

## HPP3-工程塑料轴承 Plastic Plain Bearings

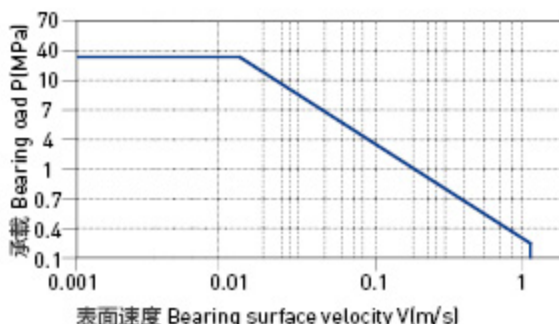
### 轴承PV值 PV Value

HPP3塑料轴承最大运行PV值为 $0.4\text{N/mm}^2 \times \text{m/s}$ ;由此决定轴承所承受的载荷与速度成反比, 详情查阅图表HPP3-1。

The max PV value of the HPP3 plastic bearing is  $0.4\text{N/mm}^2 \times \text{m/s}$  which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph HPP3-1).

图表 HPP3-1: PV 图表

Graph HPP3-1: Permissible PV value for HPP3



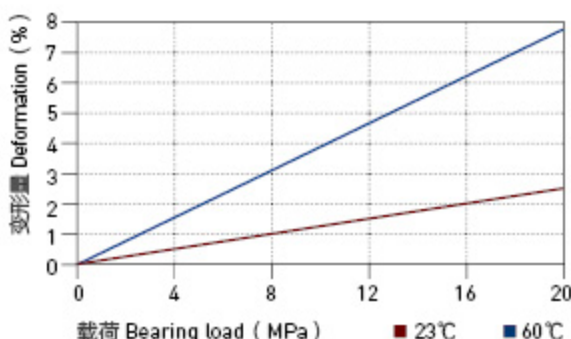
### 轴承的载荷、速度、温度 The Relation Of Load, Speed And Temperature

HPP3塑料轴承可承受最大静载荷为35Mpa, 在此载荷下轴承的最大压缩变形量参考图表HPP3-2; 轴承实际工作载荷小于35Mpa, 载荷还受到运行速度以及温度的影响, 速度越快 (Vmax: 1.5m/s)会导致摩擦温度上升, 而温度上升 (Tmax: 90℃)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HPP3-3。

HPP3 allows the max static load of 35Mpa, The max compressive deformation rate under the max load is listed in Graph HPP3-2; The actual load capacity of bearing is slightly less than 35Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.5m/s) results into higher temperature (Tmax: 90℃) which decreases the load capacity of the bearing. Please refer to the Graph HPP3-3 for such variation.

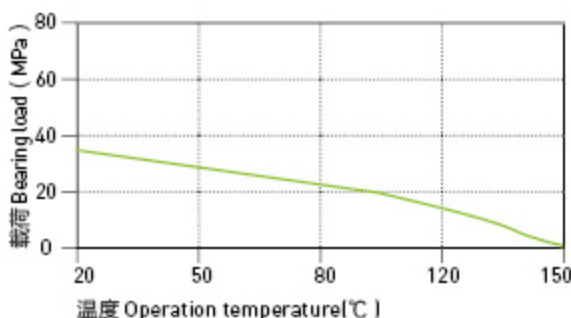
图表 HPP3-2: 载荷 - 温度 - 变形量图表

Graph HPP2-2: Load-Temperature deformation



图表 HPP3-3: 载荷 - 温度图表

Graph HPP2-3: Load-Temperature diagrams



## HPP3-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

图表HPP3-4表明HPP3轴承摩擦系数在载荷一定随着运动速度的变化率比较小；图表HPP3-5在运动速度一定摩擦系数在载荷小于10Mpa时变化率较大，而在载荷大于10Mpa是变化率也逐渐减小；图表HPP3-6表明HPP3轴材料的粗糙度越大摩擦系数也随之越大，但当粗糙度大于Ra0.5时摩擦系数也趋于平稳；此轴承适用于轴粗糙度为Ra=0.1~0.4 $\mu$ m；

HPP3 Bearing friction factor varies only little amount along with the operation speed changing (See Graph HPP3-4). When the operation speed is relatively stable, the friction factor varies a lot while the load is less than 10Mpa [see Graph HPP3-5]. At the same time, it does not vary much when the loading is greater than 10Mpa. Rough surface may result into the increasing of friction factor of the HPP3 material but when the roughness of the surface is greater than Ra0.5, the friction factor will remain relatively stable again. The recommended shaft surface roughness is Ra0.1~Ra0.4 for the HPP3 material.

| HPP3                         | 干运行<br>Dry | 油脂<br>Grease | 油<br>Oil | 水<br>Water |
|------------------------------|------------|--------------|----------|------------|
| 摩擦系数 $\mu$<br>Friction coef. | 0.05~0.15  | 0.09         | 0.04     | 0.04       |

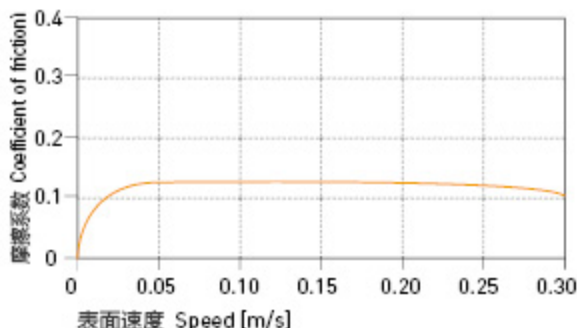
#### ■ 磨损与轴材料 Wearing and shaft material

图表HPP3-7是HPP3轴承在不同轴上运行磨损测试结果；图表HPP3-8表明当HPP3在载荷低于2Mpa下运行时适合不同的轴材料，但在硬铬轴上的摩擦磨损最小；当载荷继续增大时，此轴承在不锈钢轴的耐磨性能尤为特出。图表HPP3-8表明HPP3轴承比较适合用于旋转运动，但无论是在旋转运动还是摆动运动此轴承在硬铬轴上的运用效果是最好的。

Test of the bearing against various shaft materials shows that the material HPP3 features the best performance where the shaft material is hard chrome steel with loading less than 2Mpa. (See Graph HPP3-7). Therefore, the higher the load is increased, the wear-resistance of the bearing will be better against the stainless steel shaft. Refer to Graph HPP3-8, the material HPP3 is suitable for rotation operation. Either to be used under rotation operation or the oscillation operation, it is the best suitable material for the application against hard chrome steel shaft.

