

### Characteristics

1. PTFE	0,01 - 0,03 mm
2. Porous bronze	0,20 - 0,30 mm
3. Steel backing	0,40 - 2,20 mm
4. Tin or copper plating	~ 0,005 - 0,008 mm

### Usage:

DU bushes are widely used in hydraulic vehicles, automobiles, motorcycles, agricultural machines, textile machines, printing machines, gymnastic equipment and many other applications. DU bushes generally have good initial adaptability with a wear of 0,01 ~ 0,02mm. During the adjustment period a part of the surface in PTFE is deposited on the shaft or on the contact surface (fig. 1) forming a self-lubricating film capable of reducing friction and wear. After this initial phase and with progressive increases in the functioning hours, once 80% of the PTFE is consumed, the bush is considered depleted and therefore should be replaced. The roughness of the surface must generally be inferior to 0,8  $\mu$ . The typical wear curve is shown in fig. 2.

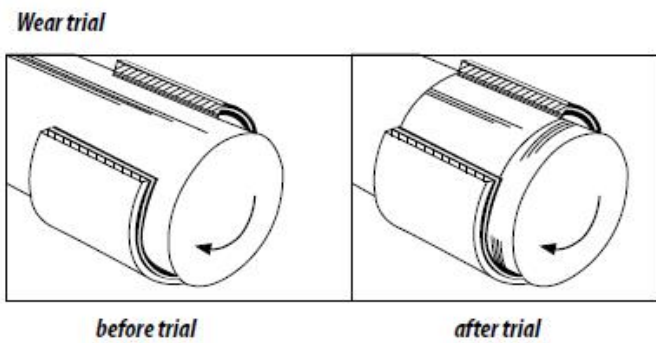


Fig. 1

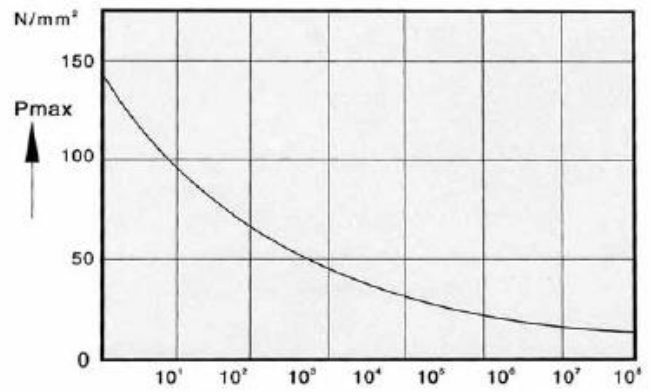


Fig. 2

### Advantages:

- exempt from lubrication.
- elevated load capacities - 140 N/mm<sup>2</sup>.
- elevated flow and low friction coefficients both static and dynamic (no stick-slip effect).
- operating temperature range from -195 °C to +280 °C.
- low vibration, noise and pollution. Possibility to use coupling metals with low hardness.
- light weight materials, compact and with minimum encumbrance.
- ease of mounting
- oil or water are not absorbed, presenting low expansion, high conductivity and excellent thermal stability.

