

## HPP34-工程塑料轴承 Plastic Plain Bearings

### 产品特性 Product Features

■ 高速低成本解决方案。耐温260度下几乎能抵抗所有的化学液体腐蚀。不适合极高载荷。环境温度高于135度需考虑额外限位装置

■ 连续使用温度：-200℃/+260℃

■ 适合干运行、免维护

■ 低摩擦系数要求

■ 适合轻载高速运动

■ 高化学抗性

■ 适合在液体运行

■ Economic solution for high speed application. Under the temperature of 260℃, the material can still have good chemical resistance feature. It is not suitable for high load application. When the temperature is higher than 135℃, additional location ring is necessary

■ Continuous working temperature: -200℃ /+260℃

■ Maintenance-free dry operation

■ Low friction requirement

■ High surface speed undertow load

■ High chemical resistance

■ Suitable for working in liquid



材料性能 Material Properties	试验方法 Testing Method	单位 Unit	HPP34
密度 Density	ISO1183	g/cm <sup>3</sup>	2.13
颜色 Color			黑色 Black
对钢的动摩擦系数 Dynamic friction/steel(dry)			0.08-0.18
最大 P.V 值 Max. PV (dry)		N/mm <sup>2</sup> × m/s	0.3
最大旋转速度值 Max. rotating velocity		m/s	2.0
最大摇摆速度值 Max. oscillating velocity		m/s	1.4
最大直线速度值 Max. linear velocity		m/s	5
抗拉强度 Tensile strength	ISO527	MPa	13
抗压强度 (轴向) Compressive strength(Axial)		MPa	8
弹性模量 E-module	ISO527	MPa	790
允许最大表面静压力 (20℃) Max.static pressure of the surface, 20℃		MPa	8
邵氏硬度 Rockwell hardness	ISO868	D	65
连续工作温度 continuous work temperature		℃	-200/+260
短时运行温度 Short-time		℃	-200/+310
导热性 Thermal conductivity	ASTME1461	W/m × k	0.25
线性热膨胀系数 Linear coef. of thermal eapansion	ASTMD696	K <sup>-1</sup> × 10 <sup>-5</sup>	12
RH50/23℃时的吸湿性 Moisture absorption RH50/23℃	ASTMD570	%	< 0.1
最大吸水率 23℃ Max. water absorption, 23℃		%	< 0.1
燃烧性能 Flammability	UL94		V0
体电阻率 Volume resistivity	IEC60093	Ω cm	> 10 <sup>4</sup>
面电阻率 Surface resistivity	IEC60093	Ω	> 10 <sup>3</sup>

## HPP34-工程塑料轴承 Plastic Plain Bearings

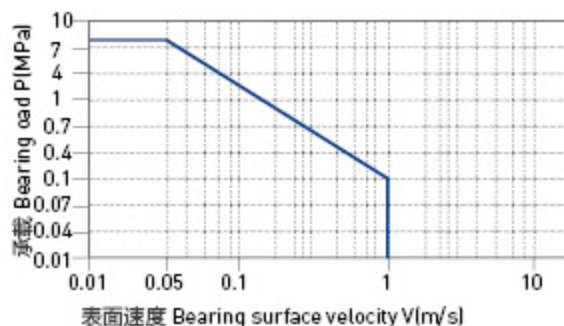
### 轴承PV值 PV Value

HPP34系列轴承最大运行PV值为 $0.3\text{N/mm}^2 \times \text{m/s}$ ;由此决定轴承所承受的载荷与速度成反比,详细查阅图表HPP34-1。

The max PV value of the HPP34 series bearing is  $0.3\text{N/mm}^2 \times \text{m/s}$  which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph HPP34-1).

