

HPP5-工程塑料轴承 Plastic Plain Bearings

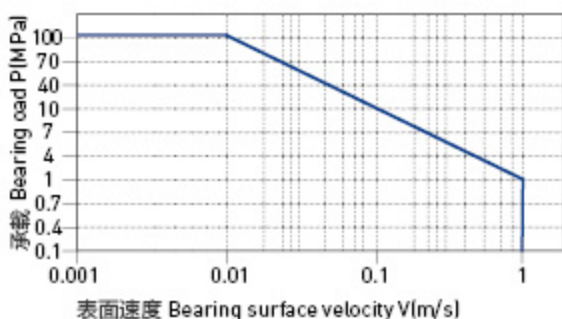
轴承PV值PV Value

HPP5塑料轴承最大运行PV值为 $1.5\text{N/mm}^2 \times \text{m/s}$ ；由此决定轴承所承受的载荷与速度成反比，详细查阅图表HPP5-1。

The max PV value of the HPP5 plastic bearings is $1.5\text{N/mm}^2 \times \text{m/s}$ which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph HPP5-1).

图表 HPP5-1: PV 图表

Graph HPP5-1: Permissible PV value for HPP5



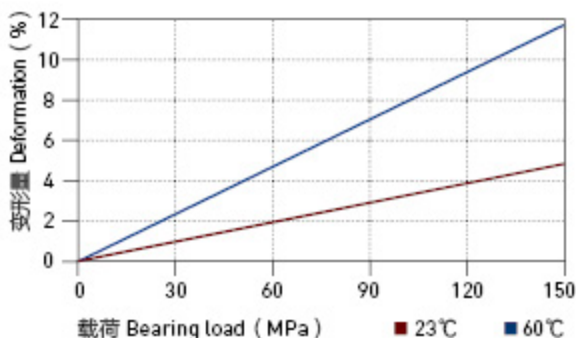
轴承的载荷、速度、温度 The Relation of Load, Speed and Temperature

HPP5塑料轴承可承受最大静载荷为150Mpa。在此载荷下轴承的最大压缩变形量参考图表HPP5-2，轴承实际工作载荷略小于150Mpa，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: 250℃)会导致轴承的承载能力逐渐减弱，载荷随轴承工作温度变换情况请参考HPP5-3。

HPP5 allows the Max static load of 150Mpa, The max compressive deformation rate under the max load is listed in Graph HPP5-2, The actual load capacity of bearing is slightly less than 150Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.5m/s) results into Higher temperature (Tmax: 250℃) which decreases the load capacity of the bearing. Please refer to the Graph HPP5-3 for such variation.

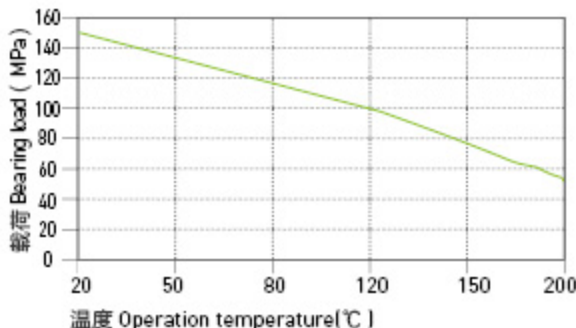
图表 HPP5-2: 载荷 - 温度 - 变形量图表

Graph HPP5-2: Load-Temperature deformation



图表 HPP5-3: 载荷 - 温度图表

Graph HPP5-3: Load-Temperature diagrams



HPP5-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HPP5-4表明HPP5轴承的摩擦系数在载荷一定时随着运行速度的增加而逐渐升高；图表HPP5-5表明HPP5轴承在速度一定载荷在20Mpa以内时摩擦系数会随着载荷的逐步增加而快速降低，而当载荷高于20Mpa时摩擦系数的变化却比较平缓。图表HPP5-6表明HPP5轴承比较适合轴的轴表面粗糙度为Ra0.6 - 0.8 μ m。

HPP5 Bearing Friction factor is increased along with the increasing of the operation speed under certain loading (See Graph HPP5-4). The friction factor of HPP5 is decreased along with the loading increasing not over 20Mpa (see Graph HPP5-5). The friction factor will not change much along with the speed when the loading is over 20Mpa. The Graph HPP5-6 shows that the bearing could achieve its best performance when the counter shaft surface roughness is around Ra0.6 to Ra0.8.

