

**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:**

PAP ... P10 bushes are widely used in hydraulic vehicles, automobiles, motorcycles, agricultural machines, textile machines, printing machines, gymnastic equipment and many other applications. PAP ... P10 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 μ. The typical wear curve is shown in fig. 2.

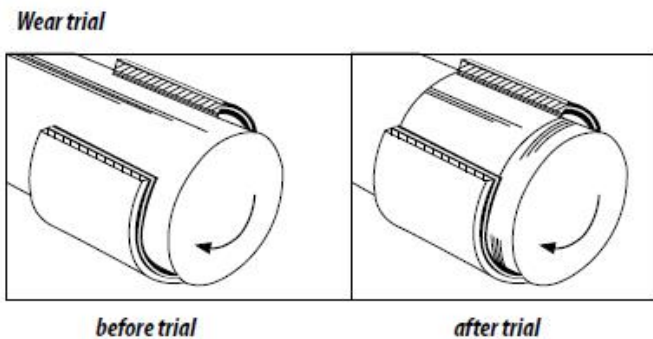


Fig. 1

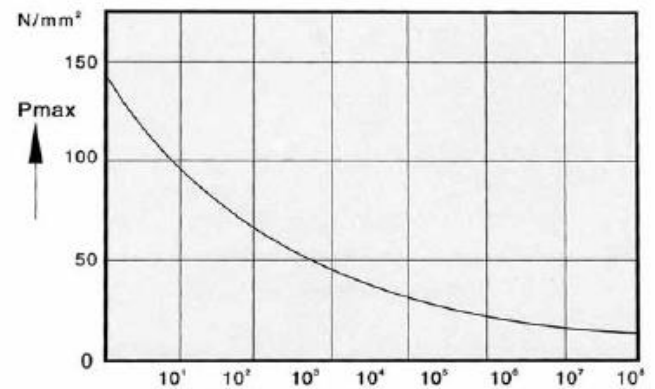


Fig. 2

**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.

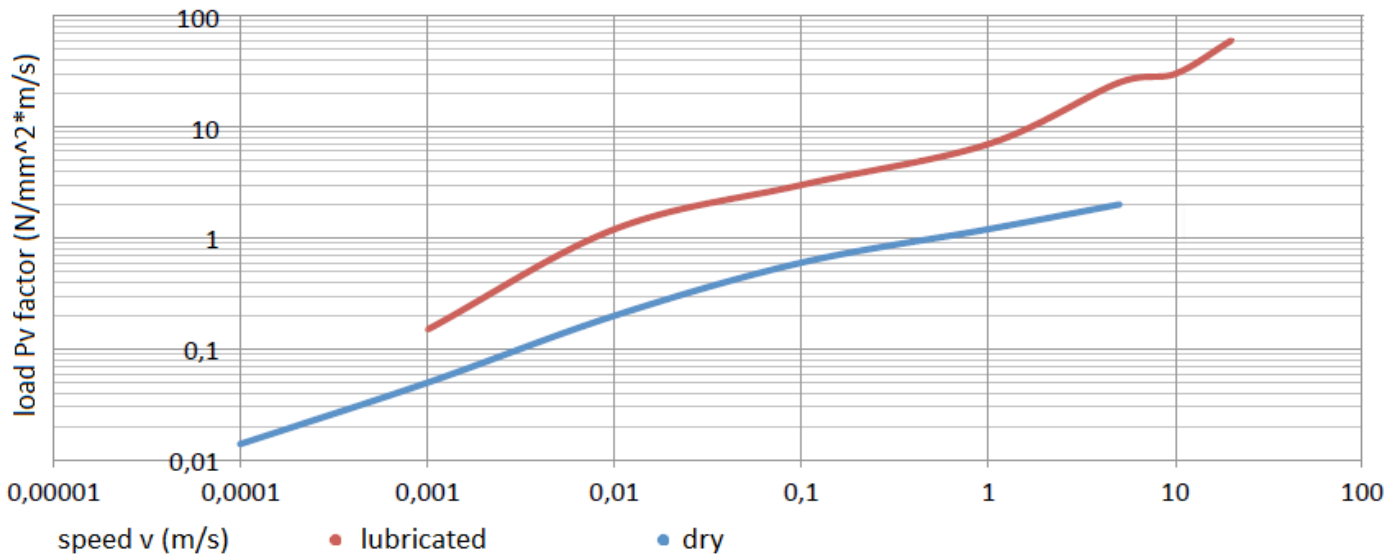
**Load capacity:**

The load capacity of the bush is expressed using the load factor Pv (N/mm<sup>2</sup> • 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<sup>2</sup>), while in dynamic conditions, therefore with rotary and oscillating movement, the specific load limit can decrease to 56 N/mm<sup>2</sup>. 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 PAP ... P10 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 hall of the bush in the fluid for approximately 2 weeks to verify that the bush remains unchanged in every part.



