

叶片式旋转型缓冲器 盖板应用方面解析

Application analysis of
vanetype rotary damper on cover plate

一、适用于盖板装置的叶片式旋转型缓冲器型号
Type No. of damper on cover plate

型号 Type No.	扭矩范围 Torque range	直径(mm) Diameter	材料 Material
Q20B-Z/Y	0.8 - 3.0N.m	20	PBT本体 Body, PBS轴 shaft
Q20BJ-Z/Y	3.0 - 4.0N.m	20	PBT本体 body, 锌合金轴 Zinc Alloy shaft
Q18B-Z/Y	0.8 - 2.5N.m	18	PBT本体body, POM轴 shaft
Q18BJ-Z/Y	2.0 - 3.0N.m	18	PBT本体 body, 锌合金轴 Zinc Alloy shaft
Q14BJ-Z/Y	1.0 - 2.5N.m	14	锌合金 Zinc Alloy

Q20B-Z/Y



Q20BJ-Z/Y



Q18B-Z/Y



Q18BJ-Z/Y



Q14BJ-Z/Y



二、关于盖板适用的缓冲器，对应扭矩选配 How to calculate the torque

如图所示：As showed on the right figure

盖子重量 Weight of the cover plate M: 1kg

盖子尺寸 Dimensions of the cover plate L: 0.3m

重心位置 Center of gravity postion G: L/2

负载扭矩 Load torque: $T=1\times 9.8\times 0.3\div 2=1.47\text{N}\cdot\text{m}$

据上述计算结果，使用缓冲器应该选择1.5N.m的产品

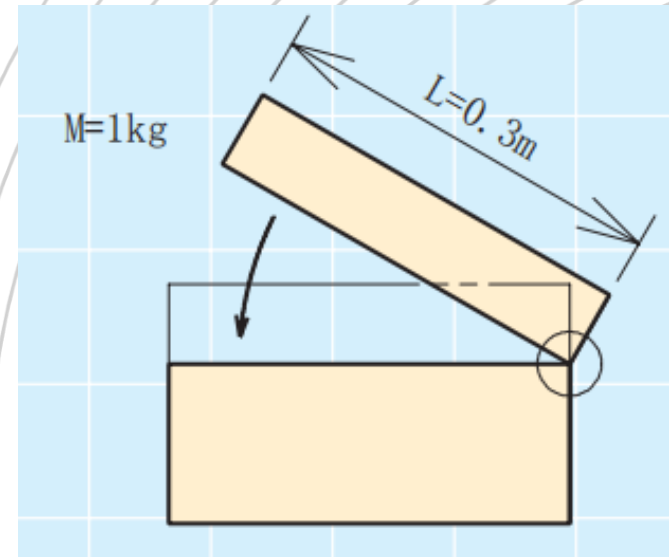
As calculated as above, the torque of the damper should be 1.5N.m.

盖板重量过大，需保证盖板平衡度，则使用左右两个缓冲器产品。单边缓冲器扭矩按总扭矩的一半计算。

For heavy cover plate, it should ensure the balance of the cover plate. Then it should use two dampers(left and right for each). The torque of each side will be half of the total torque.

盖板的形状不规则可能计算出来的扭矩有一定的偏差，最后确定使用效果时要根据具体情况决定缓冲器的扭矩。

The irregular shape of the cover plate may result in a certain deviation in the calculated torque, and the damper torque shall be determined according to the specific situation when using..



