浙江顶创精密工业有限公司
ZHEJIANG ACME PRECISION INDUSTRY CO. LTD.



镶嵌型固体润滑轴承

Embedded Solid Lubrication Bearings

acme® KENT®



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自润滑多层复合轴承
Self-lubricating Multilayer Composite Bearings

acme KENT

浙江顶创精密工业有限公司
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滚针轴承
Needle Roller Bearings

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直线轴承
Linear Motion Ball Bearings

acme KENT

彰显活力 憧憬未来

Highlight the vitality of longing for the future

浙江顶创精密工业有限公司，成立于2010年。坐落于浙江省嘉善县城西开发区内，总占地面积2227平方米，总建筑面积7882平方米；我司为外资独资企业，由台湾贞维有限公司投资。为追求更好的服务品质，我司决定于2014年转型为工贸一体企业，集研发、生产和销售于一体。专业生产无油自润滑轴承，广泛应用于各种机械行业、水利工程、航天领域、汽车制造、重型工业、国家建设项目，例如：桥梁、水坝工程及船舶工业。

其馀如滚针、直线、及滚珠类轴承我司为追求品质控制及其稳定性，均注资于战略合作夥伴，详细内容将分列于专业样本里，欢迎广大海内外客户对我的支持与指教，诚挚邀请各尊敬的客户莅临指教。

Zhejiang Acme Precision Industry Co. Ltd., founded in 2010. Zhejiang province is located in the west of Jiashan County Development Zone, covers an area of 2227 square meters, total construction area of 7882 square meters; Acme Precision is a foreign - owned enterprises, invested by Jenn Weir Co, Ltd. For the pursuit of better quality of service, our company decided in 2014 transformed into one industry and trade enterprises, combined RD, production and international sales in one. Specializing in the production of self-lubricated bearings, which widely used in all kinds of machinery industry, hydraulic engineering, aerospace, automobile manufacturing, heavy industry, the national construction projects, such as: bridge, dam engineering and shipbuilding industry.

For the rest of the needle roller bearing, ball bearings and linear bearings. In order to reach our pursuit of quality control and stability, we invest in several strategic partners, the details will be listed in seperated catalogs. We are pleased to have all customers pay a visit to our company and wish you can give us your suggestions and advises. Your visiting would be our honour.

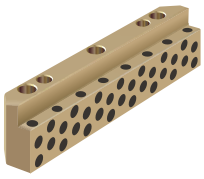
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Ball Retainer Bearing

镶嵌型固体润滑轴承
Embedded Solid Lubrication Bearings



产品特长
Product Features

1. 无需供油装置、注油孔、油槽加工

供油装置的费用、加工费、组装费等多余的成本与时间的节省，能大幅降低制造成本。

2. 运行成本的降低

大幅降低润滑油的使用量与设备的维护保养费，另外也免除了由于供油不足造成的风险。

3. 设计时间的缩短

无油化可以使设计，结构等大幅简化，降低成本，节约设计时间，此外，使用自润滑轴承还可以提高机械性能，延长使用寿命及提高可靠性等方面获得显著效果。

4. 润滑油的回收和环保

无需废油回收处理，有利于环境保护。

SPB(650#) 自润轴承作为机械行业零部件，有一定广义上的使用。为了使机械传动运行正常，下了不少功夫。将轴承区分为滚动轴承和滑动轴承。一般的滑动轴承在高负荷运动方式、异物混入、温度条件、供油、维护保养不完善等情况下，会引起拉毛。像这样一般的滑动轴承无法使用的严酷条件下，固体镶嵌型金属自润滑轴承的耐磨性，耐拉毛性上，发挥轴承应有的性能，实现机械的高性能化和免维护保养的作用。

1. No need to oil installations, the filling hole processing tank

The cost of oil installations, processing fees, assembly fees, the extra cost and time savings can significantly reduce manufacturing costs.

2. Lower operating costs

Substantially reduce the use of lubricants and equipment maintenance costs, while also eliminating the risk caused due to insufficient oil supply.

3. The shortening of design time

Non-oil can make the design, structure, and greatly simplify and reduce costs, save design time and to obtain significant results, in addition, the use of self-lubricating bearings can also improve the mechanical properties and extend the service life and higher reliability.

4. Lubricating oil recycling and environmental protection

No need to waste oil recycling, are environmentally friendly.

SPB(650#), self-lubricating bearing parts of the machinery industry, the use of certain generalized. In order to make the mechanical drive is operating normally, a lot of effort. The bearing area is divided into Rolling and plain bearings. Sliding bearings in high-load movement, foreign substances, temperature, fuel, maintenance, imperfect circumstances, can cause galling. Like sliding bearings can not be used under harsh conditions, the solid inlaid metal self-lubricating bearings, wear resistance, resistance to galling, to play the bearings of the due performance, the role of mechanical performance and maintenance-free.

使用注意事项
Application Notes

1. 在可能情况下，设计时尽量采用标准规格；
2. 装配时请注意表面有无异物；
3. 使用后的滑动面，因固体润滑剂形成的油膜导致表面有黑色或灰黑色现象，请不要擦洗，照常使用；
4. 装配前，若以润滑油涂于对磨件上，可减短走合期，利于机械操作、运转；
5. 装配时应徐徐压入，严禁敲打，以免损伤轴承及引起变形；
6. 设计时，不同的部位应选用适当的材质，以便提高机械性能，延长轴承的使用寿命；
7. 在高承载，往复运动中，建议使用螺钉固定；
8. 在淡水中、海水中及在海上作业时，对磨轴建议使用不锈钢或表面镀铬。

1. Use standard designation when designing if possible;
2. Note if there are any foreign matters on the surface when assembling;
3. Do not erase the black or grey phenomenon on the sliding surface caused by the oil film that is formed by the solid lubricant after using;
4. It is good for mechanical operation and running if lay the lubricant on the corresponding friction set before installing;
5. Pressing should be carried out slowly when installing. Do not beat in the event of damaging the bushing or causing the distortion to the bushing;
6. Using proper material in different parts when designing in order to enhance the mechanical properties and prolong the service life of the bushing;
7. It would be better to fix with bolt in high load and reciprocating motion;
8. It is recommended to use stainless steel or plate chrome on the surface of the corresponding friction shaft when working in the water or in the sea.

固体自润滑轴承的优点
he Advantages of the Solid-Lubricant-Inlaid Bearings

1. 设计灵活、简单、方便，使用范围广；

供油系统在机械设计上是一件费工，费时的装置，使用固体自润滑轴承在设计时不需要考虑加油装置，节约了加油装置设备，同时可以针对各种特殊场合，把固体自润滑轴承设计成各种形状，以满足各种特殊场合的需要，使用固体自润滑轴承，可以大幅减少机械检修，油料等费用。

2. 无油可以使用；

由于固体自润滑剂的线膨胀系数大于金属基体，因此当固体自润滑轴承开始运转时，油膜会转移到对磨件上而实现自润滑，所以固体自润滑轴承可以使用在难以加油以及不能加油或油脂的地方，即使在低速高负载的情况下，也能起到良好的润滑作用。

3. 使用成本低；

传统的机械设计，在一定的操作时间内，要经常加油保养，检查油表，供油装置是否畅通，因定期加油导致机体本身及周边环境污染，造成维护保养成本的增加，实现自润滑后，不但可以实现环境整洁，而且大大降低了使用润滑油的成本。

4. 高承载、低转速情况下，可发挥优越的性能；

固体自润滑轴承是用离心铸造的高强度合金黄铜作基体，起到承载负荷的作用，用具有良好自润滑性能的特殊配方的石墨作润滑剂，起到自润滑作用，因此它综合了他们的各自优点，即使在高承载，低转速情况下，可发挥优越的性能。

5. 往复运动、摇摆运动、起动停止频繁等油膜形成困难的场所，可发挥优越的耐磨性；

固体自润滑轴承润滑剂的排列原则是保证对磨件在运转过程中各个部位都有润滑剂作用，因此排列润滑剂时必须根据对磨件的运动方向来确定润滑剂的排布位置。

6. 优越的耐药品性及耐蚀性；

固体自润滑轴承的润滑剂是用特殊配方的石墨、PTFE、二硫化钼等耐磨材料制成的，它具有稳定的分子结构，金属基体可以根据不同金属具有不同的耐药品性和耐蚀性来选择，因此固体自润滑轴承具有优越的耐药品性和耐蚀性。

7. 产品成本更具有竞争力，与同类产品相比，工作寿命较长，所需维护保养甚少，替代更换周期长，性能好。

1. Properly and simply designed, widely used;

Oil offering system is an energy waste and time waste set in mechanical design. There is no needs for considering the oil-putting set in design when using the solid lubricant bushing so it can save the oil-putting equipment and at the same time it also design the solid-lubricant-inlaid bushing into alt kinds of shapes in order to meet various needs in special places. Using solid-lubricant. inlaid bushing can reduce the costs of the machinery mending and the oil in wide range.

2. Being used without oil;

Because of the linear coefficient expansion of the solid lubricant is bigger than that of the metal basement, when the solid-lubricant-inlaid bushing starts to operate, the oil film can transfer to the corresponding friction set to make out self-lubricant. So the solid-lubricant-inlaid bushing can be used in places where the oil or grease cannot be added. It can make out the self-lubricant function even though under high load conditions.

3. Low cost for usage;

Traditional mechanical design asks for frequently aiding oil and checking if the oil watch and the offering set are through in certain period. Because adding oil at regular intervals causes the pollution to the machine itself and the nearby surroundings and increase the maintenance cost. And when the self-lubricant is made out, it can not only make the surroundings clean but also decrease the cost of using the lubricant.

4. The superior functions can be brought into play under high load and low rotati ng speed.

The solid-lubricant-inlaid bushing is based on the high intensity brass that is centrifuge cast. And then make out the loading function. Use special graphite that has good self-lubricant properties as lubricant to make out the self-lubricant so that the bushing has included all of their advantages. It can still bring the superior properties into play even under high load and low rotating speed.

5. The wear resistance can be brought into play even In places the oil film form into difficulties because of the reciprocating and rocking movement, starting and stopping;

The arrangement principle of the lubricant of the solid-lubricant-inlaid bushing is to ensure that all the parts of the corresponding friction sets have the lubricant function in the operating procession. So the arrangement place 0f the lubricant should be depended upon the operating direction of the corresponding friction sets.

6. Superior chemical resistance and corrosion resistance;

The lubricant of the solid-lubricant. inlaid bushing is made of special graphite and PTFE. It has steady molecule structures. The metal basement can be chosen according to the different chemical resistance and corrosion resistance of the metal appliance. So the solid-lubricant-inlaid bushing has the superior chemical resistance and corrosion resistance.

7. The products is more competitive, comparing to the similar kinds of products, this kind of products has longer working life and need seldom maintenance. It has longer replacement ci rcle and good properties.

选择使用ACME自润滑轴承的基体材料
Selection of Matrix Materials for ACME Self-lubricated Bearings

材料成份和性能 Material Compostion and Properties

ACME Code	SPB (650#)	SPB (650#S1)	SPB (650#S2)	SPB (650#S3)	SPB (650#S4)	SPB (HT250)	SPB (Gcr15)
材料牌号 Code	CuZn25Al5Mn3Fe3	CuZn25Al5Mn3Fe3	CuAl9Fe4Ni4Mn2	CuSn5Pb5Zn5	CuSn12	HT250	Gcr15
密度 Density	8.0	8.0	8.5	8.9	9.05	7.3	7.8
硬度 Hardness HB	> 210	> 250	> 150	> 70	> 80	> 190	HRC > 58
抗拉强度 N/mm^2 Tensile strength	> 750	> 800	> 800	> 200	> 260	> 250	> 1500
伸长率 Elongation%	> 12	> 8	> 15	> 10	> 8	> 5	> 15
热胀系数 Coefficien of linear expansion 10^{-5}/℃	1.9	1.9	1.9	1.8	1.8	1.0	1.1
温度 Limit Temp ℃	-40~+300	-40~+150	-40~+400	-40~+400	-40~+400	-40~+400	-40~+400
最大动承载 Max.load N/mm^2	100	120	150	60	70	80	200
最大线速度 m/min Max.speed (Dry)	15	15	20	10	10	8	5
Max.PV最大PV N/mm^2*m/min	200	200	60	60	80	40	150
压缩永久变形量 300N/mm^2	< 0.01	< 0.005	< 0.04	< 0.05	< 0.05	< 0.015	< 0.002

材料对应表 Base Material Interchange

材料代号 Material Codes	中国 China Brands GB1176-87	国际 Intenational ISO 1338	德国 Germany DIN	日本 Japan JIS	美国 America ASTM(UNS)	英国 England BS	法国 France NF	适用情况 Applicable conditions
SPB(650#) 高力合金铜	ZCuZn25Al6 Fe3Mn3	GCuZn25Al6 Fe3Mn3	DIN1709 G-CuZn25Al5	H5102 CAC304	B30-92 C86300	HTB2		高载荷，低速，一般用 High-load，low speed Commonly used
SPB(650#S1) 高力合金铜	ZCuZn25Al6 Fe3Mn3	GCuZn25Al6 Fe3Mn3	DIN1709 G-CuZn25Al5	H5102 CAC304	B30-92 C86300	HTB2		超高载荷，低速，高承载用 Over high load，low speed，High load used
SPB(650#S2) 铸造锡青铜	ZCuSn5 Pb5Zn5	GCuPb5 Sn5Zn5	DIN1705 G-CuSn5ZnPb	H5111 BC6	B30-92 C83600	LG2	CuPb5 Sn5Zn5	中载荷，低速 Mid-load，low speed
SPB(650#S3) 铸造铝青铜	ZCuAl9Fe4 Ni4Mn2	GCuAl10 FeNi5	DIN17656 G-CuAl10Ni	H5114 AlBC3	B30-92 C95500	AB2	CuAl10 Fe5Ni5	中载荷，中速，一般用 Mid-load，mid-speed，Commonly used
SPB(HT250) 铸铁	GB5675-85 HT250			FC250	ASTM Class40			中载荷，低速 Mid-load，low speed

固体润滑剂 Solid Lubricant

固体润滑剂 Lubricant	特性 Features	典型用途 Typical application
SL1 高纯石墨+添加剂 Graphite+add	很好的耐磨性和化学稳定性，使用温度＜400℃ Excellent resistance against chemical attacks and low friction, Temp limit 400℃	应用于一般机械，在大气中使用 Suit for general machines and under atmosphere
SL4 PTFE+添加剂 PTFE+add	极低的摩擦系数和很好的水润性，使用温度＜300℃ Lowest in friction and good of water Lubrication,Temp limit 300℃	应用于水、海水润滑、如船舶，水工弧门，水轮机，制药饮料机械等。 Ship, hydraulic turbine, gas turbine etc.

轴承的寿命
The Life The Bushing

SPB(650#)固体润滑轴承的寿命，除急剧的烧焦外，通常由轴承内径的磨损量来决定，磨损量主要受摩擦条件的影响，而摩擦又受承载、速度、杂质、材质、表面粗糙度、工作温度、不同运行方式、所使用润滑剂等条件影响，因此，磨损量只能是一个理论估计值，轴承的寿命取决于各种复杂的条件。

The life of SPB(650#) Solid-lubricant-inlaid depends on the wear depth of the inside diameter of the bushing except such condition as acute Singe, etc. The wear depth is influenced by the load speed, foreign matter, material, surface roughness, working temperature, different operating methods and the lubricant used. So the wear depth is only a theoretical estimate value and the life of the bushing depends on all kinds of the complex conditions.

若因供油不良，杂质渗入而使磨损急剧变化时，就很难预测磨损情形。下式为正常情况下由实验得出的磨损量计算式。

If the oil is not provided well, it is hard to estimat the abrasion state when the foreign matters intermingling. the following formula is the computing method.

$$W=K\times P\times V\times T$$

K:摩擦系数 Coefficient of Friction
[mm/(N/mm^2·m/min. hr]

W:磨损量 Wear Depth (mm)

P:承载压力 Load Pressure (N/mm^2)

V:线速度 Linear speed (m/min)

T:磨损时间 Wear Time (hr)

从上式中可以看出，若摩擦系数(K)已知，便可根据承载压力(P)、线速度(V)和磨损时间(T)计算出轴承实际磨损量。但是，在各种实际条件下准确计算出摩擦系数K是件非常困难的事情。在理想条件下，摩擦系数K由影响其值的因素因子Ci来决定。

From the above formula you can see that if the coefficient of the friction "K" is known the real wear depth can be computed according to the pressure "P". linear speed "V" and wear time "T". But it is very difficult to calculate "K" under various actual conditions. Under ideal conditions. "K" depends on the factor "Ci" which influences it.

即i. e. $K=Ci\times k$

Ci: 影响磨损量的因素因子$Ci=C1\times C2\times C3\times\cdots\cdots$

Ci: $Ci=C1\times C2\times C3\times\cdots\cdots$Factor genes that influence the wear depth.

K: 理想条件下的摩擦系数 And k is the coefficient of friction under ideal conditions.

$K=(1\text{-}5)\times10^{-8}$[mm/(N/mm^2·m/min. hr)]

C_0：滑动条件系数 Coefficient of sliding conditions

C_0		线速度 Linear speed V(m/min)		
		≤1	1~10	10~30
承载压力 Loading pressure P(N/mm^2)	≤5	8~10	10~12	12~18
	5~25	12~18	18~25	25~30
	25~50	18~25	25~30	30~40

C_1：温度条件系数 Coefficient of temperature conditions

工作温度 Working temperature(℃)	≤100	100 ~ 200	200 ~ 400
C_1	1~2	3~5	5~10

C2：环境条件系数 Coefficient of surrounding temperature

环境 Surrounding	一般场所 general place	室外 outside	粉尘较多场合 Places with much powder
C_2	1~2	5~10	10~30

C3：使用场所系数 Coefficient of places used

使用场所 Places used	大气中 Atmosphere	水中 Water	海水中 Sea
C_3	1.9	0.8	1.2

工况条件
Working Conditions

1. 承载压力 Loading pressure

通常所谓承载压力是指轴承承受载荷时，轴承支持的最大载荷除以受压面积。所谓受压面积，当轴承为圆柱时，取与轴承接触部分的载荷方向的投影面积。

The so-called loading pressure generally means that when the bushing is loading, the max load it bears divides the pressed area. And the loading pressed area means the projection area of the connecting parts when the bushing is cylindrical.

2. 线速度 Linear speed

可知，对摩擦面温度的上升，滑动速度V的影响远大于承载压力P的影响。轴承若使用同一PV值，速度V愈大，轴承面温度上升愈快，因此在高温使用时，最好能供给润滑油，增大冷却效果和流 体润滑；以求降低摩擦系数，以防高磨损和烧焦现象的发生。

The heat radiated by the bushing is mainly caused by the friction of the bushing. According to the experience we know that the sliding speed "V" affects more than load pressure "P" to the surface temperature. If the bushing uses the same PV value, the higher speed the more quickly temperature ascends. So it would be better to provide lubricant to

工况条件
Working Conditions

enlarge the cooling effect and liquid lubricant by using high temperature in order to reduce the coefficient of the friction and to prevent the high abrasion and burning.

3. PV值 PV value

PV值是衡量轴承磨损极限和使用寿命的重要指标。以承载压力P(N/mm²)和线速度V(m/s)的乘积PV值(N/mm²·m/s)来表示。

PV value is an important guideline to weigh the abrasion limit and the service life of the bushing. It is shown by the load pressure P multiplying the line speed V.

轴承在单位时间，单位面积所产生的摩擦热量Q，以下式表示：

In the unit time the friction heat q caused by the unit area of the bushing can be shown by the following formula.

$$Q = \frac{\mu \cdot p \cdot v}{J} \text{ kcal/min}$$

J: 热功当量Heat equivalent of work≈ 4270(N/mm²·Kcal)

P: 承载压力 Load Pressure (N/mm²)

V: 线速度 Linear speed (m/s)

μ : 摩擦系数 coefficient of the friction

如果摩擦系数μ略大一些，轴承所产生的摩擦热量跟PV值成正比，这时所产生的热量Q，在经验上就可被认为固体润滑轴承设计时的重要依据。

当轴承运转时，轴承温度受摩擦发生的热量及热量散发情况影响，通常会在一定的温度上稳定下来. 若运转持续进行中有杂质渗入，润滑油的性能就会降低，同时由于摩擦粉末的影响，材料的疲劳，此时摩擦面的形态即发生变化，摩擦系数提高，轴承的温度上升，致使摩擦面损伤，而导致烧焦，基于此种情况，轴承的运转温度越低，亦即使用低PV值时，轴承的负荷性较好，寿命延长。所以在设计时，尽可能使用较低的PV值较安全，反之，在详细分析冷却方法，轴的材质，表面粗糙度，配合间隙等因素情况下，欲超越最大PV值使用，也是可能的。

If the coefficient of the friction " μ " is a little bigger, the friction heat and the PV value are in the direct ratio. Then the caused heat Q is commonly considered as the important principle in the solid lubricant bushing design.

When the bushing is running the heat and the heat radiation can be fixed at a certain temperature. If there are foreign matters in the running process, the lubricant property may be reduced and the friction shape may be changed because of the effect of the friction powder and the fatigue of the material. The enhancement of the coefficient of the friction and the ascending of the bushing temperature cause the damage of the friction surface and it will burn at last. Considering such cases, the load property of the bushing will be better and the service life will be longer if the operating temperature of the bushing is lower i.e.using lower PV value. So when designing, use lower PV value to ensure it is safe. Otherwise, it is also possible to use max PV value by carefully analyzing cooling methods, material of the shaft and the roughness of the surface, etc.

