

English Version

## Aerospace series - Bush, plain, aluminium alloy, with self-lubricating liner - Dimensions and loads

Série aérospatiale - Bague cylindrique, en alliage d'aluminium, à garniture autolubrifiante - Dimensions et charges

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

This European Standard was approved by CEN on 27 January 2025.

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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 2285:2025) has been prepared by ASD-STAN.

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, 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of an identical text or by endorsement, at the latest by October 2025, and conflicting national standards shall be withdrawn at the latest by October 2025.

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 2285:2017.

This document includes the following significant technical changes with respect to EN 2285:2017:

- normative references updated;
- EN 2424 introduced for marking;
- subclause 4.3 “Materials”: the different application temperatures of the possible materials are taken into account by a new additional code letter.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

### 4.3 Materials and temperature range

Bush:

- code L: aluminium alloy according to EN 2701 or EN 2704, operating temperature range  $-55\text{ °C}$  to  $121\text{ °C}$ ;
- no code: aluminium alloy according to EN 2086, operating temperature range  $-55\text{ °C}$  to  $163\text{ °C}$ .

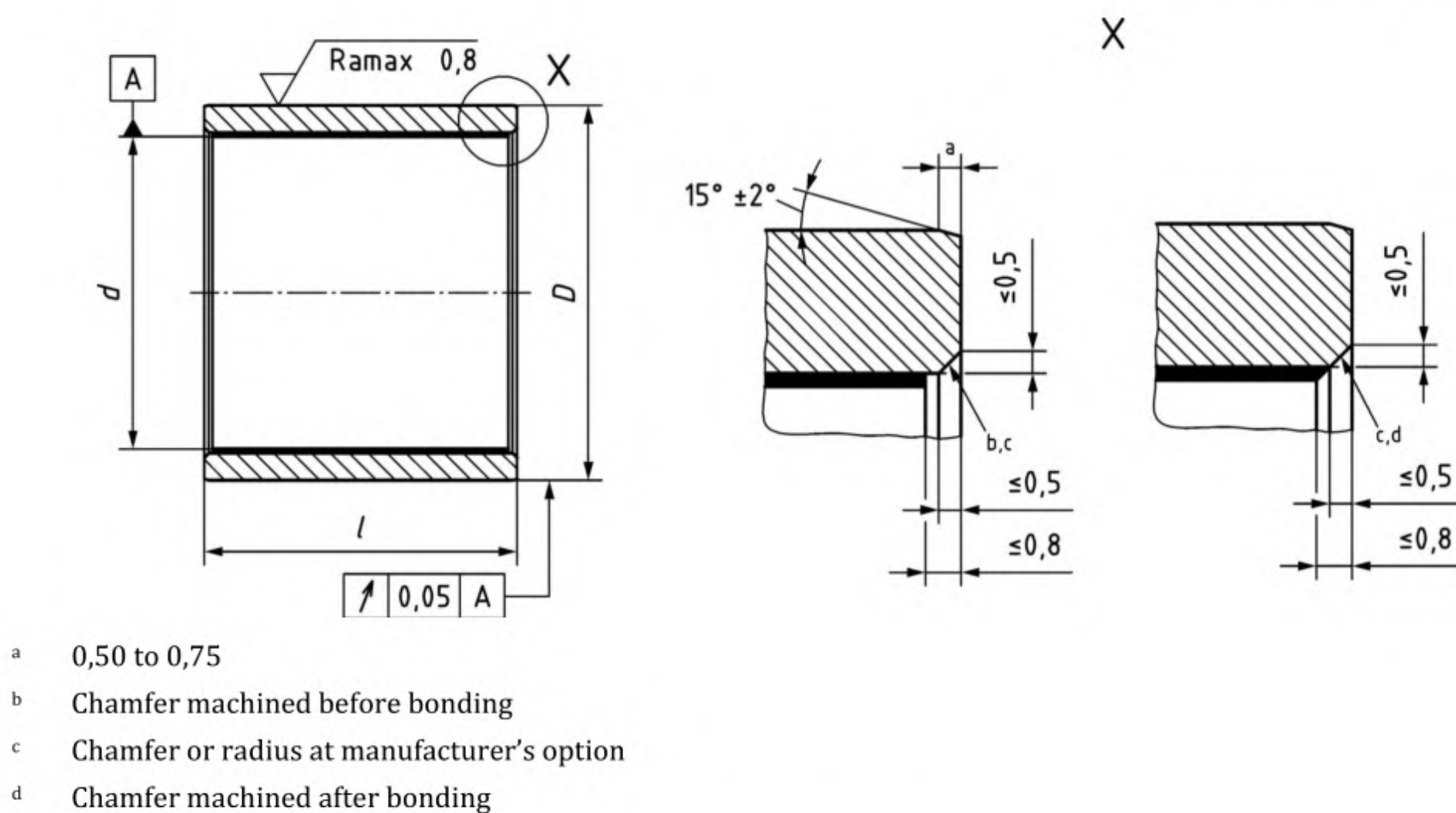
Liner: self-lubricating wear resistant material consistent with the requirements of EN 2311.