图表 HPP34-1: PV 图表

Graph HPP34-1: Permissible PV value for HPP34



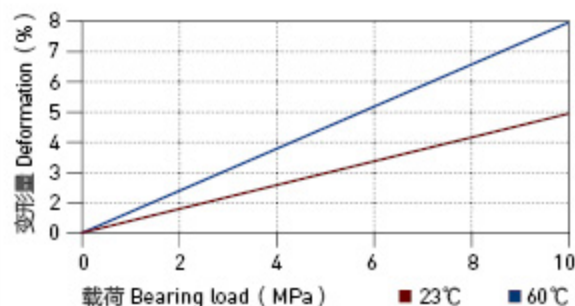
### 轴承的载荷、速度、温度 The Relation Of Load, Speed And Temperature

HPP34塑料轴承可承受最大静载荷为8Mpa,在此载荷下轴承的最大压缩变形量参考图表HPP34-2,轴承实际工作载荷略小于8Mpa,载荷还受到运行速度以及温度的影响,速度越快(Vmax: 2.0m/s)会导致摩擦温度上升,而温度上升(Tmax:260℃)会导致轴承的承载能力逐渐减弱,载荷随轴承工作温度变化情况参考图表HPP34-3。

HPP34 allows the Max static load of 8Mpa, The max compressive deformation rate under the max load is listed in Graph HPP34-2, The actual load capacity of bearing is slightly less than 8Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 2.0m/s) results into higher temperature (Tmax: 260℃) which decreases the load capacity of the bearing. Please refer to the Graph HPP34-3 for such variation

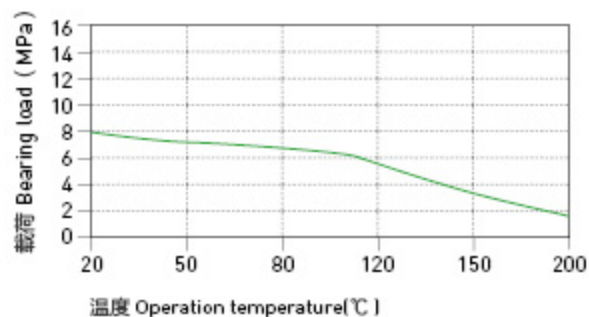
图表 HPP34-2: 载荷 - 温度 - 变形量图表

Graph HPP34-2: Load-Temperature deformation



图表 HPP34-3: 载荷 - 温度图表

Graph HPP34-3: Load-Temperature diagrams



## HPP34-工程塑料轴承 Plastic Plain Bearings

### 轴承的摩擦系数、磨损、轴材料 Friction Factor, Wear And Shaft Material

#### ■ 轴承的摩擦系数 Friction factor

通常情况下，塑料轴承随着速度的增加，它的耐磨性能和摩擦系数都会下降，但HPP34轴承由于高速产生的变化影响相对较小（见图HPP34-4与图HPP34-5）；根据图HPP34-6显示HPP34轴承的摩擦系数还会受到对磨轴表面粗糙度的影响而发生变化，我们推荐此轴承使用轴表面粗糙度值为Ra0.2—0.5 $\mu$ m。

The coefficient of friction like the wear resistance with increasing surface speed. In contrast, a higher surface speed has less impact on the coefficient of HPP34 bearing (Graph HPP34-4 and HPP34-5). From the figure HPP34-6, we could see that the friction factor is variable against the changing of changing of shaft roughness. The recommended shaft roughness is Ra0.2—0.5 $\mu$ m.

HPP34	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 $\mu$ Friction coef.	0.03-0.15	0.09	0.04	0.04

#### ■ 磨损与轴材料 Wearing and shaft material

轴材料对轴承的磨损有很大影响，但HPP34轴承适合几乎所有的轴材料；通过图HPP34-7可以看出当使用硬铬钢轴或硬化钢轴时HPP34轴承的磨损特性都非常出色。图HPP34-7显示HPP34轴承更适合用于旋转运动场合。

The shaft material is an important media for the bearing wearing but HPP34 is suitable for almost all kinds of shaft materials. Graph HPP34-7 shows that the wearing feature of HPP34 is excellent when the shaft material are hardened chrome steel or hardened steel. Graph HPP34-7 shows that the material HPP34 is most suitable for the rotation operation.