PV 值计算方法 The calculating method of the PV value:

	承载压力 Load pressure P(N/mm²)	线速度 Linear speed
轴承 bushing	$\frac{F}{dl}$	$\frac{\pi dn}{10^3}$ $\frac{\pi d \theta c}{1.8 \times 10^3}$
垫片 washer	$\frac{4F}{\pi (D^2-d^2)}$	$\frac{\pi n \sqrt{2(D^2+d^2)}}{2 \times 10^3}$ $\frac{\pi \theta \sqrt{2(D^2+d^2)}}{3.6 \times 10^3}$
滑块 sliding plate	$\frac{F}{BL}$	$\frac{60S}{T \times 10^3}$

F: 垂直承载 uprightness load (N)

d: 轴承内径 inside diameter of the bushing (mm)

D: 轴承外径 outside diameter of the bushing (mm)

B: 滑块宽度 the width of the sliding plate (mm)

L: 滑块长度 the length of the sliding plate (mm)

N: 回转数 the rotation times (rpm)

C: 往复次数 reciprocating times (cpm)

θ : 摇摆角 the rocking angle (℃)

S: 往复长度 the length of the reciprocation (mm)

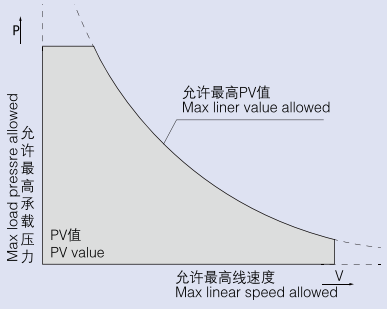
T: 往复一次需要的时间 (sec)

time spenging in each reciprocation

4. 最大PV值 Max PV value

所谓最大PV值是在轴承设计时，在轴承的单位投影面积内所承受的载荷及线速度乘积之最大值，使用时请勿超越此值，在设计时应在图1实线范围内.

The so-called max PV value means the max value of the load in the unit projection of the bushing multiplying the linear speed. Do not exceed the value when using it. When designing please be in the range of Fig 1.



对磨轴的条件
The Condition To The Corresponding Frictionshaft

SPB(650#) 固体润滑轴承的使用寿命，磨损量，最高 PV 值，最高使用温度等都受对磨轴材质等条件的影响。

The service life, wear depth, max value and max using temperature of the #650 solid-lubricant-inlaid bushing are all influenced by the corresponding friction shaft material.

1. 对磨轴的材质和硬度
The material and hardness of the corresponding bushing

一般情况下使用轴承时，对磨轴的材质可以选用 35# 以上优质碳素结构钢，Cr12 轴承钢或 9SiCr 合金工具钢等，以上材质经淬火，调质，表面处理后硬度超过轴承硬度，就能收得到比较理想的效果，但当有硬性杂质侵入时，应尽可能选用硬度较高的轴材料，可以得到更好的使用效果。

In most cases, the material of the corresponding friction shaft can be the upwards #35 superior carbon structure steel, Cr12 steel alloy or 9SiCr tool steel alloy. All the above materials are quenched, mixed and surface dealt to reach an ideal effect. But when foreign matters come into, higher hardness bushing materials should be used in order to get better effects.

2. 表面粗糙度 The surface roughness

对磨轴表面粗糙度过大时，轴与轴承的凸起部分会切断油膜，造成两者直接接触，因此，提高对磨轴的表面粗糙度，尽可能缩小油膜间隙，使其接近流体润滑的状态，这样就能提高轴承的使用寿命，一般情况下，我们推荐轴承的表面粗糙度应在 Ra0.4 以上。

When the surface roughness of the corresponding friction shaft is too large, the bulge of the shaft and the bushing may cut down the oil film so it may cause the direct connection between the two parts. So enhancing the surface roughness of the corresponding. Friction shaft can reduce the space of the oil film and be close to the lubricant state so that it can prolong the service life of the bushing. Generally, the surface roughness we recommended is above Ra0.4.

3. 表面处理 The surface treatment

通常情况下，在对磨轴表面所做处理的目的，大致可分为以下三项：

In most cases, the purpose of the treatment to the correspon-ding friction shaft can be divided into 3 items:

a. 提高耐蚀性；
Enhance the corrosion resistance;

b. 提高表面硬度；
Enhance the SU rface hardness of the surface;

c. 使表面光滑，提高润滑性能。
Make the surface flat and enhance the lubricant properties.

对磨轴进行电镀处理，可提高其耐蚀性，而且能够有效防止粗糙磨损，以及提高润滑性能等，同样当对磨轴生锈时，所产生氧化物与异物侵入，同样会出现磨损加剧，因此，我们建议使用者在对磨轴上镀硬铬，另外，在高载荷，微小摇摆运动时，将对磨轴进行适当的热处理也会收到良好的效果，又如在海水中等类似的腐蚀条件下，对磨轴镀上二至三层硬铬，是很有必要的。

It can enhance the corrosion resistance and prevent the roughness wear by the treatment to the corresponding friction shaft, it can also enhance the lubricant property. When the corresponding friction shaft is stain, the coming of the hard oxygen and the foreign matters may also cause an increase in the wear. So we recommend the users plate rigidity chrome on the corresponding friction shaft. Besides, it will get a good result by proper heat treatment on the corresponding friction shaft. It is also necessary to plate two or three rigidity chrome on the corresponding friction shaft.

轴承宽度、厚度
The Wall-Thickness and The Height of The Bushing

1. 轴承高度 Theheightofthebushing

轴承内径是由对磨轴的轴径所决定，所以在受载荷条件下，轴承宽度受轴承承载压力 P(N/mm^2) 所决定，轴承越宽，其所承受的承载压强相对减小，但此时可能会造成偏位接触，或冷却效果降低，导致轴承寿命减短，相反，轴承宽度太窄时，润滑油会很快从轴承端面流出，因此很难形成油膜，轴承性能相应降低。

The inside diameter of the bushing depends on the shaft diameter of the corresponding friction shaft. So under the load conditions, the heigth of the bushing depends on the load pressure the bushing bears. Thicker the bushing is, lower the intensity of the pressure is. But it may cause the Lean cortact or the decrease of the cooling effect and reduce the bushing life.Contrarily, if the length of the bushing is too short, the lubricant may flow out quickly so that may be difficult to form the oil filmand decrease the bushing property accordingly.

一般轴承以 L/D(轴承宽度 / 轴承内径) 的比例在 0.5-3 的范围内为适当，但应特别注意在高载荷，易引起偏位接触，高转速时引起的发热情形，此时 L/D 取 1 以下较适当。

Generally, the proportion of the height of the bushing and the inside diameter of the bushing should be in the scale of 0.5 to 3. But special attention should be paid that heat condition may cause under high load lean contact and high running speed.Then L/d should be below 1.

2. 轴承壁厚 The wall-thickness of the bushing

滑动轴承跟滚动轴承相比，其壁厚限制较小，壁厚薄为其主要的优点之一。

Comparing to the sliding bushing, the wall-thickness of thiskind of bushing has little limit Thin wall-thickness is one of themain advantage.

一般情况下，壁厚 In most cases, the wall-thickness
t= (0.05-0.07)d+ (2-5)mm

轴承宽度、厚度
The Wall-Thickness and The Height of The Bushing

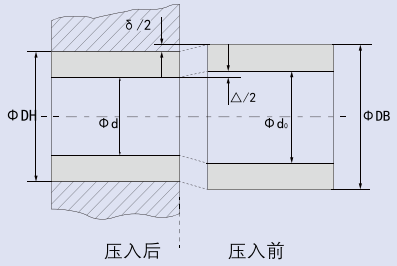
当轴承压入座孔后(如图2)，压入时的压力使轴承内外径收缩，这时，外径过盈量δ和内径收缩量△的关系，受座孔强度，材质，表面粗糙度，压入方式等因素而变化。

When the bushing is pressed into the housing, as Fig 2, the pressure put into makes the contraction of both the inside and outside diameter. Then the relation of the OD surplus " δ " and the ID shrinkage "△"is affected by the strength material, the roughness of the surface and the pressing method of the hole.

当座孔强度足够，材质为铁系，轴承材质为铜合金时，内径收缩量△可用下式表示式中：

When the strength of the housing is enough, the material is iron and the bushing material is brass alloy, the shrinkage can be shown as the following formula.

$$\triangle = \frac{10D_B d_o}{7D_B^2+3d_o^2} \times \delta$$



图Fig 2：轴承压入示意图

In the formula:

△：轴承内径收缩量(mm)

△:The shrinkage of the bushing inside diameter(mm)

δ：轴承外径过盈量(mm)

δ :The surplus quantity of the bushing outside diameter(mm)

d_0：压入前轴承内径(mm)

d_0:The inside diameter of the bushing before pressing into

D_B：压入前轴承外径(=D_B-D_H)(mm)

D_B:The outside diameter of the bushing before pressing into(=D_B-D_N)(mm)

D_H：座孔内径(mm)

D_H: The inside diameter of the housing(mm)

D：压入後轴承内径(d_0-△)(mm)

D: The inside diameter of the bushing after pressing into(d_0-△)

例：用SPB 40 50 30 轴承压入Φ50H7座孔後，计算其内径收缩量δ

e.g. calculate the shrinkage of the inside diameter after pressing SPB 40 50 30 bushing into the 50H7 housing

1. SPB 40 50 30压入前尺寸

The dimension of the SPB 40 50 30 before pressing into

轴承内径The inside diameter of the bushing:

$d_0 = \Phi 40F7 = \Phi 40^{+0.050}_{+0.025}$

轴承外径The outside diameter of the bushing:

$D_B = \Phi 50m6 = \Phi 50^{+0.025}_{+0.009}$

座孔内径The inside diameter of the hole:

$D_H = \Phi 50H7 = \Phi 50^{+0.025}_{0}$

2. 压入後轴承外径过盈量δ

The outside diameter surplus quantity of the bushing after pressing into δ

$\delta_{max} = D_{Bmax} - D_{Hmin} = 50.025 - 50 = 0.025mm$

$\delta_{min} = D_{Bmin} - D_{Bmax} = 50.009 - 50.025 = -0.016mm$

3. 压入後轴承内径收缩量△

The inside diameter shrinkage of the bushing after pressing into△

$$\triangle = \frac{10D_t d_o}{7D_t^2+3d_o^2} \times \delta = \frac{10 \times 50 \times 40}{7 \times 50^2+3 \times 40^2} \times \delta$$

$=0.89686 \times \delta$

$\triangle_{max} = 0.89686 \times \delta_{max} \approx 0.022mm$

$\triangle_{min} = 0$

4. 压入後轴承内径

The inside diameter of bushing after pressing into

$d = d_0 - \triangle$

$D_{max} = d_{0max} - \triangle_{min} = 40.050 - 0 = 40.050$

$D_{min} = d_{min} - \triangle_{max} = 40.025 - 0.022 = 40.003$

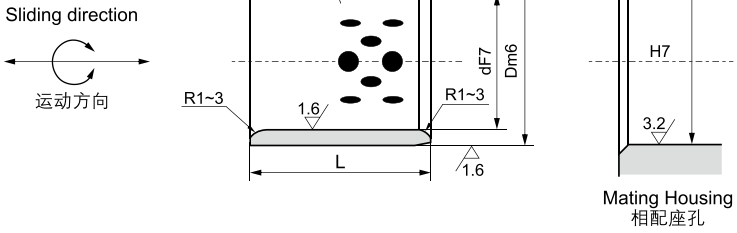
即轴承压入座孔后的内径公差为

The tolerance of the inside diameter after the bushing putting into the housing

$\Phi d = \Phi 40^{+0.050}_{+0.003}$

SPB 固体镶嵌自润滑轴承
SPB Cylindrical Oilless Bushing

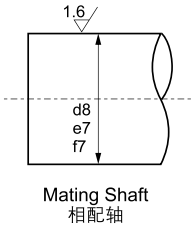




内径 F7 I.D. Ø d		外径 m6 O.D. Ø D		长度 L -0.1 -0.3							
				8	10	12	15	16	19	20	25
6	+0.022 +0.010	10	+0.015 +0.006	061008	061010	061012					
8	+0.028 +0.013	12	+0.018 +0.007	081208	081210	081212	081215				
10		14		101408	101410	101412	101415			101420	
12	+0.034 +0.016	18		121808	121810	121812	121815	121816	121819	121820	121825
13		19	+0.021 +0.008		131910	131912	131915			131920	131925
14		20			142010	142012	142015			142020	142025
15		21			152110	152112	152115	152116		152120	152125
16		22			162210	162212	162215	162216	162219	162220	162225
17		23					172315				
18		24			182410	182412	182415	182416		182420	182425
19	+0.041 +0.020	26					192615			192620	
20		28			202810	202812	202815	202816	202819	202820	202825
		30			203010	203012	203015	203016		203020	203025
22		32	+0.025 +0.009			223212	223215			223220	223225
25		33				253312	253315	253316		253320	253325
		35				253512	253515	253516		253520	253525
28		38								283820	283825
30						303812	303815			303820	303825
		40				304012	304015			304020	304025
32	+0.050 +0.020	42								324220	
35		44								354420	354425
		45								354520	354525
38		48									
40		50					405015			405020	405025
		55	+0.030 +0.011				405515				
45											
		56									
		60									

SPB 固体镶嵌自润滑轴承
SPB Cylindrical Oilless Bushing

Material	650 # + Graphite
材质	高力黄铜 + 石墨



d8：High load 高负荷
e7：Light load 轻负荷
f7：High precision 高精度

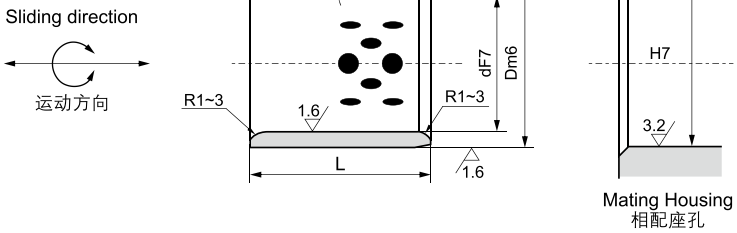
单位 (Unit): mm

长度 L $^{-0.1}_{-0.3}$							压装后内孔 I.D. After Press-Fitting	适用垫圈 SPW	内径 I.D. Ø d
30	35	40	50	60	70	80			
							+0.019 +0.007	—	6
							+0.025 +0.010	—	8
								10	10
121830							+0.031 +0.013	12	12
131930							+0.030 +0.012	13	13
142030								14	14
152130	152135	152140						15	15
162230	162235	162240						16	16
								18	17
182430	182435	182440						18	18
							+0.037 +0.016	20	19
202830	202835	202840	202850					20	20
203030	203035	203040	203050					20	
								25	22
253330	253335	253340	253350	253360				25	25
253530	253535	253540	253550	253560				25	
283830		283840						30	28
303830	303835	303840	303850	303860				30	30
304030	304035	304040	304050	304060				30	
324230		324240						35	32
354430	354435	354440	354450	354460				35	35
354530	354535	354540	354550	354560				35	
		384840						40	38
405030	405035	405040	405050	405060	405070	405080		40	40
405530	405535	405540	405550	405560			+0.045 +0.020	40	
455530	455535	455540	455550	455560				45	45
455630	455635	455640	455650	455660				45	
456030	456035	456040	456050	456060	456070	456080		45	

* 压入后内孔公差值作参考。
The ID tolerance after fitting is for reference.

SPB 固体镶嵌自润滑轴承
SPB Cylindrical Oilless Bushing

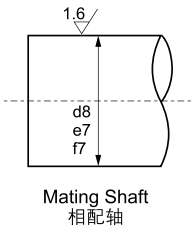




内径 F7 I.D. Ø d		外径 m6 O.D. Ø D		长度 L -0.1 -0.3							
				20	30	35	40	50	60	70	80
50	+0.050 +0.025	60	+0.030 +0.011	506020	506030	506035	506040	506050	506060	506070	506080
		62			506230	506235	506240	506250	506260	506270	506280
		65			506530		506540	506550	506560	506570	506580
55	+0.060 +0.030	70			557030	557035	557040	557050	557060	557070	
60		74			607430	607435	607440	607450	607460	607470	607480
		75			607530	607535	607540	607550	607560	607570	607580
63									637560	637570	637580
65		80					658040	658050	658060	658070	658080
70		85	+0.035 +0.013		708530	708535	708540	708550	708560	708570	708580
		90						709050	709060	709070	709080
75								759050	759060	759070	759080
		95						759550	759560	759570	759580
80		96					809640	809650	809660	809670	809680
		100					8010040		8010060	8010070	8010080
85	+0.071 +0.036								8510060		8510080
90		110						9011050	9011060		9011080
100		120						10012050	10012060	10012070	10012080
110		130	+0.040 +0.015					11013050		11013070	11013080
120		140								12014070	12014080
125	+0.083 +0.043	145									
130		150									13015080
140		160									
150		170									15017080
160		180									16018080
170		190	+0.046 +0.017								
180		200									
190	+0.096 +0.050	210									
200		230									

SPB 固体镶嵌自润滑轴承
SPB Cylindrical Oilless Bushing

Material	650 # + Graphite
材质	高力黄铜 + 石墨



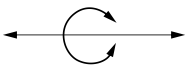
d8：High load 高负荷
e7：Light load 轻负荷
f7：High precision 高精度

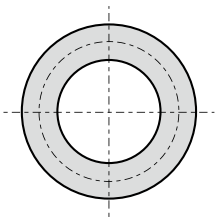
单位 (Unit): mm

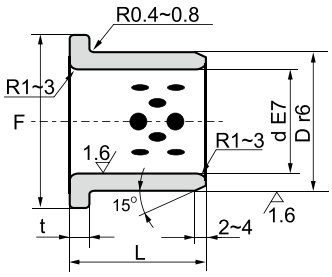
长度 L $^{-0.1}_{-0.3}$							压装后内孔	适用垫圈	内径
90	100	120	130	140	150	200	I.D. After Press-Fitting	SPW	I.D. Ø d
							+0.045 +0.020	50	50
	5065100								
							+0.055 +0.025	55	55
								60	60
	6075100								
								65	63
									65
	7085100						+0.054 +0.024	70	70
	7590100							75	75
	7595100								
	8096100	8096120						80	80
	80100100	80100120		80100140					
							+0.065 +0.030	90	85
9011090	90110100	90110120							90
10012090	100120100	100120120		100120140				100	100
	110130100	110130120					+0.064 +0.029	120	110
12014090	120140100	120140120		120140140					120
	125145100	125145120					+0.076 +0.036	—	125
	130150100		130150130						130
	140160100			140160140					140
	150170100				150170150				150
	160180100				160180150				160
	170190100				170190150				170
	180200100				180200150				180
	190210100				190210150		+0.088 +0.042		190
					200230150	200230200			200

SPF 自润滑翻边轴套
SPF Metric Flanged Bushing





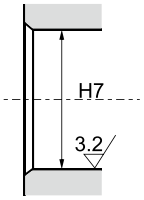




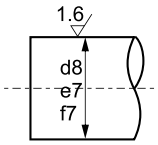
内径 E7 I.D. Ø d		外径 r6 O.D. Ø D		翻边 Flange Ø F	t		长度 L -0.1 -0.3 10	12	15	17	18	20	23	25
6	+0.032 +0.020	10	+0.028 +0.019	16			0610	0612						
8	+0.040 +0.025	12		20	2		0810	0812	0815					
10		14	+0.034 +0.023	22			1010	1012	1015	1017		1020		
12		18		25			1210	1212	1215			1220		1225
13		19		26			1310	1312	1315			1320		1325
14	+0.050 +0.032	20		27	3				1415			1420		1425
15		21	+0.041 +0.028	28			1510	1512	1515			1520		1525
16		22		29				1612	1615		1618	1620	1623	1625
18		24		32					1815			1820		1825
20		30		40					2015			2020		2025
25	+0.061 +0.040	35		45					2515			2520		2525
30		40		50								3020		3025
31.5			+0.050 +0.034									3120		
35		45		60	5							3520		3525
40	+0.075 +0.050	50		65								4020		4025
45		55		70		0 -0.1								
50		60	+0.060 +0.041	75										
55		65		80										
60		75		90										
63			+0.062 +0.043	85										
65	+0.090 +0.060	80		95	7.5									
70		85		105										
75		90	+0.073 +0.051	110										
80		100		120										
90		110	+0.076 +0.054	130										
100	+0.107 +0.072	120		150										
120		140	+0.088 +0.063	170	10									
130		150	+0.090 +0.065	180										
140	+0.125 +0.085	160		190										
150		170	+0.093 +0.068	200										
160		180		210										

SPF 自润滑翻边轴套
SPF Metric Flanged Bushing

Material	650 # + Graphite
材质	高力黄铜 + 石墨



Mating Housing
相配座孔



Mating Shaft
相配轴

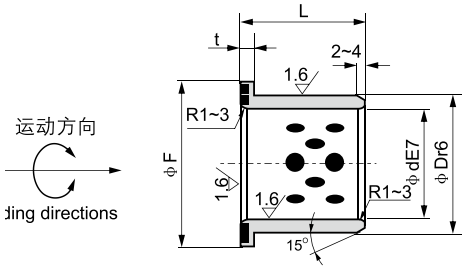
d8：High
e7：Light
f7：High

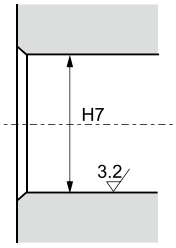
单位 (Unit): mm

长度 L $^{-0.1}_{-0.3}$									压装后内孔 I.D. After Press-Fitting	内径 I.D. Ø d
30	35	40	50	60	67.5	80	100	120		
									$^{+0.016}_{+0.004}$	6
									$^{+0.021}_{+0.006}$	8
										10
1230									$^{+0.031}_{+0.013}$	12
1330										13
										14
1530									$^{+0.026}_{+0.008}$	15
1630	1635	1640								16
1830	1835	1840								18
2030	2035	2040							$^{+0.037}_{+0.016}$	20
2530	2535	2540	2550						$^{+0.032}_{+0.011}$	25
3030	3035	3040	3050							30
3130	3135	3140								31.5
3530	3535	3540	3550						$^{+0.046}_{+0.021}$	35
4030	4035	4040	4050							40
4530	4535	4540	4550	4560						45
5030	5035	5040	5050	5060					$^{+0.040}_{+0.015}$	50
		5540		5560					$^{+0.055}_{+0.025}$	55
		6040	6050	6060		6080				60
					6367				$^{+0.053}_{+0.023}$	63
				6560						65
			7050			7080				70
				7560					$^{+0.046}_{+0.016}$	75
				8060		8080	80100			80
				9060		9080			$^{+0.060}_{+0.025}$	90
						10080	100100			100
						12080	120100		$^{+0.052}_{+0.017}$	120
						13080	130100		$^{+0.068}_{+0.028}$	130
						14080	140100			140
							150100	150120	$^{+0.065}_{+0.025}$	150
							160100	160120		160

