

HPP15-工程塑料轴承 Plastic Plain Bearings

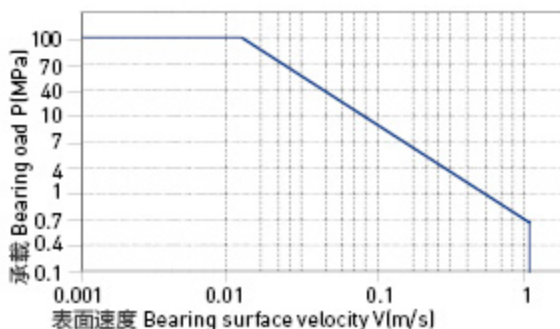
轴承PV值 PV Value

HPP15 系列轴承最大运行 PV 值为 $1.8\text{N/mm}^2 \times \text{m/s}$; 由此决定轴承所承受的载荷与速度成反比, 详细查阅图表 HPP15-1。

The max PV value of the HPP15 series bearing is $1.8\text{N/mm}^2 \times \text{m/s}$ which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph HPP15-1).

图表 HPP15-1: PV 图表

Graph HPP15-1: Permissible PV value for HPP15



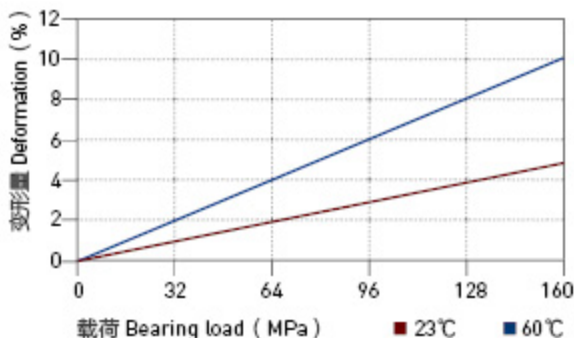
轴承的载荷、速度、温度 Load, Speed And Temperature

HPP15 塑料轴承可承受最大静载荷为 160Mpa, 在此载荷下轴承的最大压缩变形量参考图表 HPP15-2; 轴承实际工作载荷小于 160Mpa, 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: 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 HPP15-3。

HPP15 allows the max static load of 160Mpa, The max compressive deformation rate under the max load is listed in Graph HPP15-2; The actual load capacity of bearing is slightly less than 160Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 1.5m/s) results into higher temperature (Tmax: 260℃) which decreases the load capacity of the bearing. Please refer to the Graph HPP15-3 for such variation.

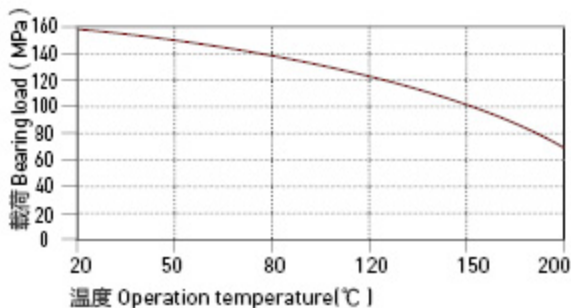
图表 HPP15-2: 载荷 - 温度 - 变形量图表

Graph HPP15-2: Load-Temperature deformation



图表 HPP15-3: 载荷 - 温度图表

Graph HPP15-3: Load-Temperature diagrams



HPP15-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 HPP15-4 表明 HPP15 轴承的摩擦系数数在载荷一定时随着运行速度的增加而逐渐升高；图表 HPP15-5 表明 HPP15 轴承在速度一定载荷在 30Mpa 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 30Mpa 时摩擦系数的变化却比较平缓。图表 HPP15-6 表明 HPP15 轴承比较适合轴表面粗糙度为 Ra0.6~ 0.8 μ m。

Graph HPP15-4 shows that the friction factor of HPP15 is increasing along with the operation speed when the loading is stable within 30 Mpa. When the loading is higher than 30Mpa, the friction factor variation will not be detectable. Graph HPP15-6 describes that HPP15 is featured best within the shaft surface roughness of Ra0.6~0.8.