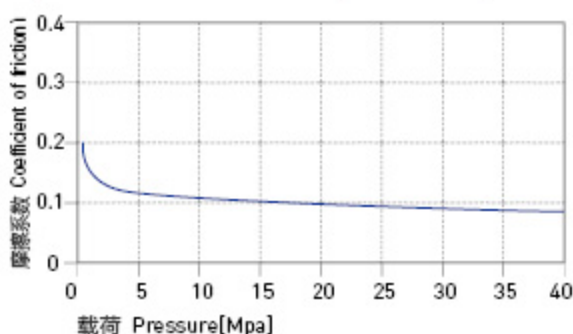
图表 HPP3-4: 摩擦系数与速度变化关系图表 P=2Mpa

Graph HPP3-4: Coefficient of friction & the speed of bearing, P=2Mpa



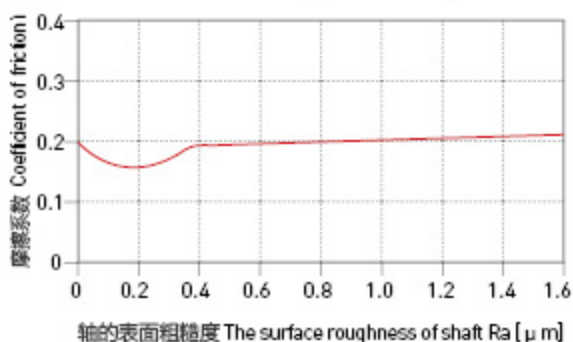
图表 HPP3-5: 摩擦系数与载荷变化关系图表 v=0.2m/s

Graph HPP3-5: Coefficient of friction & the pressure of bearing, v=0.2m/s



图表 HPP3-6: 摩擦系数与轴表面粗糙度关系图表

Graph HPP3-6: Coefficient of friction & the surface roughness of shaft



## HPP3-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

#### 化学抗性 Chemical Resistance

HPP3塑料轴承能抵抗弱碱、弱酸以及各类润滑油的腐蚀。

HPP3 is good at chemical resistance against mild base, weak acidic medium and various kinds of lubricants.

#### 吸水性 Water Absorbability

在标准大气压中, HPP3塑料轴承的吸水率为0.2%, 浸泡水中最大平衡吸水率为1.2%; 由于其具有低吸水率的特性, 故此轴承可以用于一般潮湿环境中。

The water absorb rate of HPP3 is 0.2% under the atmospheric pressure while it is 1.2% when the material is immersed into water. With its low water absorbability, the material is suitable for humid environment applications.

#### 抗UV性能 UV Resistance

HPP3长久暴露在紫外线下颜色基本不会改变。材料的硬度, 抗压强度和耐磨性都不会改变。

HPP3 can maintain its color unchanged when it is exposed into the UV ray. The hardness, Compressive strength and wear resistance of the material is also stable

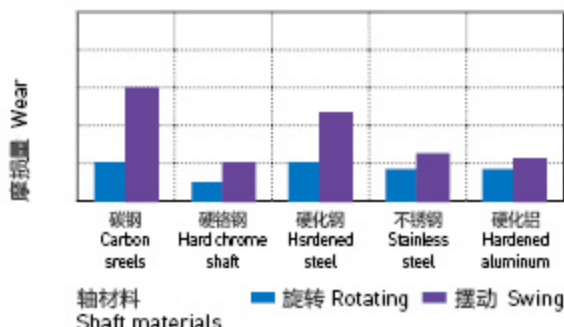
#### 安装公差 Installation Tolerances

HPP3塑料轴承压装后公差Tolerances after pressfit

| 直径 Di.<br>[ mm ] | HPP3<br>E10 [ mm ] | 座孔 Housing<br>H7 [ mm ] | 轴 Shaft<br>h9 [ mm ] |
|------------------|--------------------|-------------------------|----------------------|
| > 0~3            | +0.014~+0.054      | 0~+0.010                | 0~-0.025             |
| > 3~6            | +0.020~+0.068      | 0~+0.012                | 0~-0.030             |
| > 6~10           | +0.025~+0.083      | 0~+0.015                | 0~-0.036             |
| > 10~18          | +0.032~+0.102      | 0~+0.018                | 0~-0.043             |
| > 18~30          | +0.040~+0.124      | 0~+0.021                | 0~-0.052             |
| > 30~50          | +0.050~+0.150      | 0~+0.025                | 0~-0.062             |
| > 50~80          | +0.060~+0.180      | 0~+0.030                | 0~-0.074             |
| > 80~120         | +0.072~+0.212      | 0~+0.035                | 0~-0.087             |
| > 120~180        | +0.085~+0.245      | 0~+0.040                | 0~-0.100             |

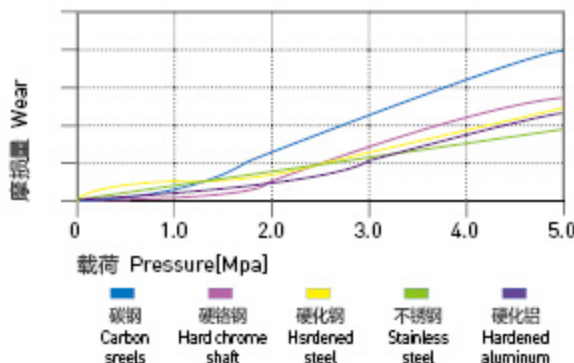
图表 HPP3-7: 在不同轴材料上旋转时的磨损量  $P=2\text{MPa}$ ,  $v=0.2\text{m/s}$