SPFG 自润滑翻边轴套
SPFG Metric Flange Bushing





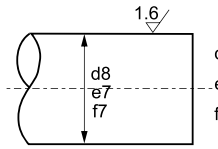


Mating Housing
相配座孔

内径 E7 I.D. Ø d		外径 r6 O.D. Ø D		翻边 Flange			长度 L $^{-0.1}_{-0.3}$								
				Ø F	t		10	11	12	13	15	18	20	23	25
6	+0.032 +0.020	10	+0.028 +0.019	20	3	0 -0.03	0610	0611	0612						
8	+0.040 +0.025	12	+0.034 +0.023	25					0812	0813	0815				
10		14								1013		1018			
12	+0.050 +0.032	18		30				1211				1218		1223	
13		19	+0.041 +0.028							1313		1318		1323	
15		21		35						1513		1518		1523	
16		22								1613		1618		1623	1625
18		24		40								1818		1823	
20	+0.061 +0.040	28		45	5								2020		2025
25		33	+0.050 +0.034	50									2520		2525
30		38		55									3020		3025
35	+0.075 +0.050	44		65									3520		3525
40		50		70	7										
50		62	+0.060 +0.041	90	8	0 -0.04									
60	+0.090 +0.060	74	+0.062 +0.043	110											
70		85	+0.073 +0.051	120	10										
80		96		140											

SPFG 自润滑翻边轴套
SPFG Metric Flange Bushing

Material	650 # + Graphite
材质	高力黄铜 + 石墨



d8：High load 高负荷
e7：Light load 轻负荷
f7：High precision 高精

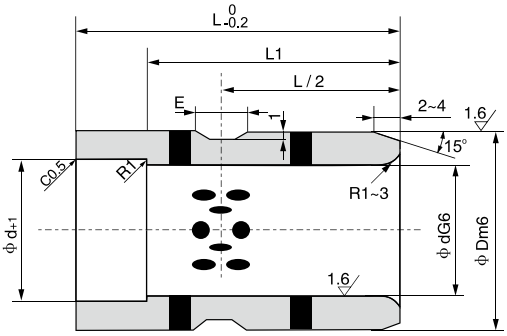
Mating Shaft
相配轴

单位 (Unit): mm

长度 $L_{-0.3}^{-0.1}$												压装后内孔 I.D. After Press-Fitting	内径 I.D. Ø d
27	35	37	38	47	48	50	58	60	68	80	90		
												+0.016 +0.004	6
												+0.021 +0.006	8
													10
												+0.031 +0.013	12
												+0.026 +0.008	13
													15
													16
													18
												+0.037 +0.016	20
												+0.032 +0.011	25
	3035												30
	3535											+0.046 +0.021	35
4027		4037		4047									40
			5038		5048		5058					+0.040 +0.015	50
			6038		6048		6058		6068			+0.053 +0.023	60
						7075				7080		+0.046 +0.016	70
								8060			8090		80

RGB 射出座导套
RGB Oilless Ejector Guide Bushing





Material	650 # + Graphite
材质	高力黄铜 + 石墨

运动方向
Sliding direction

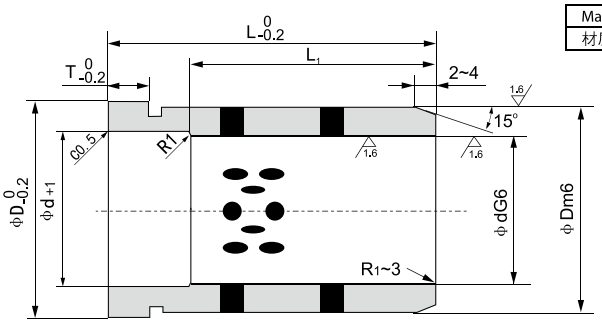
单位 (Unit): mm

型号规格 Standard No.	d	L	d G6		D m6		L1	
RGB-12 × 9	12	9	12	+0.017 +0.006	18	+0.018 +0.007	9	4
RGB-12 × 14		14					14	
RGB-12 × 19		19					19	
RGB-12 × 24		24					24	
RGB-16 × 14	16	14	16		25	+0.021 +0.008	14	6
RGB-16 × 19		19					19	
RGB-16 × 24		24					24	
RGB-16 × 29		29					29	
RGB-16 × 34		34					34	
RGB-16 × 39		39					35	
RGB-20 × 14	20	14	20	+0.020 +0.007	30		14	4
RGB-20 × 19		19					19	
RGB-20 × 24		24					24	6
RGB-20 × 29		29					29	
RGB-20 × 34		34					34	
RGB-20 × 39		39					39	
RGB-20 × 49		49					40	
RGB-25 × 24	25	24	25		35	+0.025 +0.009	24	8
RGB-25 × 29		29					29	
RGB-25 × 34		34					34	
RGB-25 × 39		39					39	
RGB-25 × 49		49					49	
RGB-25 × 59		59					50	
RGB-30 × 29	30	29	30		42		29	
RGB-30 × 34		34					34	
RGB-30 × 39		39					39	
RGB-30 × 49		49					49	
RGB-30 × 59		59					59	
RGB-30 × 69		69					60	
RGB-30 × 79		79						

型号规格 Standard No.	d	L	d G6		D m6		L1	E
RGB-35 × 29	35	29	35	+0.025 +0.009	48	+0.025 +0.009	29	8
RGB-35 × 39		34					34	
RGB-35 × 39		39					39	
RGB-35 × 49		49					49	
RGB-35 × 59		59					59	
RGB-35 × 69		69					69	
RGB-35 × 79		79					70	
RGB-40 × 39	40	39	40		55	+0.030 +0.011	39	10
RGB-40 × 49		49					49	
RGB-40 × 59		59					59	
RGB-40 × 69		69					69	
RGB-40 × 79		79					79	
RGB-40 × 89		89					80	
RGB-50 × 49	50	49	50		70		49	
RGB-50 × 59		59					59	
RGB-50 × 69		69					69	
RGB-50 × 79		79					79	
RGB-50 × 89		89					89	
RGB-50 × 99		99					90	
RGB-60 × 59	60	59	60	+0.029 +0.010	80		59	
RGB-60 × 69		69					69	
RGB-60 × 79		79					79	
RGB-60 × 89		89					89	
RGB-60 × 99		99					90	
RGB-60 × 109		109						
RGB-80 × 69	80	69	80		100	+0.035 +0.013	69	
RGB-80 × 79		79					79	
RGB-80 × 89		89					89	
RGB-80 × 99		99					99	
RGB-80 × 109		109					100	
RGB-80 × 119		119						

RGBF 自润滑翻边导向套
RGBF Oilless Ejector Guide Bushing





Material	650 # + Graphite
材质	高力黄铜 + 石墨

运动方向
Sliding direction

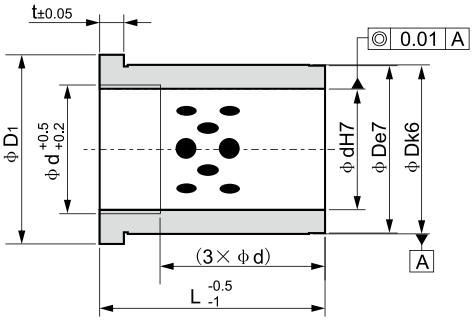
单位 (Unit): mm

型号规格 Standard No.	d	L	d G6		D m6		D_1	T	L_1
RGBF-12 × 19	12	19	12	+0.017 +0.006	18	+0.018 +0.007	25	4	19
RGBF-12 × 24		24							24
RGBF-12 × 29		29							29
RGBF-12 × 34		34							34
RGBF-16 × 19	16	19	16		25	+0.021 +0.008	30	6	19
RGBF-16 × 24		24							24
RGBF-16 × 29		29							29
RGBF-16 × 34		34							30
RGBF-16 × 39		39							
RGBF-16 × 49		49							
RGBF-20 × 24	20	24	20	+0.020 +0.007	30	+0.025 +0.009	35	8	24
RGBF-20 × 29		29							29
RGBF-20 × 34		34							34
RGBF-20 × 39		39							39
RGBF-20 × 49		49							40
RGBF-20 × 59		59							
RGBF-25 × 24	25	24	25		35		40		24
RGBF-25 × 29		29							29
RGBF-25 × 34		34							34
RGBF-25 × 39		39							39
RGBF-25 × 49		49							49
RGBF-25 × 59		59							50
RGBF-25 × 69		69							
RGBF-30 × 29	30	29	30		42		47		29
RGBF-30 × 34		34							34
RGBF-30 × 39		39							39
RGBF-30 × 49		49							49
RGBF-30 × 59		59							59
RGBF-30 × 69		69							60
RGBF-30 × 79		79							

型号规格 Standard No.	d	L	d G6		D m6		D_1	T	L_1
RGBF-35 × 39	35	39	35	+0.025 +0.009	48	+0.025 +0.009	54	10	39
RGBF-35 × 49		49							49
RGBF-35 × 59		59							59
RGBF-35 × 69		69							69
RGBF-35 × 79		79							70
RGBF-35 × 89		89							
RGBF-35 × 99		99							
RGBF-40 × 39	40	39	40		55		61		39
RGBF-40 × 49		49							49
RGBF-40 × 59		59							59
RGBF-40 × 69		69							69
RGBF-40 × 79		79							79
RGBF-40 × 89		89							80
RGBF-40 × 99		99							
RGBF-40 × 109		109							
RGBF-50 × 49	50	49	50	+0.030 +0.011	70		76	12	49
RGBF-50 × 59		59							59
RGBF-50 × 69		69							69
RGBF-50 × 79		79							79
RGBF-50 × 89		89							89
RGBF-50 × 99		99							90
RGBF-50 × 109		109							
RGBF-50 × 119		119							
RGBF-60 × 99	60	99	60	+0.029 +0.010	80		86	15	99
RGBF-60 × 109		109							109
RGBF-60 × 119		119							110
RGBF-60 × 129		129							
RGBF-60 × 149		149							

SOST 自润滑翻边导向套
SOST Oilless Flanged Guide Bushing



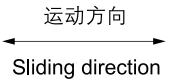


型号规格 Standard No.	d	L	t	D	Tolerance e7	Tolerance k6	D_1	d H7	
SOST-9×12	9	12	3	14	-0.032 -0.050	+0.012 +0.001	16	9	+0.015 0
SOST-9×17		17							
SOST-9×22		22							
SOST-9×27		27							
SOST-9×36		36						10	
SOST-10×12	10	12							
SOST-10×17		17							
SOST-10×22		22							
SOST-10×27		27							
SOST-10×36		36							
SOST-12×17	12	17	6	18			23	12	+0.018 0
SOST-12×22		22							
SOST-12×27		27							
SOST-12×36		36							
SOST-14×17	14	17		20	-0.040 -0.061	+0.015 +0.002	25	14	
SOST-14×22		22							
SOST-14×27		27							
SOST-14×36		36							
SOST-14×46		46							
SOST-14×56		56							
SOST-17×17	17	17						25	
SOST-17×22		22							
SOST-17×27		27							
SOST-17×36		36							
SOST-17×46		46							
SOST-17×56		56							

型号规格 Standard No.	d	L	t	D	Tolerance e7	Tolerance k6	D_1	d H7	
SOST-16×17	16	17	6	22	-0.040 -0.061	+0.015 +0.002	27	16	+0.018 0
SOST-16×22		22							
SOST-16×27		27							
SOST-16×36		36							
SOST-16×46		46							
SOST-16×56		56							
SOST-18×17	18	17		26			31	18	
SOST-18×22		22							
SOST-18×27		27							
SOST-18×36		36							
SOST-18×46		46							
SOST-18×56		56							
SOST-18×66		66							
SOST-20×17	20	17						20	+0.021 0
SOST-20×22		22							
SOST-20×27		27							
SOST-20×36		36							
SOST-20×46		46							
SOST-20×56		56							
SOST-20×66		66							

SOST 自润滑翻边导向套
SOST Oilless Flanged Guide Bushing

Material	650 # + Graphite
材质	高力黄铜 + 石墨

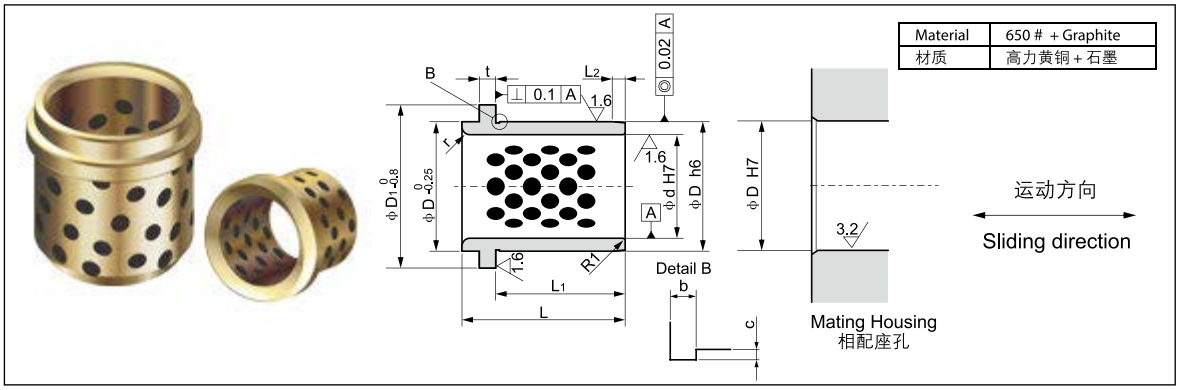


单位 (Unit): mm

型号规格 Standard No.	d	L	t	D	Tolerance e7	Tolerance k6	D_1	d H7	
SOST-22×22	22	22	6	30	-0.040 -0.061	+0.015 +0.002	35	22	+0.021 0
SOST-22×27		27							
SOST-22×36		36							
SOST-22×46		46							
SOST-22×56		56							
SOST-22×66		66							
SOST-22×76		76							
SOST-22×86		86							
SOST-24×17	24	17						24	
SOST-24×22		22							
SOST-24×27		27							
SOST-24×36		36							
SOST-24×46		46							
SOST-24×56		56							
SOST-24×66		66							
SOST-24×76		76							
SOST-24×86		86							
SOST-30×27	30	27		42	-0.050 -0.075	+0.018 +0.002	47	30	
SOST-30×36		36							
SOST-30×46		46							
SOST-30×56		56							
SOST-30×66		66							
SOST-30×76		76							
SOST-30×86		86							
SOST-30×96		96							
SOST-30×116		116							
SOST-32×27	32	27						32	+0.025 0
SOST-32×36		36							
SOST-32×46		46							
SOST-32×56		56							
SOST-32×66		66							
SOST-32×76		76							
SOST-32×86		86							
SOST-32×96		96							
SOST-32×116		116							

型号规格 Standard No.	d	L	t	D	Tolerance e7	Tolerance k6	D_1	d H7	
SOST-40×56	40	56	10	54	-0.060 -0.090	+0.021 +0.002	60	40	+0.025 0
SOST-40×66		66							
SOST-40×76		76							
SOST-40×86		86							
SOST-40×96		96							
SOST-40×116		116							
SOST-40×136		136							
SOST-40×156		156							
SOST-42×56	42	56						42	
SOST-42×66		66							
SOST-42×76		76							
SOST-42×86		86							
SOST-42×96		96							
SOST-42×116		116							
SOST-42×136		136							
SOST-42×156		156							
SOST-50×76	50	76		66			72	50	
SOST-50×86		86							
SOST-50×96		96							
SOST-50×116		116							
SOST-50×136		136							
SOST-50×156		156							
SOST-50×196		196							
SOST-60×96	60	96	20	80			86	60	+0.030 0
SOST-60×116		116							
SOST-60×136		136							
SOST-60×156		156							
SOST-60×196		196							

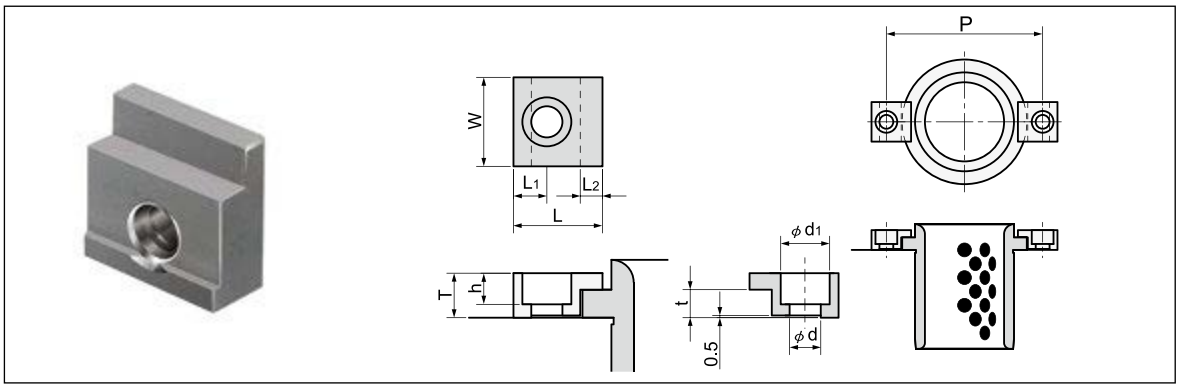
DIN9834 自润导套
DIN9834 Oilless Guide Bushing



单位 (Unit): mm

型号规格 Standard No.	d H7		D h6		L	D_1	L_1	L_2	t	r	bxc	P
DIN9834-025	25	+0.021 0	32	0 -0.016	40	40	30	3	6.3	3	0.6x0.3	58
DIN9834-032	32	+0.025 0	40		50	50	40	4				66
DIN9834-040	40		50		63	63	50	5				79
DIN9834-050	50		63	0 -0.019	71	71	56	6.3		5		89
DIN9834-063	63	+0.030 0	80		80	90	63	8	10	6	1.0x0.4	123
DIN9834-080	80		100	0 -0.022	100	112	80	10		8		143
DIN9834-100	100		125	0 -0.025	125	140	106	12.5		10		168
DIN9834-125	125	+0.040 0	160		160	180	132	16		12		203
DIN9834-160	160		200	0 -0.029	200	220	170	16		18		243

Clamp VDI-KL(JNA)



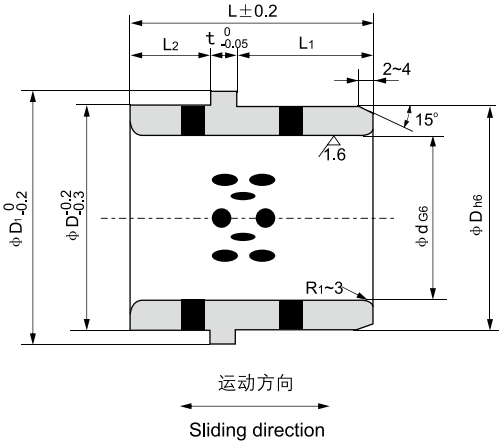
单位 (Unit): mm

型号规格 Standard No.	W	L	T	L_1	L_2	t	d	d_1	h	Applicable Bushing ID
VDI-KL-6	20	20	10	7.5	5	6.3	7	11	7	Ø25~Ø50
VDI-KL-10	32	32	16	11	10	10	11.5	17.5	11.5	Ø63~Ø160