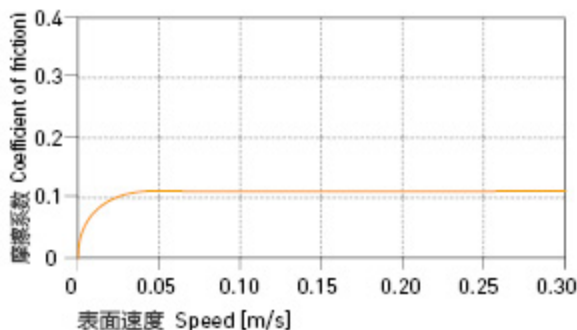
#### ■ 化学抗性 Chemical Resistance

HPP34塑料轴承具有极好的化学抗性，能抵抗浓度65%的强酸。

Chemical Resistance of HPP34 is very good. It can work well in the heavy acid of 65%.

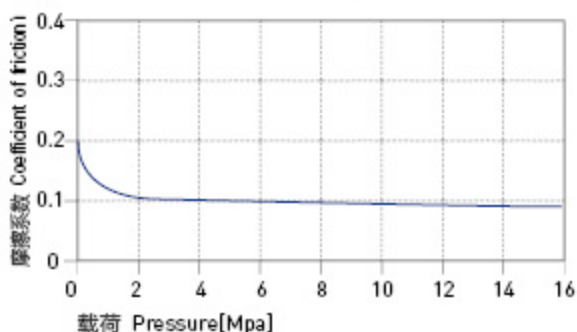
图表 HPP34-4: 摩擦系数与速度变化关系图表 P=2MPa

Graph HPP34-4: Coefficient of friction & the speed of bearing, P=2Mpa



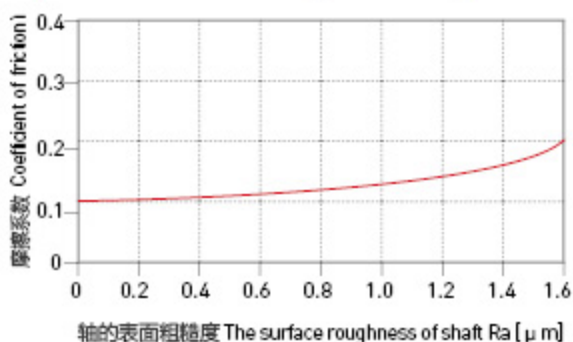
图表 HPP34-5: 摩擦系数与载荷变化关系图表 v=0.2m/s

Graph HPP34-5: Coefficient of friction & the pressure of bearing, v=0.2m/s



图表 HPP34-6: 摩擦系数与轴表面粗糙度关系图表

Graph HPP34-6: Coefficient of friction & the surface roughness of shaft



## HPP34-工程塑料轴承 Plastic Plain Bearings

### 轴承的摩擦系数、磨损、轴材料 Friction Factor, Wear And Shaft Material

#### ■ 吸水性 Water Absorbability

在标准大气压中，HPP34塑料轴承的吸水率极低小于0.1%，浸泡水中最大平衡吸水率小于0.1%；因此材料不会吸水而发生性能和尺寸变化，适用于潮湿环境或水下。

The water absorb rate of HPP34 is less than 0.1% under the atmospheric pressure while it is less than 0.1% when the material is immersed into water. The material performance and dimensions of the material is stabilized for the applications under humid environment or even in the water.

#### ■ 抗UV性能 UV Resistance

HPP34长久暴露在紫外线下材料性能不会发生变化。

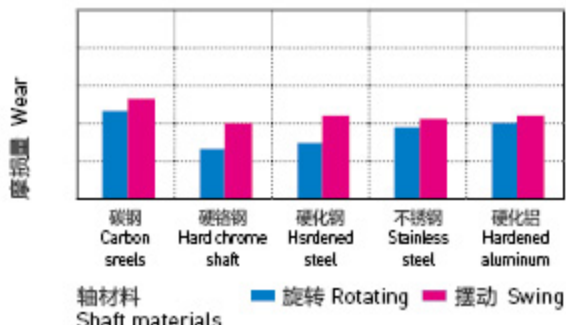
HPP34 can maintain its performance to be stable even exposed in the UV ray for long period.