HPP5	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 μ Friction coef.	0.09~0.25	0.09	0.04	0.04

■ 磨损与轴材料 Wearing and shaft material

图表HPP5-7和图表HPP5-8测试表明了HPP5轴承在不同轴材料上的运行磨损对比，在载荷2Mpa以下旋转运动时不锈钢轴和碳钢轴比较适合，而当载荷超过2Mpa时在硬化钢轴和碳轴上的运行效果较好。图表HPP5-7表明HPP5轴承比较适合用于旋转运动；特别值得注意的是图表HPP5-9表明HPP5轴承在常温23℃下的摩擦磨损性能并没有在高温150℃下优秀。

Graph HPP5-7 and Graph HPP5-8 show the test results of the material HPP5 running against different shaft materials. It is suitable for stainless steel and hot rolled carbon steel shaft when the loading is less than 2Mpa and it will be more suitable for heat treated steel and carbon steel shaft when the loading is over 2Mpa. Graph HPP5-7 shows HPP5 is good for rotation operation. Specially, from the Graph HPP5-9, it is read that HPP5 is with better performance under high temperature around 150℃ comparing with under the ambient temperature of 23℃.

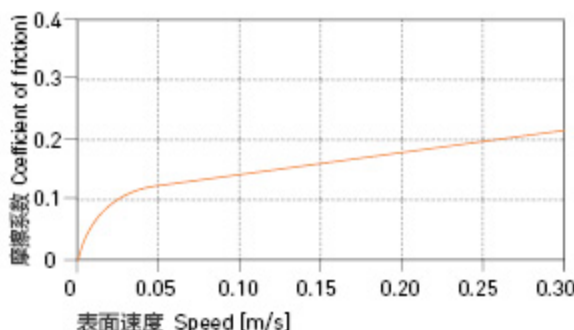
■ 化学抗性 Chemical Resistance

HPP5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 HPP5 is very good. it can work well in the heavy acid of 65%.

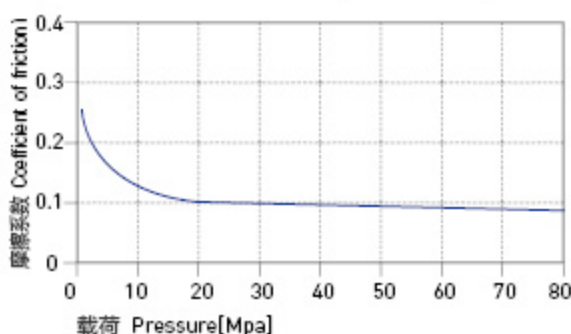
图表 HPP4-4: 摩擦系数与速度变化关系图表 P=2Mpa

Graph HPP4-4: Coefficient of friction & the speed of bearing, P=2Mpa



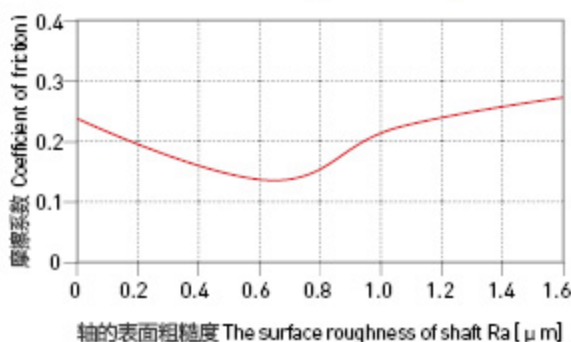
图表 HPP4-5: 摩擦系数与载荷变化关系图表 v=0.2m/s

Graph HPP4-5: Coefficient of friction & the pressure of bearing, v=0.2m/s



图表 HPP4-6: 摩擦系数与轴表面粗糙度关系图表

Graph HPP4-6: Coefficient of friction & the surface roughness of shaft



HPP5-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, HPP5塑料轴承的吸水率为0.1%, 浸泡水中最大平衡吸水率为0.5%; 因此材料不会吸水而发生性能变化和尺寸变化, 适合用于潮湿环境。

The water absorb rate of HPP5 is less than 0.1% under the atmospheric pressure while it is 0.5% when the material is immersed into water. The material performance and dimensions of the material is stabilized for the applications under humid environment.