SEGB / SEGBK 塑胶模射出座导套
SEGB / SEGBK Oilless Ejector Guide Bushing

Material	650 # + Graphite
材质	高力黄铜 + 石墨



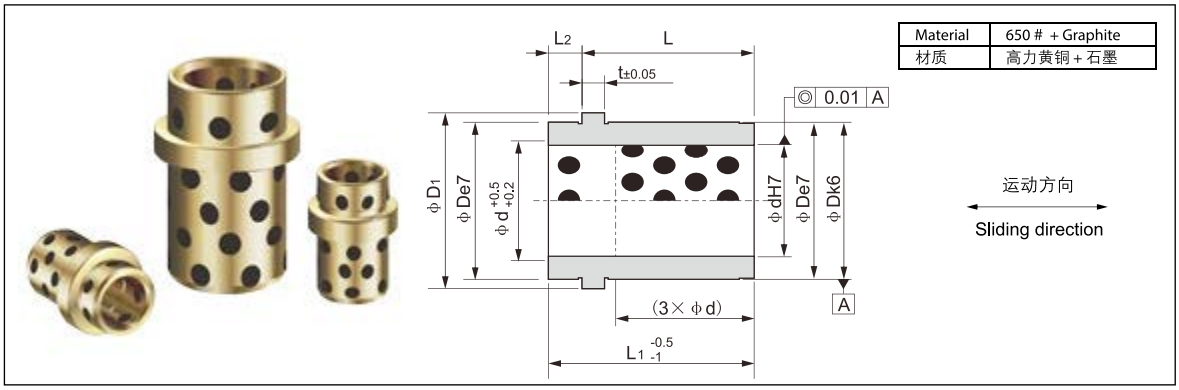


单位 (Unit): mm

型号规格 Standard No.	d	L	d G6		D h6		D_1	L_1	L_2	t
SEGB-16 × 26	16	26	16	+0.017 +0.006	25	0 -0.013	30	12	10	4
SEGB-16 × 28		28						14		
SEGB-16 × 33		33						19		
SEGB-16 × 38		38						24		
SEGB-20 × 26	20	26	20	+0.020 +0.007	30		35	12		
SEGB-20 × 28		28						14		
SEGB-20 × 33		33						19		
SEGB-20 × 38		38						24		
SEGB-25 × 26	25	26	25		35		40	12		
SEGB-25 × 28		28						14		
SEGB-25 × 33		33						19		
SEGB-25 × 38		38						24		
SEGB-30 × 33	30	33	30		46	0 -0.016	45	14	15	
SEGB-30 × 38		38						19		
SEGB-30 × 46		43						24		
SEGB-35 × 38	35	38	35		52		50	19		
SEGB-35 × 43		43						24		
SEGB-35 × 48		48						29		
SEGB-40 × 48	40	48	40	+0.025 +0.009			57	24	20	
SEGB-40 × 53		53						29		
SEGB-50 × 48	50	48	50		62	0 -0.019	67	24		
SEGB-50 × 53		53						29		

型号规格 Standard No.	d	L	d G6		D h6		D_1	L_1	L_2	t
SEGBK-25 × 33	25	33	25	+0.020 +0.007	35	0 -0.016	40	19	6	8
SEGBK-25 × 38		38						24		
SEGBK-30 × 48	30	48	30		40		45	29	11	
SEGBK-30 × 47		47			42		47	24	15	
SEGBK-30 × 52		52						29		
SEGBK-35 × 63	35	63	35	+0.025 +0.009	45		50	39	16	
SEGBK-40 × 60	40	60	40		50		55	32	20	
SEGBK-40 × 70		70						42		
SEGBK-40 × 78		78						49	21	
SEGBK-40 × 57		57			55		60	24	25	
SEGBK-40 × 67		67						29	30	
SEGBK-45 × 88	45	88	45					59	21	
SEGBK-45 × 95		98						69		
SEGBK-50 × 67	50	67	50		62	0 -0.019	67	29	30	
SEGBK-50 × 87		87						39	40	
SEGBK-60 × 67	60	67	60	+0.029 +0.010	74		82	29	30	
SEGBK-60 × 87		87						39	40	

SOSG 射出头自润导套
SOSG Ejector Guide Bushig



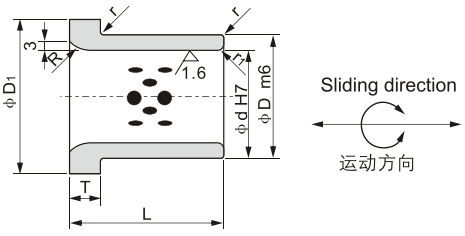
单位 (Unit): mm

型号规格 Standard No.	d	L	L_1	L_2	t	D	Toleramce e7	Toleramce k6	D_1	L_1	L_1
SOSG-9×15		12	15								
SOSG-9×20		17	20								
SOSG-9×25	9	22	25							9	
SOSG-9×30		27	30								
SOSG-9×39		36	39	3	3	14	-0.032 -0.050	+0.012 +0.001	16		+0.015 0
SOSG-10×15		12	15								
SOSG-10×20		17	20								
SOSG-10×25	10	22	25							10	
SOSG-10×30		27	30								
SOSG-10×39		36	39								
SOSG-14×26		17	26								
SOSG-14×31		22	31								
SOSG-14×36	14	27	36							14	
SOSG-14×45		36	45								
SOSG-14×55		46	55								
SOSG-14×65		56	65			20			25		
SOSG-15×26		17	26								
SOSG-15×31		22	31								
SOSG-15×36	15	27	36							15	+0.018 0
SOSG-15×45		36	45								
SOSG-15×55		46	55								
SOSG-15×65		56	65								
SOSG-18×26		17	26								
SOSG-18×31		22	31								
SOSG-18×36		27	36								
SOSG-18×45	18	36	45							18	
SOSG-18×55		46	55								
SOSG-18×65		56	65	9	6		-0.040 -0.061	+0.015 +0.002			
SOSG-18×75		66	75			26			31		
SOSG-20×26		17	26								
SOSG-20×31		22	31								
SOSG-20×36		27	36								
SOSG-20×45	20	36	45							20	
SOSG-20×55		46	55								
SOSG-20×65		56	65								
SOSG-20×75		66	75								
SOSG-22×26		17	26								
SOSG-22×31		22	31								
SOSG-22×36		27	36								
SOSG-22×45		36	45								
SOSG-22×55	22	46	55			30			35	22	+0.021 0
SOSG-22×65		56	65								
SOSG-22×75		66	75								
SOSG-22×85		76	85								
SOSG-22×95		86	95								

型号规格 Standard No.	d	L	L_1	L_2	t	D	Toleramce e7	Toleramce k6	D_1	L_1	L_1
SOSG-24×26		17	26								
SOSG-24×31		22	31								
SOSG-24×36		27	36								
SOSG-24×45		36	45								
SOSG-24×55	24	46	55			30	-0.040 -0.061	+0.015 +0.002	35	24	
SOSG-24×65		56	65								
SOSG-24×75		66	75								
SOSG-24×85		76	85								
SOSG-24×95		86	95								+0.021 0
SOSG-30×36		27	36								
SOSG-30×45		36	45								
SOSG-30×55		46	55								
SOSG-30×65		56	65								
SOSG-30×75	30	66	75	9	6					30	
SOSG-30×85		76	85								
SOSG-30×95		86	95								
SOSG-30×105		96	105								
SOSG-30×125		116	125			42	-0.050 -0.075	+0.018 +0.002	47		
SOSG-32×36		27	36								
SOSG-32×45		36	45								
SOSG-32×55		46	55								
SOSG-32×65		56	65								
SOSG-32×75	32	66	75							32	
SOSG-32×85		76	85								
SOSG-32×95		86	95								
SOSG-32×105		96	105								
SOSG-32×125		116	125								
SOSG-40×68		56	68								
SOSG-40×78		66	78								
SOSG-40×88		76	88								
SOSG-40×98	40	86	98							40	
SOSG-40×108		96	108								
SOSG-40×128		116	128								
SOSG-40×148		136	148								
SOSG-40×168		156	168								+0.025 0
SOSG-42×68		56	68	12	10	54	-0.060 -0.090	+0.021 +0.002	60		
SOSG-42×78		66	78								
SOSG-42×88		76	88								
SOSG-42×98	42	86	98							42	
SOSG-42×108		96	108								
SOSG-42×128		116	128								
SOSG-42×148		136	148								
SOSG-42×168		156	168								

SGF 自润导套
SGF Guide Bushing





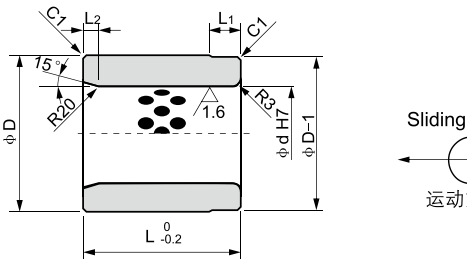
Material	650 # + Graphite
材质	高力黄铜 + 石墨

单位 (Unit): mm

型号规格 Standard No.	d	L	d h7		D	m_6	D_1	T	R	r1	r_1
SGF-25 × 40	25	40	25	+0.021 0	35	+0.025 +0.009	45	7	10	1	2
SGF-30 × 50	30	50	30		40		50	10			
SGF-40 × 70	40	70	40	+0.025 0	55	+0.030 +0.011	65		20	2	
SGF-50 × 80	50	80	50		65		75				
SGF-60 × 80	60		60	+0.030 0	75		85				
SGF-65 × 80	65		65		80		90				
SGF-65 × 120		120									
SGF-80 × 100	80	100	80		100	+0.035 +0.013	110				
SGF-80 × 140		140									
SGF-100 × 100	100	100	100	+0.035 0	120		130				
SGF-100 × 140		140									

FGB, SGB 自润滑轴套
FGB, SGB Oilless Wear Plate





JPBF	FC250 # + Graphite
	铸铁+石墨
JPBW	650 # + Graphite
	高力黄铜 + 石墨

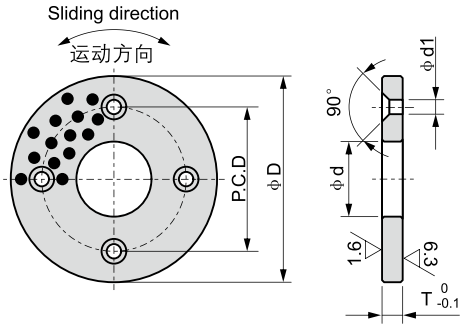
单位 (Unit): mm

型号规格 Standard No.	d	d H7		D	Tolerance 公差	L	L_1	L_2
FGB SGB	25	25	+0.021 0	40	± 0.008	40	10	5
	30	30		50		50		
	35	35	+0.025 0	60	± 0.0095	55	15	
	40	40				60	10	
	50	50		70		75	15	10
	60	60	+0.030 0	80	± 0.011	90	20	
	80	80		100		120	25	
	100	100	+0.035 0	120		150		
	120	120		140	± 0.0125	180		

SPW 标准止推垫片
SPW Oilless Thrust Washer

Material	650 # + Graphite
材质	高力黄铜 + 石墨

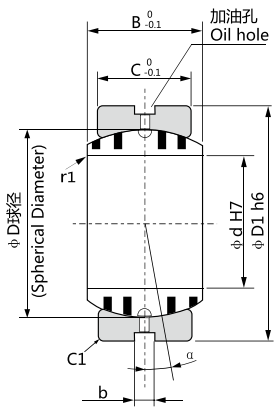


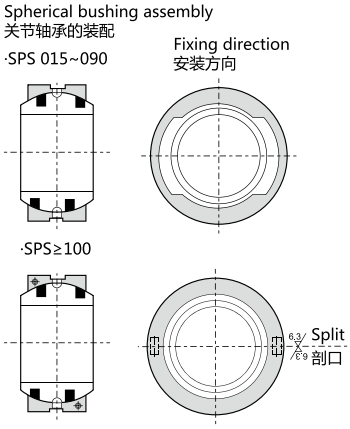


单位 (Unit): mm

型号规格 Standard No.	I.D. Ø d 内径		O.D. Ø D 外径	厚度 Thickness		螺丝孔 Screw Holes			
						P.C.D	Nunber of Holes 数量	Flat Head Screw 规格	d1
JTW-0603	6.2	+0.2 +0.1	25	3	0 -0.1	15	2	M3	3.5
JTW-0803	8.2		28			18			
JTW-1003	10.2		30			20			
JTW-1203	12.2		40			28			
JTW-1203N						Without flat head screw hole 无定位孔			
JTW-1303	13.2					28	2	M3	3.5
JTW-1403	14.2								
JTW-1503	15.2		50			35			
JTW-1603	16.2								
JTW-1603N						Without flat head screw hole 无定位孔			
JTW-1803	18.2					35	2	M3	3.5
JTW-2005	20.2			5				M5	6
JTW-2505	25.2		55			40			
JTW-3005	30.2		60			45			
JTW-3505	35.2		70			50			
JTW-4007	40.2		80	7		60		M6	7
JTW-4507	45.2		90			70			
JTW-5008	50.3	+0.3 +0.1	100	8		75	4		
JTW-5508	55.3		110			85			
JTW-6008	60.3		120			90		M8	9
JTW-6508	65.3		125			95			
JTW-7010	70.3		130	10		100			
JTW-7510	75.3		140			110			
JTW-8010	80.3		150			120			
JTW-9010	90.5		170			140		M10	11
JTW-10010	100.5		190			160			
JTW-12010	120.5		200			175			

SPS 自润滑关节轴承
SPS Metric Spherical Bushing





Inner ring 内圈	Material 材质	650 # + Gr/石墨
Outer ring 外圈	Material	S45C
	Hardness 硬度	HRC 25~30

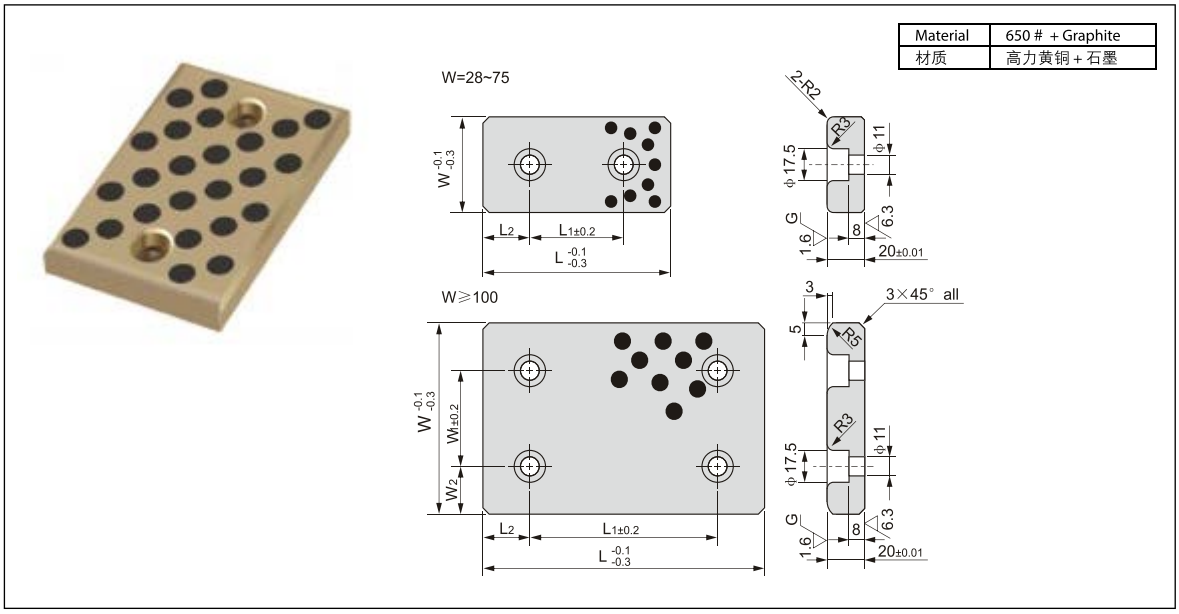
座孔 Housing: H7
轴 Shaft: g6



单位 (Unit): mm

型号规格 Standard No.	d	H7	D1	h6	B	C	D	b	调整角度Alignment Angle α°	径向承载Allowable Radial Load (kN)	径向承载Allowable Thrust Load (kN)
SPS-015	15	+0.018 0	26	0 -0.013	12	9	22	4	8	6.5	0.5
SPS-020	20	+0.021 0	32	0 -0.016	16	14	28		4	12.6	1.4
SPS-025	25		42		21	18	36		5	21.8	2.5
SPS-030	30		50		27	23	44		6	32.0	3.5
SPS-035	35	+0.025 0	55	0 -0.019	30	26	49		5	43.7	4.8
SPS-040	40		62		33	28	55		6	54.7	5.7
SPS-045	45		72		36	31	62		5	69.7	7.2
SPS-050	50		80		42	36	70			92.4	10
SPS-060	60	+0.030 0	100	0 -0.022	53	45	90		6	143	16
SPS-070	70		110		58	50	99		5	181	20
SPS-080	80		130		70	60	115		6	254	30
SPS-090	90	+0.035 0	140	0 -0.025	76	65	125			313	36
SPS-100	100		160		88	75	145	6		544	64
SPS-110	110		170		93	80	155		5	642	73
SPS-120	120		190	0 -0.029	105	90	172		6	797	94
SPS-130	130	+0.040 0	200		110	95	180		5	880	105
SPS-140	140		210		90	70			7	668	56
SPS-150	150		220		120	105	200		5	1135	129
SPS-160	160		230		105	80			8	891	73
SPS-180	180		260	0 -0.032	105		225		6	1002	74
SPS-200	200	+0.046 0	290		130	100	250		7	1434	117
SPS-220	220		320		135		275		8	1577	118
SPS-240	240		340	0 -0.036	140		300	9		1720	118
SPS-260	260	+0.052 0	370		150	110	325		7	2072	143
SPS-280	280		400		155	120	350		6	2455	172
SPS-300	300		430	0 -0.040	165	120	375		7	2630	172

JESW 自润滑板
JESW Oilless Wear Plate

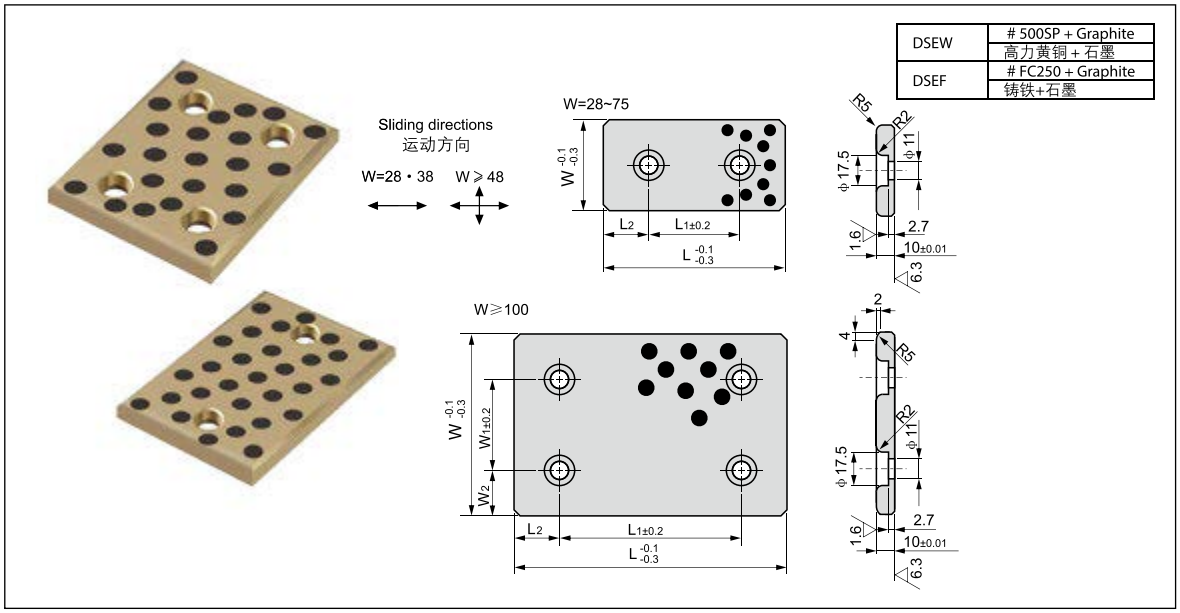


单位 (Unit): mm

型号规格 Standard No.	W	L	W_1	W_2	L_1	L_2
JESW-28×75	28	75	-	-	45	15
JESW-28×100		100			50	25
JESW-28×150		150			100	
JESW-38×75	38	75			45	15
JESW-38×100		100			50	25
JESW-38×150		150			100	
JESW-48×75	48	75			45	15
JESW-48×100		100			50	25
JESW-48×125		125			75	
JESW-48×150		150			100	
JESW-48×200		200			150	
JESW-58×75	58	75			45	15
JESW-58×100		100			50	25
JESW-58×150		150			100	
JESW-75×75	75	75			25	
JESW-75×100		100			50	
JESW-75×125		125			75	
JESW-75×150		150			100	
JESW-75×200		200			150	

型号规格 Standard No.	W	L	W_1	W_2	L_1	L_2
JESW-100×100	100	100	50	25	50	25
JESW-100×125		125			75	
JESW-100×150		150			100	
JESW-100×200		200			150	
JESW-100×250		250			200	
JESW-100×300		300				50
JESW-125×125	125	125		37.5	75	25
JESW-125×150		150			100	
JESW-125×200		200			150	
JESW-125×250		250			200	
JESW-125×300		300				50
JESW-125×350		350				75
JESW-150×150	150	150	100	25	100	25
JESW-150×200		200			150	
JESW-150×250		250			200	

