

HPP2-工程塑料轴承 Plastic Plain Bearings

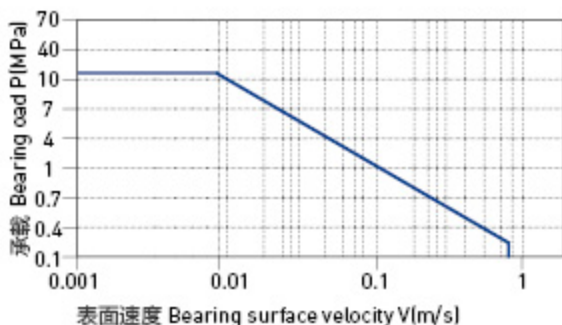
轴承PV值 PV Value

HPP2塑料轴承最大运行PV值为 $0.2\text{N/mm}^2 \times \text{m/s}$;由此决定轴承所承受的载荷与速度成反比, 详情查阅图表HPP2-1。

The max PV value of the HPP2 series bearing is $0.2\text{N/mm}^2 \times \text{m/s}$ which determines the load capacity of bearing is inversely proportional to the speed. Please refer to the chart for more detailed information (Graph HPP2-1).

图表 HPP2-1: PV 图表

Graph HPP2-1: Permissible PV value for HPP2



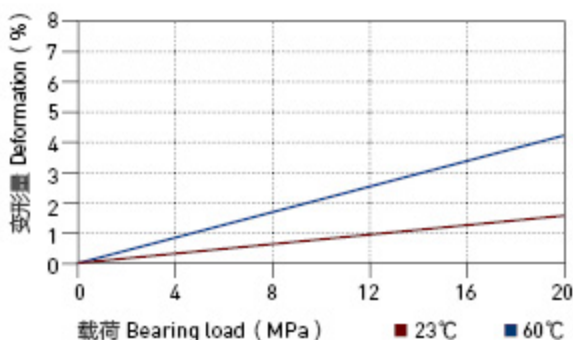
轴承的载荷、速度、温度 The Relation Of Load, Speed And Temperature

HPP2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HPP2-2, 轴承实际工作载荷略小于20MPa, 载荷还受到运行速度以及温度的影响, 速度越快(Vmax: 0.8m/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HPP2-3。

HPP2 allows the Max static load of 20MPa, The max compressive deformation rate under the max load is listed in Graph HPP2-2, The actual load capacity of bearing is slightly less than 20MPa, The bearing load is variable against the speed and temperature, Fast speed (Vmax: 0.8m/s) results into higher temperature (Tmax: 80℃) which decreases the load capacity of the bearing. Please refer to the Graph HPP2-3 for such variation.

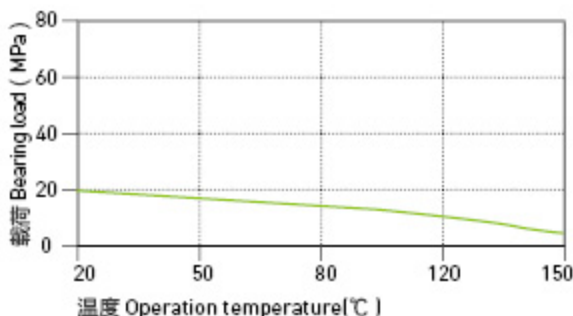
图表 HPP2-2: 载荷 - 温度 - 变形量图表

Graph HPP2-2: Load-Temperature deformation



图表 HPP2-3: 载荷 - 温度图表

Graph HPP2-3: Load-Temperature diagrams



HPP2-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HPP2-4表明HPP2轴承的摩擦系数在载荷一定的情况下随着速度的增加而快速升高，这就说明此轴承比较适合用于低速场合；图表HPP2-5表明HPP2轴承在速度一定的情况下摩擦系数随着载荷的增加而逐渐降低，滑动轴承的摩擦系数和磨损受对磨轴表面粗糙度影响比较大，图表HPP2-6表明HPP2轴承在表面粗糙度为 $Ra=0.6\mu m$ 轴上运行时可以获得最佳运行效果。

HPP2 Bearing Friction factor is increased along with the increasing of the operation speed (See Graph HPP2-4) therefore it is suitable for the application under low speed operation. The friction factor of HPP2 is decreased along with the loading increasing (see Graph HPP2-5). The friction factor and wearing of the bearing is considerably affected by the counter shaft roughness. The Graph HPP2-6 shows that the bearing could achieve its best performance when the counter shaft surface roughness is around $Ra0.6$.

