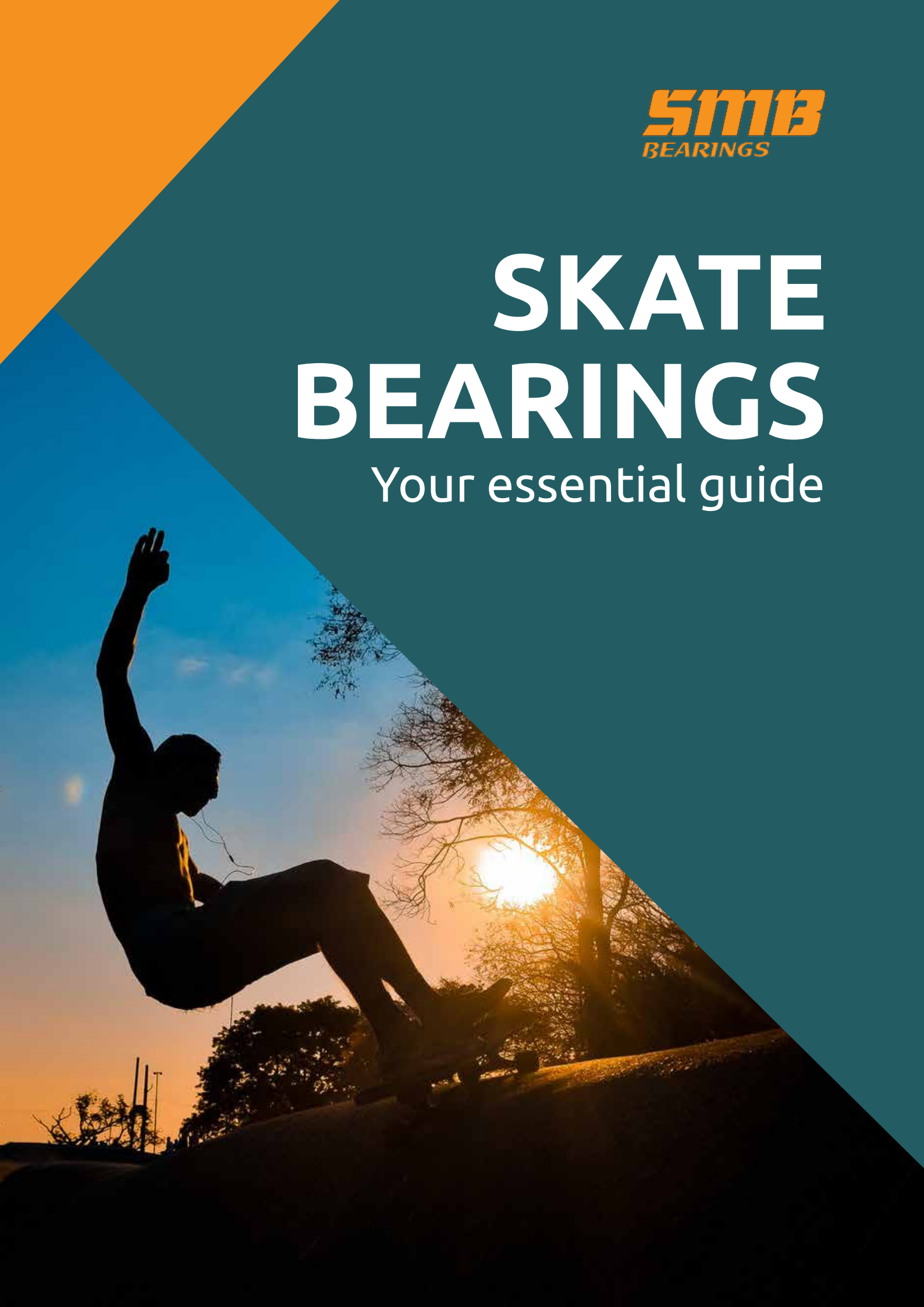


SMB
BEARINGS

SKATE BEARINGS

Your essential guide



Welcome to the SMB Bearings essential guide to skate bearings

Whether you are a professional skateboarder or a relative novice, chances are you will have heard a lot about skate bearings. Good quality, well maintained bearings are essential to skate performance.



The problem is, whatever your level of experience, the terminology and the advice can be overwhelming. Should you go for hybrid ceramic or steel bearings? What is the ABEC rating and does it matter? Do you need seals or shields? How do you clean your bearings at home?

If you're feeling a bit lost and don't know where to start, then you are in the right place. This guide will talk you through everything you need to know, beginning with the very basic elements of what a bearing is, right through to technical discussions of tolerances and other details that only bearing boffs need to know!