Graph HPP3-7: The bearing wear under rotating with different shaft materials,  $p=2\text{MPa}$ ,  $v=0.2\text{m/s}$



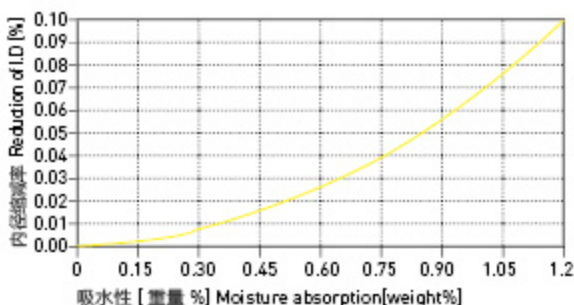
图表 HPP3-8: 旋转磨损随轴材料与压力变化关系  $v=0.2\text{m/s}$

Graph HPP3-8: The bearing wear & pressure under rotating with different shaft materials,  $v=0.2\text{m/s}$

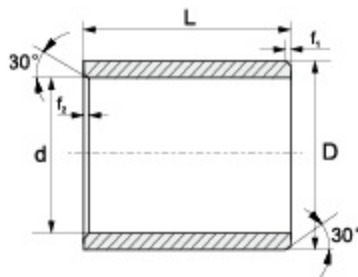


图表 HPP3-9: 吸水性的影响

Graph HPP3-9: Effect of moisture absorption on HPP3 bearings



## HPP3标准规格Standard 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:

HPP3-0304-03

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<br>Order PN | d<br>[mm] | d- 公差 After fitting<br>[mm] | D<br>[mm] | L(h13)<br>[mm] |
|------------------|-----------|-----------------------------|-----------|----------------|
| HPP3-0304-03     | 3         | +0.014/+0.054               | 4.5       | 3              |
| HPP3-0304-05     | 3         | +0.014/+0.054               | 4.5       | 5              |
| HPP3-0304-06     | 3         | +0.014/+0.054               | 4.5       | 6              |
| HPP3-0305-05     | 3         | +0.014/+0.054               | 5         | 5              |
| HPP3-0405-04     | 4         | +0.02/+0.068                | 5.5       | 4              |
| HPP3-0405-06     | 4         | +0.02/+0.068                | 5.5       | 6              |
| HPP3-0405-08     | 4         | +0.02/+0.068                | 5.5       | 8              |
| HPP3-0406-06     | 4         | +0.02/+0.068                | 6         | 6              |
| HPP3-0507-05     | 5         | +0.02/+0.068                | 7         | 5              |
| HPP3-0507-08     | 5         | +0.02/+0.068                | 7         | 8              |
| HPP3-0507-10     | 5         | +0.02/+0.068                | 7         | 10             |
| HPP3-0507-12     | 5         | +0.02/+0.068                | 7         | 12             |
| HPP3-0507-18     | 5         | +0.02/+0.068                | 7         | 18             |
| HPP3-0608-04     | 6         | +0.02/+0.068                | 8         | 4              |
| HPP3-0608-05     | 6         | +0.02/+0.068                | 8         | 5              |
| HPP3-0608-06     | 6         | +0.02/+0.068                | 8         | 6              |
| HPP3-0608-08     | 6         | +0.02/+0.068                | 8         | 8              |
| HPP3-0608-10     | 6         | +0.02/+0.068                | 8         | 10             |
| HPP3-0608-11     | 6         | +0.02/+0.068                | 8         | 11             |
| HPP3-0810-05     | 8         | +0.025/+0.083               | 10        | 5              |
| HPP3-0810-06     | 8         | +0.025/+0.083               | 10        | 6              |
| HPP3-0810-08     | 8         | +0.025/+0.083               | 10        | 8              |
| HPP3-0810-10     | 8         | +0.025/+0.083               | 10        | 10             |
| HPP3-0810-11     | 8         | +0.025/+0.083               | 10        | 11             |
| HPP3-0810-12     | 8         | +0.025/+0.083               | 10        | 12             |
| HPP3-0810-15     | 8         | +0.025/+0.083               | 10        | 15             |
| HPP3-0811-10     | 8         | +0.025/+0.083               | 11        | 10             |
| HPP3-0812-10     | 8         | +0.025/+0.083               | 12        | 10             |
| HPP3-0911-06     | 9         | +0.025/+0.083               | 11        | 6              |
| HPP3-1012-04     | 10        | +0.025/+0.083               | 12        | 4              |
| HPP3-1012-05     | 10        | +0.025/+0.083               | 12        | 5              |
| HPP3-1012-06     | 10        | +0.025/+0.083               | 12        | 6              |
| HPP3-1012-08     | 10        | +0.025/+0.083               | 12        | 8              |
| HPP3-1012-10     | 10        | +0.025/+0.083               | 12        | 10             |
| HPP3-1012-12     | 10        | +0.025/+0.083               | 12        | 12             |

