

HPP18-工程塑料轴承 Plastic Plain Bearings

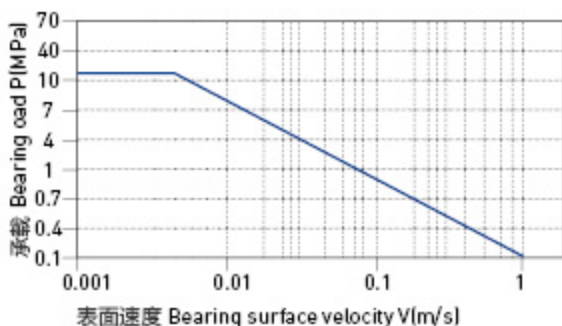
轴承PV值 PV Value

HPP18塑料轴承最大运行PV值为 $0.1 \text{ N/mm}^2 \times \text{m/s}$;由此决定轴承所承受的载荷与速度成反比,详情查阅图表HPP18-1。

The max PV value of the HPP18 plastic bearing is $0.1 \text{ N/mm}^2 \times \text{m/s}$ which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph HPP18-1).

图表 HPP18-1: PV 图表

Graph HPP18-1: Permissible PV value for HPP18



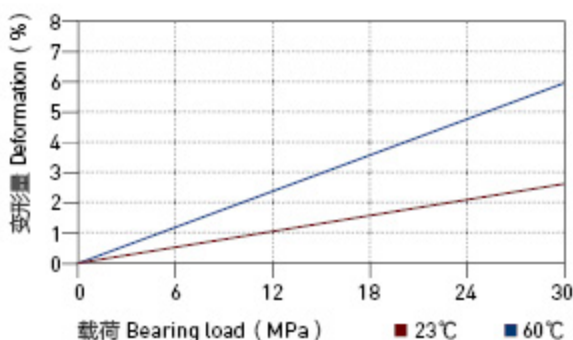
轴承的载荷、速度、温度 The Relation Of Load, Speed And Temperature

HPP18塑料轴承可承受最大静载荷为20Mpa,在此载荷下轴承的最大压缩变形量参考图表HPP18-2;轴承实际工作载荷小于20Mpa,载荷还受到运行速度以及温度的影响,速度越快 (Vmax: 0.6m/s)会导致摩擦温度上升,而温度上升 (Tmax: 80℃)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HPP18-3。

HPP18 allows the Max static load of 20Mpa, The max compressive deformation rate under the max load is listed in Graph HPP18-2, The actual load capacity of bearing is slightly less than 20Mpa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 0.6m/s) results into higher temperature (Tmax: 80℃) which decreases the load capacity of the bearing. Please refer to the Graph HPP18-3 for such variation.

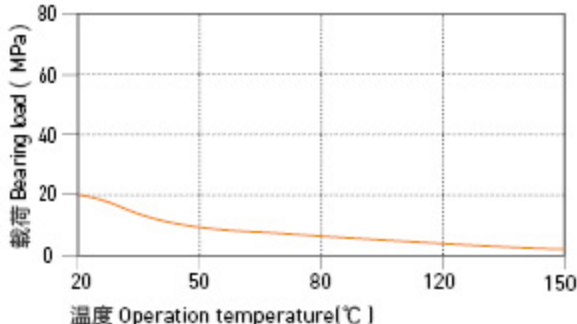
图表 HPP18-2: 载荷 - 温度 - 变形量图表

Graph HPP18-2: Load-Temperature deformation



图表 HPP18-3: 载荷 - 温度图表

Graph HPP18-3: Load-Temperature diagrams



HPP18-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HPP18-4表明HPP18轴承的摩擦系数在载荷一定的情况下随着运行速度的增加而快速升高；图表HPP18-5表明HPP18轴承在速度一定的情况下载荷低于10Mpa时摩擦系数随着载荷的增加而逐步降低，而当载荷高于10Mpa时摩擦系数的变化相对比较平缓。图表HPP18-6表明HPP18轴承的摩擦系数受轴表面粗糙度影响比较大，我们推荐使用轴表面粗糙度为Ra0.3 - 0.6 μ m。

HPP18 Bearing Friction factor is increased along with the increasing of the operation speed under certain loading (See Graph HPP18-4). The friction factor of HPP2 is decreased along with the loading increasing not over 10Mpa (see Graph HPP18-5). The friction factor will not change much along with the speed when the loading is over 10Mpa. The Graph HPP18-6 shows that the bearing could achieve its best performance when the counter shaft surface roughness is around Ra0.3 to Ra0.6.