But first, a bit about SMB Bearings. We are a UK-based specialist supplier of bearings. We don't just sell bearings, however. Many years of working closely with customers has given us an unrivalled expertise in understanding what makes a good quality bearing. Along with that, we are also experts in bearing lubrication and provide our own in house relubrication service.

So, while we may not know everything there is to know about skateboards, longboards and inline skating, we are the experts when it comes to bearings. Hopefully, this guide will give you everything you need to know without overloading you with unnecessary information. If you don't find the advice you're looking for, or if you still have a question about skate bearings, just get in touch via our website or on social media. We love a chat on Twitter!

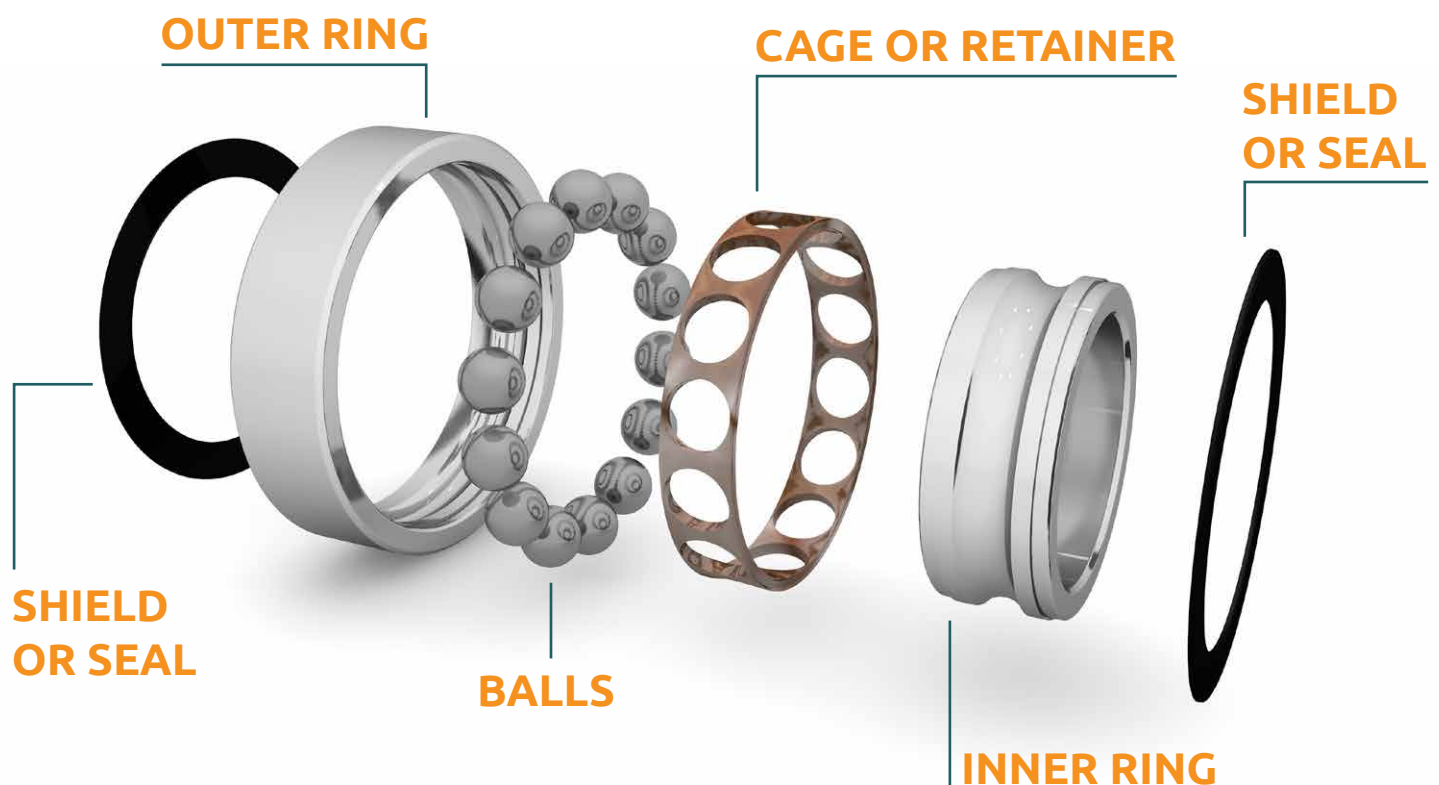
Chris Johnson
Managing director
SMB Bearings

BEARING BASICS

Bearing terminology can be confusing. In this section, we go back to basics and discuss what a bearing is and what each of its key components does. If you are already familiar with bearings, feel free to skip this section and go straight to the advice on skate bearings. However, unless you are completely sure you understand exactly what a bearing is and are familiar with terms like 'raceway' and 'retainer', this section is probably a useful starting point.