SPWP 自润滑板
SPWP Oilless Wear Plate

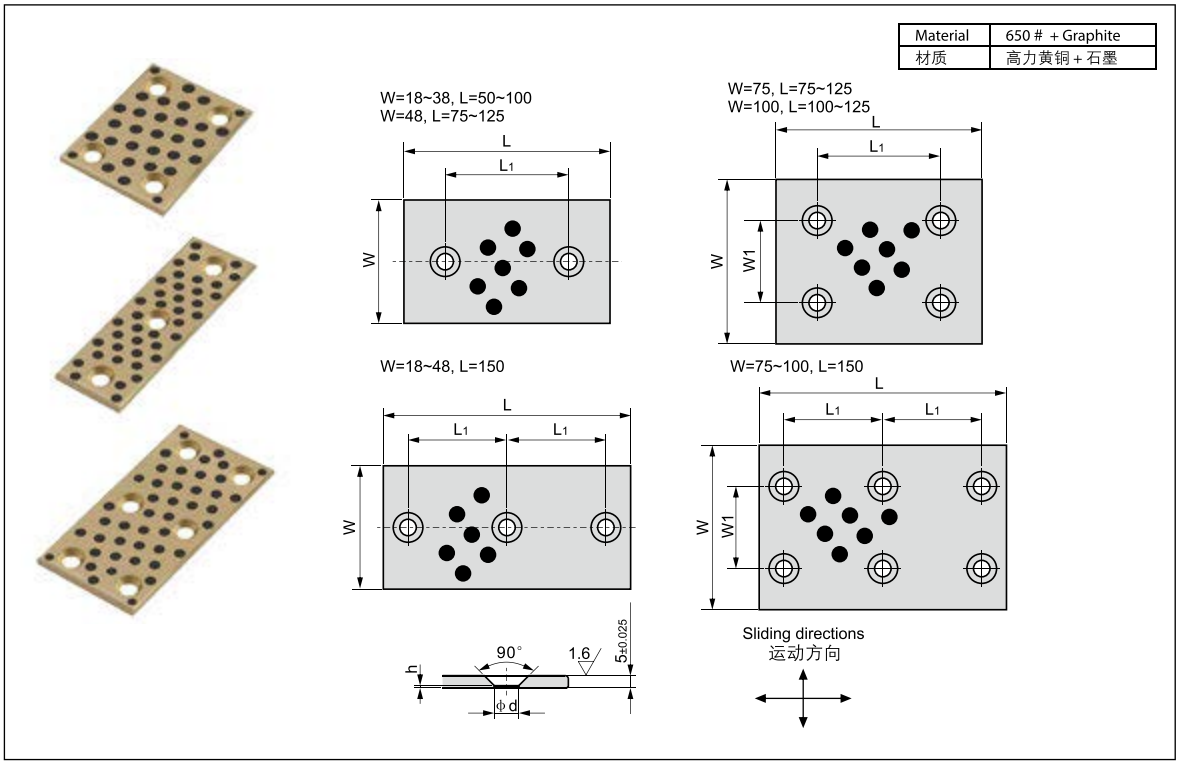


单位 (Unit): mm

型号规格 Standard No.	W	L	W_1	W_2	L_1	L_2
SPWP-28 × 75	28	75	-	-	45	15
SPWP-28 × 100		100			50	25
SPWP-28 × 125		125			75	
SPWP-28 × 150		150			100	
SPWP-38 × 75	38	75			45	15
SPWP-38 × 100		100			50	25
SPWP-38 × 125		125			75	
SPWP-38 × 150		150			100	
SPWP-48 × 75	48	75			45	15
SPWP-48 × 100		100			50	25
SPWP-48 × 125		125			75	
SPWP-48 × 150		150			100	
SPWP-48 × 200		200			150	
SPWP-58 × 75	58	75			45	15
SPWP-58 × 100		100			50	25
SPWP-58 × 150		150			100	

型号规格 Standard No.	W	L	W_1	W_2	L_1	L_2
SPWP-75 × 75	75	75	-	-	25	25
SPWP-75 × 100		100			50	
SPWP-75 × 125		125			75	
SPWP-75 × 150		150			100	
SPWP-75 × 200		200			150	
SPWP-100 × 100	100	100	50	25	50	
SPWP-100 × 125		125			75	
SPWP-100 × 150		150			100	
SPWP-100 × 200		200			150	
SPWP-100 × 250		250			200	
SPWP-125 × 150	125	150		37.5	100	
SPWP-125 × 200		200			150	
SPWP-125 × 250		250			200	
SPWP-150 × 150	150	150	100	25	100	
SPWP-150 × 200		200			150	

JUWP 自润滑板
JUWP Oilless Wear Plate



单位 (Unit): mm

型号规格 Standard No.	W	L	W_1	L_1	d	h	螺栓Mounting Bolt
JUWP 18 × 50	18	50	-	20	6.5	1.5	M6
JUWP 18 × 75		75		45			
JUWP 18 × 100		100		70			
JUWP 18 × 150		150		60			
JUWP 28 × 50	28	50	-	20	10	0.8	M8
JUWP 28 × 75		75		45			
JUWP 28 × 100		100		70			
JUWP 28 × 150		150		60			
JUWP 38 × 50	38	50	-	20			
JUWP 38 × 75		75		45			
JUWP 38 × 100		100		70			
JUWP 38 × 150		150		60			

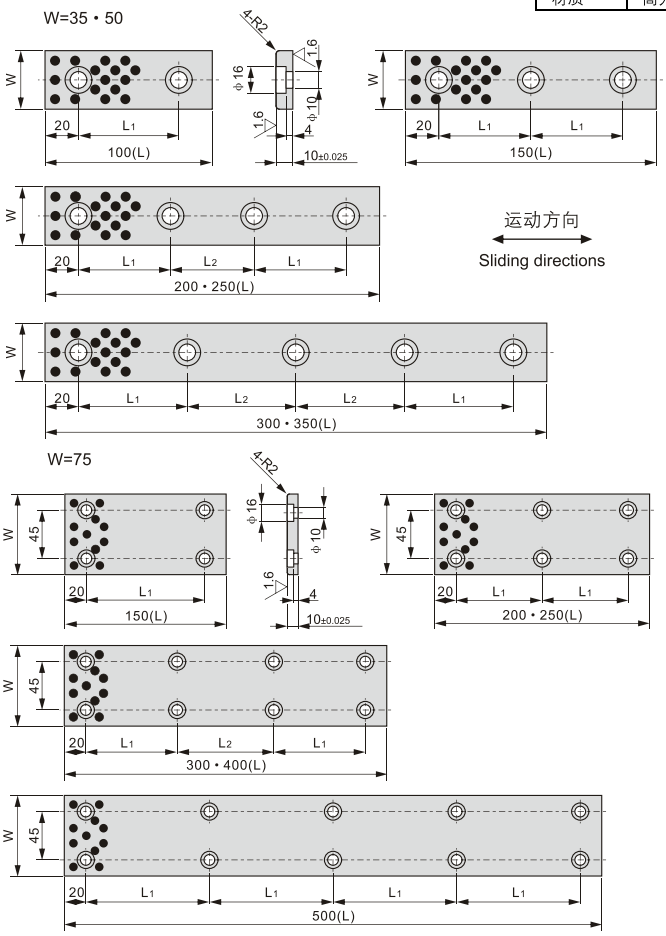
型号规格 Standard No.	W	L	W_1	L_1	d	h	螺栓Mounting Bolt
JUWP 48 × 75	48	75	-	45	10	0.8	M8
JUWP 48 × 100		100		70			
JUWP 48 × 125		125		95			
JUWP 48 × 150		150		60			
JUWP 75 × 75	75	75	45	45			
JUWP 75 × 100		100		70			
JUWP 75 × 125		125		95			
JUWP 75 × 150		150		60			
JUWP 100 × 100	100	100	70	70			
JUWP 100 × 125		125		95			
JUWP 100 × 150		150		60			

JOLP 自润滑板
JOLP Oilless Wear Plate





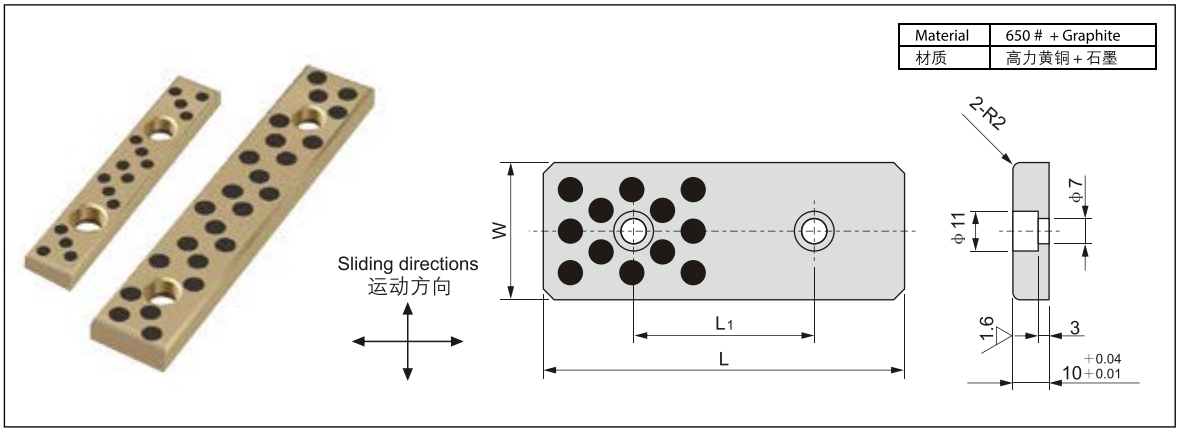
Material	650 # + Graphite
材质	高力黄铜 + 石墨



单位 (Unit): mm

型号规格 Standard No.	W	L	螺栓位置 Bolt Position		螺栓数量 Bolt Q'ty
			L_1	L_2	
JOLP-35 × 100	35	100	60	-	2
JOLP-35 × 150		150	55	-	3
JOLP-35 × 200		200	55	50	4
JOLP-35 × 250		250	70	70	
JOLP-35 × 300		300	65	65	5
JOLP-35 × 350		350	80	75	
JOLP-50 × 100	50	100	60	-	2
JOLP-50 × 150		150	55	-	3
JOLP-50 × 200		200	55	50	4
JOLP-50 × 250		250	70	70	
JOLP-50 × 300		300	65	65	5
JOLP-50 × 350		350	80	75	
JOLP-75 × 150	75	150	110	-	4
JOLP-75 × 200		200	80	-	6
JOLP-75 × 250		250	105	-	
JOLP-75 × 300		300	85	90	8
JOLP-75 × 400		400	120	120	
JOLP-75 × 500		500	115	-	10

JOML 自润滑板
JOML Oilless Wear Plate



单位 (Unit): mm

型号规格 Standard No.	W	L	L_1
JOML-18×75	18	75	45
JOML-18×100		100	50
JOML-18×125		125	75
JOML-18×150		150	100
JOML-28×75	28	75	45
JOML-28×100		100	50
JOML-28×125		125	75
JOML-28×150		150	100
JOML-38×75	38	75	45
JOML-38×100		100	50
JOML-38×125		125	75
JOML-38×150		150	100
JOML-48×75	48	75	45
JOML-48×100		100	50
JOML-48×125		125	75
JOML-48×150		150	100

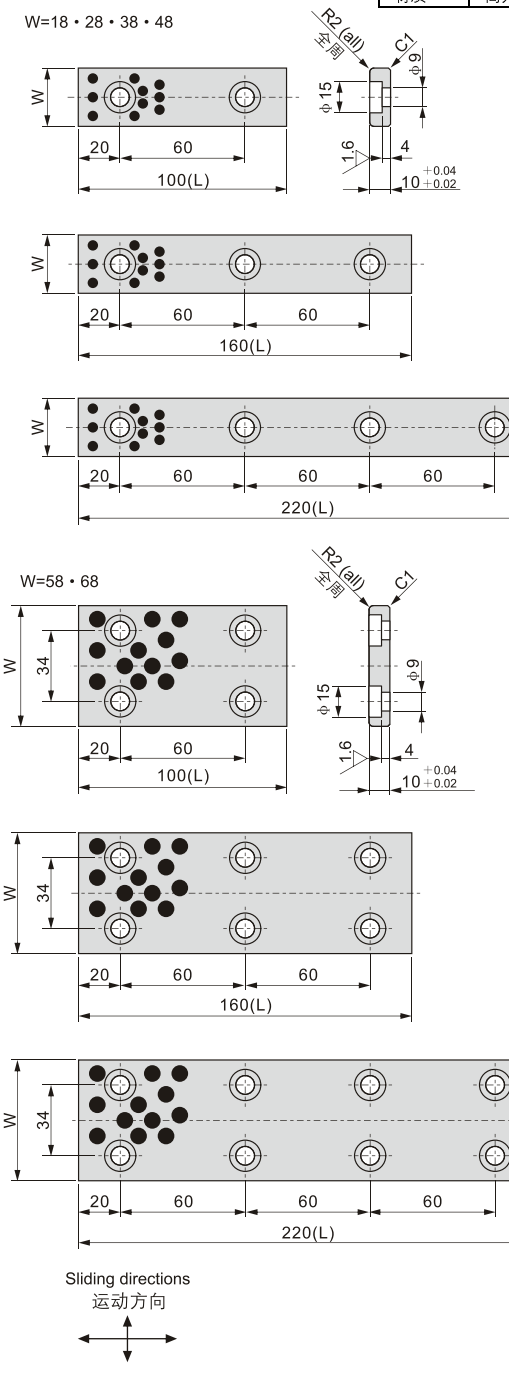
JTLP 自润滑板
JTLP Oilless Wear Plate



单位 (Unit): mm

型号规格 Standard No.	W	L
JTLP-18×100	18	100
JTLP-18×160		160
JTLP-18×220		220
JTLP-28×100	28	100
JTLP-28×160		160
JTLP-28×220		220
JTLP-38×100	38	100
JTLP-38×160		160
JTLP-38×220		220
JTLP-48×100	48	100
JTLP-48×160		160
JTLP-48×220		220
JTLP-58×100	58	100
JTLP-58×160		160
JTLP-58×220		220
JTLP-68×100	68	100
JTLP-68×160		160
JTLP-68×220		220

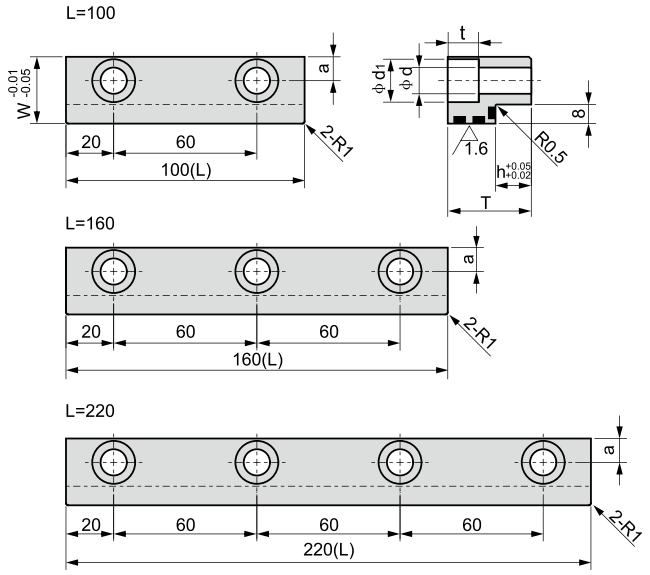
Material	650 # + Graphite
材质	高力黄铜 + 石墨



JGLDW 自润导轨
JGLDW Oilless Guide Rail



Material	650 # + Graphite
材质	高力黄铜 + 石墨

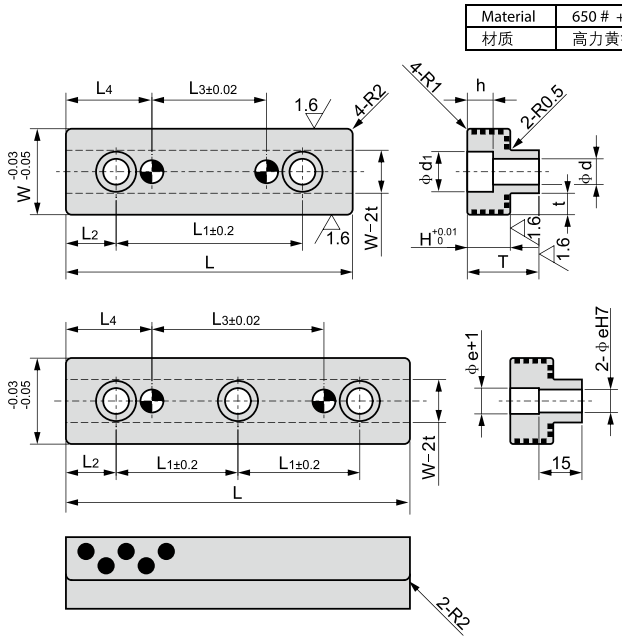


单位 (Unit): mm

型号规格 Standard No.	W	L	T	a	d	d_1	h	t
JGLDW-23x100	23	100	30	7.5	7	11	15	7
JGLDW-23x160		160						
JGLDW-23x220		220						
JGLDW-23x100		100	41				26	
JGLDW-23x160		160						
JGLDW-23x220		220						
JGLDW-28x100	28	100	25	10	11	18	10	13
JGLDW-28x160		160						
JGLDW-28x220		220						
JGLDW-28x100		100	35				15	
JGLDW-28x160		160						
JGLDW-28x220		220						
JGLDW-28x100		100	56				26	
JGLDW-28x160		160						
JGLDW-28x220		220						

JTGLW 自润导轨
JTGLW Oilless Guide Rail

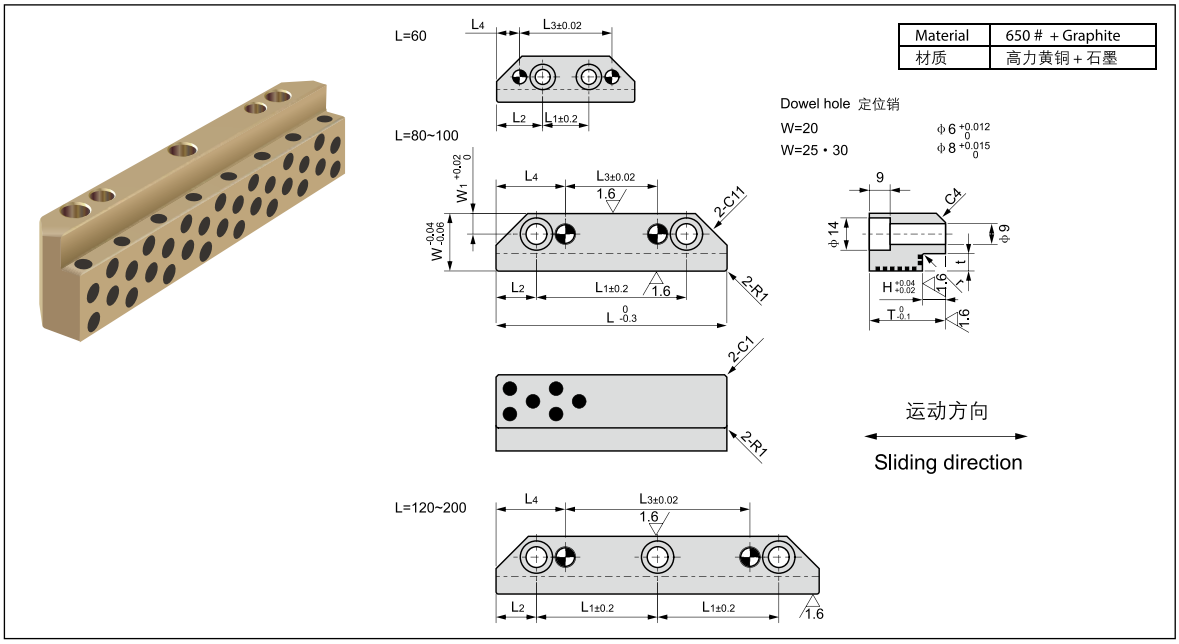




单位 (Unit): mm

型号规格 Standard No.	W	L	L_1	L_2	L_3	L_4	T	H	t	d	d_1	h	e H7
JTGLW-20×60		60	35		15								
JTGLW-20×80	20	80	55	12.5	35	22.5	15		4.5	5.5	9.5	6	
JTGLW-20×100		100	75		55			8					6 +0.012 0
JTGLW-25×80		80	50		20								
JTGLW-25×100	25	100	70	15	40		20		5.5	6.5	11	7	
JTGLW-25×120		120	45		60	30							
JTGLW-30×100		100	65		40								
JTGLW-30×120	30	120	42.5	17.5	60		25	10	7.5	9	14	9	
JTGLW-30×140		140	52.5		80								
JTGLW-40×120		120	40		40								8 +0.015 0
JTGLW-40×140	40	140	50	20	60	40	30	15	11	11	18	11	
JTGLW-40×160		160	60		80								
JTGLW-40×180		180	70		100								

JGLXS 自润滑板
JGLXS Oilless Wear Plate

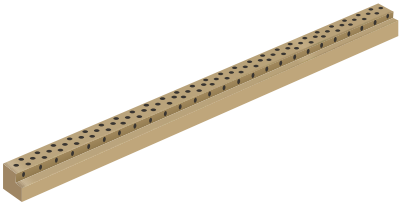


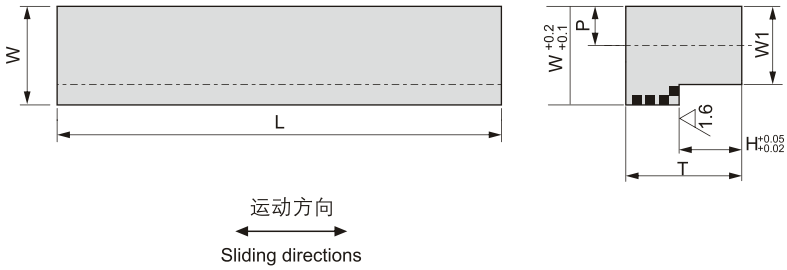
单位 (Unit): mm

型号规格 Standard No.	W	L	T	W_1	L_1	L_2	L_3	L_4	H	t	r
JGLXS-20×60×T	20	60	23 28	9	20	20	40	10	8	5.5	0.5
JGLXS-20×80×T		80			50	15	20	30			
JGLXS-20×100×T		100			70		40				
JGLXS-20×120×T		120			45		60				
JGLXS-20×140×T		140			55		80				
JGLXS-20×160×T		160			65		100				
JGLXS-25×80×T	25	80	28 33 43		45	17.5	20		10	7.5	0.8
JGLXS-25×100×T		100			65		40				
JGLXS-25×120×T		120			42.5		60				
JGLXS-25×140×T		140			52.5		80				
JGLXS-25×160×T		160			62.5		100				
JGLXS-25×180×T		180			72.5		120				
JGLXS-25×200×T		200			82.5		140				
JGLXS-30×100×T	30	100	43 53	11	60	20	20	40	15	11	
JGLXS-30×120×T	30	120			40		40				
JGLXS-30×140×T	30	140			50		60				
JGLXS-30×160×T	30	160			60		80				
JGLXS-30×180×T	30	180			70		100				
JGLXS-30×200×T	30	200			80		120				