HPP15	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 μ Friction coef.	0.10~0.25	0.09	0.04	0.04

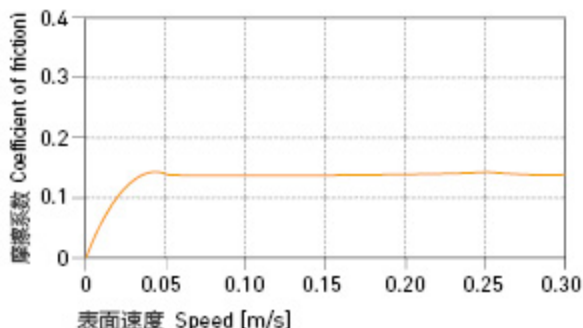
■ 磨损与轴材料 Wearing and shaft material

图表 HPP15-7 和图表 HPP15-8 测试表明了 HPP15 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 HPP15-7 表明 HPP15 轴承比较适合用于旋转运动；特别值得注意的是图表 HPP15-9 表明 HPP15 轴承在常温 23 $^{\circ}$ C 下的摩擦磨损性能并没有在高温 150 $^{\circ}$ C 下优秀。

Graph HPP15-7 and Graph HPP15-8 is the comparing test for the HPP15 wearing against different shaft materials. Stainless steel and hot-rolled steel shaft is the best shaft material for HPP15 when the loading is lower than 2Mpa. Graph HPP15-7 shows that HPP15 is most suitable for rotation operation. Graph HPP15-9 shows a very special feature of HPP15 that the wearing Features of HPP15 is much better when the temperature is 150 $^{\circ}$ C than that of the temperature of 23 $^{\circ}$ C .

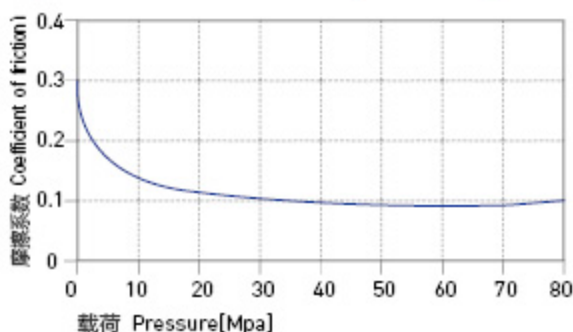
图表 HPP15-4: 摩擦系数与速度变化关系图表 P=2MPa

Graph HPP15-4: Coefficient of friction & the speed of bearing, P=2Mpa



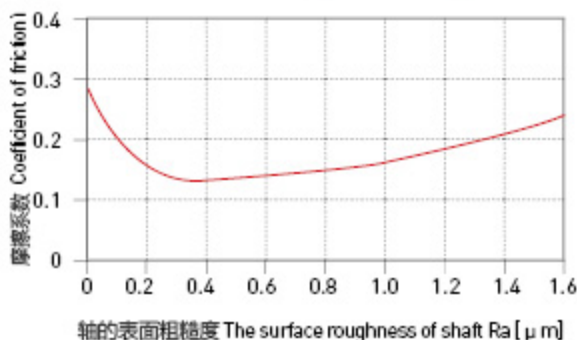
图表 HPP15-5: 摩擦系数与载荷变化关系图表 v=0.2m/s

Graph HPP15-5: Coefficient of friction & the pressure of bearing, v=0.2m/s



图表 HPP15-6: 摩擦系数与轴表面粗糙度关系图表

Graph HPP15-6: Coefficient of friction & the surface roughness of shaft



HPP15-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

HPP15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 HPP15 is very good. It can work well in the heavy acid of 65%.

■ 吸水性 Water Absorbability

在标准大气压中，HPP15塑料轴承的吸水率极低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和尺寸变化，适用于潮湿环境。

The water absorb rate of HPP15 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 material is stabilized for the applications under humid environment.

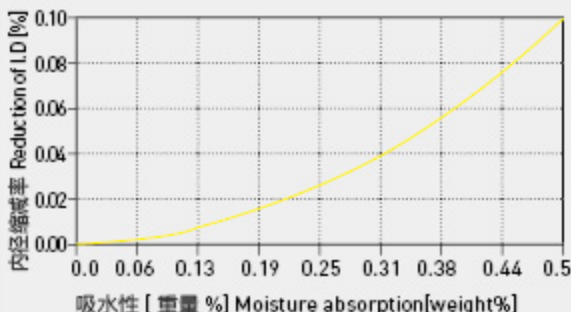
■ 抗UV性能 UV Resistance

HPP15长久暴露在紫外线下材料性能不会发生变化。

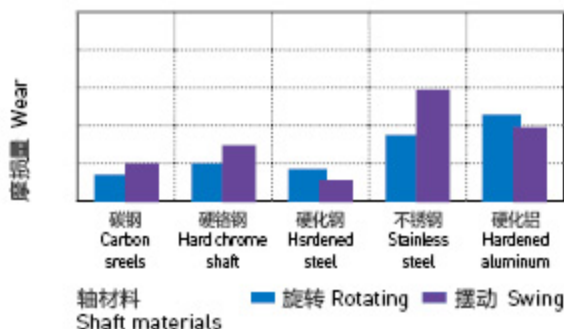
HPP15 can maintain its performance to be stable even exposed in the UV ray for long period.