HPP2	干运行 Dry	油脂 Grease	油 Oil	水 Water
摩擦系数 μ Friction coef.	0.01~0.30	0.09	0.04	0.04

■ 磨损与轴材料 Wearing and shaft material

图表HPP2-7表明HPP2轴承在不同轴材料上的运行效果表明此轴承在载荷超过2Mpa且做旋转运动时与轴材料的关系相对较小，由此图可以看出在低载荷时HPP2轴承运行效果较好。当轴承的载荷增加时，轴承的磨损会快速上升，由图表HPP2-8可以看出在高载荷时HPP2比较适合用于硬铬轴上运行。图表HPP2-8表明HPP2轴承在用于旋转运动时的性能要明显优越于摆动运动。

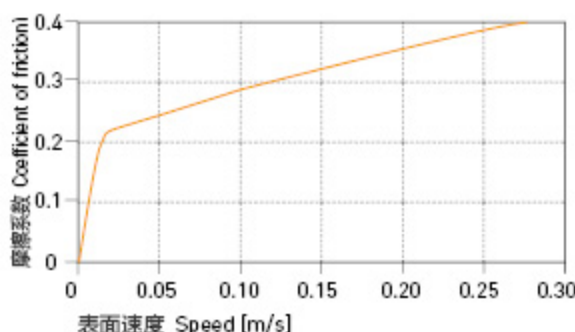
Test of the bearing against various shaft material HPP2 shows that the material HPP2 features the wearing performance of the material is not sensitive with

different materials where the loading is over 2Mpa. (See Graph HPP2-7). The bearing performance remains the best when the loading is in the lower range. when the loading is increased, the wearing will be sharply increased. From the

Graph HPP2-8, the HPP2 material is better for the application with the counter shaft material of hard chrome steel. Graph HPP2-8 shows that the material is better for rotation than oscillation operation.

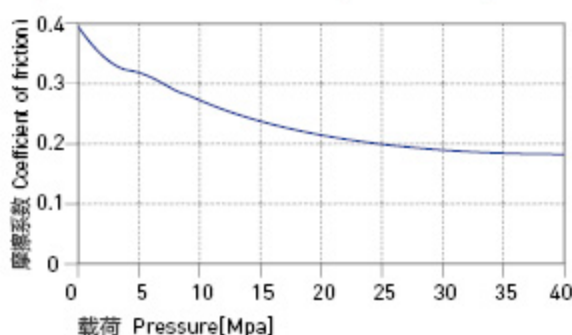
图表 HPP2-4: 摩擦系数与速度变化关系图表 $P=2Mpa$

Graph HPP2-4: Coefficient of friction & the speed of bearing, $P=2Mpa$



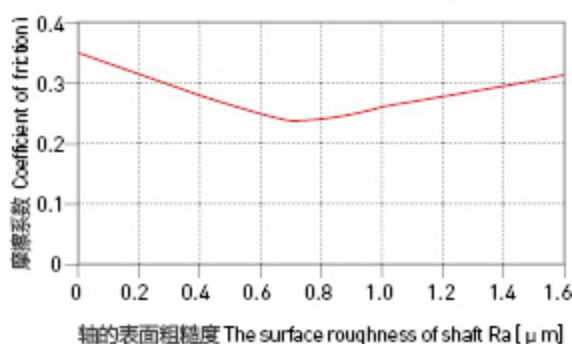
图表 HPP2-5: 摩擦系数与载荷变化关系图表 $v=0.2m/s$

Graph HPP2-5: Coefficient of friction & the pressure of bearing, $v=0.2m/s$



图表 HPP2-6: 摩擦系数与轴表面粗糙度关系图表

Graph HPP2-6: Coefficient of friction & the surface roughness of shaft



HPP2-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

HPP2塑料轴承能抵抗弱碱以及各类润滑油的腐蚀。

HPP2 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，HPP2塑料轴承的吸水率为1.4%，浸泡水中最大平衡吸水率为7.6%；由于吸水率的特性，我们必须考虑此轴承的应用环境。