### 4.4 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



**Figure 1 — Configuration**

Table 2 — Dimensions and tolerances

Dimensions in millimetres

$\varnothing d$		$\varnothing D$		$L$ $-0,1$ $-0,4$																
Nominal-size	Tolerances	Nominal-size	Tolerances	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	0,9*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	+27 + 5	12	+29 +18	1,1	1,4*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10		14		1,3	1,7	2,1*	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12	+33 + 6	16		1,5	2,0*	2,5	3,0*	—	—	—	—	—	—	—	—	—	—	—	—	—
15		19	+35 +22	—	2,4	3,0*	3,6	4,6*	—	—	—	—	—	—	—	—	—	—	—	—
16		20		—	2,6	3,2	3,8	4,8	5,1	—	—	—	—	—	—	—	—	—	—	—
18		22		—	—	3,6	4,3	5,5	—	6,6	—	—	—	—	—	—	—	—	—	—
20		25		—	—	5,0	6,0*	7,5	—	—	10,0*	—	—	—	—	—	—	—	—	—
22	+40 + 7	26		—	—	—	5,1	6,4*	—	—	8,5	9,4*	—	—	—	—	—	—	—	—
25		30		—	—	—	7,4	9,2*	—	—	12,5	13,5	15,3*	—	—	—	—	—	—	—
28		34	+42 +26	—	—	—	—	12,4	—	—	16,6	18,2	20,7	23,2	—	—	—	—	—	—
30	+48 + 9	36		—	—	—	—	13,3	—	—	17,7*	19,5	22,1	—	26,5*	—	—	—	—	—
32		38		—	—	—	—	14,0	—	—	18,7	20,5	23,5	—	28,0	29,9	—	—	—	—
35		42		—	—	—	—	—	—	—	24,0*	26,5	30,1	—	36,0	—	42,2*	—	—	—
40		48		—	—	—	—	—	—	—	31,0	—	—	—	46,9*	—	54,9	62,8*	—	—
45	+48 + 9	52	+51	—	—	—	—	—	—	—	—	—	38,0	—	45,6	—	53,1*	60,7	68,2*	—
50		58	+32	—	—	—	—	—	—	—	—	—	48,7	—	58,2	—	67,7	77,3*	86,8	96,4*

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

The recommended sizes are indicated by \*.



Table 3 — Loads

$\varnothing d$	$L$	Permissible radial load	
		Static $C_s^a$ kN	Dynamic $C_{25}^b$ kN
mm	mm		
6	6	4,9	4,1
8	6	6,6	5,5
	8	9,9	8,3
10	6	8,2	6,8
	8	12,4	10,3
	10	16,5	13,8
12	6	9,9	8,3
	8	14,8	12,3
	10	19,8	16,5
	12	24,7	20,6
15	8	18,5	15,4
	10	24,7	20,6
	12	30,9	25,8
	15	40,2	33,5
16	8	19,8	16,5
	10	26,4	22,0
	12	33,0	27,5
	15	42,5	35,7
	16	45,1	38,4
18	10	29,7	24,8
	12	37,1	30,9
	15	48,2	40,2
	18	59,3	49,4
20	10	33,0	27,5
	12	41,2	34,3
	15	53,6	44,7
	20	74,2	61,8
22	12	45,3	37,7
	15	58,9	49,1
	20	81,6	68,0
	22	90,6	75,5

$\varnothing d$  mm	$L$  mm	Permissible radial load	
		Static	Dynamic
		$C_s^a$ kN	$C_{25}^b$ kN
25	12	51,5	42,9
	15	67,0	55,8
	20	92,7	77,3
	22	103,0	85,8
	25	118,5	98,8
28	15	75,0	62,5
	20	103,8	86,5
	22	115,4	96,2
	25	132,7	110,6
	28	150,0	125,0
30	15	80,3	66,9
	20	111,2	92,7
	22	123,6	103,0
	25	142,1	118,4
	30	173,0	144,2
32	15	85,7	71,4
	20	118,7	98,9
	22	131,8	109,8
	25	151,6	126,3
	30	184,6	153,8
	32	197,8	164,8
35	20	129,8	108,2
	22	144,2	120,2
	25	165,8	138,2
	30	201,9	168,3
	35	237,9	198,3
40	20	148,3	123,6
	25	189,5	157,9
	30	230,7	192,3
	35	271,9	226,6
	40	313,1	260,9

$\varnothing d$	$L$	Permissible radial load	
		Static $C_s^a$ kN	Dynamic $C_{25}^b$ kN
mm	mm		
	25	213,2	177,7
	30	259,6	216,3
	35	305,9	254,9
	40	352,3	293,6
45	45	398,5	332,1
	25	236,9	197,4
	30	288,4	240,3
	35	339,9	283,3
	40	391,4	326,2
50	45	442,9	369,1
	50	494,4	412,0
Definitions of all loads are given in EN 2311.			
<sup>a</sup> $C_s = 0,206 d (L - 2)$ [kN] — based on a unit pressure of 206 MPa. <sup>b</sup> $C_{25} = \frac{C_s}{1,25}$ [kN].			