| 订购编码<br>Order PN | d<br>[mm] | d- 公差 After fitting<br>[mm] | D<br>[mm] | L(h13)<br>[mm] |
|------------------|-----------|-----------------------------|-----------|----------------|
| HPP3-1012-15     | 10        | +0.025/+0.083               | 12        | 15             |
| HPP3-1014-10     | 10        | +0.025/+0.083               | 14        | 10             |
| HPP3-1014-16     | 10        | +0.025/+0.083               | 14        | 16             |
| HPP3-1012-18     | 10        | +0.025/+0.083               | 12        | 18             |
| HPP3-1012-20     | 10        | +0.025/+0.083               | 12        | 20             |
| HPP3-1214-06     | 12        | +0.032/+0.102               | 14        | 6              |
| HPP3-1214-08     | 12        | +0.032/+0.102               | 14        | 8              |
| HPP3-1214-10     | 12        | +0.032/+0.102               | 14        | 10             |
| HPP3-1214-12     | 12        | +0.032/+0.102               | 14        | 12             |
| HPP3-1214-15     | 12        | +0.032/+0.102               | 14        | 15             |
| HPP3-1214-20     | 12        | +0.032/+0.102               | 14        | 20             |
| HPP3-1214-25     | 12        | +0.032/+0.102               | 14        | 25             |
| HPP3-1214-30     | 12        | +0.032/+0.102               | 14        | 30             |
| HPP3-1215-20     | 12        | +0.032/+0.102               | 15        | 20             |
| HPP3-1216-12     | 12        | +0.032/+0.102               | 16        | 12             |
| HPP3-1315-07     | 13        | +0.032/+0.102               | 15        | 7              |
| HPP3-1315-10     | 13        | +0.032/+0.102               | 15        | 10             |
| HPP3-1416-08     | 14        | +0.032/+0.102               | 16        | 8              |
| HPP3-1416-10     | 14        | +0.032/+0.102               | 16        | 10             |
| HPP3-1416-12     | 14        | +0.032/+0.102               | 16        | 12             |
| HPP3-1416-15     | 14        | +0.032/+0.102               | 16        | 15             |
| HPP3-1416-20     | 14        | +0.032/+0.102               | 16        | 20             |
| HPP3-1416-25     | 14        | +0.032/+0.102               | 16        | 25             |
| HPP3-1517-10     | 15        | +0.032/+0.102               | 17        | 10             |
| HPP3-1517-12     | 15        | +0.032/+0.102               | 17        | 12             |
| HPP3-1517-15     | 15        | +0.032/+0.102               | 17        | 15             |
| HPP3-1517-17     | 15        | +0.032/+0.102               | 17        | 17             |
| HPP3-1517-20     | 15        | +0.032/+0.102               | 17        | 20             |
| HPP3-1517-25     | 15        | +0.032/+0.102               | 17        | 25             |
| HPP3-1618-10     | 16        | +0.032/+0.102               | 18        | 10             |
| HPP3-1618-12     | 16        | +0.032/+0.102               | 18        | 12             |
| HPP3-1618-15     | 16        | +0.032/+0.102               | 18        | 15             |
| HPP3-1618-20     | 16        | +0.032/+0.102               | 18        | 20             |
| HPP3-1618-25     | 16        | +0.032/+0.102               | 18        | 25             |
| HPP3-1619-5.55   | 16        | +0.015/+0.055               | 19        | 5.5            |

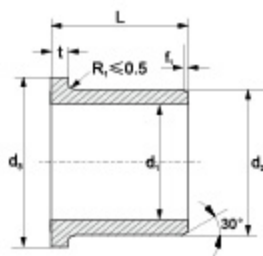
| 订购编码<br>Order PN | d<br>[mm] | d- 公差 After fitting<br>[mm] | D<br>[mm] | L(h13)<br>[mm] |
|------------------|-----------|-----------------------------|-----------|----------------|
| HPP3-1620-16     | 16        | +0.032/+0.102               | 20        | 16             |
| HPP3-1820-15     | 18        | +0.032/+0.102               | 20        | 15             |
| HPP3-1820-20     | 18        | +0.032/+0.102               | 20        | 20             |
| HPP3-1820-25     | 18        | +0.032/+0.102               | 20        | 25             |
| HPP3-2022-12     | 20        | +0.04/+0.124                | 22        | 12             |
| HPP3-2022-15     | 20        | +0.04/+0.124                | 22        | 15             |
| HPP3-2022-28     | 20        | +0.04/+0.124                | 22        | 28             |
| HPP3-2023-10     | 20        | +0.04/+0.124                | 23        | 10             |
| HPP3-2023-15     | 20        | +0.04/+0.124                | 23        | 15             |
| HPP3-2023-20     | 20        | +0.04/+0.124                | 23        | 20             |
| HPP3-2023-23     | 20        | +0.04/+0.124                | 23        | 23             |
| HPP3-2023-25     | 20        | +0.04/+0.124                | 23        | 25             |
| HPP3-2023-30     | 20        | +0.04/+0.124                | 23        | 30             |
| HPP3-2025-15     | 20        | +0.04/+0.124                | 25        | 15             |
| HPP3-2225-15     | 22        | +0.04/+0.124                | 25        | 15             |
| HPP3-2225-20     | 22        | +0.04/+0.124                | 25        | 20             |
| HPP3-2225-25     | 22        | +0.04/+0.124                | 25        | 25             |
| HPP3-2225-30     | 22        | +0.04/+0.124                | 25        | 30             |
| HPP3-2528-10     | 25        | +0.04/+0.124                | 28        | 10             |
| HPP3-2528-12     | 25        | +0.04/+0.124                | 28        | 12             |
| HPP3-2528-15     | 25        | +0.04/+0.124                | 28        | 15             |
| HPP3-2528-20     | 25        | +0.04/+0.124                | 28        | 20             |
| HPP3-2528-25     | 25        | +0.04/+0.124                | 28        | 25             |
| HPP3-2528-30     | 25        | +0.04/+0.124                | 28        | 30             |
| HPP3-2529-25     | 25        | +0.04/+0.124                | 29        | 25             |
| HPP3-2530-25     | 25        | +0.02/+0.104                | 30        | 25             |
| HPP3-2832-20     | 28        | +0.04/+0.124                | 32        | 20             |
| HPP3-2832-25     | 28        | +0.04/+0.124                | 32        | 25             |
| HPP3-2832-30     | 28        | +0.04/+0.124                | 32        | 30             |
| HPP3-3034-20     | 30        | +0.04/+0.124                | 34        | 20             |
| HPP3-3034-25     | 30        | +0.04/+0.124                | 34        | 25             |
| HPP3-3034-30     | 30        | +0.04/+0.124                | 34        | 30             |
| HPP3-3034-40     | 30        | +0.04/+0.124                | 34        | 40             |