图表 HPP15-10: 吸水性的影响

Graph HPP15-10: Effect of moisture absorption on HPP15 bearings

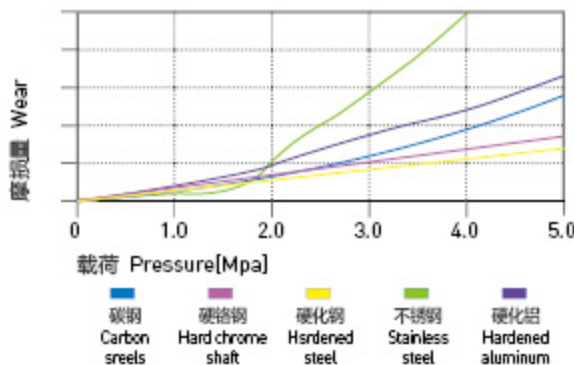


图表 HPP15-7: 在不同轴材料上旋转时的磨损量 $p=2\text{MPa}$, $v=0.2\text{m/s}$
Graph HPP15-7: The bearing wear under rotating with different shaft materials, $p=2\text{MPa}$, $v=0.2\text{m/s}$



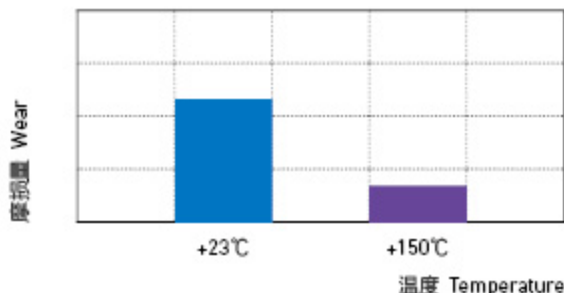
图表 HPP15-8: 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

Graph HPP15-8: The bearing wear & pressure under rotating with different shaft materials, $v=0.2\text{m/s}$

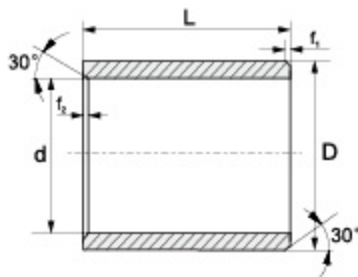


图表 HPP15-9: 在不同温度下的磨损量 $p=2\text{MPa}$ $V=0.2\text{m/s}$

The bearing wear under rotating with different temperature $p=2\text{MPa}$ $v=0.2\text{m/s}$



HPP15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:

HPP15-0304-03

材料 Material

d D L

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]
HPP15-0304-03	3	+0.006/+0.046	4.5	3
HPP15-0304-06	3	+0.006/+0.046	4.5	6
HPP15-0405-04	4	+0.010/+0.058	5.5	4
HPP15-0405-06	4	+0.010/+0.058	5.5	6
HPP15-0507-05	5	+0.010/+0.058	7	5
HPP15-0507-08	5	+0.010/+0.058	7	8
HPP15-0608-06	6	+0.010/+0.058	8	6
HPP15-0608-08	6	+0.010/+0.058	8	8
HPP15-0608-10	6	+0.010/+0.058	8	10
HPP15-0810-06	8	+0.013/+0.071	10	6
HPP15-0810-08	8	+0.013/+0.071	10	8
HPP15-0810-10	8	+0.013/+0.071	10	10
HPP15-0810-12	8	+0.013/+0.071	10	12
HPP15-0810-15	8	+0.013/+0.071	10	15
HPP15-1012-06	10	+0.013/+0.071	12	6
HPP15-1012-08	10	+0.013/+0.071	12	8
HPP15-1012-10	10	+0.013/+0.071	12	10
HPP15-1012-12	10	+0.013/+0.071	12	12
HPP15-1012-15	10	+0.013/+0.071	12	15
HPP15-1012-20	10	+0.013/+0.071	12	20
HPP15-1214-06	12	+0.016/+0.086	14	6
HPP15-1214-08	12	+0.016/+0.086	14	8
HPP15-1214-10	12	+0.016/+0.086	14	10
HPP15-1214-12	12	+0.016/+0.086	14	12
HPP15-1214-15	12	+0.016/+0.086	14	15
HPP15-1214-20	12	+0.016/+0.086	14	20
HPP15-1214-25	12	+0.016/+0.086	14	25
HPP15-1416-12	14	+0.016/+0.086	16	12
HPP15-1416-15	14	+0.016/+0.086	16	15
HPP15-1416-20	14	+0.016/+0.086	16	20
HPP15-1517-07	15	+0.016/+0.086	17	7
HPP15-1517-10	15	+0.016/+0.086	17	10
HPP15-1517-15	15	+0.016/+0.086	17	15
HPP15-1517-20	15	+0.016/+0.086	17	20
HPP15-1517-25	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]
HPP15-1618-10	16	+0.016/+0.086	18	10
HPP15-1618-12	16	+0.016/+0.086	18	12
HPP15-1618-15	16	+0.016/+0.086	18	15
HPP15-1618-20	16	+0.016/+0.086	18	20
HPP15-1618-25	16	+0.016/+0.086	18	25
HPP15-1618-35	16	+0.016/+0.086	18	35
HPP15-1719-20	17	+0.016/+0.086	19	20
HPP15-1820-15	18	+0.016/+0.086	20	15
HPP15-1820-20	18	+0.016/+0.086	20	20
HPP15-1820-25	18	+0.016/+0.086	20	25
HPP15-2023-10	20	+0.020/+0.104	23	10
HPP15-2023-15	20	+0.020/+0.104	23	15
HPP15-2023-20	20	+0.020/+0.104	23	20
HPP15-2023-25	20	+0.020/+0.104	23	25
HPP15-2023-30	20	+0.020/+0.104	23	30
HPP15-2225-15	22	+0.020/+0.104	25	15
HPP15-2225-20	22	+0.020/+0.104	25	20
HPP15-2528-09	25	+0.020/+0.104	28	9
HPP15-2528-12	25	+0.020/+0.104	28	12
HPP15-2528-13	25	+0.020/+0.104	28	13
HPP15-2528-15	25	+0.020/+0.104	28	15
HPP15-2528-20	25	+0.020/+0.104	28	20
HPP15-2528-30	25	+0.020/+0.104	28	30
HPP15-2528-35	25	+0.020/+0.104	28	35
HPP15-2832-20	28	+0.020/+0.104	32	20
HPP15-2832-30	28	+0.020/+0.104	32	30
HPP15-3034-15	30	+0.020/+0.104	34	15
HPP15-3034-20	30	+0.020/+0.104	34	20
HPP15-3034-25	30	+0.020/+0.104	34	25
HPP15-3034-30	30	+0.020/+0.104	34	30
HPP15-3034-40	30	+0.020/+0.104	34	40
HPP15-3034-60	30	+0.020/+0.104	34	60
HPP15-3236-25	32	+0.025/+0.125	36	25
HPP15-3236-30	32	+0.025/+0.125	36	30
HPP15-3236-40	32	+0.025/+0.125	36	40

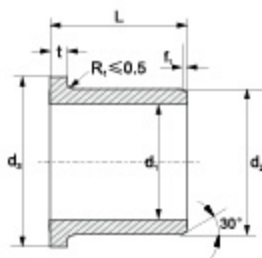
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HPP15-3539-20	35	+0.025/+0.125	39	20
HPP15-3539-30	35	+0.025/+0.125	39	30
HPP15-3539-40	35	+0.025/+0.125	39	40
HPP15-3539-50	35	+0.025/+0.125	39	50
HPP15-4044-20	40	+0.025/+0.125	44	20
HPP15-4044-30	40	+0.025/+0.125	44	30
HPP15-4044-40	40	+0.025/+0.125	44	40
HPP15-4044-50	40	+0.025/+0.125	44	50
HPP15-4550-30	45	+0.025/+0.125	50	30
HPP15-4550-50	45	+0.025/+0.125	50	50
HPP15-5055-30	50	+0.025/+0.125	55	30
HPP15-5055-40	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]
HPP15-5055-60	50	+0.025/+0.125	55	60
HPP15-5560-26	55	+0.030/+0.150	60	26
HPP15-5560-50	55	+0.030/+0.150	60	50
HPP15-6065-45	60	+0.030/+0.150	65	45
HPP15-6065-60	60	+0.030/+0.150	65	65
HPP15-6570-50	65	+0.030t/+0.150	70	50
HPP15-7075-50	70	+0.030/+0.150	75	50
HPP15-7075-70	70	+0.030/+0.150	75	70
HPP15-7580-60	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:

HPP15 E-0304-05

材料 Material
 翻边轴套 Flange bushes

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 _{0.16} [mm]
HPP15F-0304-05	3	+0.006/+0.046	4.5	7.5	5	0.75
HPP15F-0405-04	4	+0.010/+0.058	5.5	9.5	4	0.75
HPP15F-0405-06	4	+0.010/+0.058	5.5	9.5	6	0.75
HPP15F-0507-05	5	+0.010/+0.058	7	11	5	1
HPP15F-0507-08	5	+0.010/+0.058	7	11	8	1
HPP15F-0608-04	6	+0.010/+0.058	8	12	4	1
HPP15F-0608-06	6	+0.010/+0.058	8	12	6	1
HPP15F-0608-08	6	+0.010/+0.058	8	12	8	1
HPP15F-0608-10	6	+0.010/+0.058	8	12	10	1
HPP15F-0810-05	8	+0.013/+0.071	10	15	5.5	1
HPP15F-0810-06	8	+0.013/+0.071	10	15	6	1
HPP15F-0810-07	8	+0.013/+0.071	10	15	7	1
HPP15F-0810-08	8	+0.013/+0.071	10	15	8	1
HPP15F-0810-09	8	+0.013/+0.071	10	15	9	1
HPP15F-0810-10	8	+0.013/+0.071	10	15	10	1
HPP15F-0810-15	8	+0.013/+0.071	10	15	15	1
HPP15F-0812-06	8	+0.025/+0.083	12	16	6	2
HPP15F-1012-04	10	+0.013/+0.071	12	18	4	1
HPP15F-1012-05	10	+0.013/+0.071	12	18	5	1