■ 抗UV性能 UV Resistance

HPP5长久暴露在紫外线下材料性能不会发生变化。

HPP5 can maintain its performance to stable even exposed in the UV ray for long period.

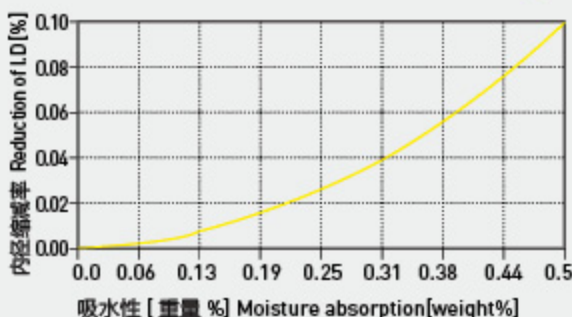
■ 安装公差 Installation Tolerances

HPP5塑料轴承压装后公差Tolerances after pressfit

直径 Di. [mm]	HPP5 F10 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
> 0-3	+0.006+0.046	0-+0.010	0--0.025
> 3-6	+0.010+0.058	0-+0.012	0--0.030
> 6-10	+0.013+0.071	0-+0.015	0--0.036
> 10-18	+0.016+0.086	0-+0.018	0--0.043
> 18-30	+0.020+0.104	0-+0.021	0--0.052
> 30-50	+0.025+0.125	0-+0.025	0--0.062
> 50-80	+0.030+0.150	0-+0.030	0--0.074
> 80-120	+0.036+0.176	0-+0.035	0--0.087

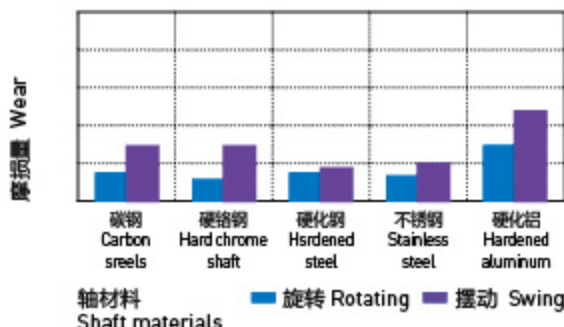
图表 HPP5-10: 吸水性的影响

Graph HPP5-10: Effect of moisture absorption on HPP5 bearings



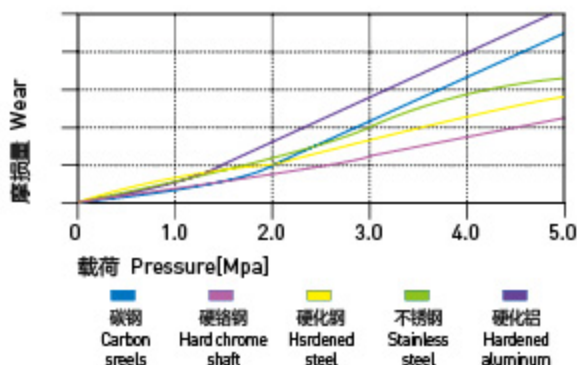
图表 HPP5-7: 在不同轴材料上旋转时的磨损量 $P=2\text{MPa}$, $v=0.2\text{m/s}$

Graph HPP5-7: The bearing wear under rotating with different shaft materials, $p=2\text{MPa}$, $v=0.2\text{m/s}$