| 订购编码<br>Order PN | d<br>[mm] | d- 公差 After fitting<br>[mm] | D<br>[mm] | L(h13)<br>[mm] |
|------------------|-----------|-----------------------------|-----------|----------------|
| HPP3-3236-20     | 32        | +0.05/+0.15                 | 36        | 20             |
| HPP3-3236-23     | 32        | +0.05/+0.15                 | 36        | 23             |
| HPP3-3236-25     | 32        | +0.05/+0.15                 | 36        | 25             |
| HPP3-3236-30     | 32        | +0.05/+0.15                 | 36        | 30             |
| HPP3-3236-40     | 32        | +0.05/+0.15                 | 36        | 40             |
| HPP3-3539-15     | 35        | +0.05/+0.15                 | 39        | 15             |
| HPP3-3539-20     | 35        | +0.05/+0.15                 | 39        | 20             |
| HPP3-3539-25     | 35        | +0.05/+0.15                 | 39        | 25             |
| HPP3-3539-30     | 35        | +0.05/+0.15                 | 39        | 30             |
| HPP3-3539-40     | 35        | +0.05/+0.15                 | 39        | 40             |
| HPP3-3539-50     | 35        | +0.05/+0.15                 | 39        | 50             |
| HPP3-4044-20     | 40        | +0.05/+0.15                 | 44        | 20             |
| HPP3-4044-30     | 40        | +0.05/+0.15                 | 44        | 30             |
| HPP3-4044-40     | 40        | +0.05/+0.15                 | 44        | 40             |
| HPP3-4044-50     | 40        | +0.05/+0.15                 | 44        | 50             |
| HPP3-4550-30     | 45        | +0.05/+0.15                 | 50        | 30             |
| HPP3-4550-40     | 45        | +0.05/+0.15                 | 50        | 40             |
| HPP3-4550-50     | 45        | +0.05/+0.15                 | 50        | 50             |
| HPP3-5055-10     | 50        | +0.05/+0.15                 | 55        | 10             |
| HPP3-5055-20     | 50        | +0.05/+0.15                 | 55        | 20             |
| HPP3-5055-30     | 50        | +0.05/+0.15                 | 55        | 30             |
| HPP3-5055-40     | 50        | +0.05/+0.15                 | 55        | 40             |
| HPP3-5055-50     | 50        | +0.05/+0.15                 | 55        | 50             |
| HPP3-5456-30     | 54        | +0.060/+0.180               | 56        | 30             |
| HPP3-6065-50     | 60        | +0.060/+0.180               | 65        | 50             |
| HPP3-7075-50     | 70        | +0.060/+0.180               | 75        | 50             |
| HPP3-8085-40     | 80        | +0.060/+0.180               | 85        | 40             |
| HPP3-8590-40     | 85        | +0.072/+0.212               | 90        | 40             |
| HPP3-125130-60S  | 125       | +0.043/+0.143               | 130       | 60             |
| HPP3-150155-60S  | 150       | +0.043/+0.143               | 155       | 60             |

\*d 公差为压入标准 H7 座孔 (ISO3547-1) 后公差

\*Tolerance d: 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:

HPP3 F-0304-03

 翻边轴套 Flange bushes  
 材料 Material

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

| 订购编号<br>Order PN  | d <sub>1</sub><br>[mm] | d <sub>1</sub> -公差<br>After fitting<br>[mm] | d <sub>2</sub><br>[mm] | d <sub>2</sub> [d13]<br>[mm] | L[h13]<br>[mm] | t <sub>0.12</sub><br>[mm] |
|-------------------|------------------------|---------------------------------------------|------------------------|------------------------------|----------------|---------------------------|
| HPP3F-0304-03     | 3                      | +0.014/+0.054                               | 4.5                    | 7.5                          | 3              | 0.75                      |
| HPP3F-0304-05     | 3                      | +0.014/+0.054                               | 4.5                    | 7.5                          | 5              | 0.75                      |
| HPP3F-0405-03     | 4                      | +0.02/+0.068                                | 5.5                    | 9.5                          | 3              | 0.75                      |
| HPP3F-0405-06     | 4                      | +0.02/+0.068                                | 5.5                    | 9.5                          | 6              | 0.75                      |
| HPP3F-0507-03     | 5                      | +0.02/+0.068                                | 7                      | 11                           | 3              | 1                         |
| HPP3F-0507-04     | 5                      | +0.02/+0.068                                | 7                      | 11                           | 4              | 1                         |
| HPP3F-0507-05     | 5                      | +0.02/+0.068                                | 7                      | 11                           | 5              | 1                         |
| HPP3F-0608-04     | 6                      | +0.02/+0.068                                | 8                      | 12                           | 4              | 1                         |
| HPP3F-0608-05     | 6                      | +0.02/+0.068                                | 8                      | 12                           | 5              | 1                         |
| HPP3F-0608-06     | 6                      | +0.02/+0.068                                | 8                      | 12                           | 6              | 1                         |
| HPP3F-0608-08     | 6                      | +0.02/+0.068                                | 8                      | 12                           | 8              | 1                         |
| HPP3F-0608-10     | 6                      | +0.02/+0.068                                | 8                      | 12                           | 10             | 1                         |
| HPP3F-0810-05     | 8                      | +0.025/+0.083                               | 10                     | 15                           | 5              | 1                         |
| HPP3F-0810-06     | 8                      | +0.025/+0.083                               | 10                     | 15                           | 6              | 1                         |
| HPP3F-0810-07     | 8                      | +0.025/+0.083                               | 10                     | 15                           | 7              | 1                         |
| HPP3F-0810-09     | 8                      | +0.025/+0.083                               | 10                     | 15                           | 9              | 1                         |
| HPP3F-0810-10     | 8                      | +0.025/+0.083                               | 10                     | 15                           | 10             | 1                         |
| HPP3F-081014-12   | 8                      | +0.025/+0.083                               | 10                     | 14                           | 12             | 1                         |
| HPP3F-081014-12F2 | 8                      | +0.025/+0.083                               | 10                     | 14                           | 12             | 2                         |
| HPP3F-0810-12     | 8                      | +0.025/+0.083                               | 10                     | 15                           | 12             | 1                         |
| HPP3F-081018-13   | 8                      | +0.025/+0.083                               | 10                     | 18                           | 13             | 1                         |
| HPP3F-081017-15   | 8                      | +0.025/+0.083                               | 10                     | 17                           | 15             | 1                         |
| HPP3F-081216-10   | 8                      | +0.013/+0.071                               | 12                     | 16                           | 10             | 2                         |
| HPP3F-0912-10     | 9                      | +0.025/+0.083                               | 12                     | 18                           | 10             | 2                         |
| HPP3F-1012-05     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 5              | 1                         |
| HPP3F-1012-06     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 6              | 1                         |
| HPP3F-1012-07     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 7              | 1                         |
| HPP3F-1012-08     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 8              | 1                         |
| HPP3F-1012-09     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 9              | 1                         |
| HPP3F-1012-10     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 10             | 1                         |
| HPP3F-1012-12     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 12             | 1                         |
| HPP3F-1012-15     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 15             | 1                         |
| HPP3F-1012-17     | 10                     | +0.025/+0.083                               | 12                     | 18                           | 17             | 1                         |
| HPP3F-101216-12   | 10                     | +0.013/+0.071                               | 12                     | 16                           | 12             | 2                         |
| HPP3F-101418-10   | 10                     | +0.013/+0.071                               | 14                     | 18                           | 10             | 2                         |
| HPP3F-1214-04     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 4              | 1                         |
| HPP3F-1214-05     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 5              | 1                         |
| HPP3F-1214-06     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 6              | 1                         |
| HPP3F-1214-07     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 7              | 1                         |
| HPP3F-1214-09     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 9              | 1                         |
| HPP3F-1214-10     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 10             | 1                         |
| HPP3F-1214-12     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 12             | 1                         |
| HPP3F-1214-13     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 13             | 1                         |
| HPP3F-1214-15     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 15             | 1                         |
| HPP3F-1214-17     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 17             | 1                         |
| HPP3F-1214-18     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 18             | 1                         |
| HPP3F-1214-20     | 12                     | +0.032/+0.102                               | 14                     | 20                           | 20             | 1                         |
| HPP3F121417-04    | 12                     | +0.032/+0.102                               | 14                     | 17                           | 4              | 1                         |
| HPP3F-121417-05   | 12                     | +0.032/+0.102                               | 14                     | 17                           | 5              | 1                         |
| HPP3F-121418-12F2 | 12                     | +0.016/+0.086                               | 14                     | 18                           | 12             | 2                         |
| HPP3F-121418-25   | 12                     | +0.032/+0.102                               | 14                     | 18                           | 25             | 1                         |
| HPP3F-121418-40F2 | 12                     | +0.016/+0.086                               | 14                     | 18                           | 40             | 2                         |
| HPP3F-121620-10   | 12                     | +0.016/+0.086                               | 16                     | 20                           | 10             | 2                         |
| HPP3F-121620-12   | 12                     | +0.016/+0.086                               | 16                     | 20                           | 12             | 2                         |