Bearings help support rotational movement. They are found in almost anything that has rotational elements but for your skateboard, longboards and inline skates, bearings are essential in keeping your wheels turning smoothly.

THERE ARE FIVE KEY COMPONENTS TO A BEARING:



The balls sit between the inner and outer ring. You then have an inner and outer race or raceway, which refers to grooves in which the balls move. A cage or retainer separates the balls out and stops them from colliding with one another in the raceway. Shields or seals are then added to keep the lubrication in and any dirt or foreign particles out.

When all these elements come together the outer ring rotates, along with the balls, while the inner ring is stationary. For this to work perfectly you need minimal friction between the rotational elements. Therefore, surface material and quality are important, as is the lubrication (more on these later).

WHY BEARINGS MATTER

Bearings are essential in so many different applications and technologies. Pretty much anything that has rotating elements in it will rely on bearings to perform properly. What makes a good bearing is dependent on the application and the environment in which it is operating. A good bearing for an industrial oven might not be a good bearing for a skateboard, and vice-versa.

At SMB Bearings, we pride ourselves on knowing what kind of bearing is suitable for each unique application, from sports and hobbies to scientific laboratories and space technology.

We have designed our skate bearings with two key aims in mind. Firstly, we wanted to guarantee high quality performance. Secondly, we wanted to deliver value for money.

1

**GUARANTEE HIGH
QUALITY PERFORMANCE**

2

**DELIVER VALUE
FOR MONEY**



There are well informed people who will wrongly advise that if you are unsure which bearings to pick and cannot be bothered to do your research, you should just pick a brand you trust and go for the cheapest ones. While a trusted brand is important, we would advise against simply picking the cheapest.

CHEAPER PRODUCTS WILL MORE LIKELY BE MADE FROM CHEAPER QUALITY MATERIALS, MAKING THEM MORE PRONE TO WEAR.

Cheaper bearings will also have raceways that are less round. None of these subtle differences will be visible to the naked eye, but they will impact performance, reliability and durability.

You don't need to pick the most expensive bearings and price is often not the best indicator of quality. However, if someone tells you that all bearings are pretty much the same, then they probably don't know what they are talking about!

There are many factors that determine bearing quality and suitability when it comes to skating. These are material, seals and shields and lubrication. Before we take a look at those, let's tackle head on the controversial topic of ABEC ratings!



ABEC RATINGS

ABEC stands for Annular Bearing Engineering Committee of the American Bearings Manufacturers Association. They devised the rating system to set an industry standard for bearing tolerances.

Tolerance refers to the amount of permissible variation in the measurements of the material. Let's say, for example, you are manufacturing a part for an industrial robot. You have measurements from the designer telling you that a piece of metal needs to be 100 mm long. The tolerance rating refers to how close to 100 mm it needs to be.

The higher the ABEC rating, the greater the precision with which the bearing has been machined. But bear in mind we are talking about minute differences here that are not visible to the naked eye. There are five ABEC ratings: ABEC 1, ABEC 3, ABEC 5, ABEC 7 and ABEC 9. The differences between each of these is significantly less than a hair's width.



Now we come to the important part. This rating system was designed for industrial applications. It is a measure of the tolerances, not an automatic indicator of quality. When it comes to skate bearings, many people wrongly attach too much importance to the ABEC rating.

There are very few manufacturers in the world who can produce genuine ABEC 9 bearings. They are very expensive and are used in outer space applications. It isn't necessary for skate bearings. For many components in aerospace applications, peak performance is absolutely critical so the bearings and mating parts need to be made to very tight tolerances.

In these cases, ABEC 9 bearings may be used along with other components that are made to the same standards. It makes no sense to use a very high precision bearing with a low precision shaft and housing.

At SMB Bearings, our custom-made skate bearings are ABEC 5. This means that the inner diameter must measure between 7.995 and 8.0 mm. However, ABEC 3 would be perfectly suitable for your skate bearings too. So, if you are wanting to have a higher ABEC rating because it sounds cool, we've got you covered. Just bear in mind this is not an especially good indicator of whether the bearing is any good for skating.

BEARING MATERIAL

One thing you do want to pay more attention to is the material that the bearings are made from. There are three possible types: steel bearings, hybrid bearings or full ceramic bearings. For hybrid bearings, the balls are ceramic while the other components are steel.