The water absorb rate of HPP2 is 1.4% 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

HPP2长久暴露在紫外线下颜色基本不会改变。材料性能基本都不会发生改变。

HPP2 can maintain its color unchanged when it is exposed into the UV ray. The material performance stays stable.

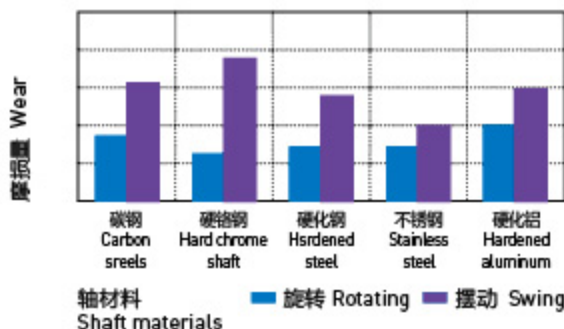
■ 安装公差 Installation Tolerances

HPP2塑料轴承压装后公差Tolerances after pressfit

直径 Di. [mm]	HPP2 D11 [mm]	座孔 Housing H7 [mm]	轴 Shaft h9 [mm]
> 0-3	+0.020+0.080	0~+0.010	0~-0.025
> 3-6	+0.030+0.105	0~+0.012	0~-0.030
> 6-10	+0.040+0.130	0~+0.015	0~-0.036
> 10-18	+0.050+0.160	0~+0.018	0~-0.043
> 18-30	+0.065+0.195	0~+0.021	0~-0.052
> 30-50	+0.080+0.240	0~+0.025	0~-0.062
> 50-80	+0.100+0.290	0~+0.030	0~-0.074
> 80-120	+0.120+0.340	0~+0.035	0~-0.087
> 120-180	+0.145+0.395	0~+0.040	0~-0.100

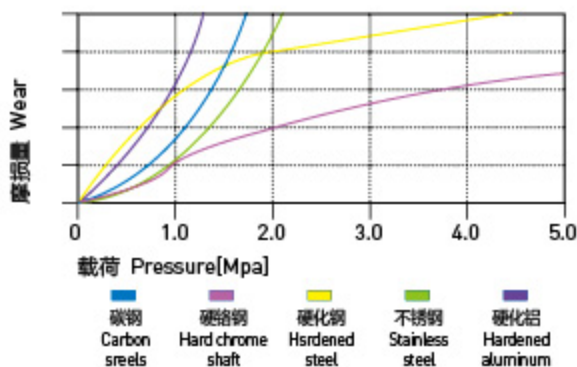
图表 HPP2-7: 在不同轴材料上旋转时的磨损量 $P=2\text{MPa}$, $v=0.2\text{m/s}$

Graph HPP2-7: The bearing wear under rotating with different shaft materials, $p=2\text{MPa}$, $v=0.2\text{m/s}$



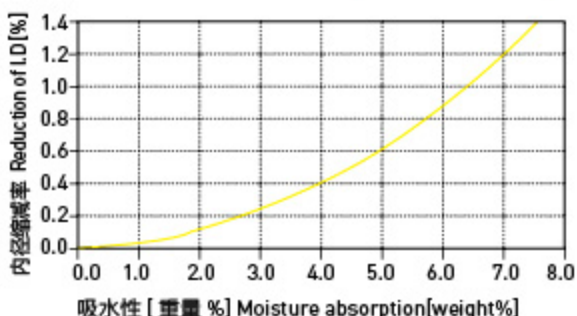
图表 HPP2-8: 旋转磨损随轴材料与压力变化关系 $v=0.2\text{m/s}$