| 订购编号<br>Order PN | d <sub>1</sub><br>[mm] | d <sub>1</sub> -公差<br>After fitting<br>[mm] | d <sub>2</sub><br>[mm] | d <sub>2</sub> [d13]<br>[mm] | L[h13]<br>[mm] | t <sub>0.12</sub><br>[mm] |
|------------------|------------------------|---------------------------------------------|------------------------|------------------------------|----------------|---------------------------|
| HPP3F-131519-12  | 13                     | +0.032/+0.102                               | 15                     | 19                           | 12             | 1                         |
| HPP3F-1416-052   | 14                     | +0.032/+0.102                               | 16                     | 22                           | 5.2            | 1                         |
| HPP3F-1416-08    | 14                     | +0.032/+0.102                               | 16                     | 22                           | 8              | 1                         |
| HPP3F-1416-10    | 14                     | +0.032/+0.102                               | 16                     | 22                           | 10             | 1                         |
| HPP3F-1416-12    | 14                     | +0.032/+0.102                               | 16                     | 22                           | 12             | 1                         |
| HPP3F-1416-17    | 14                     | +0.032/+0.102                               | 16                     | 22                           | 17             | 1                         |
| HPP3F-141620-06  | 14                     | +0.016/+0.086                               | 16                     | 20                           | 6              | 2                         |
| HPP3F-141620-15  | 14                     | +0.016/+0.086                               | 16                     | 20                           | 15             | 2                         |
| HPP3F-141822-20  | 14                     | +0.032/+0.102                               | 18                     | 22                           | 20             | 2                         |
| HPP3F-151720-05  | 15                     | +0.032/+0.102                               | 17                     | 20                           | 5              | 1                         |
| HPP3F-1517-09    | 15                     | +0.032/+0.102                               | 17                     | 23                           | 9              | 1                         |
| HPP3F-1517-12    | 15                     | +0.032/+0.102                               | 17                     | 23                           | 12             | 1                         |
| HPP3F-151720-12  | 15                     | +0.032/+0.102                               | 17                     | 20                           | 12             | 1                         |
| HPP3F-1517-15    | 15                     | +0.032/+0.102                               | 17                     | 23                           | 15             | 1                         |
| HPP3F-1517-17    | 15                     | +0.032/+0.102                               | 17                     | 23                           | 17             | 1                         |
| HPP3F-1517-20    | 15                     | +0.032/+0.102                               | 17                     | 23                           | 20             | 1                         |
| HPP3F-1518-12    | 15                     | +0.032/+0.102                               | 18                     | 23                           | 12             | 1                         |
| HPP3F-1517-25    | 15                     | +0.032/+0.102                               | 17                     | 23                           | 25             | 1                         |
| HPP3F-1618-12    | 16                     | +0.032/+0.102                               | 18                     | 24                           | 12             | 1                         |
| HPP3F-1618-17    | 16                     | +0.032/+0.102                               | 18                     | 24                           | 17             | 1                         |
| HPP3F-161822-22  | 16                     | +0.016/+0.086                               | 18                     | 22                           | 22             | 2                         |
| HPP3F-162024-16  | 16                     | +0.016/+0.086                               | 20                     | 24                           | 16             | 2                         |
| HPP3F-162024-22  | 16                     | +0.016/+0.086                               | 20                     | 24                           | 22             | 2                         |
| HPP3F-1820-12    | 18                     | +0.032/+0.102                               | 20                     | 26                           | 12             | 1                         |
| HPP3F-1820-17    | 18                     | +0.032/+0.102                               | 20                     | 26                           | 17             | 1                         |
| HPP3F-1820-20    | 18                     | +0.032/+0.102                               | 20                     | 26                           | 20             | 1                         |
| HPP3F-182024-22  | 18                     | +0.016/+0.086                               | 20                     | 24                           | 22             | 2                         |
| HPP3F-2022-15    | 20                     | +0.04/+0.124                                | 22                     | 25                           | 15             | 1.5                       |
| HPP3F-2023-11.5  | 20                     | +0.04/+0.124                                | 23                     | 30                           | 11.5           | 1.5                       |
| HPP3F-2023-16.5  | 20                     | +0.04/+0.124                                | 23                     | 30                           | 16.5           | 1.5                       |
| HPP3F-2023-21.5  | 20                     | +0.04/+0.124                                | 23                     | 30                           | 21.5           | 1.5                       |
| HPP3F-2023-25    | 20                     | +0.04/+0.124                                | 23                     | 30                           | 25             | 1.5                       |
| HPP3F-202330-15  | 20                     | +0.02/+0.104                                | 23                     | 30                           | 15             | 2                         |
| HPP3F-202330-22  | 20                     | +0.02/+0.104                                | 23                     | 30                           | 22             | 2                         |
| HPP3F-202430-20  | 20                     | +0.02/+0.104                                | 24                     | 30                           | 20             | 2                         |
| HPP3F-202530-15  | 20                     | +0.02/+0.104                                | 25                     | 30                           | 15             | 2                         |
| HPP3F-202732-20  | 20                     | +0.02/+0.104                                | 27                     | 32                           | 20             | 2                         |
| HPP3F-2225-11.5  | 22                     | +0.04/+0.124                                | 25                     | 33                           | 11.5           | 1.5                       |
| HPP3F-2528-11.5  | 25                     | +0.04/+0.124                                | 28                     | 35                           | 11.5           | 1.5                       |
| HPP3F-2528-16.5  | 25                     | +0.04/+0.124                                | 28                     | 35                           | 16.5           | 1.5                       |
| HPP3F-2528-21.5  | 25                     | +0.04/+0.124                                | 28                     | 35                           | 21.5           | 1.5                       |
| HPP3F-252835-22  | 25                     | +0.02/+0.104                                | 28                     | 35                           | 22             | 2                         |
| HPP3F-252835-32  | 25                     | +0.02/+0.104                                | 28                     | 35                           | 32             | 2                         |
| HPP3F-253035-20  | 25                     | +0.02/+0.104                                | 30                     | 35                           | 20             | 2.5                       |
| HPP3F-253035-25  | 25                     | +0.02/+0.104                                | 30                     | 35                           | 25             | 2.5                       |
| HPP3F-303335-04  | 30                     | +0.02/+0.104                                | 33                     | 35                           | 4              | 1                         |
| HPP3F-3034-09    | 30                     | +0.04/+0.124                                | 34                     | 42                           | 9              | 2                         |
| HPP3F-3034-16    | 30                     | +0.04/+0.124                                | 34                     | 42                           | 16             | 2                         |
| HPP3F-3034-26    | 30                     | +0.04/+0.124                                | 34                     | 42                           | 26             | 2                         |
| HPP3F-3034-32    | 30                     | +0.04/+0.124                                | 34                     | 42                           | 32             | 2                         |
| HPP3F-3034-37    | 30                     | +0.04/+0.124                                | 34                     | 42                           | 37             | 2                         |
| HPP3F-303445-18  | 30                     | +0.02/+0.104                                | 34                     | 45                           | 18             | 2                         |
| HPP3F-303445-22  | 30                     | +0.02/+0.104                                | 34                     | 45                           | 22             | 2                         |
| HPP3F-303445-32  | 30                     | +0.04/+0.124                                | 34                     | 45                           | 32             | 2                         |