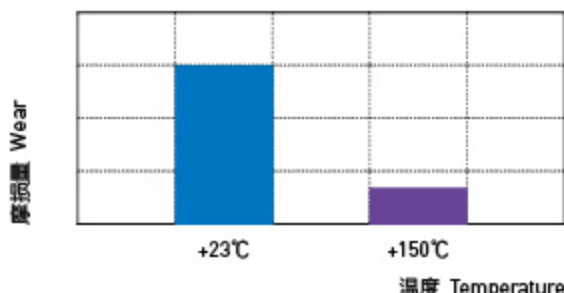
图表 HPP5-8: 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

Graph HPP5-8: The bearing wear & pressure under rotating with different shaft materials, $v=0.2\text{m/s}$

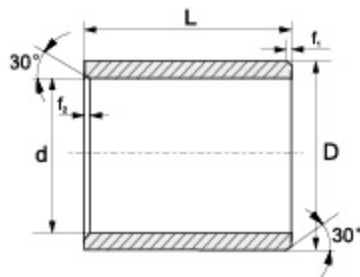


图表 HPP5-9: 在不同轴材料上旋转时的磨损量 $P=2\text{MPa}$, $v=0.2\text{m/s}$

Graph HPP5-9: The bearing wear under rotating with different shaft materials, $p=2\text{MPa}$, $v=0.2\text{m/s}$



HPP5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:

HPP5-0304-03

d D L

材料 Material

d	f ₁	f ₂
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 After fitting [mm]	D [mm]	L(h13) [mm]
HPP5-0304-03	3	+0.006/+0.046	4.5	3
HPP5-0304-06	3	+0.006/+0.046	4.5	6
HPP5-0405-04	4	+0.010/+0.058	5.5	4
HPP5-0405-06	4	+0.010/+0.058	5.5	6
HPP5-0507-05	5	+0.010/+0.058	7	5
HPP5-0507-08	5	+0.010/+0.058	7	8
HPP5-0608-06	6	+0.010/+0.058	8	6
HPP5-0608-08	6	+0.010/+0.058	8	8
HPP5-0608-10	6	+0.010/+0.058	8	10
HPP5-0810-06	8	+0.013/+0.071	10	6
HPP5-0810-08	8	+0.013/+0.071	10	8
HPP5-0810-10	8	+0.013/+0.071	10	10
HPP5-0810-12	8	+0.013/+0.071	10	12
HPP5-0810-15	8	+0.013/+0.071	10	15
HPP5-1012-06	10	+0.013/+0.071	12	6
HPP5-1012-08	10	+0.013/+0.071	12	8
HPP5-1012-10	10	+0.013/+0.071	12	10
HPP5-1012-12	10	+0.013/+0.071	12	12
HPP5-1012-15	10	+0.013/+0.071	12	15
HPP5-1012-20	10	+0.013/+0.071	12	20
HPP5-1214-06	12	+0.016/+0.086	14	6
HPP5-1214-08	12	+0.016/+0.086	14	8
HPP5-1214-10	12	+0.016/+0.086	14	10
HPP5-1214-12	12	+0.016/+0.086	14	12
HPP5-1214-15	12	+0.016/+0.086	14	15
HPP5-1214-20	12	+0.016/+0.086	14	20
HPP5-1214-25	12	+0.016/+0.086	14	25
HPP5-1416-12	14	+0.016/+0.086	16	12
HPP5-1416-15	14	+0.016/+0.086	16	15
HPP5-1416-20	14	+0.016/+0.086	16	20
HPP5-1517-07	15	+0.016/+0.086	17	7
HPP5-1517-10	15	+0.016/+0.086	17	10
HPP5-1517-15	15	+0.016/+0.086	17	15
HPP5-1517-20	15	+0.016/+0.086	17	20
HPP5-1517-25	15	+0.016/+0.086	17	25