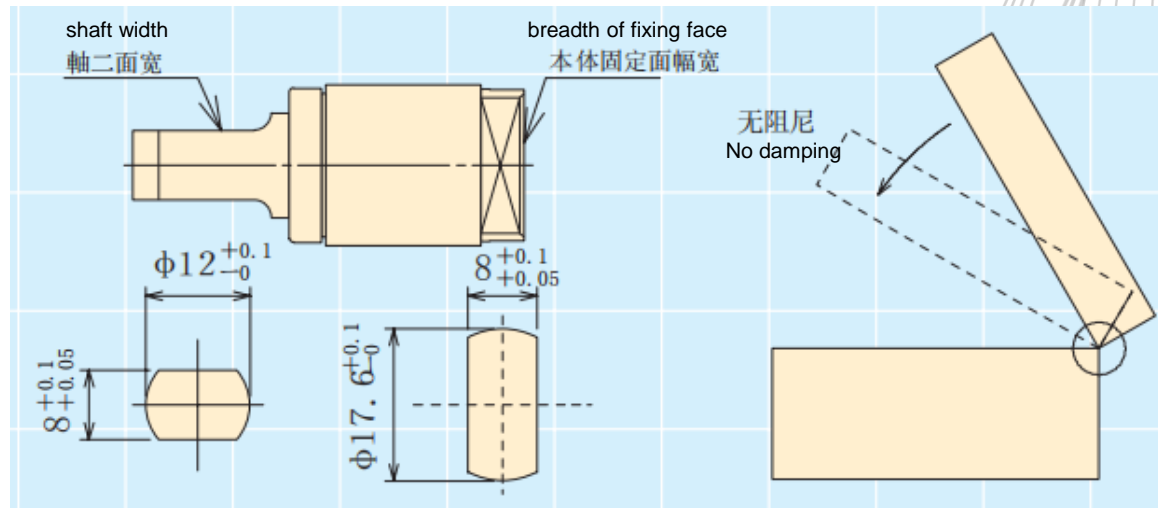
三、缓冲器与盖板配合安装时注意事项

Precautions when installing the damper to the cover plate

- 外部固定件与缓冲器的配合间隙需要控制在0.2mm以内，间隙变化会影响阻尼器下落时间。

The matching gap between the external fixed parts and the damper should be controlled within 0.2mm. The gap change will affect the falling time of the damper.

例：For example:



- 缓冲器在盖板两端的安装必须保证在同一条中心线上，不得有偏心力负载，否则会损坏缓冲器，造成产品漏油。

Installation of the damper on both ends of the cover plate must ensure that the product axis rotates in a Central Line, and there must be no eccentric force load, otherwise it will cause oil leakage of the product and damage the damper.

- 单向旋转缓冲器产品的使用角度为110°，打开角度如果超过110°，会造成缓冲器损伤，按照扭矩（缓冲）发生方向从70°开始逐渐增加，30°到0°时为扭矩（缓冲）最大值。如果缓冲器安装角度偏移过大可能有扭矩使用不到或者关闭不到位现象。

The working angle of uni-directional rotary damper is 110°. Above 110° of the opening angle will cause the damper injury. The torque mainly occurs within 40° before closing of the cover plate. The torque will reach the peak value in 110°. If the cover plate is designed with an angle offset, torque may not be reached or the closure may not be in place

- 盖板关闭时位置应该是缓冲器闭合位置，保证有5°的宽裕角度，以确保在缓冲器的有效工作区域内。

When the cover plate is closed, its position should be overlapped with the initial position of the damper, and with 5° angle of dample, to ensure that the cover plate is in the workable damping area of the damper.

- 盖板的尺寸和重量需定期确认，如果变化过大，会影响缓冲下落时间。

The size and weight of the cover plate shall be confirmed periodically. If the change is too large, it will affect the buffer falling time.