JGLX 自润滑板
JGLX Oilless Wear Plate

Material	650 # + Graphite
材质	高力黄铜 + 石墨

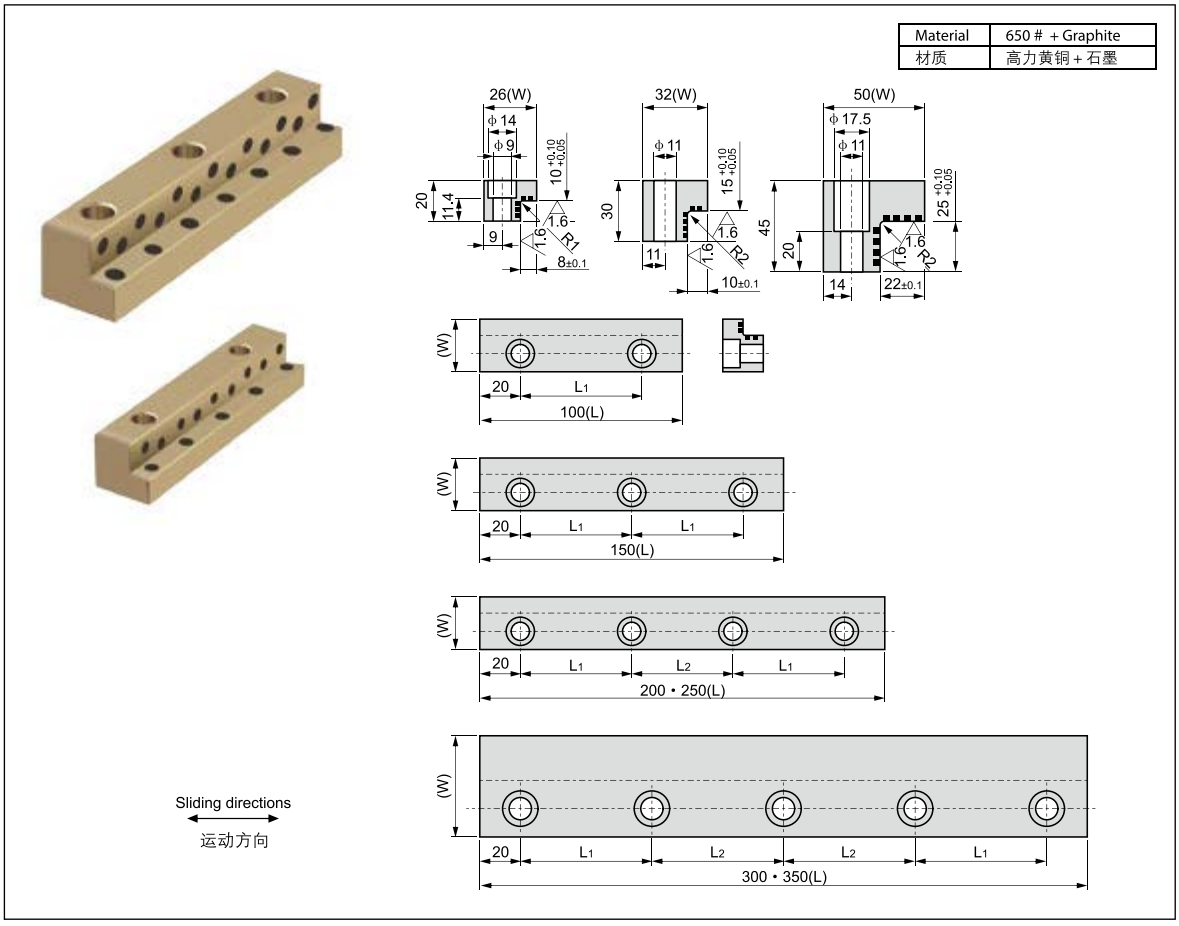




单位 (Unit): mm

型号规格 Standard No.	W	L	T	W_1	H	推荐安装孔 Recommended Mounting Hole	
						P	Size
JGLX-20 × 15	20	320	15	14.5	5	8	M8
JGLX-20 × 20			20				
JGLX-20 × 25			25				
JGLX-20 × 23			23		8		
JGLX-20 × 28			28				
JGLX-25 × 28	25	320 605	28	17.5	10	10	
JGLX-25 × 33			33				
JGLX-25 × 43			43				
JGLX-30 × 38	30		38	19	15		
JGLX-30 × 43			43				
JGLX-30 × 53			53				
JGLX-35 × 43	35		43	23		12	M10
JGLX-35 × 53			53				
JGLX-35 × 63			63		20		
JGLX-40 × 45	40		45	28		14	M12
JGLX-40 × 55			55				
JGLX-40 × 65			65				

JSOL 自润滑板
JSOL Oilless Wear Plate

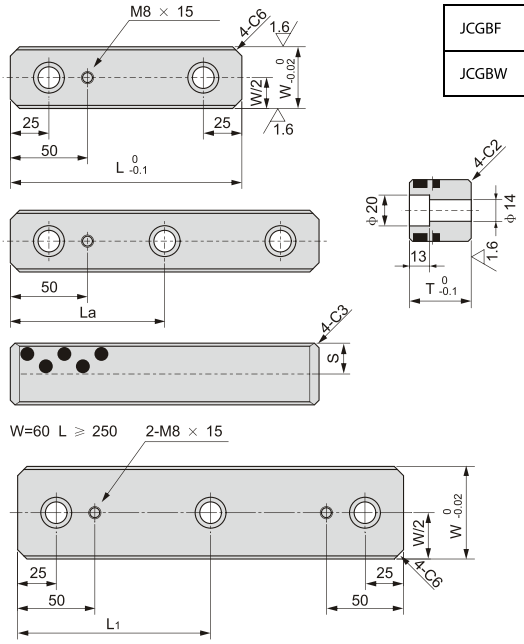


单位 (Unit): mm

型号规格 Standard No.	W	L	螺栓孔位置 Bolt Position		螺栓孔 Mounting Bolt	
			L1	L1	尺寸 Size	数量 Quantity
JSOL-26 × 100	26	100	60	-	M8	2
JSOL-26 × 150		150	55			3
JSOL-26 × 200		200		50		4
JSOL-32 × 100	32	100	60	-	M10	2
JSOL-32 × 150		150	55			3
JSOL-32 × 200		200		50		4
JSOL-32 × 250		250	70	70		
JSOL-50 × 200	50	200	55	50		
JSOL-50 × 250		250	70	70		
JSOL-50 × 300		300	65	65		5
JSOL-50 × 350		350	80	75		

JCGBF, JCGBW 自润滑板
JCGBF, JCGBW Oilless Wear Plate



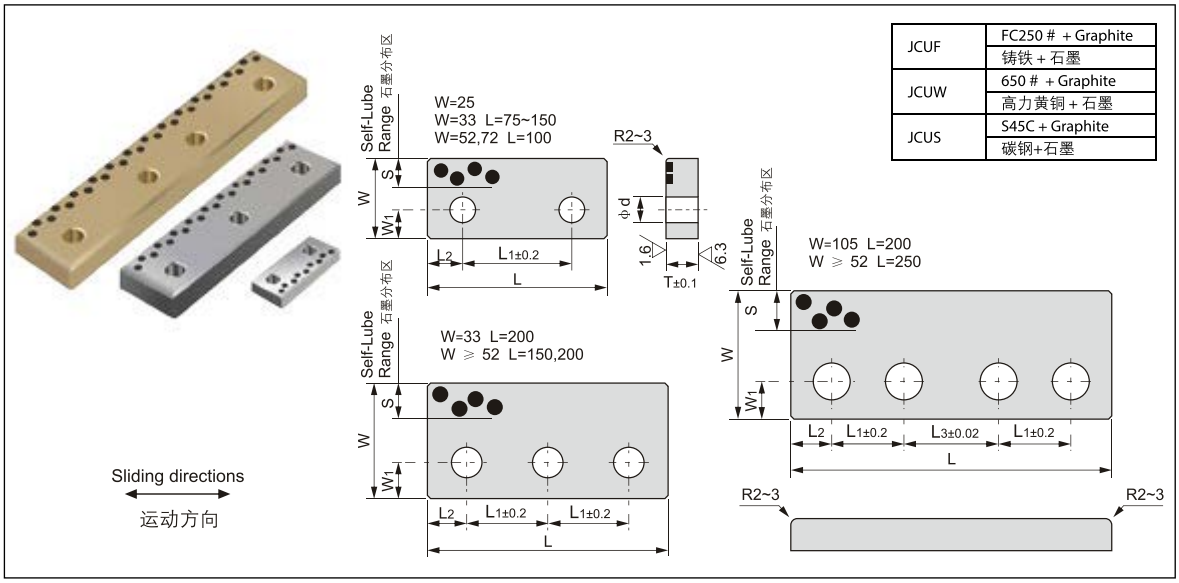


JCGBF	FC250 # + Graphite 铸铁 + 石墨
JCGBW	650 # + Graphite 高力黄铜 + 石墨

单位 (Unit): mm

型号规格 Standard No.	材料 Material	W	L	T	L_1	S
30 × 100 × 30	JCGBF	30	100	30	-	15
30 × 150 × 30			150		-	
30 × 200 × 30			200		100	
30 × 250 × 30			250		125	
30 × 300 × 30			300		150	
30 × 350 × 30			350		175	
40 × 100 × 30	JCGBF	40	100	30	-	
40 × 150 × 30			150		-	
40 × 200 × 30			200		100	
40 × 250 × 30			250		125	
40 × 300 × 30			300		150	
40 × 350 × 30			350		175	
30 × 100 × 40	JCGBF JCGBW	40	100	40	-	20
30 × 150 × 40			150		-	
30 × 200 × 40			200		100	
30 × 250 × 40			250		125	
30 × 300 × 40			300		150	
30 × 350 × 40			350		175	
40 × 100 × 40	JCGBW	60	100	40	-	25
40 × 250 × 40			250		125	
40 × 300 × 40			300		150	
40 × 350 × 40			350		175	

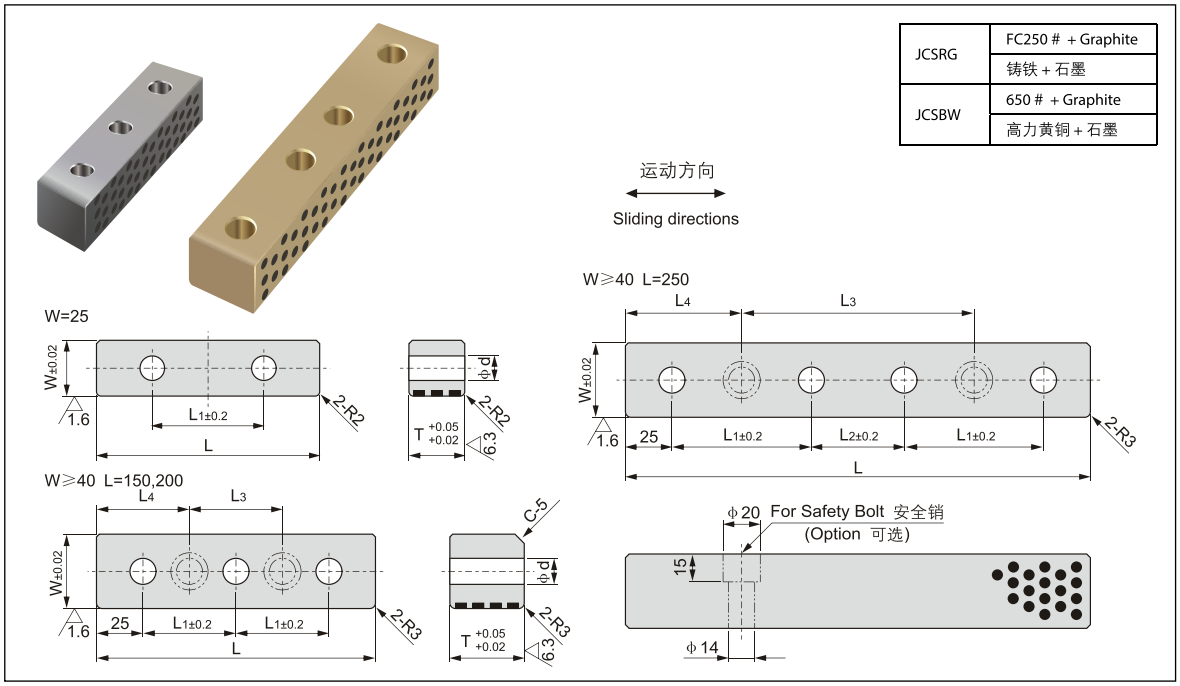
JCUW, JCUF, JCUS 自润滑板
JCUW, JCUF, JCUS Oilless Wear Plate



单位 (Unit): mm

型号规格 Standard No.	Material 材料	W	L	T	L_1	L_2	L_3	W_1	s	d	Bolt Hole Q'ty 螺孔数
25 × 75	JCUW	25	75	10	45	15	-	8	7.5	9	2
25 × 100			100		50	25					
25 × 125			125		75						
33 × 75	JCUW	33	75		45	15		12.5	9	11	
33 × 100			100		50	25					
33 × 125			125		75						
33 × 150			150		100						
33 × 200			200		75						3
52 × 100	JCUW JCUF JCUS	52	100	20	50			20	13	13	2
52 × 150			150								3
52 × 200			200		75						
52 × 250			250				50				4
72 × 100	JCUW JCUF JCUS	72	100	30	50			25	22	18	2
72 × 150			150								3
72 × 200			200		75						
72 × 250			250				50				4
77 × 150	JCUW JCUF JCUS	77	150	35	50				27		3
77 × 200			200		75						
77 × 250			250				50				4
82 × 150	JCUW JCUF JCUS	82	150	40	50				32		3
82 × 200			200		75						
82 × 250			250				50				4
105 × 150	JCUW JCUF	105	150		50						3
105 × 200			200				50				4
105 × 250			250		75						

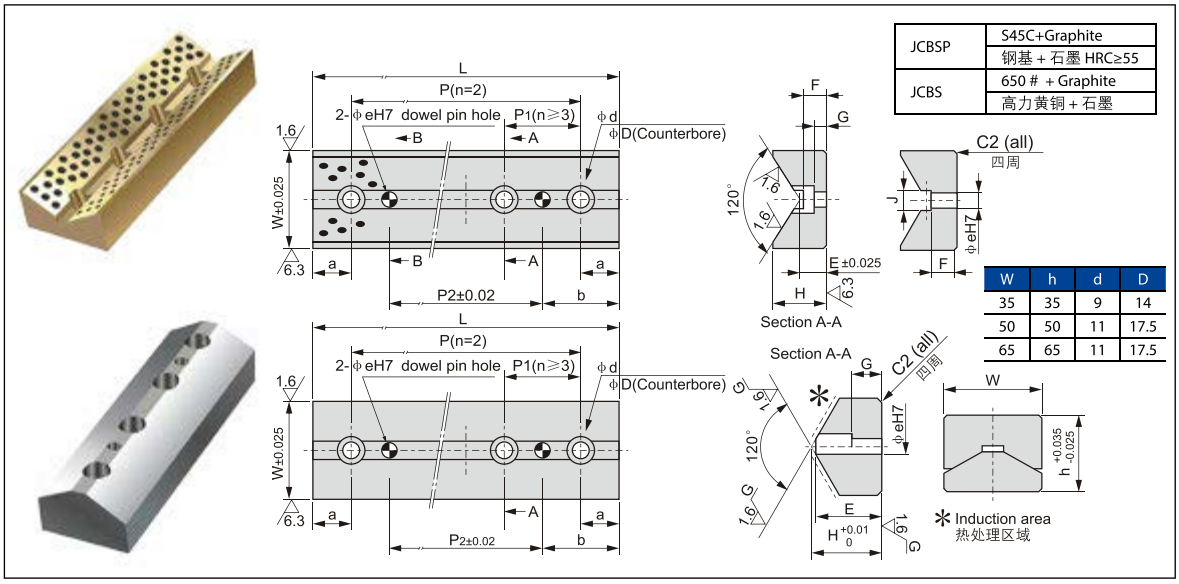
JCSRG, JCSRW 自润滑板
JCSRG, JCSRW Oilless Wear Plate



单位 (Unit): mm

型号规格 Standard No.	材料 Material	W	L	L_3	L_4	T	L_1	L_2	d
25 × 75 × 25	JCSRG	25	75	-	-	25	45	-	11
25 × 100 × 25			100				50		
25 × 125 × 25			125				75		
25 × 150 × 25			150				100		
40 × 150 × 30	JCSRG JCSRW	40	150	50	50	30	50	-	14
40 × 200 × 30			200	75	62.5		75		
40 × 250 × 30			250	125	62.5			50	
40 × 150 × 40			150	50	50	40	50	-	
40 × 200 × 40			200	75	62.5		75		
40 × 250 × 40			250	125	62.5			50	
50 × 150 × 45	JCSRG JCSRW	50	150	50	50	45	50	-	20
50 × 200 × 45			200	75	62.5		75		
50 × 250 × 45			250	125	62.5			50	
50 × 150 × 55			150	50	50	55	50	-	
50 × 200 × 55			200	75	62.5		75		
50 × 250 × 55			250	125	62.5			50	
50 × 150 × 60			150	50	50	60	50	-	
50 × 200 × 60			200	75	62.5		75		
50 × 250 × 60			250	125	62.5			50	
50 × 150 × 70			150	50	50	70	50	-	
50 × 200 × 70			200	75	62.5		75		
50 × 250 × 70			250	125	62.5			50	

JCBS, JCBSP 凸轮底部导板
JCBS, JCBSP Oilless Cam Btroke Guide Plate



单位 (Unit): mm

型号规格 Standard No.	W	L	H	a	b	P	P1	No. of Bolt Holes 螺栓数量	e	P2	E	F	G	J
JCBS-75 × 35	35	75	24	15	30	45	-	2	8	15	15	15	4	11
JCBS-100 × 35		100		20	40	60				20				
JCBS-125 × 35		125				85				45				
JCBS-150 × 35		150				110				70				
JCBS-75 × 50	50	75	31	15	30	45			10	15	18		8	13
JCBS-100 × 50		100		20	40	60				20				
JCBS-125 × 50		125		25	50	75				25				
JCBS-150 × 50		150				100				50				
JCBS-100 × 65	65	100	35	20	40	60				20				
JCBS-150 × 65		150		25	50	-	50	3		50				
JCBS-200 × 65		200						4		100				
JCBS-250 × 65		250						5		150				
JCBS-300 × 65		300						6		200				

型号规格 Standard No.	W	L	H	a	b	P	P1	No. of Bolt Holes 螺栓数量	e	P2	E	G
JCBSP-75 × 35	35	75	20	15	30	45	-	2	8	15	17	4
JCBSP-100 × 35		100		20	40	60				20		
JCBSP-125 × 35		125				85				45		
JCBSP-150 × 35		150				110				70		
JCBSP-75 × 50	50	75	32	15	30	45			10	15	29	10
JCBSP-100 × 50		100		20	40	60				20		
JCBSP-125 × 50		125		25	50	75				25		
JCBSP-150 × 50		150				100				50		
JCBSP-100 × 65	65	100	47	20	40	60				20	44	20
JCBSP-150 × 65		150		25	50	-	50	3		50		
JCBSP-200 × 65		200						4		100		
JCBSP-250 × 65		250						5		150		
JCBSP-300 × 65		300						6		200		

JSPW, JSPS 凸轮行程滑板
JSPW, JSPS Cam Stroke Plate



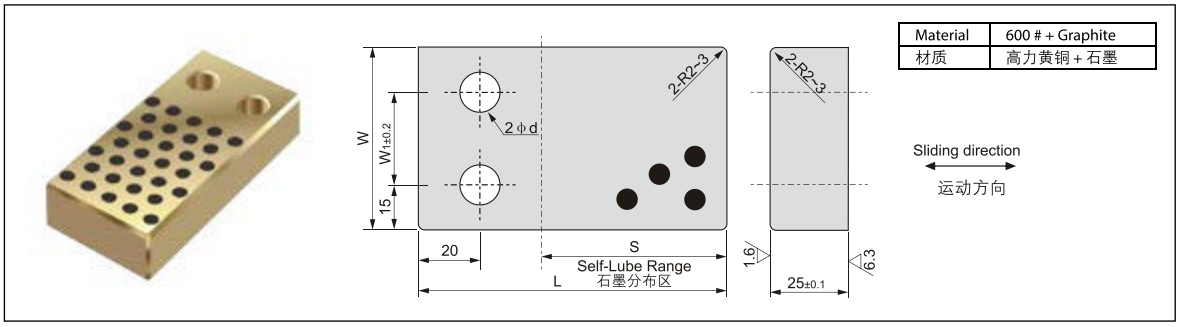


JSPS	S45C+Graphite
	钢基 + 石墨 HRC≥55
JSPW	650 # + Graphite
	高力黄铜 + 石墨

单位 (Unit): mm

型号规格 Standard No.	W	L	T	W_1	L_1	L_2
JSPW/JSPS-75 × 130	75	130	30	40	50	95
JSPW/JSPS-75 × 150	100	150	45		45	90
JSPW/JSPS-100 × 130		130	30	60	50	95
JSPW/JSPS-100 × 150		150	45		45	90
JSPW/JSPS-100 × 170		170	60			
JSPW/JSPS-100 × 200		200			75	120
JSPW/JSPS-125 × 130	125	130	30	85	50	95
JSPW/JSPS-125 × 150		150	45		45	90
JSPW/JSPS-125 × 170		170	60			
JSPW/JSPS-125 × 200		200			75	120
JSPW/JSPS-150 × 130	150	130	30	110	50	95
JSPW/JSPS-150 × 150		150	45		45	90
JSPW/JSPS-150 × 170		170	60			
JSPW/JSPS-150 × 200		200			75	120