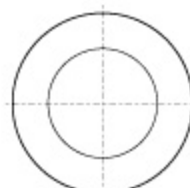
| 订购编码<br>Order PN | d <sub>1</sub><br>[mm] | d <sub>1</sub> -公差<br>After fitting<br>[mm] | d <sub>2</sub><br>[mm] | d <sub>2</sub> [d13]<br>[mm] | L[h13]<br>[mm] | t <sub>0.15</sub><br>[mm] |
|------------------|------------------------|---------------------------------------------|------------------------|------------------------------|----------------|---------------------------|
| HPP3F-3236-16    | 32                     | +0.05/+0.15                                 | 36                     | 40                           | 16             | 2                         |
| HPP3F-3236-26    | 32                     | +0.05/+0.15                                 | 36                     | 40                           | 26             | 2                         |
| HPP3F-3539-16    | 35                     | +0.05/+0.15                                 | 39                     | 47                           | 16             | 2                         |
| HPP3F-3539-26    | 35                     | +0.05/+0.15                                 | 39                     | 47                           | 26             | 2                         |
| HPP3F-353950-22  | 35                     | +0.025/+0.125                               | 39                     | 50                           | 22             | 2                         |
| HPP3F-4044-30    | 40                     | +0.05/+0.15                                 | 44                     | 52                           | 30             | 2                         |
| HPP3F-4044-40    | 40                     | +0.05/+0.15                                 | 44                     | 52                           | 40             | 2                         |
| HPP3F-404455-17  | 40                     | +0.025/+0.125                               | 44                     | 55                           | 17             | 2                         |
| HPP3F-4550-25    | 45                     | +0.05/+0.15                                 | 50                     | 58                           | 25             | 2                         |
| HPP3F-4550-45    | 45                     | +0.05/+0.15                                 | 50                     | 58                           | 45             | 2                         |
| HPP3F-4550-50    | 45                     | +0.05/+0.15                                 | 50                     | 58                           | 50             | 2                         |
| HPP3F-455060-45  | 45                     | +0.025/+0.125                               | 50                     | 60                           | 45             | 2.5                       |
| HPP3F-5055-20    | 50                     | +0.05/+0.15                                 | 55                     | 63                           | 20             | 2                         |
| HPP3F-5055-30    | 50                     | +0.05/+0.15                                 | 55                     | 63                           | 30             | 2                         |