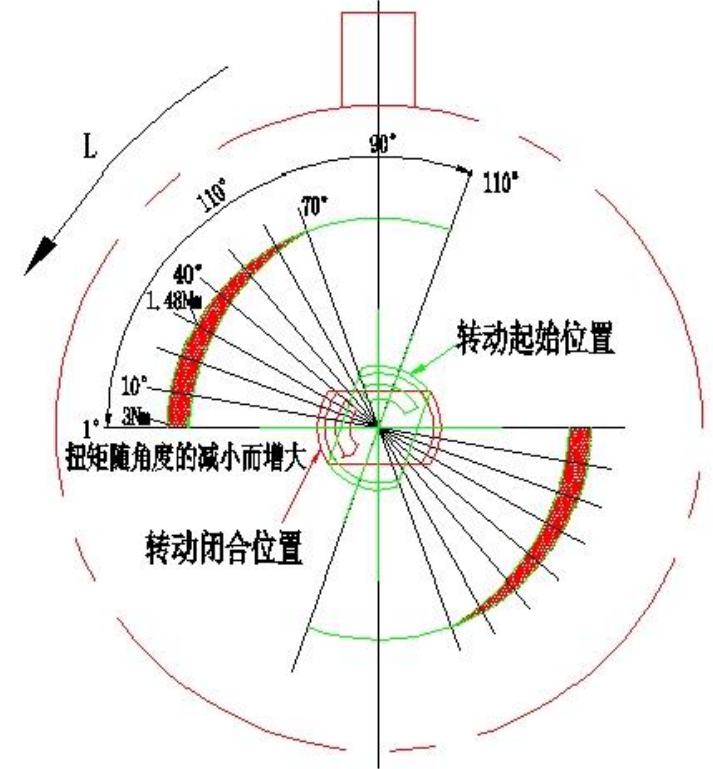
不同的盖板，按照不同的重量，我们对不同扭矩的缓冲器

The weight of the lid increases gradually according to the time. According to different weights, different lid correspond to dampers of different torque

例如：对应1.75-2.45公斤的盖板。应该选成2款，2.3±0.15kg,1.9±0.15kg

For the cover plate of 1.75kgs to 2.45 kgs, should choose these two types: 2.3±0.15kg,1.9±0.15kg

图示为逆时针旋转的缓冲器从110°开始到闭合时扭矩变化示意图。



四、缓冲器下落时间的确定

Determination of the falling time of the damper

缓冲器生产检测时标准的下落时间为 10 ± 5 秒。

The damper torque in production is generally specified as the tolerance of 10 ± 5 second.

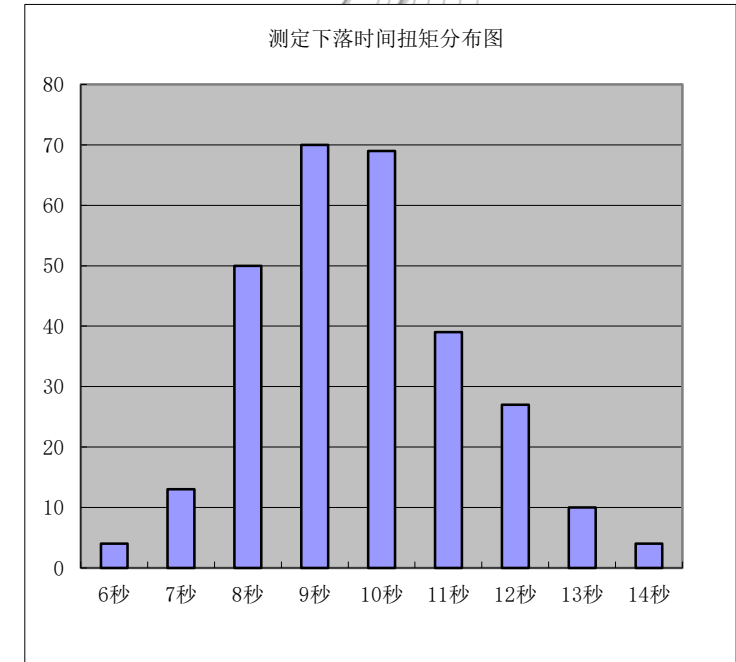
如果客户要求缓冲器下落时间缩短，则产品的不良率会上升。通常每缩短2秒，按照缩短梯度产品的不良率会以5%，10%，20%的倍数上升。这个不良率不是产品质量不良，而是应对客户要求有部分被选出，超出客户时间范围的产品只能废弃。如果产品是专门为客户定做的，则价格成本会相应提高。

If the customer requires to narrow the time range, the defect rate of the product will rise. Usually, every 2 seconds of reduction in the range will increase by a multiple of 5%, 10% and 20%. The defect rate is not the poor quality of the product, but the out-of-time range according to the customer requirements. The damper out-of-range could only be discarded. If the product is specially customized for the customer, the price cost will increase accordingly

图表是我们拿出一个批号内扭矩为2N.m的缓冲器，下落时间要求在6-14秒的300个合格品的扭矩分布图。大约85%集中在中间4秒区间内

The diagram is the torque distribution diagram of 300 qualified products with the torque of 2N.m in same batch number, whose falling time is required to be 6-14 seconds. About 85% is concentrated in the middle 4-second range

Distribution diagram of falling time



五、会导致缓冲器下落时间变化的因素

Factors that causes change in the fall time of the damper

- 温度变化对缓冲器的影响

Effect of temperature change on damper

缓冲器中的缓冲介质是硅油，硅油的粘度随温度变化而发生变化。

The damper has silicone oil, the viscosity of the oil will be changed with the temperature.