HPP18	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 μ Friction coef.	0.05-0.18	0.09	0.04	0.04

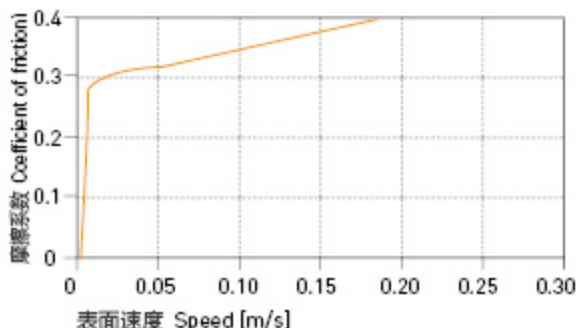
■ 磨损与轴材料 Wearing and shaft material

图表HPP18-7与图表HPP18-8为HPP18轴承在不同轴材料下旋转运动的结果，由此表明HPP18轴承磨损受轴材料影响比较大，通过试验结果我们推荐使用硬铬轴。图表HPP18-8表明HPP18轴承在大多数情况下比较适合用于摆动，但当轴材料为硬铬钢时旋转运动效果是最佳的，而在做摆动运动时硬铬碳钢效果是最好的。

Graph HPP18-7 and Graph HPP18-8 show the test results of the material HPP18 running against different shaft materials. The test result induces that the wearing is considerably affected by the different shaft materials. It is recommended to use hard chrome steel shaft for this material. Graph HPP18-8 shows HPP18 is commonly suitable for oscillation operation but it features well for the rotation operation when the shaft material is hard chrome and it is good for oscillation operation when the shaft material is carbon steel steel.

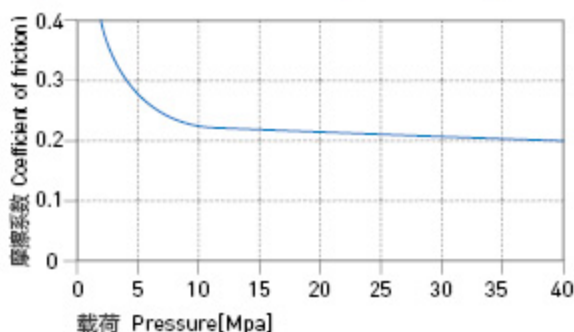
图表 HPP18-4: 摩擦系数与速度变化关系图表 P=2MPa

Graph HPP18-4: Coefficient of friction & the speed of bearing, P=2Mpa



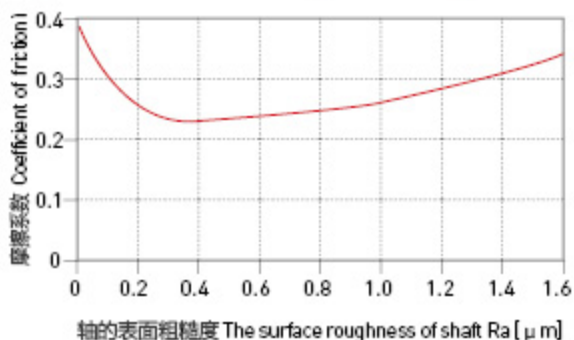
图表 HPP18-5: 摩擦系数与载荷变化关系图表 v=0.2m/s

Graph HPP18-5: Coefficient of friction & the pressure of bearing, v=0.2m/s



图表 HPP18-6: 摩擦系数与轴表面粗糙度

Graph HPP18-6: Coefficient of friction & the surface roughness of shaft



HPP18-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

HPP18塑料轴承能抵抗弱碱以及各类润滑油的腐蚀。

HPP18 is good at chemical resistance against weak acidic medium and various kinds of lubricants.

■ 吸水性 Water Absorbability

在标准大气压中, HPP18 塑料轴承的吸水率为 1.5%, 浸泡水中最大平衡吸水率为 7.6%; 由于此吸水率的特性, 我们必须考虑此轴承的应用环境。

The water absorb rate of HPP18 is 1.5% under the atmospheric pressure while it is 7.6% when the material is immersed into water. The application environment has to be considered because of its water absorb properties.