订购编码 Order PN	d [mm]	d- 公差 After fitting [mm]	D [mm]	L(h13) [mm]
HPP5-1618-10	16	+0.016/+0.086	18	10
HPP5-1618-12	16	+0.016/+0.086	18	12
HPP5-1618-15	16	+0.016/+0.086	18	15
HPP5-1618-20	16	+0.016/+0.086	18	20
HPP5-1618-25	16	+0.016/+0.086	18	25
HPP5-1618-35	16	+0.016/+0.086	18	35
HPP5-1719-20	17	+0.016/+0.086	19	20
HPP5-1820-15	18	+0.016/+0.086	20	15
HPP5-1820-20	18	+0.016/+0.086	20	20
HPP5-1820-25	18	+0.016/+0.086	20	25
HPP5-2023-10	20	+0.020/+0.104	23	10
HPP5-2023-15	20	+0.020/+0.104	23	15
HPP5-2023-20	20	+0.020/+0.104	23	20
HPP5-2023-25	20	+0.020/+0.104	23	25
HPP5-2023-30	20	+0.020/+0.104	23	30
HPP5-2225-15	22	+0.020/+0.104	25	15
HPP5-2225-20	22	+0.020/+0.104	25	20
HPP5-2528-09	25	+0.020/+0.104	28	9
HPP5-2528-12	25	+0.020/+0.104	28	12
HPP5-2528-13	25	+0.020/+0.104	28	13
HPP5-2528-15	25	+0.020/+0.104	28	15
HPP5-2528-20	25	+0.020/+0.104	28	20
HPP5-2528-30	25	+0.020/+0.104	28	30
HPP5-2528-35	25	+0.020/+0.104	28	35
HPP5-2832-20	28	+0.020/+0.104	32	20
HPP5-2832-30	28	+0.020/+0.104	32	30
HPP5-3034-15	30	+0.020/+0.104	34	15
HPP5-3034-20	30	+0.020/+0.104	34	20
HPP5-3034-25	30	+0.020/+0.104	34	25
HPP5-3034-30	30	+0.020/+0.104	34	30
HPP5-3034-40	30	+0.020/+0.104	34	40
HPP5-3034-60	30	+0.020/+0.104	34	60
HPP5-3236-25	32	+0.025/+0.125	36	25
HPP5-3236-30	32	+0.025/+0.125	36	30
HPP5-3236-40	32	+0.025/+0.125	36	40

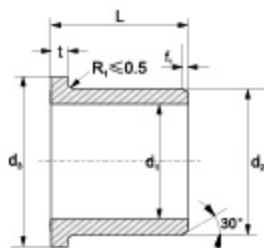
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HPP5-3539-20	35	+0.025/+0.125	39	20
HPP5-3539-30	35	+0.025/+0.125	39	30
HPP5-3539-40	35	+0.025/+0.125	39	40
HPP5-3539-50	35	+0.025/+0.125	39	50
HPP5-4044-20	40	+0.025/+0.125	44	20
HPP5-4044-30	40	+0.025/+0.125	44	30
HPP5-4044-40	40	+0.025/+0.125	44	40
HPP5-4044-50	40	+0.025/+0.125	44	50
HPP5-4550-30	45	+0.025/+0.125	50	30
HPP5-4550-50	45	+0.025/+0.125	50	50
HPP5-5055-30	50	+0.025/+0.125	55	30
HPP5-5055-40	50	+0.025/+0.125	55	40

订购编码 Order PN	d [mm]	d- 公差 After fitting [mm]	D [mm]	L(h13) [mm]
HPP5-5055-60	50	+0.025/+0.125	55	60
HPP5-5560-26	55	+0.030/+0.150	60	26
HPP5-5560-50	55	+0.030/+0.150	60	50
HPP5-6065-45	60	+0.030/+0.150	65	45
HPP5-6065-60	60	+0.030/+0.150	65	65
HPP5-6570-50	65	+0.030t/+0.150	70	50
HPP5-7075-50	70	+0.030/+0.150	75	50
HPP5-7075-70	70	+0.030/+0.150	75	70
HPP5-7580-60	75	+0.030/+0.150	80	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:

HPP5 F-0304-05

 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

订购编码 Order PN	d ₁ [mm]	d ₁ - 公差 After fitting [mm]	d ₂ [mm]	d ₃ [d13] [mm]	L[h13] [mm]	t _{0.15} [mm]
HPP5F-0304-05	3	+0.006/+0.046	4.5	7.5	5	0.75
HPP5F-0405-04	4	+0.010/+0.058	5.5	9.5	4	0.75
HPP5F-0405-06	4	+0.010/+0.058	5.5	9.5	6	0.75
HPP5F-0507-05	5	+0.010/+0.058	7	11	5	1
HPP5F-0507-08	5	+0.010/+0.058	7	11	8	1
HPP5F-0608-04	6	+0.010/+0.058	8	12	4	1
HPP5F-0608-06	6	+0.010/+0.058	8	12	6	1
HPP5F-0608-08	6	+0.010/+0.058	8	12	8	1
HPP5F-0608-10	6	+0.010/+0.058	8	12	10	1
HPP5F-0810-05	8	+0.013/+0.071	10	15	5.5	1
HPP5F-0810-06	8	+0.013/+0.071	10	15	6	1
HPP5F-0810-07	8	+0.013/+0.071	10	15	7	1
HPP5F-0810-08	8	+0.013/+0.071	10	15	8	1
HPP5F-0810-09	8	+0.013/+0.071	10	15	9	1
HPP5F-0810-10	8	+0.013/+0.071	10	15	10	1
HPP5F-0810-15	8	+0.013/+0.071	10	15	15	1
HPP5F-0812-06	8	+0.025/+0.083	12	16	6	2
HPP5F-1012-04	10	+0.013/+0.071	12	18	4	1
HPP5F-1012-05	10	+0.013/+0.071	12	18	5	1

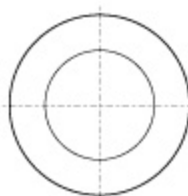
订购编码 Order PN	d ₁ [mm]	d ₁ - 公差 After fitting [mm]	d ₂ [mm]	d ₃ [d13] [mm]	L[h13] [mm]	t _{0.15} [mm]
HPP5F-1012-06	10	+0.013/+0.071	12	18	6	1
HPP5F-1012-08	10	+0.013/+0.071	12	18	8	1
HPP5F-1012-09	10	+0.013/+0.071	12	18	9	1
HPP5F-1012-10	10	+0.013/+0.071	12	18	10	1
HPP5F-1012-12	10	+0.013/+0.071	12	18	12	1
HPP5F-1012-15	10	+0.013/+0.071	12	18	15	1
HPP5F-1012-17	10	+0.013/+0.071	12	18	17	1
HPP5F-1012-20	10	+0.013/+0.071	12	18	20	1
HPP5F-1012-22	10	+0.013/+0.071	12	18	22	1
HPP5F-1012-25	10	+0.013/+0.071	12	18	25	1
HPP5F-1214-07	12	+0.016/+0.086	14	20	7	1
HPP5F-1214-09	12	+0.016/+0.086	14	20	9	1
HPP5F-1214-10	12	+0.016/+0.086	14	20	10	1
HPP5F-1214-12	12	+0.016/+0.086	14	20	12	1
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HPP5F-1214-20	12	+0.016/+0.086	14	20	20	1
HPP5F-1416-10	14	+0.016/+0.086	16	22	10	1
HPP5F-1416-12	14	+0.016/+0.086	16	22	12	1
HPP5F-1416-17	14	+0.016/+0.086	16	22	17	1