产品的使用温度为-5°C - 50°C，低温时缓冲器下落时间会延缓，高温时会加快，变化率最高为50%。

产品的适合储存温度在-20°C - 65°C。

产品在极限温度时下落时间变化较大，需在室温下放置5小时以上，方能基本恢复正常使用功能。

Working temperature of damper is - 5 ° C to 50 ° C. In low temperature, the falling time of the damper will be prolonged. while in high temperature, it will speed up. The highest rate of change is about 50%. The storage temperate of damper is-20°C - 65°C.

The falling time of the product varies greatly in the extreme temperature, and it needs to be kept at room temperature for more than 5 hours, then the product can be basically restored to normal use

- 缓冲器长期处于打开状态时，下落时间会延缓，闭合状态放置24小时后，恢复到标准下落时间内。

When the damper angle is in open state for a long time, as the oil recover state is unstable, the falling time will be delayed.

After placed in close state of the angle after 24 hours in room temperature, the damper will return to normal state.

六、缓冲器的最小发生缓冲角度 The minimum working angle of the damper

规格书规定的缓冲器的最小工作角度在抬起角度为40°以上放手落下有缓冲效果。

In the specifications sheet, the minimum working angle is specified as 40°. When the lid is lifted up in 40°, it still has the damping effect

在抬起15°-40°内时，需停留2-3秒后，则会有缓冲效果。这是因为缓冲器内部须有回油时间。抬起角度越小则等待时间越长。抬起15°内无效。

When the lid is lifted during 15° to 40 °, it need to wait for return of oil by holding the lid 2-3 seconds and then let it go. The smaller the angle, the longer the wait. It will be invalid within 15 °.

影响小角度缓冲效果的原因：

Factors that affect the effect of small angle buffering,

a) 高扭矩缓冲器由于硅油的粘度高，硅油回流速度慢，获得同样缓冲效果需要增加抬起角度或停留时间。

For the damper of big torque, due to the high viscosity of oil, the oil flow speed is slow when changing the direction, which need to increase the angle of lift or dwell time.

b) 外部配合件与缓冲器配合轴间隙过大，缓冲器需先消除间隙后再开始发生扭矩，导致抬起角度增加。

The clearance between the external fittings and the damper's mating shaft is too large, and the damper swings the clearance before starting to work when changing the direction, resulting in the increase of lifting Angle

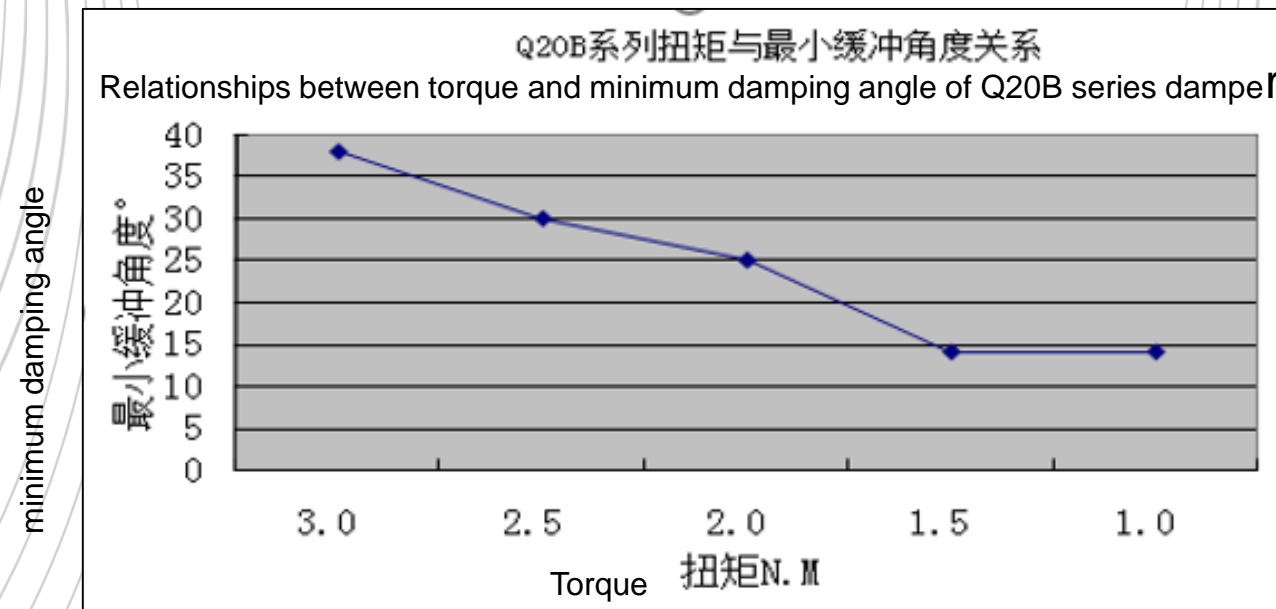
缓冲器扭矩不同时，使用硅油的粘度不同，产生的小角度也不同。硅油粘度越小，小角度的效果越好。

