniture autolubrificante - Dimensions et charges

Ta slovenski standard je istoveten z: **EN 2288:2019**

ICS:

49.030.99	Drugi vezni elementi	Other fasteners

SIST EN 2288:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2288

February 2019

ICS 49.030.99

Supersedes EN 2288:1989

English Version

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

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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

Page

European foreword

This document (EN 2288:2019) 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of an identical text or by endorsement, at the latest by August 2019, and conflicting national standards shall be withdrawn at the latest by August 2019.

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This document supersedes EN 2288:1989.

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1 Scope

This European standard specifies the characteristics of flanged 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 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 2311, *Aerospace series — Bushes with self-lubricating liner — Technical specification*

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

EN 3161, *Aerospace series — Steel FE-PM3801 (X5CrNiCu17-4) — Air melted, solution treated and precipitation treated, bar a or D ≤ 200 mm, $R_m \geq 930$ MPa*

EN 3490, *Aerospace series — Steel FE-PM3901 (X15CrNi17-3) — Air melted — Hardened and tempered — Bar for machining — $D_e \leq 200$ mm — 900 MPa ≤ R_m ≤ 1 100 MPa*

3 Requirements

3.1 Configuration — Masses

Configuration: according to Figure 1.

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

3.2 Surface roughness

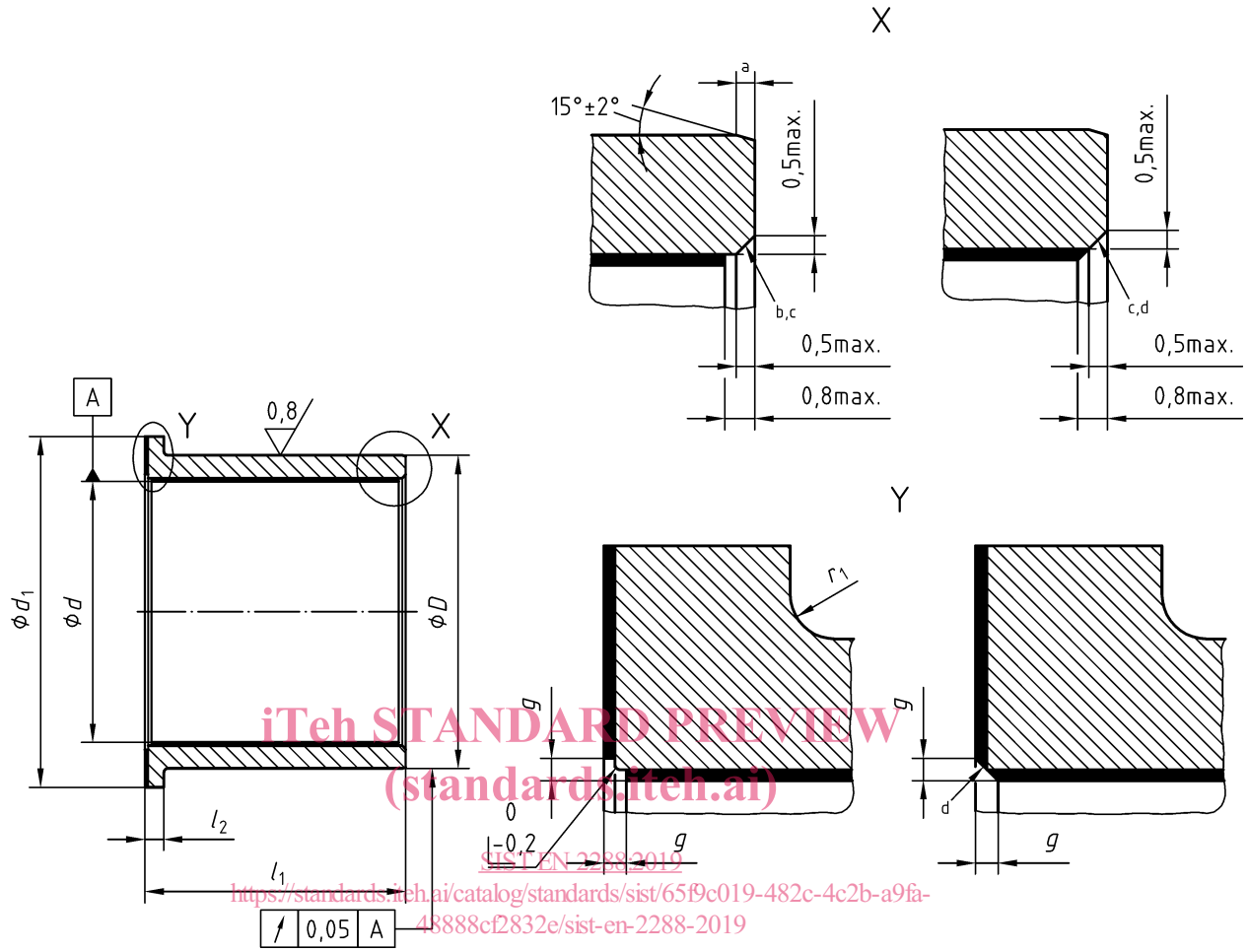
According to Figure 1.