WE SUPPLY **TWO TYPES** OF SKATE BEARINGS



**608 STEEL
BEARINGS**



**608 HYBRID CERAMIC
BEARINGS**

The main difference between the two is that the latter type has ceramic balls inside, which are made from silicon nitride.

The key benefits of ceramic are the hardness and lightness of the material. If the balls are ceramic, they will not get scratched or indented as easily, meaning smoother surfaces, less friction and better performance. Unlike steel, ceramic does not rust either. But remember, hybrid ceramic bearings are a combination of steel and ceramic, so not all rust concerns go out the window.

Hardness of the material is not the only thing that matters, however. Ceramic is more brittle, making it less effective at withstanding heavy loads or impact loads. If you are doing lots of jumps and tricks, chrome steel bearings may last longer in comparison with hybrid ceramic bearings. Full ceramic bearings are the least forgiving of impact loads which is why they are not generally used as skate bearings.

SPEED, TORQUE AND DRAG

Although you may go fast when skating, you will never approach the maximum speed of a bearing. Standard skate bearings have a speed rating of 34,000 revolutions per minute (RPM). Our skate bearings have an RPM of 48,000. For wheels that are 75 mm in diameter, a mere 7,000 RPM would be equivalent to traveling at approximately 60 miles per hour (or 96 kph).

Torque is more important. This refers to rotational force, or the amount of force required to get the bearing turning and then maintain that speed. For skate bearings, this is the force and weight you apply to get the skateboard moving.

Frictional torque is the difference between the applied force and the outcome or result. In other words, the frictional torque is the force that counters the force you apply. So, you want low frictional torque to allow your bearings to rotate quickly and easily.

Similarly, drag refers to a force that acts in the opposite direction to the relative motion of the object. For example, if you are skating in the direction of the wind, the force of the wind countering your motion is a drag force.

Your choice of seal and lubricant will impact things like frictional torque and drag, potentially slowing your bearings if you make the wrong decisions. A bearing that is very round and with good surface finishes will rotate more freely.



CAGES AND RETAINERS

The cage helps hold the balls in place in the raceway. A good all-purpose steel cage is suitable for skate bearings. However, our steel and hybrid skate bearings use nylon cages. This is because this material is more forgiving if dirt or other particles enter the bearing, or if there is insufficient lubrication.



SEALS AND SHIELDS

Seals and shields are a key component of any bearing. They perform the dual task of keeping lubricant in and foreign particles, like dirt and dust, out. This is essential in maintaining bearing performance.

There are pros and cons to both seals and shields. Metal shields keep out large particles like dirt, but they will not prevent dust entering the bearing. The benefit of shields is that they do not increase torque.

THERE ARE PROS AND CONS TO BOTH SEALS AND SHIELDS. METAL SHIELDS KEEP OUT LARGE PARTICLES LIKE DIRT, BUT THEY WILL NOT PREVENT DUST ENTERING THE BEARING. THE BENEFIT OF SHIELDS IS THAT THEY DO NOT INCREASE TORQUE.

Rubber seals, sometimes called contact seals, do increase the torque significantly, thereby slowing the bearing. However, they are much better at keeping dust and other small particles out of the bearing and, as we discussed before, the bearing already rotates at a speed that is vastly above anything required in the world of skating.

Non-contact seals are the middle ground option and arguably best suited for skate bearings. They provide a tighter seal than shields, so are more effective at keeping out dust. At the same time, because they do not rub against the bearing inner ring, they do not produce the same level of frictional torque as contact seals.

Our custom skate bearings therefore have non-contact seals.

The seals can easily be removed if you need to relubricate the bearings. You can use a Stanley knife or other thin blade to remove them. Carefully insert the blade under the tip of the seal and gently prise open. Be careful not to cut the seal or push the blade in too far though because you want to avoid catching the cage.



CAGES AND RETAINERS

The cage helps hold the balls in place in the raceway. A good all-purpose steel cage is suitable for skate bearings. However, our steel and hybrid skate bearings use nylon cages. This is because this material is more forgiving if dirt or other particles enter the bearing, or if there is insufficient lubrication.

CLEARANCE

Bearings are designed to take mainly radial load. This is a load acting at a right angle (90 degrees) to the axis of rotation. In other words, your weight pressing down on the skateboard. Axial load refers to loads that are acting parallel to the axis of rotation, so sideways in this context.

THE SPACE BETWEEN THE BALLS AND THE RACEWAYS IS REFERRED TO AS THE INTERNAL CLEARANCE.

We have designed our skate bearings with slightly higher clearance than normal to allow for increased axial load when necessary, making them better able to withstand the impact of tricks.