## 5 Designation

### EXAMPLE

#### BUSH EN 2285-12 08 A R L

In this designation, the elements have the following meaning:

- 12 Code for diameter  $d$  (see Table 2)
- 08 Code for length  $L$  (see Table 2)
- A Technology code (see Table 4)
- R Surface treatment (see Table 1)
- L Code for material (see 4.3)

NOTE The number of characters is constant, Zero (0) is inserted to the left of the figure when the diameter  $d$  or length  $L$  is less than 10.

If necessary, the code I9005 shall be placed between the description block and the identity block.

Parts manufactured before the issue of this standard shall be accepted without technology code.



**Table 4 — Technology codes**

Technology code	Technology
A	Bonded fabric liner
B	Injection moulded liner
Without code	Both technologies can be used at user's convenience

## 6 Marking

Marking shall be according to EN 2424, style A.

Marking position and method are at manufacturer's option.

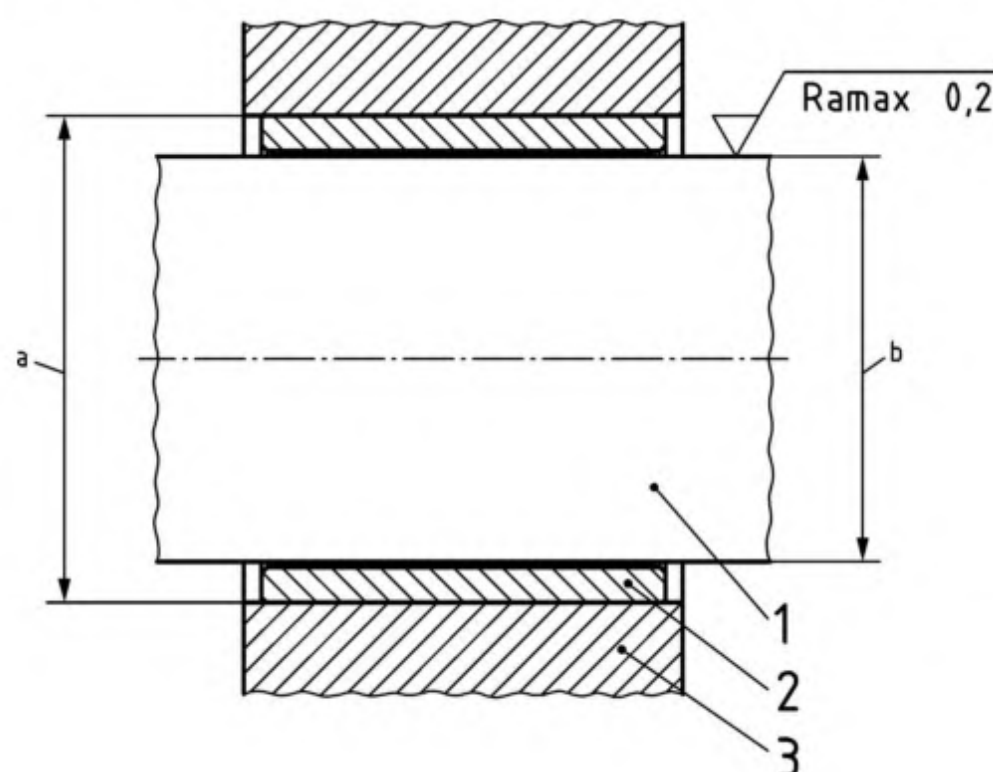
Bushes which are too small to be marked with style A shall be marked according to style G.

## 7 Technical specification

The technical specification shall be according to EN 2311.

## 8 Design recommendation

Bushes specified in this standard are intended to be installed by interference fit methods (see Figure 2). Therefore, the loads given in Table 3 can only be ensured if the following mounting is applied.



### Key

- 1 shaft
- 2 bush
- 3 housing
- a housing diameter  $D$  H7
- b shaft diameter  $d$  f6

**Figure 2 — Design recommendation**

Hardness of the shaft: 50 HRC min.

Surface roughness of the shaft: according to 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).

When applied in actual usage, the coefficient of friction under load could be different from that specified in EN 2311, since it depends on the following shaft definitions: Material, hardness, surface finish, surface treatment and installation conditions.