#### ■ 安装公差 Installation Tolerances

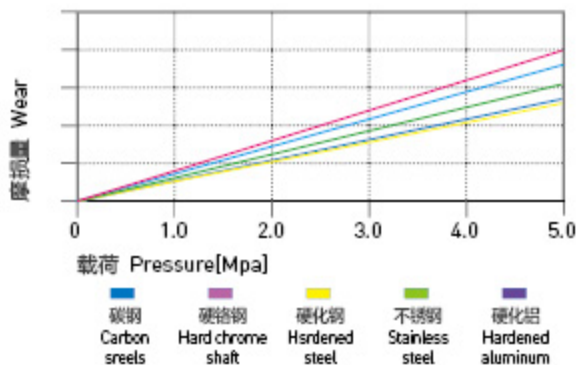
HPP34塑料轴承压装后公差Tolerances after pressfit

直径 Di. [mm]	HPP34 D11[mm]	座孔 Housing H7[mm]	轴 Shaft h9[mm]
> 0-3	+0.020~+0.080	0~+0.010	0~-0.025
> 3-6	+0.030~+0.105	0~+0.012	0~-0.030
> 6-10	+0.040~+0.130	0~+0.015	0~-0.036
> 10-18	+0.050~+0.160	0~+0.018	0~-0.043
> 18-30	+0.065~+0.195	0~+0.021	0~-0.052
> 30-50	+0.080~+0.240	0~+0.025	0~-0.062
> 50-80	+0.100~+0.290	0~+0.030	0~-0.074

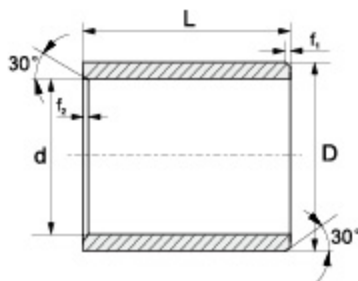
图表 HPP34-7: 在不同轴材料上旋转时的磨损量  $P=2\text{MPa}$ ,  $v=0.2\text{m/s}$   
 Graph HPP34-7: The bearing wear under rotating with different shaft materials,  $p=2\text{MPa}$ ,  $v=0.2\text{m/s}$



图表 HPP34-8: 旋转磨损随轴材料与压力变化关系  $v=0.2\text{m/s}$   
 Graph HPP34-8: The bearing wear & pressure under rotating with different shaft materials,  $v=0.2\text{m/s}$



## HPP34-工程塑料轴承 直套 Metric Cylindrical Bushings



推荐安装公差 Recommend fitting tolerance:

座孔 Housing: H7

轴 Shaft: h9

订购编码 Order P/N:

HPP34-0508-06

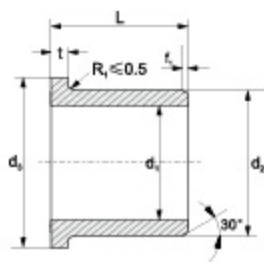
材料 Material

d	f <sub>1</sub>	f <sub>2</sub>
1-6	0.3	0.5
6-12	0.5	
12-30	0.8	
>30	1.2	

订购编码 Order PN	d [mm]	d 公差 Tolerance	D [mm]	L(h13) [mm]
HPP34-0508-06	5	+0.030/+0.105	8	6
HPP34-0609-08	6	+0.030/+0.105	9	8
HPP34-0812-08	8	+0.040/+0.130	12	8
HPP34-1014-10	10	+0.040/+0.130	14	10
HPP34-1216-10	12	+0.050/+0.160	16	10
HPP34-1521-15	15	+0.050/+0.160	21	15
HPP34-1622-15	16	+0.050/+0.160	22	15
HPP34-1824-20	18	+0.050/+0.160	24	20
HPP34-2026-20	20	+0.065/+0.195	26	20
HPP34-2228-20	22	+0.065/+0.195	28	20
HPP34-2530-25	25	+0.065/+0.195	30	25
HPP34-2532-30	25	+0.065/+0.195	32	30
HPP34-2834-30	28	+0.065/+0.195	34	30
HPP34-2836-30	28	+0.065/+0.195	36	30
HPP34-3036-30	30	+0.065/+0.195	36	30
HPP34-3038-30	30	+0.065/+0.195	38	30
HPP34-3240-30	32	+0.080/+0.240	40	30
HPP34-3543-35	35	+0.080/+0.240	43	35
HPP34-3545-40	35	+0.080/+0.240	45	40
HPP34-4048-40	40	+0.080/+0.240	48	40
HPP34-4050-40	40	+0.080/+0.240	50	40
HPP34-4553-50	45	+0.080/+0.240	53	50
HPP34-4555-40	45	+0.080/+0.240	55	40
HPP34-5060-50	50	+0.080/+0.240	60	50