For different torque of the damper, the viscosity of the oil is different. The minimum working angle is also different. The smaller the viscosity of silicone oil, the better the effect of minimum working angle.

以下是Q20系列的不同扭矩产品的小角度变化曲线图。The following is the curve of minimum working angle for different torque of Q20 series of dampers.

测试方法：从下往上抬起，对应角度放下，蓝色曲线上为开始产生缓冲效果的角度。

Method of test the minimum working angle: Lift the lid rom the bottom up, stay and let go. The area above blue curve is the the angle starting to have damping effect.



七、我公司测量阻尼器扭矩及下落时间的方式：

This is how we test the torque and the falling time.

工厂生产时以客户的盖板为参考，制定相应的重力锤模仿盖板的下落，定出时间区间，确定产品的公差，从开启角度为70°时开始计算下落时间。

Confirm the torque according to the weight and dimensions of lid. Then match the corresponding heavy hammer in the detector. And then counting the falling time from 70°.



视频为两种不同重量的重锤，可以从下落时间的变化区分，右侧黑色数字显示为盖板重量。

Video shows two heavy hammers of different weights, which can be distinguished from the change of falling time. The black number on the right shows the weight of the lid.

八、生产缓冲器时对下落时间的管控方式

How we control the falling time when we produce dampers :

根据不同旋转方向 and 不同型号的缓冲器确定扭矩检测机。

According to different rotation direction and different types of dampers to determine the torque detector.

确定客户需要的扭矩值，调整检测机到确定的数值，每一个产品出厂前均用检测机进行全检，检测出符合标准下落时间，达到客户要求范围的即为合格品。

Determine the torque required by the customer, adjust the detection machine to the determined value. Before delivery from factory, each product needs to use the detection machine for full inspection, to measure the standard falling time. Qualified products are those that reach the range of customer requirements. otherwise regarded as unqualified products.

例如：客户要求6-14秒的下落范围，我们按扭矩调整，以9秒钟下落时间为中心调整产品的生产。

For example: The customer requires the falling time range is 6 to 14 seconds. We adjust the falling time according to the torque and take the falling time of 9 seconds as the optimal state to adjust production.



视频为缓冲器生产工序中全检方式
This is how we full inspect the product during production

九、我们的产品优势 Advantages of our product

我公司产品是从日本不二乳胶株式会社全套引进图纸，生产设备，工艺及技术管理的。

公司董事长留学日本，机械专业硕士学历，并在日本不二乳胶株式会社工作15年。公司生产主管，质量主管，技术负责人均去日本不二乳胶株式会社进行技术专业培训。自2003年在中国开始生产以来，一直是同行业产品中的领先。与市场