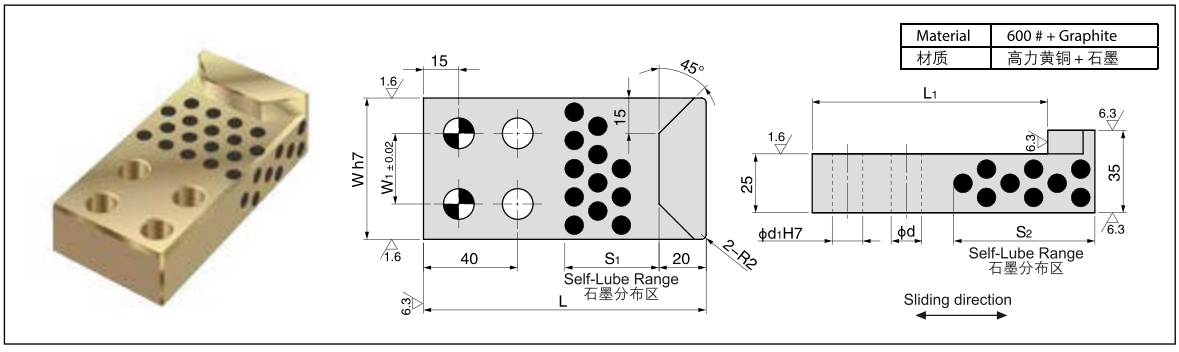
JPGPB 自润滑板
JPGPB Oilless Wear Plate



单位 (Unit): mm

型号规格 Standard No.	W	L	S	W_1	d
JPGPB-60 × 80	60	80	40	30	13
JPGPB-60 × 100		100	60		
JPGPB-60 × 120		120	80		
JPGPB-100 × 80	100	80	40	70	18
JPGPB-100 × 100		100	60		
JPGPB-100 × 120		120	80		
JPGPB-150 × 80	150	80	40	120	
JPGPB-150 × 100		100	60		
JPGPB-150 × 120		120	80		

JPGPC 自润滑板
JPGPC Oilless Wear Plate



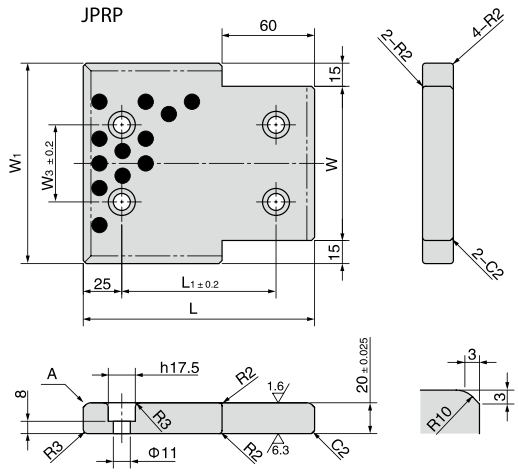
单位 (Unit): mm

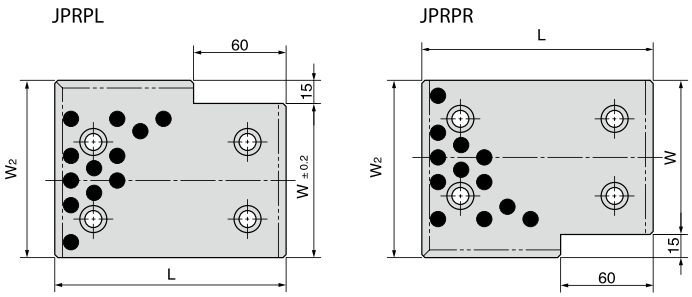
型号规格 Standard No.	W h7		L_1	L_2	S_1	S_2	W_1	d	d_1
JPGPC-60 × 120	60	0 -0.030	120	100	40	60	30	13	13
JPGPC-60 × 140			140	120	60	80			
JPGPC-60 × 160			160	140	80	100			
JPGPC-100 × 120	100	0 -0.035	120	100	40	60	70	18	16
JPGPC-100 × 140			140	120	60	80			
JPGPC-100 × 160			160	140	80	100			
JPGPC-150 × 120	150	0 -0.040	120	100	40	60	120		
JPGPC-150 × 140			140	120	60	80			
JPGPC-150 × 160			160	140	80	100			

JPRP 凸轮退回滑板
JPRP Oilless Cam Positive Return Plate

Material	600 # + Graphite
材质	高力黄铜 + 石墨







单位 (Unit): mm

材料 Material	型号规格 Standard No.	W	L	W1	W2	W3	La
JPRP JPRPL JPRPR	100 × 75	75	100	105	90	40	50
	125 × 75		125				75
	150 × 75		150				100
	125 × 100	100	125	130	115	50	75
	150 × 100		150				100
	150 × 125	125		155	140	75	
	200 × 125		200				150
	250 × 125		250				200
	200 × 150	150	200	180	165	100	150
	250 × 150		250				200

FZ 钢球保持架
FZ Ball Retainer Bearing



FZH 铜基钢球保持架 Bronze Ball Retainer

该产品以铜基，配以优质钢球，按一定的角度和密度有序地排列，采用特殊工艺加工而成。产品适用于冷冲模具，精密机床等。

The basement of this product is copper. With the high quality roller being arranged orderly in certain angle and density, it is produced by special workmanship. This kind of products is used in punching mold and high-precision machine tools.

※技术参数：Technical Data

最大承载压力	30N/mm^2	装配过盈	0.01mm~0.02mm
最高线速度	6m/s	钢球直径偏差	<0.002mm
摩擦系数	0.01~0.08		



FZL 铝基钢球保持架 Aluminium Ball Retainer

该产品以铝基为基体，配以优质钢球，按一定的角度和密度有序地排列，采用特殊工艺加工而成。产品适用于冷冲模具，精密机床等。

The basement of this product is aluminum. With the high quality roller being arranged orderly in certain angle and density, it is produced by special workmanship. This kind of products is used in punching mold and high-precision machine tools.

※技术参数：Technical Data

最大承载压力	25N/mm^2	装配过盈	0.01mm~0.02mm
最高线速度	6m/s	钢球直径偏差	<0.002mm
摩擦系数	0.01~0.08		



FZP 树脂基钢球保持架 Resin Ball Retainer

该产品以POM为基体，配以优质钢球，按一定的角度和密度有序地排列，采用特殊工艺加工而成。产品适用于冷冲模具，精密机床等。

The basement of this product is POM. With the high quality roller being arranged orderly in certain angle and density, it is produced by special workmanship. This kind of products is used in punching mold and high-precision machine tools.

※技术参数：Technical Data

最大承载压力	20N/mm^2	装配过盈	0.01mm~0.02mm
最高线速度	6m/s	钢球直径偏差	<0.002mm
摩擦系数	0.01~0.08		

导套 Guide Bushing

材料 QCrj15，YB9，热处理，硬度 HRC60-66，技术条件按 GB/T12446 与，轴配合应具有 0.01-0.02 径向过盈量，表面粗糙度为 0.05

Material gcri 5， YB9,heat treament HRC62-66, technlque condition according to gb/t12446, thesurface roughnessis 0.05

轴 Guide Posts

材料 GCrl15，YB9，热处理，硬度 HRC60-66，技术条件按 GB/T12446 与，表面粗糙度为 0.05

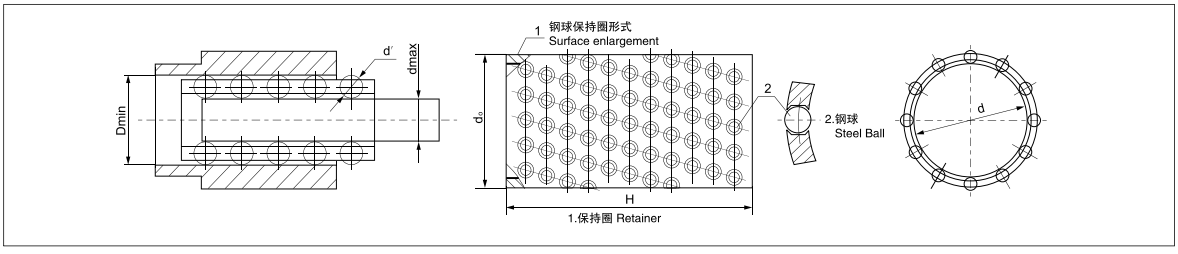
Material GCrl5,YB9,heat treament HRC62-66,the tolerance of shaftis h5, the surface Roughness is 0.05

测量 Size Test

用通用的测量手段（气动量仪，外径千分尺，内径千分表等）测量轴、导套和钢球的尺寸偏差值，即 Ymax=dax+2d2-Dmin, 可示出配合后的过盈量为 0.01-0.02mm.

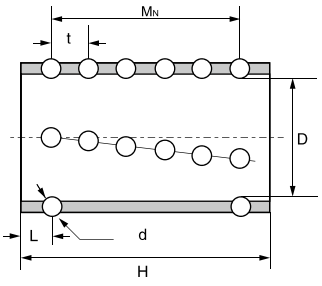
It is tested by outside micrometer 8 dial gauge as usual, The ymax(yamx=dax+2d'-dmini Request 0.01.0.02mm)

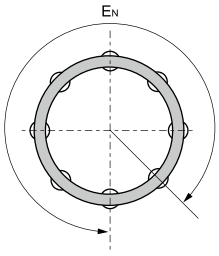
钢球保持圈形式 Surface enlargement



FZ 钢球保持架
FZ Ball Retainer Bearing







※标准产品标注方式：Standard Bushing Label Mode FZ□ 1950

单位 (Unit): mm

型号规格 Designation	ϕ D	H	ϕ d	E_N	M_N	Balls	t	T
FZ □ 1950	19	50	3	12	8	96	5.5	5.75
FZ □ 1960		60			10	120		5.25
FZ □ 2050	20	50			8	96		5.75
FZ □ 2060		60			10	120		5.25
FZ □ 2250	22	50		14	8	112		5.75
FZ □ 2260		60			10	140		5.25
FZ □ 2360	23	60			10	140		5.25
FZ □ 2475	24	75		16	13	208	5.45	4.80
FZ □ 2550	25	50			8	128	5.5	5.75
FZ □ 2560		60			10	160		5.25
FZ □ 2775	27	75			13	208	5.45	4.80
FZ □ 2860	28	60	4	14	8	112	6.5	7.25
FZ □ 2875		75			11	154		5.0
FZ □ 3060	30	60			8	112		7.25
FZ □ 3075		75			11	154		5.0
FZ □ 3260	32	60		16	8	128		7.25
FZ □ 3275		75			11	176		5.0
FZ □ 3685	36	85			12	192		6.75
FZ □ 3690		90			13	208		6.0
FZ □ 3870	38	70	5		8	128	8.0	7.0
FZ □ 3890		90			11	176	7.9	5.5
FZ □ 4090	40	90			11	176		5.5
FZ □ 4590	45	90		18	11	195		5.5
FZ □ 45110		110			13	234	8.0	7.0
FZ □ 5090	50	90		20	11	220	7.9	5.5
FZ □ 50110		110			13	260	8.0	7.0
FZ □ 6090	60	90		22	11	242	7.9	5.5
FZ □ 60110		110			13	286	8.0	7.0
FZ □ 80130	80	130		28	15	420		9.0

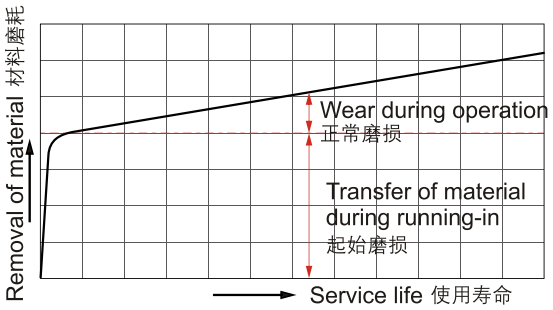
相关设计
The Technical

影响轴承使用寿命的因素 Influences on the service life

- 轴承载荷和负载方式
- 线速度
- PV 值
- 对磨件表面光洁度
- 对磨件热处理方式
- 环境温度等

Wear and service life of the slide bearings are dependent on the following:

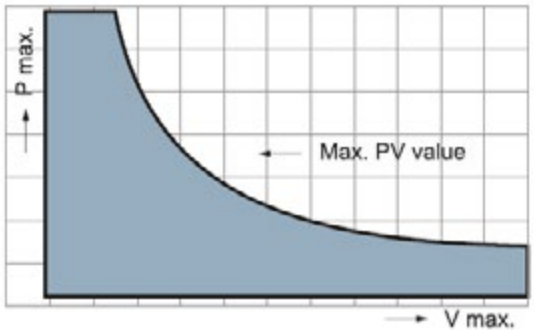
- Specific bearing load
- Sliding speed
- PV value
- Roughness depth of the mating surface
- Mating surface material and Temperature etc.



PV Value Calculation PV值的计算 $PV=P \times V(N/mm^2 \times m/s)$

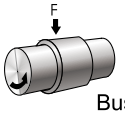
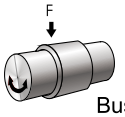
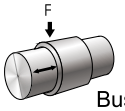
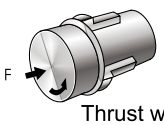
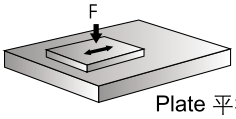
PV 是指轴承在一定的承载和线速度条件下的乘积之和，PV 值与轴承的使用寿命成反比例关系；因此建议设计时尽量使用比较低的安全 PV 值，以确保轴承会有更长的使用寿命；虽然样本中有明确了各类材料的 PV 值，但是这些都是在径向旋转条件下测得的，而事实上设计人员在设计轴承的寿命是还需要考虑很多因素。另外环境温度是一个必须要考虑的因素，由于温度的上升会导致轴承于座孔间的配合间隙发生变化，轴与轴承内孔的配合公差也会发生变化，从而影响轴承的正常使用。

As the sum of products of a bearing under the conditions of certain loading and linear velocity, PV value is inversely proportional to the service life of the bearing, so lower safe PV value is suggested to be used during design to ensure longer service life of the bearing. Although PV values of different materials are defined in the sample, these are measured under the condition of radial rotation, as a matter of fact, designers need to consider many factors when designing bearing life. Besides, ambient temperature, as a parameter which must be considered, should consider many factors, because fit clearance between bearing and seat hole and fit tolerance between shaft and bearing bore change due to temperature rise.



相关设计
The Technical

运转方式和PV值的计算 Direction of motion and PV value

		Load 负载 P N/mm² {kgf/cm²}	Velocity V 线速度 m/s {m/min}	PV Value PV值 N/mm²*m/s {kgf/cm²*m/min}
1. Rotating motion in single direction of radial journal 旋转运动	 Bushing 轴套	$\frac{F}{dL}$ $\left\{\frac{10^2F}{dL}\right\}$	$\frac{\pi dn}{10^3}$ $\left\{\frac{\pi dn}{10^3}\right\}$	$\frac{\pi Fn}{10^3L}$ $\left\{\frac{\pi Fn}{10L}\right\}$
2. Oscillating motion 摇摆运动	 Bushing 轴套	$\frac{F}{dL}$ $\left\{\frac{10^2F}{dL}\right\}$	$\frac{dc\,\theta}{10^3}$ $\left\{\frac{\pi\,dc\,\theta}{180\times10^3}\right\}$	$\frac{Fc\,\theta}{10^3L}$ $\left\{\frac{\pi\,Fc\,\theta}{180\times10^2L}\right\}$
3. Reciprocating motion 往复运动	 Bushing 轴套	$\frac{F}{dL}$ $\left\{\frac{10^2F}{dL}\right\}$	$\frac{2cS}{10^3}$ $\left\{\frac{2cS}{10^3}\right\}$	$\frac{2FcS}{10^3dL}$ $\left\{\frac{FcS}{5dL}\right\}$
4. Thrust motion 推力运动	 Rotation 旋转 Oscillation 摇摆 Thrust washer 垫片	$\frac{4F}{\pi(D^2-d^2)}$ $\left\{\frac{400F}{\pi(D^2-d^2)}\right\}$	$\frac{\pi Dn}{10^3}$ $\left\{\frac{\pi Dn}{10^3}\right\}$	$\frac{4FDn}{10^3(D^2-d^2)}$ $\left\{\frac{4FDn}{10(D^2-d^2)}\right\}$
		$\frac{4F}{\pi(D^2-d^2)}$ $\left\{\frac{400F}{\pi(D^2-d^2)}\right\}$	$\frac{Dc\,\theta}{10^3}$ $\left\{\frac{\pi\,Dc\,\theta}{180\times10^3}\right\}$	$\frac{4FDc\,\theta}{10^3\,\pi\,(D^2-d^2)}$ $\left\{\frac{4FDc\,\theta}{180\times10(D^2-d^2)}\right\}$
5. Plane reciprocating motion 平面滑动	 Plate 平板	$\frac{F}{BL}$ $\left\{\frac{10^2F}{WL}\right\}$	$\frac{2cS}{10^3}$ $\left\{\frac{2cS}{10^3}\right\}$	$\frac{2FcS}{10^3BL}$ $\left\{\frac{FcS}{5WL}\right\}$

F ：承载 …… N { kgf }
N：转数 …… S^{-1} { rpm }
c ：往复或摇摆数 …… S^{-1} { cpm }
S ：行程 …… m { mm }
θ ：摇摆角度 …… rad
d ：轴承内径 …… mm { mm }
D：轴承外径 …… mm { mm }
L ：轴承高度 …… mm { mm }
W：轴承宽度 …… mm { mm }

相关设计
The Technical

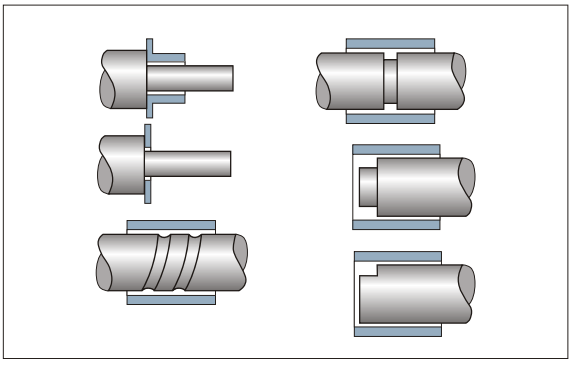
相配轴 Mating Shaft

相配轴的材料、硬度、表面粗超度和表面处理对轴承的使用有很大的影响，以下推荐材料可供参考；另外，在海水、药液等腐蚀场合下使用时建议使用不锈钢霍表面镀铬处理。

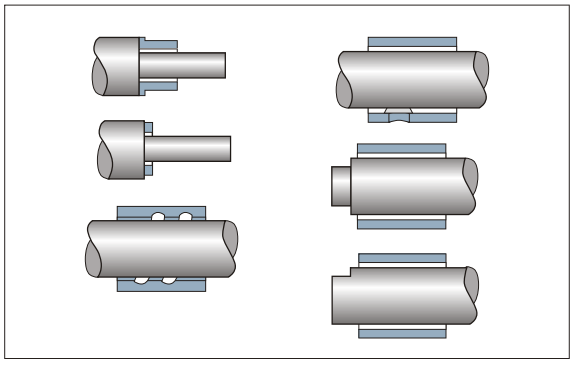
Bearing performance is influenced by the material, hardness, surface roughness and surface treatment of the mating shaft. If uesd in a corrosive environment such as in the seawater, or in the chemical liquid, double or triple chrome plating should be consideration.

轴承材料 Bearing material	面压 Bearing load	推荐相配轴材料 Shaft material recommend	硬度 Hardness	表面粗超度 Roughness
金属基 自润滑轴承 Metallic Bearing	<25Mpa	优质碳钢，合金钢，腐蚀条件下使用耐腐蚀钢 Carbon steel, structure alloy steel (S45C,SNC415,SCM435), In corrosive environment, corrosion resistant steel (SUS304,SUS403,SUS420)	>HB150	<1.6a
	25~49Mpa	表面硬化处理如渗碳处理、感应淬火等 Surface hardening treatment such as induction hardening and carburizing should be implemented for the above materials.	>HB250	<1.6a
	49~98Mpa	以上处理外同时作渗氮处理、镀硬铬等 In addition to surface hardering treatment as above, additional surface treatment such as nitride treatment and hard chrome plating for above material.	>HRC50	<1.6a

不正确设计 Incorrect



正确设计 Correct



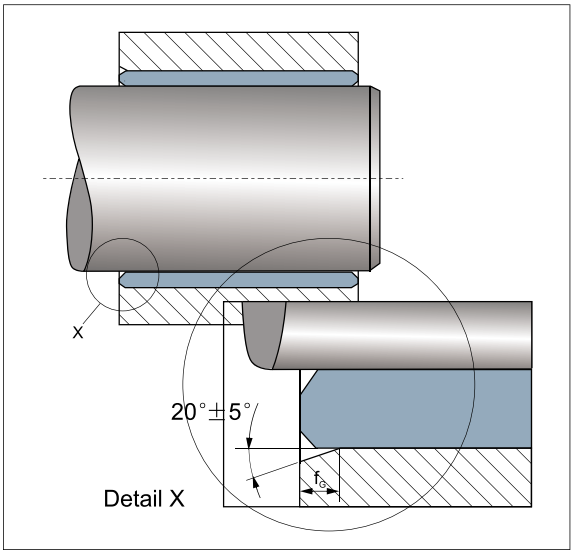
相关设计
The Technical

轴承座孔 Housing

设计的标准轴承要求座孔必须加工到 H7 公差，最大表面粗糙度为 Ra3.2。为了便于轴承的安装，轴承座孔应有 20° ±5° 的倒角。

There should be chamfers on the housing bore during the assembly. A chamfer $F_G \times 20°$ ±5° is important for the easier pressing of the bushing into the housing.