■ 抗UV性能 UV Resistance

HPP18 长久暴露在紫外线下材料性能基本不会发生改变。

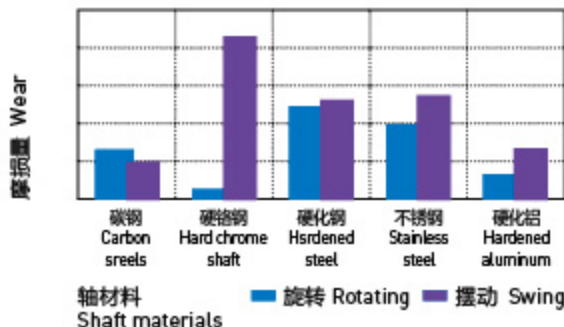
When HPP18 is exposed into the UV ray, the material performance stays stable.

■ 安装公差 Installation Tolerances

HPP18 塑料轴承压装后公差 Tolerances after pressfit

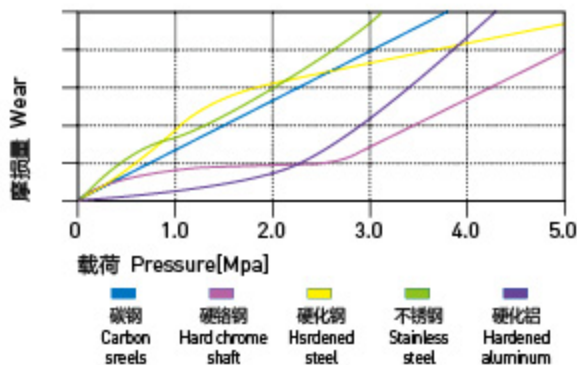
直径 Di [mm]	HPP18 E10 [mm]	座孔 Housing H7 [mm ²]	轴 Shaft h9 [mm]
> 0-3	+0.014~+0.054	0~+0.010	0~-0.025
> 3-6	+0.020~+0.068	0~+0.012	0~-0.030
> 6-10	+0.025~+0.083	0~+0.015	0~-0.036
> 10-18	+0.032~+0.102	0~+0.018	0~-0.043
> 18-30	+0.040~+0.124	0~+0.021	0~-0.052
> 30-50	+0.050~+0.150	0~+0.025	0~-0.062
> 50-80	+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 HPP18-7: 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 HPP18-7: The bearing wear under rotating with different shaft materials, $p=2\text{MPa}$, $v=0.2\text{m/s}$



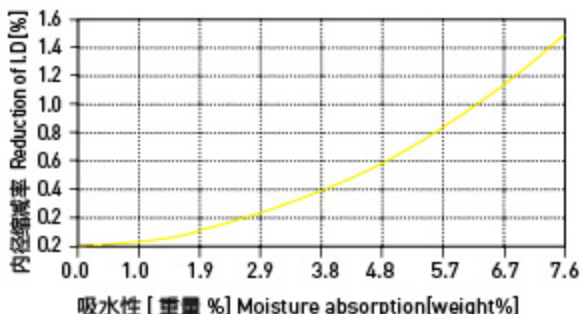
图表 HPP18-8: 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

Graph HPP18-8: The bearing wear & pressure under rotating with different shaft materials, $v=0.2\text{m/s}$

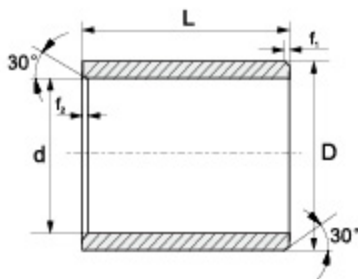


图表 HPP18-9: 吸水性的影响

Graph HPP18-9: Effect of moisture absorption on HPP18 bearings



HPP18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:

HPP18-0304-03
 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]
HPP18-0304-03	3	+0.014/+0.054	4.5	3
HPP18-0304-05	3	+0.014/+0.054	4.5	5
HPP18-0304-06	3	+0.014/+0.054	4.5	6
HPP18-0405-04	4	+0.02/+0.068	5.5	4
HPP18-0405-06	4	+0.02/+0.068	5.5	6
HPP18-0405-08	4	+0.02/+0.068	5.5	8
HPP18-0405-10	4	+0.02/+0.068	5.5	10
HPP18-0507-05	5	+0.02/+0.068	7	5
HPP18-0507-08	5	+0.02/+0.068	7	8
HPP18-0507-10	5	+0.02/+0.068	7	10
HPP18-0608-06	6	+0.02/+0.068	8	6
HPP18-0608-08	6	+0.02/+0.068	8	8
HPP18-0608-09	6	+0.02/+0.068	8	9
HPP18-0608-10	6	+0.02/+0.068	8	10
HPP18-0608-11	6	+0.02/+0.068	8	11
HPP18-0810-06	8	+0.025/+0.083	10	6
HPP18-0810-08	8	+0.025/+0.083	10	8
HPP18-0810-10	8	+0.025/+0.083	10	10
HPP18-0810-12	8	+0.025/+0.083	10	12
HPP18-0810-13	8	+0.025/+0.083	10	13
HPP18-0810-15	8	+0.025/+0.083	10	15
HPP18-0810-21	8	+0.025/+0.083	10	21
HPP18-1012-04	10	+0.025/+0.083	12	4
HPP18-1012-06	10	+0.025/+0.083	12	6
HPP18-1012-08	10	+0.025/+0.083	12	8
HPP18-1012-10	10	+0.025/+0.083	12	10
HPP18-1012-12	10	+0.025/+0.083	12	12
HPP18-1012-20	10	+0.025/+0.083	12	20
HPP18-1214-05	12	+0.032/+0.102	14	5
HPP18-1214-06	12	+0.032/+0.102	14	6
HPP18-1214-10	12	+0.032/+0.102	14	10
HPP18-1214-12	12	+0.032/+0.102	14	12
HPP18-1214-15	12	+0.032/+0.102	14	15
HPP18-1214-20	12	+0.032/+0.102	14	20
HPP18-1214-25	12	+0.032/+0.102	14	25
HPP18-1416-10	14	+0.032/+0.102	16	10
HPP18-1416-15	14	+0.032/+0.102	16	15

订购编码 Order PN	d [mm]	d- 公差 After fitting [mm]	D [mm]	L[h13] [mm]
HPP18-1416-20	14	+0.032/+0.102	16	20
HPP18-1416-25	14	+0.032/+0.102	16	25
HPP18-1517-10	15	+0.032/+0.102	17	10
HPP18-1517-20	15	+0.032/+0.102	17	20
HPP18-1517-25	15	+0.032/+0.102	17	25
HPP18-1618-08	16	+0.032/+0.102	18	8
HPP18-1618-15	16	+0.032/+0.102	18	15
HPP18-1618-20	16	+0.032/+0.102	18	20
HPP18-1618-25	16	+0.032/+0.102	18	25
HPP18-1820-20	18	+0.032/+0.102	20	20
HPP18-2022-15	20	+0.04/+0.124	22	15
HPP18-2023-10	20	+0.04/+0.124	23	10
HPP18-2023-15	20	+0.04/+0.124	23	15
HPP18-2023-20	20	+0.04/+0.124	23	20
HPP18-2023-23	20	+0.04/+0.124	23	23
HPP18-2023-30	20	+0.04/+0.124	23	30
HPP18-2225-15	22	+0.04/+0.124	25	15
HPP18-2225-20	22	+0.04/+0.124	25	20
HPP18-2225-25	22	+0.04/+0.124	25	25
HPP18-2225-30	22	+0.04/+0.124	25	30
HPP18-2528-12	25	+0.04/+0.124	28	12
HPP18-2528-20	25	+0.04/+0.124	28	20
HPP18-2528-25	25	+0.04/+0.124	28	25
HPP18-2528-30	25	+0.04/+0.124	28	30
HPP18-2832-20	28	+0.04/+0.124	32	20
HPP18-2832-25	28	+0.04/+0.124	32	25
HPP18-2832-30	28	+0.04/+0.124	32	30
HPP18-3034-20	30	+0.04/+0.124	34	20
HPP18-3034-25	30	+0.04/+0.124	34	25
HPP18-3034-30	30	+0.04/+0.124	34	30
HPP18-3034-40	30	+0.04/+0.124	34	40
HPP18-3236-20	32	+0.05/+0.15	36	20
HPP18-3236-30	32	+0.05/+0.15	36	30
HPP18-3236-40	32	+0.05/+0.15	36	40
HPP18-3539-20	35	+0.05/+0.15	39	20
HPP18-3539-30	35	+0.05/+0.15	39	30
HPP18-3539-40	35	+0.05/+0.15	39	40