订购编码 Order PN	d ₁ [mm]	d ₁ -公差 After fitting [mm]	d ₂ [mm]	d ₂ [d13] [mm]	L[h13] [mm]	t _{0.15} [mm]
HPP5F-1517-06	15	+0.016/+0.086	17	23	6	1
HPP5F-1517-12	15	+0.016/+0.086	17	23	12	1
HPP5F-1517-17	15	+0.016/+0.086	17	23	17	1
HPP5F-1618-10	16	+0.016/+0.086	18	24	10	1
HPP5F-1618-12	16	+0.016/+0.086	18	24	12	1
HPP5F-1618-13	16	+0.016/+0.086	18	24	13	1
HPP5F-1618-17	16	+0.016/+0.086	18	24	17	1
HPP5F-1618-25	16	+0.016/+0.086	18	24	25	1
HPP5F-1820-12	18	+0.016/+0.086	20	26	12	1
HPP5F-1820-17	18	+0.016/+0.086	20	26	17	1
HPP5F-2023-07	20	+0.020/+0.104	23	30	7	1.5
HPP5F-2023-11.5	20	+0.020/+0.104	23	30	11.5	1.5
HPP5F-2023-16.5	20	+0.020/+0.104	23	30	16.5	1.5
HPP5F-2023-21.5	20	+0.020/+0.104	23	30	21.5	1.5
HPP5F-2023-30	20	+0.020/+0.104	23	30	30	1.5
HPP5F-2528-13.5	25	+0.020/+0.104	28	35	13.5	1.5
HPP5F-2528-21.5	25	+0.020/+0.104	28	35	21.5	1.5
HPP5F-2528-30	25	+0.020/+0.104	28	35	30	1.5
HPP5F-3034-16	30	+0.020/+0.104	34	42	16	2

订购编码 Order PN	d ₁ [mm]	d ₁ -公差 After fitting [mm]	d ₂ [mm]	d ₂ [d13] [mm]	L[h13] [mm]	t _{0.15} [mm]
HPP5F-3034-26	30	+0.020/+0.104	34	42	26	2
HPP5F-3034-40	30	+0.020/+0.104	34	42	40	2
HPP5F-3236-15	32	+0.025/+0.125	36	45	15	2
HPP5F-3236-26	32	+0.025/+0.125	36	45	26	2
HPP5F-3539-26	35	+0.025/+0.125	39	47	26	2
HPP5F-4044-22	40	+0.025/+0.125	44	52	22	2
HPP5F-4044-30	40	+0.025/+0.125	44	52	30	2
HPP5F-4044-40	40	+0.025/+0.125	44	52	40	2
HPP5F-4550-50	45	+0.025/+0.125	50	58	50	2
HPP5F-5055-40	50	+0.025/+0.125	55	63	40	2
HPP5F-5055-50	50	+0.025/+0.125	55	63	50	2
HPP5F-6065-40	60	+0.030/+0.150	65	75	40	2
HPP5F-6065-50	60	+0.030/+0.150	65	75	50	2
HPP5F-7075-40	70	+0.030/+0.150	75	83	40	2
HPP5F-7075-50	70	+0.030/+0.150	75	83	50	2
HPP5F-7580-50	75	+0.030/+0.150	80	88	50	2

*d₁公差为压入标准 H7 座孔 (ISO3547-1) 后公差*Tolerance d₁: after being pressed into housing H7(ISO3547-1)

垫片 Metric Thrust Washers



订购编码 Order PN:

HPP5 W-0509-006

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]
HPP5W-0509-006	5	9	0.6
HPP5W-0615-015	6	15	1.5
HPP5W-0620-015	6	20	1.5
HPP5W-0815-005	8	15	0.5
HPP5W-0815-015	8	15	1.5
HPP5W-0818-010	8	18	1.0
HPP5W-0818-015	8	18	1.5
HPP5W-1018-010	10	18	1.0
HPP5W-1018-015	10	18	1.5
HPP5W-1018-020	10	18	2.0
HPP5W-1224-015	12	24	1.5
HPP5W-1426-015	14	26	1.5
HPP5W-1524-015	15	24	1.5
HPP5W-1630-015	16	30	1.5

订购编码 Order PN	d ^{+0.25} [mm]	D _{0.25} [mm]	T _{0.05} [mm]
HPP5W-1832-015	18	32	1.5
HPP5W-2036-015	20	36	1.5
HPP5W-2238-015	22	38	1.5
HPP5W-2442-015	24	42	1.5
HPP5W-2640-0075	26	40	0.75
HPP5W-2644-015	26	44	1.5
HPP5W-2848-015	28	48	1.5
HPP5W-3254-015	32	54	1.5
HPP5W-3862-015	38	62	1.5
HPP5W-4266-015	42	66	1.5
HPP5W-4874-020	48	74	2.0
HPP5W-5278-020	52	78	2.0
HPP5W-6290-020	62	90	2.0

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