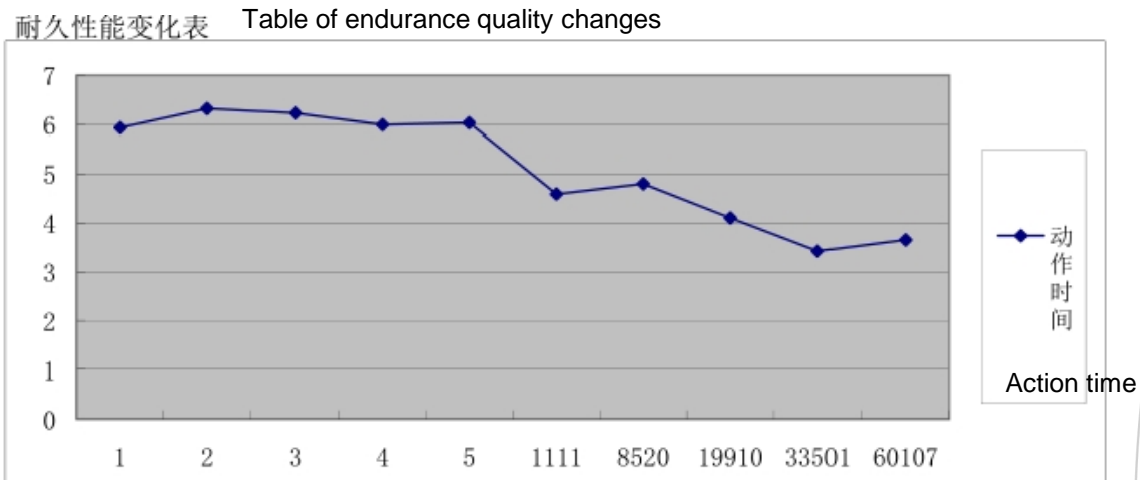
上很多抄袭我公司的同类产品相比，我们的产品外观精致，使用寿命长，质量稳定，市场评价好。

公司的生产理念是，优质，诚信，敬业，创新。

Our company's products are imported from Fuji Latex co., LTD (Japan) with complete sets of drawings, production equipments, process and technical management. The chairman of the company has studied in Japan and obtained a master's degree in mechanical engineering, and then worked for Fuji Latex (Japan) for 15 years. The production supervisor, quality supervisor and technical responsible person of the company also went to Fuji Latex for technical professional training. Since the beginning of production in China in 2003, our products are always the most qualified products in this industry. Compared with many similar products copied from our company in the market, our products have delicate appearance, long service life, stable quality and good market evaluation.

The philosophy of our company is Quality, Integrity, Dedication and Innovation

● 我们的产品**使用寿命**：保证寿命50000次，破坏性寿命测试5000次。在寿命检测中我公司产品的使用变化率远小于其它产品。
Service life of our products is guaranteed by 50000 cycles. Destructive service life testing is 5000 cycles. In the life time test, the changing rate our products is much lower than that of other products. Pls refer to the following curve.



● 我们的产品生产使用的原材料均为进口和中国国内外商独资企业生产，产品不使用回料和再生料，保证产品质量。
The raw materials used in the production of our products are all imported or produced by domestic foreign-funded enterprises in China. The products do not use recycled materials and recycled materials to ensure the quality of the products.

● 我们的产品在生产过程中，每道工序均有生产记录，产品的制造过程履历可以追溯5年。产品在生产过程中进行100%全检，出厂前再进行抽检，发货时均有检测报告并长期保存。
In the production process of our products, there are production records for each process. And the manufacturing process can be traced back to 5 years. 100% full inspection is carried out in the production process, sampling inspection is carried out again before delivery, and the test report is available and stored for a long time upon delivery.

● 我们的产品小角度使用效果远胜于其它产品。经惠而浦合肥工厂对市场同类产品进行测试，我公司缓冲器装在洗衣机盖板上，抬起9CM后就有缓冲效果。市场其他同类缓冲器需要抬起18CM后才有缓冲效果。

The effect of minimum working angle of our products is much better than other products. After the test of similar products in the market by Whirlpool Hefei factory, when our damper is installed on the lid of washing machine, the damping effect can be achieved after lifting the lid by 9CM. While other similar dampers in the market need to be raised by 18CM to have the damping effect.

● 我们的产品的下落曲线可以按客户要求设计。缓冲器随着运动过程中扭矩的增加设计的缓冲阻力也增加，达到下落过程平稳。相对市场其他厂家产品寿命长、扭矩衰减小、质量稳定。

The falling time curve of our products can be customized.. With the increase of the torque in the process of motion, the buffer resistance of the design also increases to reach a stable falling process. Compared to other manufacturers in the market, our product has longer life time, smaller torque attenuation, more stable quality.