Graph HPP2-8: The bearing wear & pressure under rotating with different shaft materials, $v=0.2\text{m/s}$



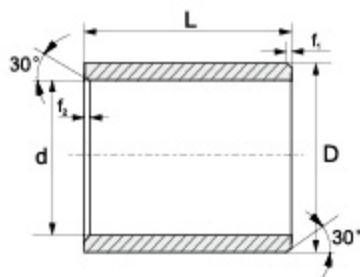
图表 HPP2-9: 吸水性的影响

Graph HPP2-9: Effect of moisture absorption on HPP2 bearings



HPP2 标准规格

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:

HPP2-0306-04

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	

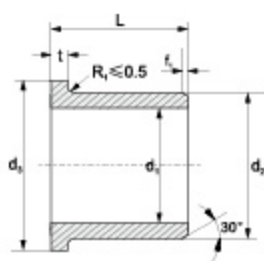
订购编码 Order PN	d [mm]	d- 公差 After fitting [mm]	D [mm]	L(h13) [mm]
HPP2-0306-04	3	+0.020/+0.080	6	4
HPP2-0509-05	5	+0.030/+0.105	9	5
HPP2-0509-08	5	+0.030/+0.105	9	8
HPP2-0610-04	6	+0.030/+0.105	10	4
HPP2-0610-06	6	+0.030/+0.105	10	6
HPP2-0610-08	6	+0.030/+0.105	10	8
HPP2-0610-10	6	+0.030/+0.105	10	10
HPP2-0612-06	6	+0.030/+0.105	12	6
HPP2-0612-10	6	+0.030/+0.105	12	10
HPP2-0812-04	8	+0.040/+0.130	12	4
HPP2-0812-06	8	+0.040/+0.130	12	6
HPP2-0812-08	8	+0.040/+0.130	12	8
HPP2-0812-10	8	+0.040/+0.130	12	10
HPP2-0812-12	8	+0.040/+0.130	12	12
HPP2-0814-06	8	+0.040/+0.130	14	6
HPP2-0814-10	8	+0.040/+0.130	14	10
HPP2-1014-06	10	+0.040/+0.130	14	6
HPP2-1014-08	10	+0.040/+0.130	14	8
HPP2-1014-10	10	+0.040/+0.130	14	10
HPP2-1014-12	10	+0.040/+0.130	14	12
HPP2-1016-06	10	+0.040/+0.130	16	6
HPP2-1016-08	10	+0.040/+0.130	16	8
HPP2-1016-10	10	+0.040/+0.130	16	10
HPP2-1216-10	12	+0.050/+0.160	16	10
HPP2-1216-15	12	+0.050/+0.160	16	15
HPP2-1216-20	12	+0.050/+0.160	16	20
HPP2-1218-08	12	+0.050/+0.160	18	8
HPP2-1218-10	12	+0.050/+0.160	18	10
HPP2-1218-12	12	+0.050/+0.160	18	12
HPP2-1218-15	12	+0.050/+0.160	18	15
HPP2-1218-20	12	+0.050/+0.160	18	20