3.3 Material

Bush: Steel according to EN 3490 or EN 3161.

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

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

Table 1

Dimensions in millimetres

$\varnothing d$		$\varnothing D$		$\varnothing d_1$ 0 −0,25	g	l_2 0 −0,15	r_1	$l_1 - 0{,}1$ −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	12	0,65 to 0,90	1,5	0,1 to 0,4	2,8*																
8	+27 +5	12	+29 +18	14				3,5	4,4*															
10		14		16				4,1	5,3	6,5*														
12	+33 +6	16		22			0,5 to 0,8	6,3	7,6*	9,0	10,4*													
15		19	+35 +22	25					9,2	10,8*	12,5	15,6*												
16		20		26					9,7	11,5	13,2	15,9	16,8											
18		22		28						12,7	14,7	17,6		20,8										
20	+40 +7	25		30	0,95 to 1,20					16,5	19,2*	23,4			30,4*									
22		26		32							17,5	21,0*			27,0	29,3*								
25		30		35							23,4	28,5*			37,0	40,4	45,5*							
28		34	+42 +26	40		2,5						41,4			52,8	57,4	64,3	71,2						
30		36		42								43,9			56,2*	61,1	68,4		80,7*					
32	+48 +9	38		44								46,5			59,5	64,7	72,5		85,5	90,7				
35		42		47											73,5*	80,2	90,2		106,8		123,5*			
40		48		52											93,2		115,0		136,0*		158,5	180,0*		
45		52	+51 +32	57													113,3		138,3		155,3*	176,3	197,3*	
50		58		62													140,9		167,6		194,3	221,0*	247,7	274,4

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

Table 2

Ød mm	l_1 mm	Permissible radial load: Static C_s [a] kN	Permissible radial load: Dynamic C_{25} [b] kN	Permissible axial static load C_a [c] kN
6	6	7,5	3,0	12,9
8	6	10,0	4,0	15,6
	8	16,9	6,8	
10	6	12,5	5,0	18,4
	8	21,1	8,4	
	10	29,7	11,9	
12	6	12,9	5,2	71,4
	8	23,2	9,3	
	10	33,5	13,4	
	12	43,9	17,6	
15	8	29,0	11,6	83,6
	10	41,9	16,8	
	12	54,8	21,9	
	15	74,2	29,7	
16	8	31,0	12,4	87,8
	10	44,7	17,9	
	12	58,5	23,4	
	15	79,1	31,6	
	16	86,0	34,3	
18	10	58,3	20,1	95,9
	12	65,8	26,3	
	15	89,0	35,5	
	18	112,2	44,8	
20	10	55,9	22,4	104
	12	73,1	29,2	
	15	98,9	39,6	
	20	141,9	56,8	
22	12	80,4	32,2	112,2
	15	108,8	43,5	
	20	156,1	62,4	
	22	175,0	70,0	
25	12	69,9	28,0	124,4
	15	123,6	49,4	
	20	177,4	71,0	
	22	198,9	79,6	
	25	231,1	92,4	
28	15	126,4	50,6	187,7
	20	186,6	74,6	
	22	210,7	84,3	
	25	246,8	98,5	
	28	282,9	113,0	
30	15	135,5	54,2	198,6
	20	200,0	80,0	
	22	225,8	90,3	
	25	264,5	105,8	
	30	329,0	131,6	
32	15	144,5	57,8	209,4
	20	213,3	85,3	
	22	240,8	96,3	
	25	282,1	112,8	
	30	350,9	140,1	
	32	378,4	151,1	
35	20	233,3	93,3	225,8
	22	263,4	105,4	
	25	308,5	123,4	
	30	383,8	153,5	
	35	459,0	183,6	
40	20	266,6	106,6	253
	25	352,6	141,0	
	30	438,6	175,4	
	35	524,6	209,8	
	40	610,6	244,2	
45	25	396,7	158,7	280,2
	30	493,4	197,4	
	35	590,2	236,1	
	40	686,9	274,8	
	45	783,7	313,5	
50	25	440,8	176,3	307,4
	30	548,3	219,3	
	35	655,8	262,3	
	40	763,3	305,3	
	45	870,8	348,3	
	50	978,3	391,3	

[a] $C_s = 0{,}43\ d\ (l_1\ 1{,}2 - r_1\ \text{max.} - l_2\ \text{max.})$ [kN] — based on a unit pressure of 430 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] $C_{25} = \frac{C_s}{2{,}5}$

[c] $C_a = 0{,}34\ [(d_1 - 1{,}5)2 - (d + 2{,}5)2]$ [kN].

Definitions of all loads are given in EN 2311.