LUBRICATION

Lubrication is essential in reducing friction and protecting surfaces from dirt and debris. This keeps the bearing operating smoothly. There are two main types of lubricants you can use: oil and grease.

Oil flows more easily than grease and is chosen in bearings that are employed in high speed applications (generally much faster than is required for skate bearings). Because it is relatively thin, it will not stay in the bearing as well as grease and you will therefore find yourself having to reapply lubricant often.

Grease is a better option for skate bearings. Grease is simply oil with a thickener added. Despite being more viscous (thicker) than oil, low viscosity grease only creates a minimal amount of extra drag when the bearing is acting under load (i.e. with your weight on the skateboard). When the grease warms up it also gets softer and any frictional torque is further reduced.

Grease will stay in your bearings for longer and performs a superior job at sealing out dirt and other foreign particles. Our skate bearings use a high speed, low torque grease manufactured by Klueber, who make lubricants for some of the most demanding applications in industry and aerospace.

Many people will simply replace their bearings rather than go through the hassle of relubrication. Fortunately, relubrication is easier than you might think and can save you money if you know what you are doing.

After use, grease may contain dirt or other

particles that will abrade the bearing's surfaces, reducing their smoothness. You therefore want to clean out old grease and replace it with fresh grease on a regular basis. Grease can be removed using a solvent like white spirit. Spin the bearing in the solvent to accelerate the cleaning process. As always, follow the relevant safety instructions on the product.

Pay attention in making sure the bearings are dry before relubrication. If there is any solvent still on the bearing it will dissolve the new lubricant, defeating the purpose of relubrication.

When applying the lubricant, aim to fill approximately 15-20 per cent of the internal space of the bearing. Try to evenly distribute the grease around the bearing, squeezing a small amount between the balls and onto the raceways. Once this is done, rotate the bearing several times to help further distribute the grease.

We offer tubes of grease for those who want to regrease their own bearings.





MAINTENANCE AND CARE

Even if relubrication is too much hassle for you, you should check your bearings for wear, so you know when to replace them. Over time, fine particles of metal will break away from the bearings. Heavy impacts such as jumps may dent the raceways. And of course, dirt and other debris will enter the bearing and speed up the process of wear.

If you hold the bearing's inner ring between a thumb and finger and then turn the outer ring with your other hand, you will be able to feel a roughness or grittiness if the bearing is worn. If the roughness is still there after cleaning, the bearing is due for replacement.

It is also a good idea to protect your bearings against corrosion by applying a light coat of oil to outer surfaces of steel bearings. Using your skateboard in the rain will increase the risk of corrosion for steel bearings.

MYTH BUSTING



MYTH #1

THE ABEC RATING IS THE KEY DETERMINANT OF BEARING QUALITY

We've already covered this one at length, but given the attention on ABEC ratings in the skate community, it is a good idea to reiterate here. Firstly, the ABEC rating is a measure of tolerance but other aspects of the bearing, such as lubricant, may make a high precision bearing less suitable for skating. Secondly, the scale was developed for industrial applications, not skating.

If your friend says that upgrading their bearings from an ABEC 5 to an ABEC 7 resulted in a sudden increase in performance, that may only be because they have got new bearings. If you upgraded from worn ABEC 5 bearings to brand new ABEC 3 bearings, you might feel similar improvements.





MYTH #2

SPINNING A BEARING WITH YOUR FINGER IS A GOOD TEST

You may see people go into skate shops and spin bearings or wheels in their fingers. This is a terrible way to test because it does not replicate the conditions the bearing will face when you are using it for skating. An unlubricated bearing will spin most freely but will wear the quickest.

You need to know how the bearing will perform under load. Specifically, you need to know how well this bearing will perform with your full weight bearing down on it, while performing jumps and subjecting it to other impact loads. Spinning it in your finger cannot really tell you this, so it does not really tell you anything useful.

MYTH #3

CERAMIC BEARINGS ARE ALWAYS BETTER THAN STEEL BEARINGS

As we have seen, there are many factors that impact bearing quality and suitability. Ceramic materials have their advantages, but it is wrong to assume that simply being harder and lighter makes them better in every instance. Hybrid ceramic bearings are less likely to withstand repeated impact loads, such as constant jumps, so your choice of bearing material needs to take account of the type of skating you are doing.



ANY OTHER QUESTIONS?

E-mail us at sales@smbbearings.com
or call us on +44 (0) 1993 842 555



www.smbbearings.com



+44 (0) 1993 842 555



sales@smbbearings.com

SMB
BEARINGS