常规缓冲器下落曲线有匀速，或先快后慢。

The falling time curve of normal damper has uniform speed, or first fast then slow



匀速闭合最后角度加快效果的视频展示
Video of closing in uniform speed first and then fast.



先快后慢的视频展示
Video of first fast then slow

- 根据客户的需求，我们还提供时钟15点至18点下落先慢后快的动作效果产品。
According to the needs of customers, we also provide the damping effect of first slow then fast from 15 to 18 o'clock direction.

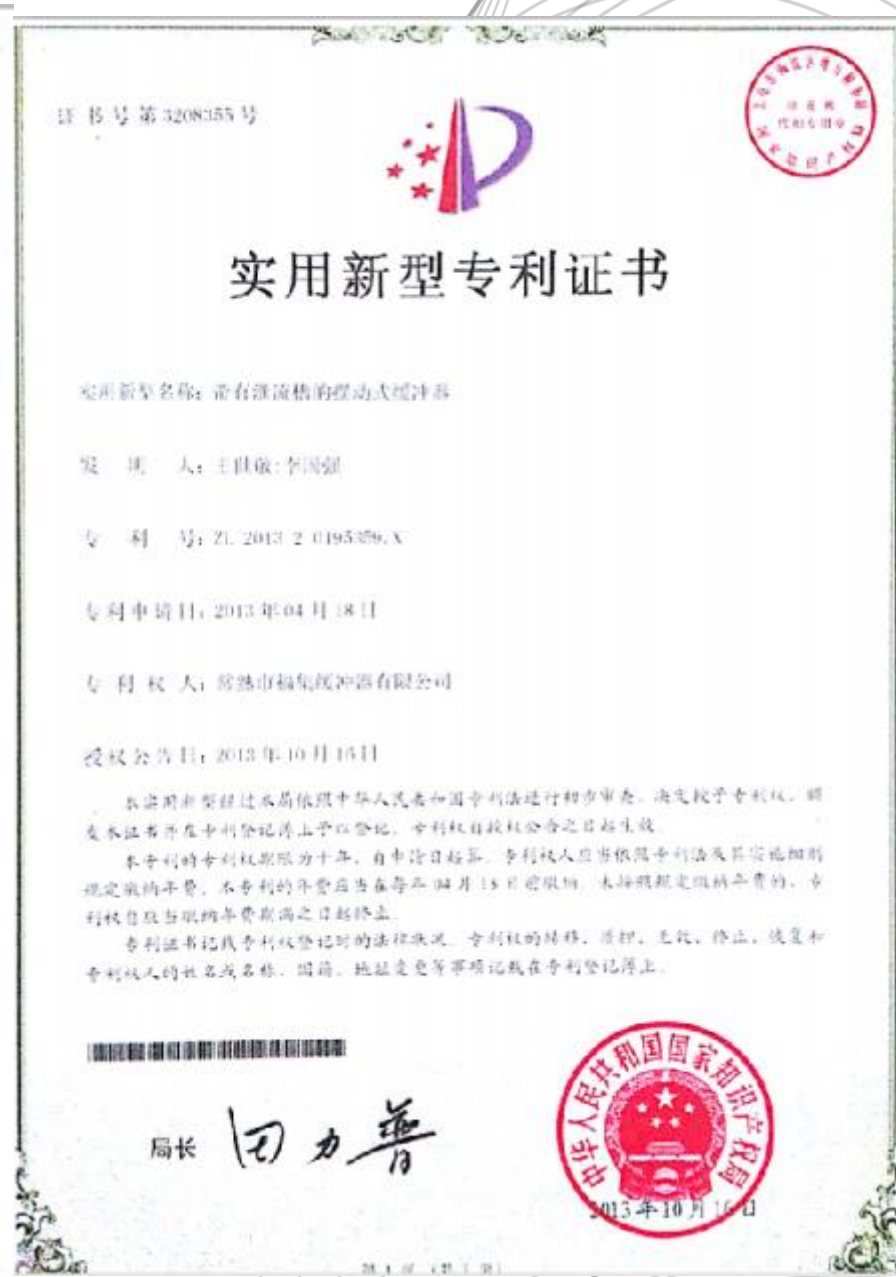
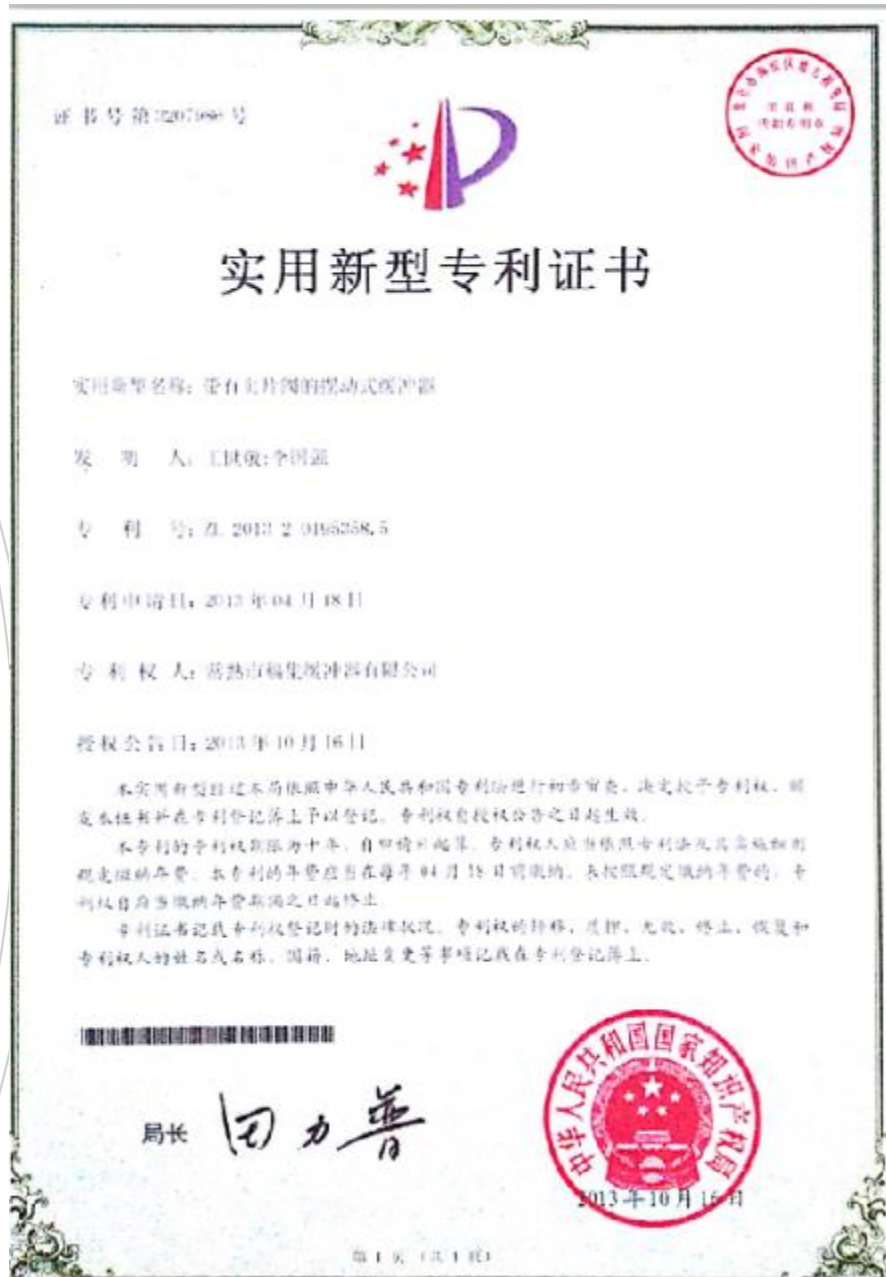


时钟12点至15点先快后慢再快的三段动作效果产品
Three speeds of motion from 12 to 15 o'clock direction.

我们的旋转型缓冲器已有17年的生产经验，产品质量及稳定性处于国内领先水平。

在产品的技术及应用上我们一直在探索，不断提高，已取得了5项技术专利，另还有18项专利在审批中。

We have 17 years of production experience for rotary dampers. The product quality and stability is in the leading level in domestic market. On the technology and application of products, we have always been exploring, and obtained a number of technology patents.





我们只生产最好的缓冲器

We only produce the best dampers

THANKS