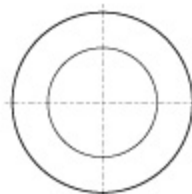
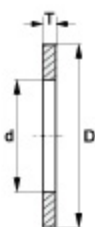
订购编码 Order PN	d ₁ [mm]	d ₁ - 公差 After fitting [mm]	d ₂ [mm]	d ₃ [d13] [mm]	L[h13] [mm]	t _{0.16} [mm]
HPP15F-1012-06	10	+0.013/+0.071	12	18	6	1
HPP15F-1012-08	10	+0.013/+0.071	12	18	8	1
HPP15F-1012-09	10	+0.013/+0.071	12	18	9	1
HPP15F-1012-10	10	+0.013/+0.071	12	18	10	1
HPP15F-1012-12	10	+0.013/+0.071	12	18	12	1
HPP15F-1012-15	10	+0.013/+0.071	12	18	15	1
HPP15F-1012-17	10	+0.013/+0.071	12	18	17	1
HPP15F-1012-20	10	+0.013/+0.071	12	18	20	1
HPP15F-1012-22	10	+0.013/+0.071	12	18	22	1
HPP15F-1012-25	10	+0.013/+0.071	12	18	25	1
HPP15F-1214-07	12	+0.016/+0.086	14	20	7	1
HPP15F-1214-09	12	+0.016/+0.086	14	20	9	1
HPP15F-1214-10	12	+0.016/+0.086	14	20	10	1
HPP15F-1214-12	12	+0.016/+0.086	14	20	12	1
HPP15F-1214-15	12	+0.016/+0.086	14	20	15	1
HPP15F-1214-20	12	+0.016/+0.086	14	20	20	1
HPP15F-1416-10	14	+0.016/+0.086	16	22	10	1
HPP15F-1416-12	14	+0.016/+0.086	16	22	12	1
HPP15F-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_3 [d13] [mm]	L[h13] [mm]	$t_{0.15}$ [mm]
HPP15F-1517-06	15	+0.016/+0.086	17	23	6	1
HPP15F-1517-12	15	+0.016/+0.086	17	23	12	1
HPP15F-1517-17	15	+0.016/+0.086	17	23	17	1
HPP15F-1618-10	16	+0.016/+0.086	18	24	10	1
HPP15F-1618-12	16	+0.016/+0.086	18	24	12	1
HPP15F-1618-13	16	+0.016/+0.086	18	24	13	1
HPP15F-1618-17	16	+0.016/+0.086	18	24	17	1
HPP15F-1618-25	16	+0.016/+0.086	18	24	25	1
HPP15F-1820-12	18	+0.016/+0.086	20	26	12	1
HPP15F-1820-17	18	+0.016/+0.086	20	26	17	1
HPP15F-2023-07	20	+0.020/+0.104	23	30	7	1.5
HPP15F-2023-11.5	20	+0.020/+0.104	23	30	11.5	1.5
HPP15F-2023-16.5	20	+0.020/+0.104	23	30	16.5	1.5
HPP15F-2023-21.5	20	+0.020/+0.104	23	30	21.5	1.5
HPP15F-2023-30	20	+0.020/+0.104	23	30	30	1.5
HPP15F-2528-13.5	25	+0.020/+0.104	28	35	13.5	1.5
HPP15F-2528-21.5	25	+0.020/+0.104	28	35	21.5	1.5
HPP15F-2528-30	25	+0.020/+0.104	28	35	30	1.5
HPP15F-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_3 [d13] [mm]	L[h13] [mm]	$t_{0.15}$ [mm]
HPP15F-3034-26	30	+0.020/+0.104	34	42	26	2
HPP15F-3034-40	30	+0.020/+0.104	34	42	40	2
HPP15F-3236-15	32	+0.025/+0.125	36	45	15	2
HPP15F-3236-26	32	+0.025/+0.125	36	45	26	2
HPP15F-3539-26	35	+0.025/+0.125	39	47	26	2
HPP15F-4044-22	40	+0.025/+0.125	44	52	22	2
HPP15F-4044-30	40	+0.025/+0.125	44	52	30	2
HPP15F-4044-40	40	+0.025/+0.125	44	52	40	2
HPP15F-4550-50	45	+0.025/+0.125	50	58	50	2
HPP15F-5055-40	50	+0.025/+0.125	55	63	40	2
HPP15F-5055-50	50	+0.025/+0.125	55	63	50	2
HPP15F-6065-40	60	+0.030/+0.150	65	75	40	2
HPP15F-6065-50	60	+0.030/+0.150	65	75	50	2
HPP15F-7075-40	70	+0.030/+0.150	75	83	40	2
HPP15F-7075-50	70	+0.030/+0.150	75	83	50	2
HPP15F-7580-50	75	+0.030/+0.150	80	88	50	2

* d_1 公差为压入标准 H7 座孔 (ISO3547-1) 后公差*Tolerance d_1 : after being pressed into housing H7(ISO3547-1)

垫片 Metric Thrust Washers



订购编码 Order PN:

HPP15 W-0509-006

HPP15 W-0509-006
 垫片 Washer
 材料 Material

订购编码 Order PN	$d^{+0.25}$ [mm]	$D_{-0.25}$ [mm]	$T_{\pm 0.05}$ [mm]
HPP15W-0509-006	5	9	0.6
HPP15W-0615-015	6	15	1.5
HPP15W-0620-015	6	20	1.5
HPP15W-0815-005	8	15	0.5
HPP15W-0815-015	8	15	1.5
HPP15W-0818-010	8	18	1.0
HPP15W-0818-015	8	18	1.5
HPP15W-1018-010	10	18	1.0
HPP15W-1018-015	10	18	1.5
HPP15W-1018-020	10	18	2.0
HPP15W-1224-015	12	24	1.5
HPP15W-1426-015	14	26	1.5
HPP15W-1524-015	15	24	1.5
HPP15W-1630-015	16	30	1.5

订购编码 Order PN	$d^{+0.25}$ [mm]	$D_{-0.25}$ [mm]	$T_{\pm 0.05}$ [mm]
HPP15W-1832-015	18	32	1.5
HPP15W-2036-015	20	36	1.5
HPP15W-2238-015	22	38	1.5
HPP15W-2442-015	24	42	1.5
HPP15W-2640-0075	26	40	0.75
HPP15W-2644-015	26	44	1.5
HPP15W-2848-015	28	48	1.5
HPP15W-3254-015	32	54	1.5
HPP15W-3862-015	38	62	1.5
HPP15W-4266-015	42	66	1.5
HPP15W-4874-020	48	74	2.0
HPP15W-5278-020	52	78	2.0
HPP15W-6290-020	62	90	2.0

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