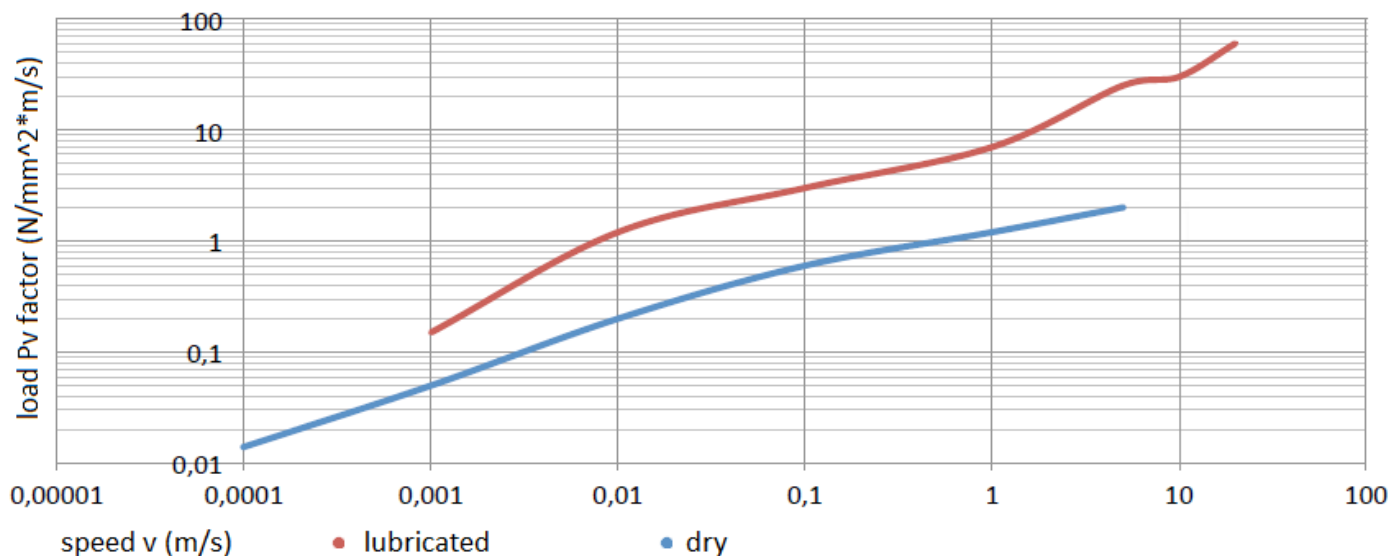
## Load capacity:

The load capacity of the bush is expressed using the load factor  $Pv$  ( $N/mm^2 \cdot m/s$ ) where  $P$  represents the specific load and  $v$  the velocity. The specific maximum load applicable in constant conditions can reach a value of ( $140 N/mm^2$ ), while in dynamic conditions, therefore with rotary and oscillating movement, the specific load limit can decrease to  $56 N/mm^2$ . The limit of the load can be influenced by the temperature: it is important to maintain constant temperature in order to obtain the best performances and therefore to increase the duration of the bush. If we consider  $F$  as total load,  $d$  the internal diameter and  $b$  the length, the load limit will be equal to:

$$p = F / (d \cdot b)$$

The lubrication can influence the load factor too: in fact the maximum specific load  $p$  depends on the conditions of the greasing, as shown below.

Pv factor in dry and lubricated conditions



## Lubricants:

Despite the material used for the construction of the DU bushing is of good quality and usable when dry, when used in the presence of fluids, liquids and or lubricants the limits  $Pv$  increase sensibly; in fact, the presence of fluids allows the dispersion of the friction heat possible and the contact between the surfaces, increasing the useful duration of the bush. The presence of lubricating fluids creates the adapt conditions for the hydrodynamic functioning, incrementing noticeably the sliding velocity bling the specific load the seme. It is worthwhile to always verify the compatibility of the bush with the fluid present because an undesirable effect could be experienced in the use of one fluid rather than another. It is advisable to try to immerse half of the bush in the fluid for approximately 2 weeks to verify that the bush remains unchanged in every part.



## DU series bushes (PAP ... P10 / EGB E40)

maintenance-free

### Temperature:

In case the temperature remains between 0 °C and 100 °C, the impact of the friction coefficient is rather limited; once this limit is surpassed, the friction coefficient increases rapidly by approximately 50%. With an estimated temperature of over 200 °C and with constant load factor, the duration of the bush would be reduced by 80% with respect to that registered at 20 °C (see table below).

Limit Pv at various temperatures				
Speed (m/s)	Load (N/mm <sup>2</sup> )	Limit Pv (N/mm <sup>2</sup> * m/s)		
		20°C	100°C	200°C
0,0001	140	0,014	0,014	0,014
0,0010	50	0,500	0,300	0,100
0,0100	6,0	0,600	0,350	0,120
1,0000	1,2	1,200	0,720	0,240
5,0000	0,4	2,000	1,000	0,400