订购编码 Order PN	d [mm]	d- 公差 After fitting [mm]	D [mm]	L(h13) [mm]
HPP2-1420-10	14	+0.050/+0.160	20	10
HPP2-1420-15	14	+0.050/+0.160	20	15
HPP2-1420-20	14	+0.050/+0.160	20	20
HPP2-1521-10	15	+0.050/+0.160	21	10
HPP2-1521-15	15	+0.050/+0.160	21	15
HPP2-1521-20	15	+0.050/+0.160	21	20
HPP2-1521-25	15	+0.050/+0.160	21	25
HPP2-1620-12	16	+0.050/+0.160	20	12
HPP2-1620-15	16	+0.050/+0.160	20	15
HPP2-1620-20	16	+0.050/+0.160	20	20
HPP2-1620-25	16	+0.050/+0.160	20	25
HPP2-1622-12	16	+0.050/+0.160	22	12
HPP2-1622-15	16	+0.050/+0.160	22	15
HPP2-1622-20	16	+0.050/+0.160	22	20
HPP2-1622-25	16	+0.050/+0.160	22	25
HPP2-2025-14	20	+0.065/+0.195	25	14
HPP2-2025-20	20	+0.065/+0.195	25	20
HPP2-2026-15	20	+0.065/+0.195	26	15
HPP2-2026-17	20	+0.065/+0.195	26	17
HPP2-2026-20	20	+0.065/+0.195	26	20
HPP2-2026-30	20	+0.065/+0.195	26	30
HPP2-2530-20	25	+0.065/+0.195	30	20
HPP2-2530-30	25	+0.065/+0.195	30	30
HPP2-2532-20	25	+0.065H-0.195	32	20
HPP2-2532-30	25	+0.065/+0.195	32	30
HPP2-3038-20	30	+0.065/+0.195	38	20
HPP2-3038-30	30	+0.065/+0.195	38	30
HPP2-3038-40	30	+0.065/+0.195	38	40

*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:

HPP2 F-0306-04

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

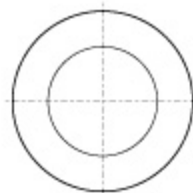
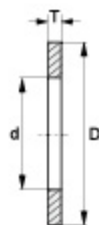
订购编码 Order PN	d ₁ [mm]	d ₁ - 公差 After fitting [mm]	d ₂ [mm]	d ₃ [d13] [mm]	L[h13] [mm]	t _{0.15} [mm]
HPP2F-0306-04	3	+0.020/+0.080	6	9	4	1.5
HPP2F-0509-05	5	+0.030/+0.105	9	13	5	2
HPP2F-0509-06	5	+0.030/+0.105	9	13	6	2
HPP2F-0509-08	5	+0.030/+0.105	9	13	8	2
HPP2F-0610-04	6	+0.030/+0.105	10	14	4	2
HPP2F-0610-06	6	+0.030/+0.105	10	14	6	2
HPP2F-0610-08	6	+0.030/+0.105	10	14	8	2
HPP2F-0610-10	6	+0.030/+0.105	10	14	10	2
HPP2F-0612-06	6	+0.030/+0.105	12	14	6	3
HPP2F-0612-10	6	+0.030/+0.105	12	14	10	3
HPP2F-0812-06	8	+0.040/+0.130	12	16	6	2
HPP2F-0812-08	8	+0.040/+0.130	12	16	8	2
HPP2F-0812-10	8	+0.040/+0.130	12	16	10	2
HPP2F-0812-12	8	+0.040/+0.130	12	16	12	2
HPP2F-081416-06	8	+0.040/+0.130	14	16	6	3
HPP2F-081416-10	8	+0.040/+0.130	14	16	10	3
HPP2F-0814-06	8	+0.040/+0.130	14	18	6	3
HPP2F-0814-10	8	+0.040/+0.130	14	18	10	3
HPP2F-1014-06	10	+0.040/+0.130	14	19	6	2
HPP2F-1014-08	10	+0.040/+0.130	14	19	8	2
HPP2F-1014-10	10	+0.040/+0.130	14	19	10	2
HPP2F-101420-12	10	+0.040/+0.130	14	20	12	2
HPP2F-101620-06	10	+0.040/+0.130	16	20	6	3
HPP2F-1016-08	10	+0.040/+0.130	16	22	8	3
HPP2F-101620-10	10	+0.040/+0.130	16	20	10	3
HPP2F-1216-10	12	+0.050/+0.160	16	22	10	2
HPP2F-1216-20	12	+0.050/+0.160	16	22	20	2
HPP2F-1218-08	12	+0.050/+0.160	18	24	8	3
HPP2F-1218-10	12	+0.050/+0.160	18	22	10	3
HPP2F-1218-12	12	+0.050/+0.160	18	24	12	3