# PAP ... P10 series bushes (EGB E40 / SF-1 / PCM E / PG F)

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

## PAP ... P10 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 PAP ... P10 comply with standard ISO 3547-1:2006

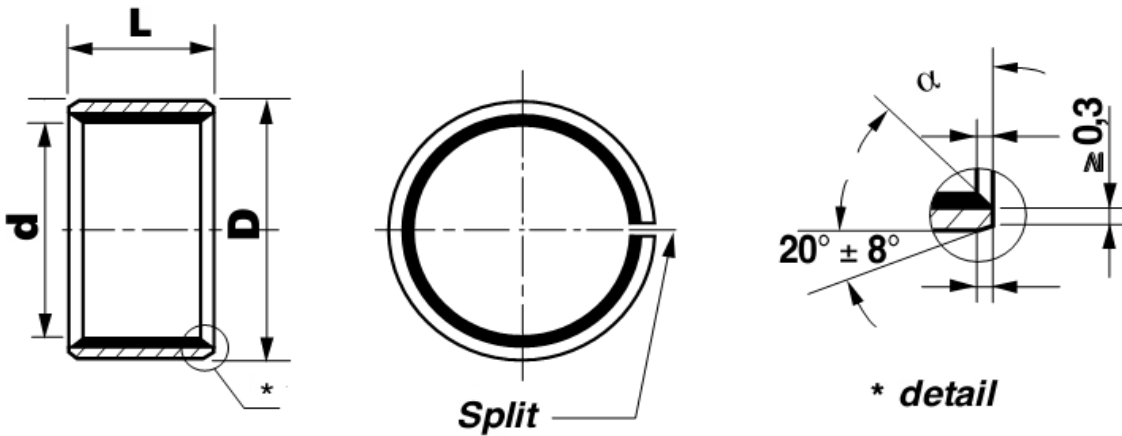
## Recommended mounting tolerances:

### Shaft:

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

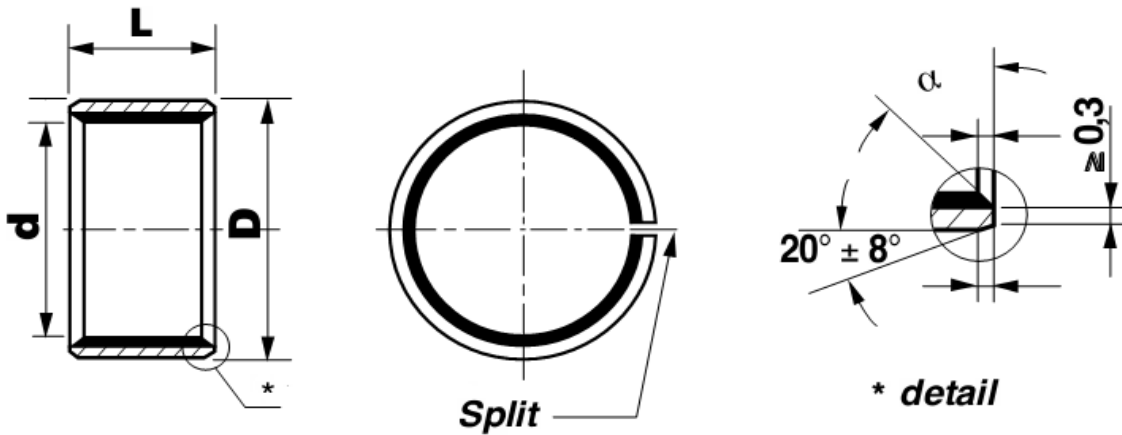
### Bore:

< 4 mm      H6  
 > 4 mm      H7



Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
PAP0404-P10	4	5,5	4
PAP0606-P10	6	8	6
PAP0608-P10	6	8	8
PAP0610-P10	6	8	10
PAP0710-P10	7	9	10
PAP0808-P10	8	10	8
PAP0810-P10	8	10	10
PAP0812-P10	8	10	12
PAP1008-P10	10	12	8
PAP1010-P10	10	12	10
PAP1012-P10	10	12	12
PAP1015-P10	10	12	15
PAP1020-P10	10	12	20
PAP1208-P10	12	14	8
PAP1210-P10	12	14	10
PAP1212-P10	12	14	12
PAP1215-P10	12	14	15
PAP1220-P10	12	14	20
PAP1225-P10	12	14	25
PAP1310-P10	13	15	10
PAP1410-P10	14	16	10
PAP1412-P10	14	16	12
PAP1415-P10	14	16	15
PAP1420-P10	14	16	20
PAP1425-P10	14	16	25
PAP1510-P10	15	17	10
PAP1512-P10	15	17	12
PAP1515-P10	15	17	15
PAP1520-P10	15	17	20
PAP1525-P10	15	17	25
PAP1610-P10	16	18	10

Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
PAP1612-P10	16	18	12
PAP1615-P10	16	18	15
PAP1620-P10	16	18	20
PAP1625-P10	16	18	25
PAP1815-P10	18	20	15
PAP1820-P10	18	20	20
PAP1825-P10	18	20	25
PAP2010-P10	20	23	10
PAP2015-P10	20	23	15
PAP2020-P10	20	23	20
PAP2025-P10	20	23	25
PAP2030-P10	20	23	30
PAP2215-P10	22	25	15
PAP2220-P10	22	25	20
PAP2225-P10	22	25	25
PAP2230-P10	22	25	30
PAP2415-P10	24	27	15
PAP2420-P10	24	27	20
PAP2425-P10	24	27	25
PAP2430-P10	24	27	30
PAP2510-P10	25	28	10
PAP2515-P10	25	28	15
PAP2520-P10	25	28	20
PAP2525-P10	25	28	25
PAP2530-P10	25	28	30
PAP2540-P10	25	28	40
PAP2550-P10	25	28	50
PAP2820-P10	28	32	20
PAP2830-P10	28	32	30
PAP3015-P10	30	34	15
PAP3020-P10	30	34	20



Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
PAP3025-P10	30	34	25
PAP3030-P10	30	34	30
PAP3040-P10	30	34	40
PAP3230-P10	32	36	30
PAP3240-P10	32	36	40
PAP3520-P10	35	39	20
PAP3530-P10	35	39	30
PAP3540-P10	35	39	40
PAP3550-P10	35	39	50
PAP4030-P10	40	44	30
PAP4040-P10	40	44	40
PAP4050-P10	40	44	50
PAP4530-P10	45	50	30
PAP4540-P10	45	50	40
PAP4550-P10	45	50	50
PAP5020-P10	50	55	20
PAP5030-P10	50	55	30
PAP5040-P10	50	55	40
PAP5060-P10	50	55	60
PAP5540-P10	55	60	40
PAP5560-P10	55	60	60
PAP6020-P10	60	65	20
PAP6030-P10	60	65	30
PAP6040-P10	60	65	40
PAP6060-P10	60	65	60
PAP6070-P10	60	65	70
PAP6540-P10	65	70	40
PAP6550-P10	65	70	50

Dimensions (mm)			
Product No.	d	D	L <sup>±0,25</sup>
PAP6560-P10	65	70	60
PAP6570-P10	65	70	70
PAP7040-P10	70	75	40
PAP7050-P10	70	75	50
PAP7070-P10	70	75	70
PAP7540-P10	75	80	40
PAP7550-P10	75	80	50
PAP7560-P10	75	80	60
PAP7580-P10	75	80	80
PAP8040-P10	80	85	40
PAP8060-P10	80	85	60
PAP8080-P10	80	85	80
PAP80100-P10	80	85	100
PAP8560-P10	85	90	60
PAP85100-P10	85	90	100
PAP9050-P10	90	95	50
PAP9060-P10	90	95	60
PAP90100-P10	90	95	100
PAP9560-P10	95	100	60
PAP95100-P10	95	100	100
PAP10050-P10	100	105	50
PAP10060-P10	100	105	60
PAP100115-P10	100	105	115
PAP10560-P10	105	110	60
PAP105115-P10	105	110	115
PAP11060-P10	110	115	60
PAP110115-P10	110	115	115