### DU Bushes tolerances:

Outer Diameter D (mm)	Outer diameter tolerances D (mm)	Thickness tolerances S <sub>B</sub> (mm)		Chamfer dimensions		
		S <sub>B</sub> (mm)		S <sub>B</sub> (mm)	f <sub>1</sub> (mm)	f <sub>2</sub> (mm)
≤ 10	+ 0,055 + 0,025	0,75	- 0,000 - 0,020	0,75	0,5 ± 0,3	- 0,05 - 0,30
10 < ≤ 18	+ 0,065 + 0,030	1	+ 0,005 - 0,020	1	0,6 ± 0,4	- 0,1 - 0,4
18 < ≤ 30	+ 0,075 + 0,035	1,5	+ 0,005 - 0,025	1,5	0,6 ± 0,4	- 0,1 - 0,6
30 < ≤ 50	+ 0,085 + 0,045	2	+ 0,005 - 0,030	2	1,2 ± 0,4	- 0,1 - 0,7
50 < ≤ 80	+ 0,100 + 0,055	2,5	+ 0,005 - 0,040	2,5	1,8 ± 0,6	- 0,2 - 1,0
80 < ≤ 120	+ 0,120 + 0,070	2,5	- 0,010 - 0,060	2,5	1,8 ± 0,6	- 0,2 - 1,0
120 < ≤ 180	+ 0,170 + 0,100	2,5	- 0,035 - 0,085	2,5	1,8 ± 0,6	- 0,2 - 1,0
180 < ≤ 305	+ 0,255 + 0,125	2,5	- 0,035 - 0,085	2,5	1,8 ± 0,6	- 0,2 - 1,0

Tolerance values of metric bushings DU comply with standard ISO 3547-1:2006

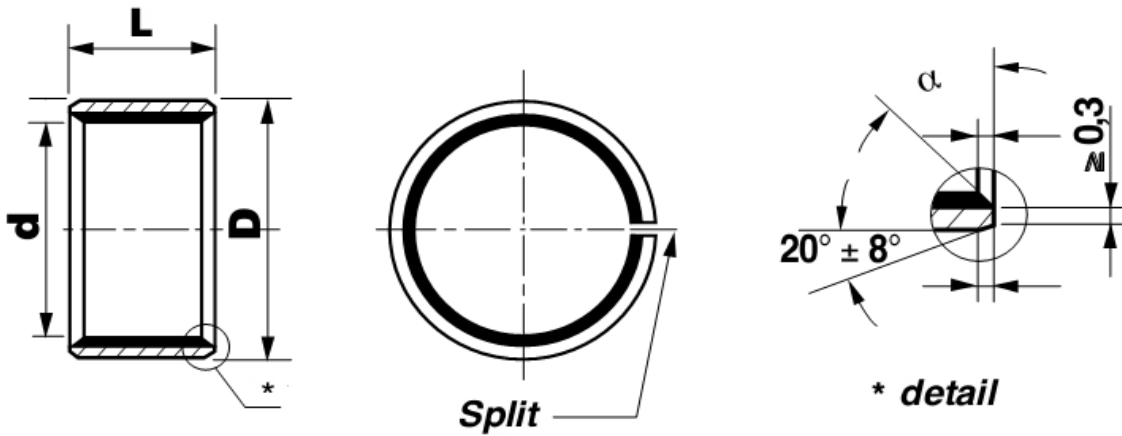
### Recommended mounting tolerances:

#### Shaft:

< 5 mm      h6  
 5 - 75 mm    f7  
 > 75 mm     h8

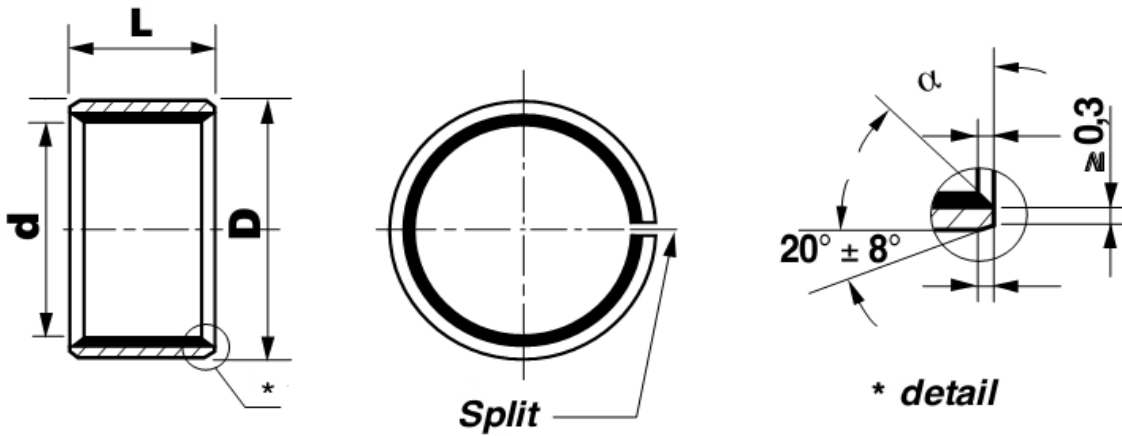
#### Bore:

< 4 mm      H6  
 > 4 mm      H7



Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
DU 0606	6	8	6
DU 0608	6	8	8
DU 0610	6	8	10
DU 0710	7	9	10
DU 0808	8	10	8
DU 0810	8	10	10
DU 0812	8	10	12
DU 1008	10	12	8
DU 1010	10	12	10
DU 1012	10	12	12
DU 1015	10	12	15
DU 1020	10	12	20
DU 1208	12	14	8
DU 1210	12	14	10
DU 1212	12	14	12
DU 1215	12	14	15
DU 1220	12	14	20
DU 1225	12	14	25
DU 1310	13	15	10
DU 1410	14	16	10
DU 1412	14	16	12
DU 1415	14	16	15
DU 1420	14	16	20
DU 1425	14	16	25
DU 1510	15	17	10
DU 1512	15	17	12
DU 1515	15	17	15
DU 1520	15	17	20
DU 1525	15	17	25
DU 1610	16	18	10

Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
DU 1612	16	18	12
DU 1615	16	18	15
DU 1620	16	18	20
DU 1625	16	18	25
DU 1815	18	20	15
DU 1820	18	20	20
DU 1825	18	20	25
DU 2010	20	23	10
DU 2015	20	23	15
DU 2020	20	23	20
DU 2025	20	23	25
DU 2030	20	23	30
DU 2215	22	25	15
DU 2220	22	25	20
DU 2225	22	25	25
DU 2230	22	25	30
DU 2415	24	27	15
DU 2420	24	27	20
DU 2425	24	27	25
DU 2430	24	27	30
DU 2510	25	28	10
DU 2515	25	28	15
DU 2520	25	28	20
DU 2525	25	28	25
DU 2530	25	28	30
DU 2540	25	28	40
DU 2550	25	28	50
DU 2820	28	32	20
DU 2830	28	32	30
DU 3015	30	34	15



Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
DU 3020	30	34	20
DU 3025	30	34	25
DU 3030	30	34	30
DU 3040	30	34	40
DU 3230	32	36	30
DU 3240	32	36	40
DU 3520	35	39	20
DU 3530	35	39	30
DU 3540	35	39	40
DU 3550	35	39	50
DU 4030	40	44	30
DU 4040	40	44	40
DU 4050	40	44	50
DU 4530	45	50	30
DU 4540	45	50	40
DU 4550	45	50	50
DU 5020	50	55	20
DU 5030	50	55	30
DU 5040	50	55	40
DU 5060	50	55	60
DU 5540	55	60	40
DU 5560	55	60	60
DU 6020	60	65	20
DU 6030	60	65	30
DU 6040	60	65	40
DU 6060	60	65	60
DU 6070	60	65	70
DU 6540	65	70	40
DU 6550	65	70	50

Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
DU 6560	65	70	60
DU 6570	65	70	70
DU 7040	70	75	40
DU 7050	70	75	50
DU 7070	70	75	70
DU 7540	75	80	40
DU 7550	75	80	50
DU 7560	75	80	60
DU 7580	75	80	80
DU 8040	80	85	40
DU 8060	80	85	60
DU 8080	80	85	80
DU 80100	80	85	100
DU 8560	85	90	60
DU 85100	85	90	100
DU 9050	90	95	50
DU 9060	90	95	60
DU 90100	90	95	100
DU 9560	95	100	60
DU 95100	95	100	100
DU 10050	100	105	50
DU 10060	100	105	60
DU 100115	100	105	115
DU 10560	105	110	60
DU 105115	105	110	115
DU 11060	110	115	60
DU 110115	110	115	115