\*d<sub>1</sub> 公差为压入标准 H7 座孔 (ISO3547-1) 后公差 \*Tolerance d<sub>1</sub>: after being pressed into housing H7 (ISO3547-1)

## 翻边轴套 Metric Flange Bushings



推荐安装公差 Recommend fitting tolerance:

座孔 Housing: H7

轴 Shaft: h9

订购编码 Order P/N:

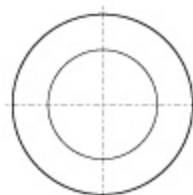
HPP34 F-0508-08

材料 Material

d	f
1-6	0.3
6-12	0.5
12-30	0.8
>30	1.2

订购编码 Order PN	$d_1$ [mm]	$d_1$ 公差 Tolerance	$d_2$ [mm]	$d_3(d13)$ [mm]	L(h13) [mm]	t(h13)[mm]
HPP34F-0508-08	5	+0.030/+0.105	8	11	8	1.5
HPP34F-0609-08	6	+0.030/+0.105	9	12	8	2
HPP34F-0812-10	8	+0.040/+0.130	12	16	10	2
HPP34F-1014-15	10	+0.040/+0.130	14	18	15	2
HPP34F-1216-15	12	+0.050/+0.160	16	20	15	2
HPP34F-1521-20	15	+0.050/+0.160	21	27	20	3
HPP34F-1622-20	16	+0.050/+0.160	22	28	20	3
HPP34F-1824-20	18	+0.050/+0.160	24	30	20	3
HPP34F-2026-25	20	+0.065/+0.195	26	32	25	3
HPP34F-2228-25	22	+0.065/+0.195	28	34	25	3
HPP34F-2530-30	25	+0.065/+0.195	30	37	30	3
HPP34F-2532-30	25	+0.065/+0.195	32	38	30	4
HPP34F-2834-30	28	+0.065/+0.195	34	40	30	3
HPP34F-2836-30	28	+0.065/+0.195	36	42	30	4
HPP34F-3036-35	30	+0.065/+0.195	36	42	35	3
HPP34F-3038-30	30	+0.065/+0.195	38	44	30	4
HPP34F-3240-35	32	+0.080/+0.240	40	48	35	4
HPP34F-3543-40	35	+0.080/+0.240	43	51	40	4
HPP34F-3545-40	35	+0.080/+0.240	45	50	40	5
HPP34F-4048-45	40	+0.080/+0.240	48	56	45	4
HPP34F-4050-40	40	+0.080/+0.240	50	56	40	5
HPP34F-4553-50	45	+0.080/+0.240	53	61	50	4
HPP34F-4555-40	45	+0.080/+0.240	55	63	40	5
HPP34F-5060-50	50	+0.080/+0.240	60	70	50	5

## 垫片 Metric Thrust Washers



订购编码 Order PN:

HPP34 W-0613-008

$d$   $D$   $T$   
 垫片 Washer  
 材料 Material

订购编码 Order PN	$d^{+0.25}$ [mm]	$D_{+0.25}$ [mm]	$T_{-0.05}$ [mm]
HPP34W-0613-008	6	13	0.8
HPP34W-0815-008	8	15	0.8
HPP34W-1020-008	10	20	0.8
HPP34W-1225-008	12	25	0.8
HPP34W-1530-008	15	30	0.8
HPP34W-2040-008	20	40	0.8
HPP34W-2245-008	22	45	0.8
HPP34W-2550-008	25	50	0.8

订购编码 Order PN	$d^{+0.25}$ [mm]	$D_{+0.25}$ [mm]	$T_{-0.05}$ [mm]
HPP34W-2855-008	28	55	0.8
HPP34W-3060-008	30	60	0.8
HPP34W-3260-008	32	60	0.8
HPP34W-3565-008	35	65	0.8
HPP34W-4070-008	40	70	0.8
HPP34W-4575-008	45	75	0.8
HPP34W-5080-008	50	80	0.8

\* 根据要求提供定位孔设计 The fixing bore design upon request