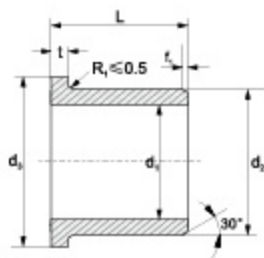
订购编码 Order PN	d [mm]	d- 公差 After fitting [mm]	D [mm]	L(h13) [mm]
HPP18-3539-50	35	+0.05/+0.15	39	50
HPP18-4044-20	40	+0.05/+0.15	44	20
HPP18-4044-30	40	+0.05/+0.15	44	30
HPP18-4044-40	40	+0.05/+0.15	44	40
HPP18-4044-50	40	+0.05/+0.15	44	50

订购编码 Order PN	d [mm]	d- 公差 After fitting [mm]	D [mm]	L(h13) [mm]
HPP18-5055-40	50	+0.05/+0.15	55	40
HPP18-5055-50	50	+0.05/+0.15	55	50

*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



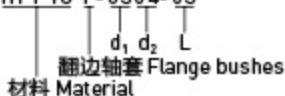
推荐安装公差 Recommend fitting tolerance:

座孔 Housing: H7

轴 Shaft: h9

订购编码 Order P/N:

HPP18 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 _{0.16} [mm]
HPP18F-0304-03	3	+0.014/+0.054	4.5	7.5	3	0.75
HPP18F-0304-05	3	+0.014/+0.054	4.5	7.5	5	0.75
HPP18F-0405-03	4	+0.02/+0.068	5.5	9.5	3	0.75
HPP18F-0405-04	4	+0.02/+0.068	5.5	9.5	4	0.75
HPP18F-0405-06	4	+0.02/+0.068	5.5	9.5	6	0.75
HPP18F-0506-15	5	+0.02/+0.068	6	10	15	0.5
HPP18F-0507-04	5	+0.02/+0.068	7	11	4	1
HPP18F-0507-05	5	+0.02/+0.068	7	11	5	1
HPP18F-0507-10	5	+0.02/+0.068	7	11	10	1
HPP18F-0608-04	6	+0.02/+0.068	8	12	4	1
HPP18F-0608-06	6	+0.02/+0.068	8	12	6	1
HPP18F-0608-08	6	+0.02/+0.068	8	12	8	1
HPP18F-0608-10	6	+0.02/+0.068	8	12	10	1
HPP18F-0810-04	8	+0.025/+0.083	10	15	4	1
HPP18F-0810-05	8	+0.025/+0.083	10	15	5	1
HPP18F-0810-07	8	+0.025/+0.083	10	15	7	1
HPP18F-0810-08F2.5	8	+0.025/+0.083	10	15	8	2.5
HPP18F-0810-09	8	+0.025/+0.083	10	15	9	1
HPP18F-0810-10	8	+0.025/+0.083	10	15	10	1
HPP18F-0810-30	8	+0.025/+0.083	10	15	30	1
HPP18F-1012-06	10	+0.025/+0.083	12	18	6	1
HPP18F-1012-07	10	+0.025/+0.083	12	18	7	1
HPP18F-1012-10	10	+0.025/+0.083	12	18	10	1
HPP18F-1012-12	10	+0.025/+0.083	12	18	12	1
HPP18F-1012-15	10	+0.025/+0.083	12	18	15	1
HPP18F-1012-17	10	+0.025/+0.083	12	18	17	1