| 订购编码<br>Order PN   | d <sub>1</sub><br>[mm] | d <sub>1</sub> -公差<br>After fitting<br>[mm] | d <sub>2</sub><br>[mm] | d <sub>2</sub> [d13]<br>[mm] | L[h13]<br>[mm] | t <sub>0.15</sub><br>[mm] |
|--------------------|------------------------|---------------------------------------------|------------------------|------------------------------|----------------|---------------------------|
| HPP3F-5055-40      | 50                     | +0.05/+0.15                                 | 55                     | 63                           | 40             | 2                         |
| HPP3F-5055-50      | 50                     | +0.05/+0.15                                 | 55                     | 63                           | 50             | 2                         |
| HPP3F-505563-50    | 50                     | +0.025/+0.125                               | 55                     | 63                           | 50             | 2                         |
| HPP3F-505565-20.5  | 50                     | +0.025/+0.125                               | 55                     | 65                           | 20.5           | 2.5                       |
| HPP3F-6065-60      | 60                     | +0.06/+0.18                                 | 65                     | 73                           | 60             | 2                         |
| HPP3F-657080-60    | 65                     | +0.03/+0.15                                 | 70                     | 80                           | 60             | 2.5                       |
| HPP3F-7075-50      | 70                     | +0.060/+0.180                               | 75                     | 83                           | 50             | 2                         |
| HPP3F-758090-25    | 75                     | +0.030/+0.150                               | 80                     | 90                           | 25             | 2.5                       |
| HPP3F-758090-40    | 75                     | +0.030/+0.150                               | 80                     | 90                           | 40             | 2.5                       |
| HPP3F-9095110-50   | 90                     | +0.036/+0.176                               | 95                     | 110                          | 50             | 2.5                       |
| HPP3F-120125140-50 | 120                    | +0.072/+0.212                               | 125                    | 140                          | 50             | 2.5                       |

\*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)

## 垫片 Metric Thrust Washers



订购编码 Order PN:

HPP3 W-0509-006

d D T  
垫片 Washer  
材料 Material

| 订购编码<br>Order PN | d <sup>+0.25</sup><br>[mm] | D <sub>-0.25</sub><br>[mm] | T <sub>-0.05</sub><br>[mm] |
|------------------|----------------------------|----------------------------|----------------------------|
| HPP3W-0509-006   | 5                          | 9                          | 0.6                        |
| HPP3W-0615-015   | 6                          | 15                         | 1.5                        |
| HPP3W-0620-015   | 6                          | 20                         | 1.5                        |
| HPP3W-0815-005   | 8                          | 15                         | 0.5                        |
| HPP3W-0815-015   | 8                          | 15                         | 1.5                        |
| HPP3W-0818-010   | 8                          | 18                         | 1.0                        |
| HPP3W-0818-015   | 8                          | 18                         | 1.5                        |
| HPP3W-1018-010   | 10                         | 18                         | 1.0                        |
| HPP3W-1018-015   | 10                         | 18                         | 1.5                        |
| HPP3W-1018-020   | 10                         | 18                         | 2.0                        |
| HPP3W-1024-015   | 10                         | 24                         | 1.5                        |
| HPP3W-1224-015   | 12                         | 24                         | 1.5                        |
| HPP3W-1226-015   | 12                         | 26                         | 1.5                        |
| HPP3W-1426-015   | 14                         | 26                         | 1.5                        |
| HPP3W-1430-015   | 14                         | 30                         | 1.5                        |
| HPP3W-1524-015   | 15                         | 24                         | 1.5                        |
| HPP3W-1630-015   | 16                         | 30                         | 1.5                        |
| HPP3W-1632-015   | 16                         | 32                         | 1.5                        |
| HPP3W-1832-015   | 18                         | 32                         | 1.5                        |
| HPP3W-1836-015   | 18                         | 36                         | 1.5                        |

| 订购编码<br>Order PN | d <sup>+0.25</sup><br>[mm] | D <sub>-0.25</sub><br>[mm] | T <sub>-0.05</sub><br>[mm] |
|------------------|----------------------------|----------------------------|----------------------------|
| HPP3W-2030-015   | 20                         | 30                         | 1.5                        |
| HPP3W-2036-015   | 20                         | 36                         | 1.5                        |
| HPP3W-2038-015   | 20                         | 38                         | 1.5                        |
| HPP3W-2238-015   | 22                         | 38                         | 1.5                        |
| HPP3W-2242-015   | 22                         | 42                         | 1.5                        |
| HPP3W-2442-015   | 24                         | 42                         | 1.5                        |
| HPP3W-2444-015   | 24                         | 44                         | 1.5                        |
| HPP3W-2548-015   | 25                         | 48                         | 1.5                        |
| HPP3W-2644-015   | 26                         | 44                         | 1.5                        |
| HPP3W-2848-015   | 28                         | 48                         | 1.5                        |
| HPP3W-3054-015   | 30                         | 54                         | 1.5                        |
| HPP3W-3254-015   | 32                         | 54                         | 1.5                        |
| HPP3W-3662-015   | 36                         | 62                         | 1.5                        |
| HPP3W-3862-015   | 38                         | 62                         | 1.5                        |
| HPP3W-4266-015   | 42                         | 66                         | 1.5                        |
| HPP3W-4674-020   | 46                         | 74                         | 2.0                        |
| HPP3W-4874-020   | 48                         | 74                         | 2.0                        |
| HPP3W-5178-020   | 51                         | 78                         | 2.0                        |
| HPP3W-5278-020   | 52                         | 78                         | 2.0                        |
| HPP3W-6290-020   | 62                         | 90                         | 2.0                        |