座孔 Housing bore diameter d_G	倒角 Chamfer with f_G
$d_G \leq 30$	0.8 ± 0.3
$30 < d_G \leq 80$	1.2 ± 0.4
$80 < d_G \leq 180$	1.8 ± 0.8
$180 < d_G$	2.5 ± 1.0



壁厚设计 Wall thickness

金属自润滑轴承的壁厚可以尽可能的设计成薄壁结构已达到尺寸的最小化，建议壁厚设计如下：

Wall thickness of the metallic bearings can be made thin to realize smaller mechanical design.

内径 ID	10mm	20mm	50mm	100mm	300mm
壁厚 Wall thickness	3~4mm	3~5mm	7.5~10mm	10~15mm	20~30mm

长度设计 Length

一般来说，轴承的长度是根据轴承的长度和内径比计算得到的，比如一般工况我们建议长度和内径比为 0.5~2.0，而对于高速、高载和不平稳的接触面运用时建议长度和内径比为 0.8~1.0。

In general, length of bearing is calculated by the ratio of the bearing hength and inner side diameter, for normal application: the length/ID=0.5~2.0, for high load, high speed and uneven contact is recommend: the length/ID=0.8~1.0.

相关设计
The Technical

定期给油 Periodic Greasing

金属基自润滑轴承设计为自润滑免维护的轴承材料，但在润滑条件下更能表现出其优越的性能。

- 降低摩擦系数，减少磨损量
- 运行更平稳，提高 PV 值
- 带走轴承运行过程中产生的热量
- 可以大大延长轴承的使用寿命
- 防止异物的侵入
- 防止对磨件的生锈现象

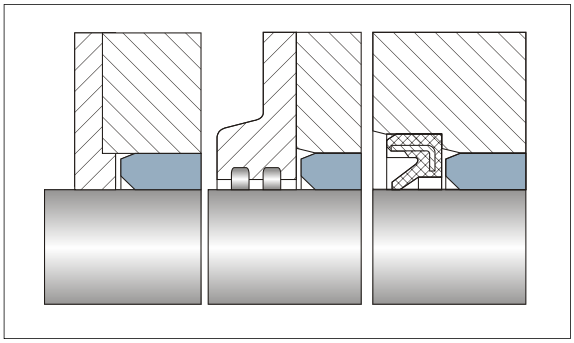
Metallic self-lubricating bearings designed for maintenance-free and dry operation, but periodic greasing or oiling will improve the bearing performance and extension the service life.

- Reduction of coefficient of friction and wear amount
- Smoothly running and Increase the limited PV value
- Cooling effect
- Greatly extension the bearing service life
- Protect the contamination reach the bearing section
- Prevent mating material rust

密封件 Seals

金属基自润滑轴承允许一些不会损害轴承表面的异物进入，但当异物的侵入增加或高碾磨型物质进入时应当安装合适的密封件以提高轴承的使用寿命。

if increased levels of contamination occur or the bearing is used in an aggressive environment, the bearing section should be protected from dust and containment. The normal solution is to re-design the surrounding structure so that the contamination can not reach the bearing section. if the contamination is critical, a collar of grease or a shaft seal is recommended.



金属类轴承的安装
Metal Bushing Installation

机械压装 Pressure Assembly

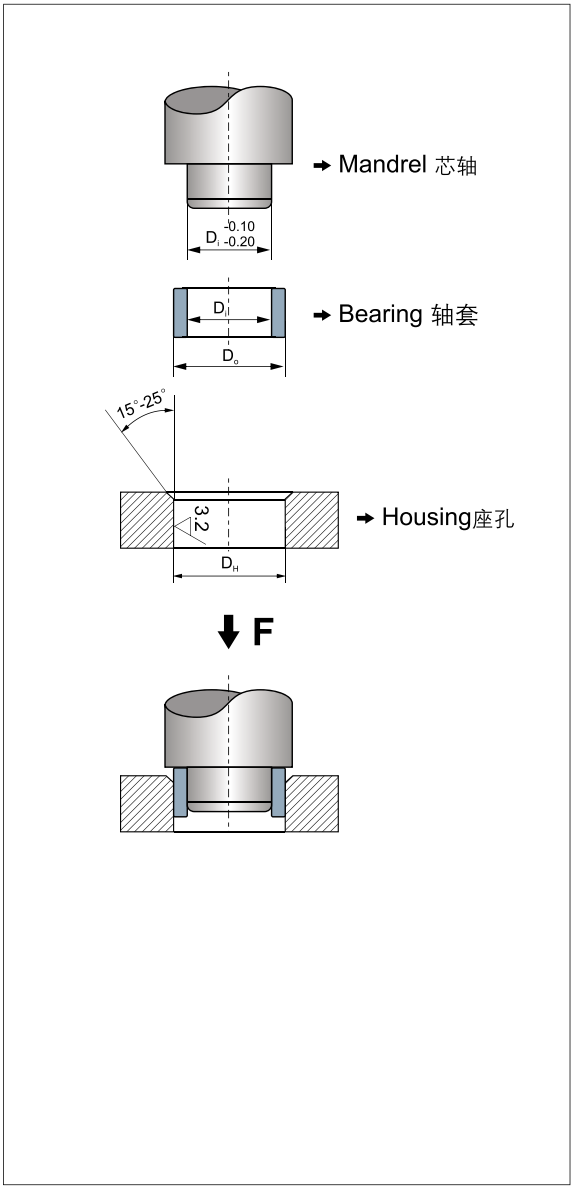
通常情况下，轴承可以采用压力装配的方式进行安装，装配时应采用芯轴慢慢压入，禁止直接击打轴承以免产生变形，装配前应确保座孔内表面光洁无异物。

Typically, the bearings can be used to pressure the assembly with the installation, assembly, slowly push the mandrel should be used to prohibit the direct hit to avoid deformation of the bearing, the assembly should ensure that the seat before the hole smooth surface without foreign body.

冷冻装配 Cooling assembly

通过液氮或干冰采用冷装配压装相比采用机械压装方式更为有效，此时标准的冷冻温度为 -40℃ ~-70℃，冷冻时间一般为 1 小时以上，具体需要根据零件的壁厚和配合公差。

By liquid nitrogen or dry ice compared with cold press-fit assembly with mechanical press-fit method is more effective, then the standard freezing temperature of -40 ℃ ~ -70 ℃ , freezing time is generally 1 hour or more, according to the specific needs of parts of the wall thick and with tolerance.



轴承的收缩量可以根据以下公式计算：

Shrinkage of the bearing can be calculated according to the following companies:

$\Delta D=D \times \alpha \times \Delta T$

ΔD:OD 外径收缩量

D:OD 轴承外径

α：线性膨胀系数 (1/105K)

ΔT: 温度差

$\Delta D=D \times \alpha \times \Delta T$ ΔD:OD Diameter shrinkage

D:OD Bearing outer diameter

α:Linear expansion coefficient(1/105K)

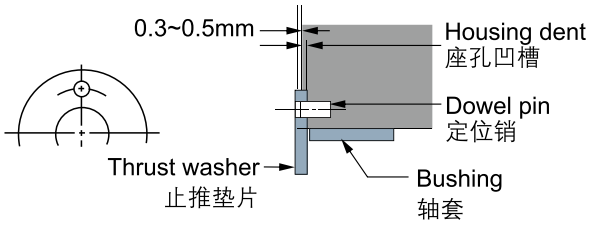
ΔT:Temperature difference

金属类轴承的安装
Metal Bushing Installation

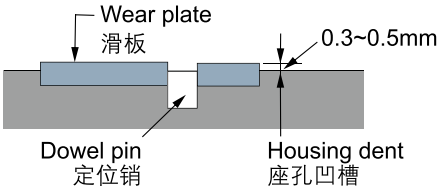
止推垫片和滑板的安装

止推垫片和滑板应当安装在座孔的凹槽内，为了避免零件的移动建议使用定位销或沉头螺丝加以固定。
It is recommended to install the thrust washers and sliding plates with the hollow indented housings. To avoid the moving of such parts, a dowel pins is recommended to be installed.

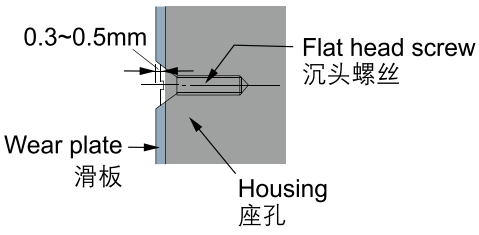
1. 定位销安装 Dowel pin application (thrust washer)



2. 镶嵌式安装 Inlaid installation（ Plate ）



3. 沉头螺丝安装 Flat head screw application



表面粗糙度对照表
Surface Roughness Table

CHINA 中国 GB 1031-83 ≈ISO 468-83			UK 英国 BS 1134-61		USA 美国 ASAB 46.1-62		GERMANY 德国 DIN4763-60			SWITZERLAND 瑞士 VSM 10321-62		ITALY 意大利 UNI 13963-60	POLAND 波兰 PN 58/M 042-51			CZECH 捷克 CSNo 14450-61			JAPAN 日本 JIS B0601-70			
Ra (μ)	Rz Ry (μ)	Code	Ra (μ in)(μ)	Code	Ra (μ in)(μ)	Code	Ra (μ)	Rz (μ)	Code	Ra (μ)	Code	Ra (μ)	Ra (μ)	Rz (μ)	Code	Ra (μ)	Rz (μ)	Code	Ra (μ)	Rz (μ)	Rmax (μ)	Code
0.008	0.032												0.01	0.05	√14							
0.01	0.04	0.012 0.008					0.01	0.04														
0.012	0.05															0.012	0.05		(0.0125a)		(0.05S)	
0.016	0.063						0.016	0.063					0.02	0.10	√13							
0.02	0.08	0.025																				
0.025	0.10		1(0.025)		1(0.025)		0.025	0.10		0.025	N1	0.025				0.025	0.10			0.1Z	0.1S	
0.032	0.125												0.04	0.20	√12							
0.04	0.16	0.05					0.04	0.16														
0.05	0.20		2(0.05)		2(0.05)					0.05	N2	0.05				0.05	0.20		0.05a	0.2Z	0.2S	
0.063	0.25						0.063	0.25					0.08	0.40	√11							
0.08	0.32	0.10			3(0.08)							0.08										
0.10	0.40		4(0.10)		4(0.10)		0.10	0.40		0.1	N3	0.1				0.10	0.40		0.1a	0.4Z	0.4S	
0.125	0.50				5(0.125)							0.12	0.16	0.80	√10							
0.16	0.63	Rz0.8			6(0.16)		0.16	0.63				0.16										
0.20	0.80		8(0.2)		8(0.2)					0.2	N4	0.2				0.20	0.80		0.2a	0.8Z	0.8S	
0.25	1				10(0.25)		0.25	1				0.25	0.32	1.60	√9							
0.32	1.25	Rz1.6		16	13(0.32)							0.3						6.3				
0.40	1.6		16(0.4)		16(0.4)		0.40	1.60		0.4	N5	0.4				0.40	1.60		0.4a	1.6Z	1.6S	
0.50	2				20(0.5)					0.5	N6	0.5	0.63	3.20	√8							
0.63	2.5	0.80			25(0.63)		0.63	2.5				0.6										
0.8	3.2		32(0.8)		32(0.8)	16 √						0.8				0.80	3.2		0.8a	3.2Z	3.2S	
1	4				40(1)		1	4				1	1.25	6.30	√7							
1.25	5	1.60			50(1.25)	16 8 √						1.2										
1.6	6.3		63(1.6)		63(1.6)		1.6	6.3		1.6	N7	1.6				1.6	6.3		1.6a	6.3Z	6.3S	
2	8				80(2)							2	2.5	10	√6							
2.5	10	3.2			100(2.5)		2.5	10				2.5										
3.2	12.5		125(3.2)		125(3.2)					3.2	N8	3				3.2	12.5		3.2a	12.5Z	12.5S	
4	16				160(4)		4	16				4	5	20	√5					(18Z)	(18S)	
5	20	6.3			200(5)							5										
6.3	25		250(6.3)		250(6.3)		6.3	25		6.3	N9	6				6.3	25		6.3a	25Z	25S	
8	32											8	10	40	√4					35Z	35S	
10	40	Rz50					10	40				10										
12.5	50		500(12.5)		500(12.5)					12.5	N10	12				12.5	50		12.5a	50Z	50S	
16	63						16	63					20	80	√3							
20	80	25			800(20)															(70Z)	(70S)	
25	100		1000(25)		1000(25)		25	100		25	N11	25				25	100		25a	100Z	100S	
32	125												40	160	√2					140Z	140S	
40	160	Rz200					40	160														
125	200									50	N12					50	200		(50a)	200Z	200S	S
63	250						63	250					80	320	√1					280Z	280S	
80	320	100																				
250	400						100	400								100	400		(100a)	400Z	400S	
							160	630	S											560Z	560S	
							250	1000														
								1600														
								2500														

16 C LA 8-16 C LA or 8.16 C LA

μ=0.000001m=0.001mm

μin=0.000001 in=0.0254μ

轴径公差
Shaft tolerances

≥	<	c9	d8	e7	e8	f7	g6	h5	h6	h7	h8	js6	js7	k6	m6	n6	p6	p7	r6	s6
-	3	-60 -85	-20 -34	-14 -24	-14 -28	-6 -16	-2 -8	0 -4	0 -6	0 -10	0 -14	± 3	± 5	+6 0	+8 +2	+10 +4	+12 +6	+16 +6	+16 +10	+20 +14
3	6	-70 -100	-30 -48	-20 -32	-20 -38	-10 -22	-4 -12	0 -5	0 -8	0 -12	0 -18	± 4	± 6	+9 +1	+12 +4	+16 +8	+20 +12	+24 +12	+23 +15	+27 +19
6	10	-80 -116	-40 -62	-25 -40	-25 -47	-13 -28	-5 -14	0 -6	0 -9	0 -15	0 -22	± 4.5	± 7	+10 +1	+15 +6	+19 +10	+24 +15	+30 +15	+28 +19	+32 +23
10	18	-95 -138	-50 -77	-32 -50	-32 -59	-16 -34	-6 -17	0 -8	0 -11	0 -18	0 -27	± 5.5	± 9	+12 +1	+18 +7	+23 +12	+29 +18	+36 +18	+34 +23	+39 +28
18	24	-110 -162	-65 -98	-40 -61	-40 -73	-20 -41	-7 -20	0 -9	0 -13	0 -21	0 -33	± 6.5	± 10	+15 +2	+21 +8	+28 +15	+35 +22	+43 +22	+41 +28	+48 +35
24	30																			
30	40	-120 -182	-80 -119	-50 -75	-50 -89	-25 -50	-9 -25	0 -11	0 -16	0 -25	0 -39	± 8	± 12	+18 +2	+25 +9	+33 +17	+42 +26	+51 +26	+50 +34	+59 +43
40	50	-130 -192																		
50	65	-140 -214	-100 -146	-60 -90	-60 -106	-30 -60	-10 -29	0 -13	0 -19	0 -30	0 -46	± 9.5	± 15	+21 +2	+30 +11	+39 +20	+51 +32	+62 +32	+60 +41	+72 +53
65	80	-150 -224																	+62 +43	+78 +59
80	100	-170 -257	-120 -174	-72 -107	-72 -126	-36 -71	-12 -34	0 -15	0 -22	0 -35	0 -54	± 11	± 17	+25 +3	+35 +13	+45 +23	+59 +37	+72 +37	+73 +51	+93 +71
100	120	-180 -267																	+76 +54	+101 +79
120	140	-200 -300	-145 -208	-85 -125	-85 -148	-43 -83	-14 -39	0 -18	0 -25	0 -40	0 -63	± 12.5	± 20	+28 +3	+40 +15	+52 +27	+68 +43	+83 +43	+88 +63	+117 +92
140	160	-210 -310																	+90 +65	+125 +100
160	180	-230 -330																	+93 +68	+133 +108
180	200	-240 -355	-170 -242	-100 -146	-100 -172	-50 -96	-15 -44	0 -20	0 -29	0 -46	0 -72	± 14.5	± 23	+33 +14	+46 +17	+60 +31	+79 +50	+96 +50	+106 +77	+151 +122
200	225	-260 -375																	+109 +80	+159 +130
225	250	-280 -395																	+113 +84	+169 +140
250	280	-300 -430	-190 -271	-110 -162	-110 -191	-56 -108	-17 -49	0 -23	0 -32	0 -52	0 -81	± 16	± 26	+36 +14	+52 +20	+66 +34	+88 +56	+108 +56	+126 +94	+190 +158
280	315	-330 -460																	+130 +98	+202 +170
315	355	-360 -500	-210 -299	-125 -182	-125 -214	-62 -119	-18 -54	0 -25	0 -36	0 -57	0 -89	± 18	± 28	+40 +4	+57 +21	+73 +37	+98 +62	+119 +62	+114 +108	+226 +190
355	400	-400 -540																	+150 +114	+244 +208
400	450	-440 -595	-230 -327	-135 -198	-135 -232	-68 -131	-20 -60	0 -27	0 -40	0 -63	0 -97	± 20	± 31	+45 +5	+63 +23	+80 +40	+108 +68	+131 +68	+166 +126	+272 +232
450	500	-480 -635																	+172 +132	+292 +252

座孔公差
Bore tolerance

≥	<	B10	C9	D8	E7	E8	F7	G7	H6	H7	H8	JS7	K7	M7	N7	P7	R7	S7	T7
-	3	+180 +140	+85 +60	+34 +20	+24 +14	+28 +14	+16 +6	+12 +2	+6 0	+10 0	+14 0	± 5	0 -10	-2 -12	-4 -14	-6 -16	-10 -20	-14 -24	-
3	6	+188 +140	+100 +70	+48 +30	+32 +20	+38 +20	+22 +10	+16 +4	+8 0	+12 0	+18 0	± 6	+3 -9	0 -12	-4 -16	-8 -20	-11 -23	-15 -27	-
6	10	+208 +150	+116 +80	+62 +40	+40 +25	+47 +25	+28 +13	+20 +5	+9 0	+15 0	+22 0	± 7	+5 -10	0 -15	-4 -19	-9 -24	-13 -28	-17 -32	-
10	14	+200 +150	+138 +95	+77 +50	+50 +32	+59 +32	+34 +16	+24 +6	+11 0	+18 0	+27 0	± 9	+6 -12	0 -18	-5 -23	-11 -29	-16 -34	-21 -39	-
14	18																		
18	24	+244 +160	+162 +110	+98 +65	+61 +40	+73 +40	+41 +20	+28 +7	+13 0	+21 0	+33 0	± 10	+6 -15	0 -21	-7 -28	-14 -35	-20 -41	-27 -48	-
24	30																		-33 -54
30	40	+270 +170	+182 +120	+119 +80	+75 +50	+89 +50	+50 +25	+34 +9	+16 0	+25 0	+39 0	± 12	+7 -18	0 -25	-8 -33	-17 -42	-25 -50	-34 -59	-39 -64
40	50	+280 +180	+192 +130																-45 -70
50	65	+310 +190	+214 +140	+146 +100	+90 +60	+106 +60	+60 +30	+40 +10	+19 0	+30 0	+46 0	± 15	+9 -21	0 -30	-9 -39	-21 -51	-30 -60	-42 -72	-55 -85
65	80	+320 +200	+224 +150														-32 -62	-48 -78	-64 -94
80	100	+360 +220	+257 +170	+174 +120	+107 +72	+125 +72	+71 +36	+47 +12	+22 0	+35 0	+54 0	± 17	+10 -25	0 -35	-10 -45	-24 -59	-38 -73	-58 -93	-78 -113
100	120	+380 +240	+267 +180														-41 -76	-66 -101	-91 -126
120	140	+420 +260	+300 +200	+208 +145	+125 +85	+148 +85	+83 +43	+54 +14	+25 0	+40 0	+63 0	± 20	+12 -28	0 -40	-12 -52	-28 -68	-48 -88	-77 -117	-107 -147
140	160	+440 +280	+310 +210														-50 -90	-85 -125	-119 -159
160	180	+470 +310	+330 +230														-53 -93	-93 -133	-131 -171
180	200	+525 +340	+355 +240	+242 +170	+146 +100	+172 +100	+96 +50	+61 +15	+29 0	+46 0	+72 0	± 23	+13 -33	0 -46	-14 -60	-33 -79	-60 -106	-105 -151	-149 -195
200	225	+565 +380	+375 +260														-63 -109	-113 -159	-163 -209
225	250	+605 +420	+395 +280														-67 -113	-123 -169	-179 -225
250	280	+690 +480	+430 +300	+271 +190	+162 +110	+191 +110	+108 +56	+69 +17	+32 0	+52 0	+81 0	± 26	+16 -36	0 -52	-14 -66	-36 -88	-74 -126	-138 -190	-198 -250
280	315	+750 +540	+460 +330														-78 -130	-150 -202	-220 -272
315	355	+830 +600	+500 +360	+299 +210	+182 +125	+214 +125	+119 +62	+75 +18	+36 0	+57 0	+89 0	± 28	+17 -40	0 -57	-16 -73	-41 -98	-87 -144	-169 -226	-247 -304
355	400	+910 +680	+540 +400														-93 -150	-187 -224	-273 -330
400	450	+1010 +760	+595 +440	+327 +230	+198 +135	+232 +135	+131 +68	+83 +20	+40 0	+63 0	+97 0	± 31	+18 -45	0 -63	-17 -80	-45 -108	-103 -166	-209 -272	-307 -370
450	500	+1090 +840	+635 +480														-109 -172	-229 -292	-337 -400

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