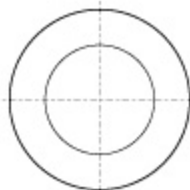
订购编码 Order PN	d ₁ [mm]	d ₁ - 公差 After fitting [mm]	d ₂ [mm]	d ₂ [d13] [mm]	L[h13] [mm]	t _{0.16} [mm]
HPP18F-1214-04	12	+0.032/+0.102	14	18	4	1
HPP18F-1214-07	12	+0.032/+0.102	14	20	7	1
HPP18F-1214-09	12	+0.032/+0.102	14	20	9	1
HPP18F-1214-10	12	+0.032/+0.102	14	20	10	1
HPP18F-1214-11	12	+0.032/+0.102	14	20	11	1
HPP18F-1214-12	12	+0.033/+0.102	14	20	12	1
HPP18F-1214-15	12	+0.032/+0.102	14	20	15	1
HPP18F-1214-17	12	+0.032/+0.102	14	20	17	1
HPP18F-1214-20	12	+0.032/+0.102	14	20	20	1
HPP18F-1416-12	14	+0.032/+0.102	16	22	12	1
HPP18F-1416-17	14	+0.032/+0.102	16	22	17	1
HPP18F-1517-12	15	+0.032/+0.102	17	23	12	1
HPP18F-1517-17	15	+0.032/+0.102	17	23	17	1
HPP18F-1517-20	15	+0.032/+0.102	17	23	20	1
HPP18F-1618-09	16	+0.032/+0.102	18	24	9	1
HPP18F-1618-12	16	+0.032/+0.102	18	24	12	1
HPP18F-1618-17	16	+0.032/+0.102	18	24	17	1
HPP18F-1820-17	18	+0.032/+0.102	20	26	17	1
HPP18F-1820-22	18	+0.032/+0.102	20	26	22	1
HPP18F-2023-11.5	20	+0.04/+0.124	23	30	11.5	1.5
HPP18F-2023-16.5	20	+0.04/+0.124	23	30	16.5	1.5
HPP18F-2023-21.5	20	+0.04/+0.124	23	30	21.5	1.5
HPP18F-2528-11.5	25	+0.04/+0.124	28	35	11.5	1.5
HPP18F-2528-16.5	25	+0.04/+0.124	28	35	16.5	1.5
HPP18F-2528-21.5	25	+0.04/+0.124	28	35	21.5	1.5
HPP18F-3034-16	30	+0.04/+0.124	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]
HPP18F-3034-26	30	+0.04/+0.124	34	42	26	2
HPP18F-3034-37	30	+0.04/+0.124	34	42	37	2
HPP18F-3236-16	32	+0.05/+0.15	36	40	16	2
HPP18F-3236-26	32	+0.05/+0.15	36	40	26	2
HPP18F-3539-09	35	+0.05/+0.15	39	47	9	2
HPP18F-3539-16	35	+0.05/+0.15	39	47	16	2
HPP18F-3539-26	35	+0.05/+0.15	39	47	26	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]
HPP18F-4044-30	40	+0.05/+0.15	44	52	30	2
HPP18F-4550-50	45	+0.05/+0.15	50	58	50	2
HPP18F-5055-40	50	+0.05/+0.15	55	63	40	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:

HPP18 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]
HPP18W-0509-006	5	9	0.6
HPP18W-0615-015	6	15	1.5
HPP18W-0620-015	6	20	1.5
HPP18W-0815-005	8	15	0.5
HPP18W-0815-015	8	15	1.5
HPP18W-0818-005	8	18	0.5
HPP18W-0818-010	8	18	1.0
HPP18W-0818-015	8	18	1.5
HPP18W-1018-010	10	18	1.0
HPP18W-1018-015	10	18	1.5
HPP18W-1018-020	10	18	2.0
HPP18W-1224-012	12	24	1.2
HPP18W-1224-015	12	24	1.5
HPP18W-1426-015	14	26	1.5
HPP18W-1524-015	15	24	1.5

订购编码 Order PN	$d^{+0.25}$ [mm]	$D_{-0.25}$ [mm]	$T_{-0.05}$ [mm]
HPP18W-1630-015	16	30	1.5
HPP18W-1832-015	18	32	1.5
HPP18W-2032-010	20	32	1.0
HPP18W-2036-015	20	36	1.5
HPP18W-2238-015	22	38	1.5
HPP18W-2442-015	24	42	1.5
HPP18W-2644-015	26	44	1.5
HPP18W-2848-015	28	48	1.5
HPP18W-3254-015	32	54	1.5
HPP18W-3862-015	38	62	1.5
HPP18W-4266-015	42	66	1.5
HPP18W-4874-020	48	74	2.0
HPP18W-5278-020	52	78	2.0
HPP18W-6290-020	62	90	2.0

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