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]
HPP2F-1218-15	12	+0.050/+0.160	18	22	15	3
HPP2F-1218-20	12	+0.050/+0.160	18	22	20	3
HPP2F-1420-10	14	+0.050/+0.160	20	25	10	3
HPP2F-1420-15	14	+0.050/+0.160	20	25	15	3
HPP2F-1420-20	14	+0.050/+0.160	20	25	20	3
HPP2F-1521-10	15	+0.050/+0.160	21	27	10	3
HPP2F-1521-15	15	+0.050/+0.160	21	27	15	3
HPP2F-1521-20	15	+0.050/+0.160	21	27	20	3
HPP2F-1521-25	15	+0.050/+0.160	21	27	25	3
HPP2F-1620-12	16	+0.050/+0.160	20	27	12	3
HPP2F-1620-15	16	+0.050/+0.160	20	27	15	3
HPP2F-1620-20	16	+0.050/+0.160	20	27	20	3
HPP2F-1620-25	16	+0.050/+0.160	20	27	25	3
HPP2F-1622-12	16	+0.050/+0.160	22	28	12	3
HPP2F-1622-15	16	+0.050/+0.160	22	28	15	3
HPP2F-1622-20	16	+0.050/+0.160	22	28	20	3
HPP2F-1622-25	16	+0.050/+0.160	22	28	25	3
HPP2F-162230-15	16	+0.050/+0.160	22	30	15	2
HPP2F-2026-15	20	+0.065/+0.195	26	32	15	3
HPP2F-2026-20	20	+0.065/+0.195	26	32	20	3
HPP2F-2026-30	20	+0.065/+0.195	26	32	30	3
HPP2F-2430-30	24	+0.065/+0.195	30	36	30	3
HPP2F-2532-20	25	+0.065/+0.195	32	38	20	4
HPP2F-2532-30	25	+0.065/+0.195	32	38	30	4
HPP2F-3038-20	30	+0.065/+0.195	38	44	20	4
HPP2F-3038-30	30	+0.065/+0.195	38	44	30	4
HPP2F-3038-40	30	+0.065/+0.195	38	44	40	4

*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:

HPP2 W-0509-006

HPP2 W-0509-006
 d D T
 垫片 Washer
 材料 Material

订购编码 Order PN	$d_{+0.25}^{+0.25}$ [mm]	$D_{-0.25}$ [mm]	$T_{-0.05}$ [mm]
HPP2W-0509-006	5	9	0.6
HPP2W-0615-015	6	15	1.5
HPP2W-0620-015	6	20	1.5
HPP2W-0815-005	8	15	0.5
HPP2W-0815-015	8	15	1.5
HPP2W-0818-005	8	18	0.5
HPP2W-0818-010	8	18	1.0
HPP2W-0818-015	8	18	1.5
HPP2W-1018-010	10	18	1.0
HPP2W-1018-015	10	18	1.5
HPP2W-1018-020	10	18	2.0
HPP2W-1224-012	12	24	1.2
HPP2W-1224-015	12	24	1.5
HPP2W-1426-015	14	26	1.5
HPP2W-1524-015	15	24	1.5

订购编码 Order PN	$d_{+0.25}^{+0.25}$ [mm]	$D_{-0.25}$ [mm]	$T_{-0.05}$ [mm]
HPP2W-1630-015	16	30	1.5
HPP2W-1832-015	18	32	1.5
HPP2W-2032-010	20	32	1.0
HPP2W-2036-015	20	36	1.5
HPP2W-2238-015	22	38	1.5
HPP2W-2442-015	24	42	1.5
HPP2W-2644-015	26	44	1.5
HPP2W-2848-015	28	48	1.5
HPP2W-3254-015	32	54	1.5
HPP2W-3862-015	38	62	1.5
HPP2W-4266-015	42	66	1.5
HPP2W-4874-020	48	74	2.0
HPP2W-5278-020	52	78	2.0
HPP2W-6290-020	62	90	2.0

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