

H.E. Supplies Pty Ltd

**Hobby Supplies
Engineering Supplies**

ABN 54 125 001 541



Abec Information

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ABEC INFORMATION SHEET

What is the meaning of ABEC?

ABEC is an acronym for Annular Bearing Engineering Committee of the AFBMA (Anti-Friction Bearing Manufacturers Association Inc). The ABEC grades of bearings are a set of standards for the manufacturing tolerances of bearings. All quality manufacturers around the world manufacture to at least ABEC 1 standard. If you were to ask your local bearing supplier for a 608ZZ (common size used in skates), you would almost certainly receive an ABEC 1 bearing.

Are there any other standards for measuring Bearing precision?

Yes. The other commonly used standard is the ISO (International Standards Organisation) standard. There are slight differences in the standards applied, but basically ISO Grade P0 is approximately equal to ABEC 1, ISO P6 approximates ABEC 3, ISO P5 approximates ABEC 5, ISO P4 approximates ABEC 7 and ISO P2 approximates ABEC 9.

What is the purpose of higher precision bearings?

Higher precision bearings are designed to allow high precision machinery to operate smoother and sometimes at higher speeds than a standard bearing would allow. Keeping this in mind, no matter how good your skates are, they are not classed as *high precision machinery*. A standard ABEC1 608ZZ has a limiting speed of 32,000 RPM with grease lubrication and 38,000 RPM with oil lubrication. The actual speed the bearing will attain without failure also depends on the loads applied and other running conditions but there is really no need to go into that too heavily here.

We feel that we must stress here that the purpose of higher precision bearings **is not to go faster**, but amongst other things, to **allow high precision machinery to operate smoother and at higher speeds than a standard bearing will allow**.

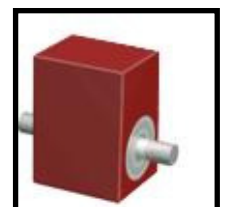
What are the grades of bearings available in order? How different are the grades?

From Lowest to Highest

- ABEC 1 Approximately equal to ISO P0
- ABEC 3 Approximately equal to ISO P6
- ABEC 5 Approximately equal to ISO P5
- ABEC 7 Approximately equal to ISO P4
- ABEC 9 Approximately equal to ISO P2

There are a number of factors covered by the ABEC grades, but to give you an idea we will just examine one of these factors - the eccentricity (out of roundness) of the track in the inner ring. For an ABEC 1 (lowest grade) bearing, the maximum eccentricity allowable is 0.0075 mm (0.000295"). This is quite precise - more than precise enough for skates and skateboards. The figures for other grades are

- ABEC3: 0.005 mm (0.000197")
- ABEC5: 0.0035 mm (0.000138")
- ABEC7: 0.0025 mm (0.000098")





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- ABEC9: 0.0012 mm (0.000047")

If used in high precision, high speed machinery (see above), these minute variations can make a difference. The fact is that no matter which of these bearings you use in skates or skate boards, after 5 - 10 minutes of use the tracks won't just be eccentric, they will become damaged enough to be indistinguishable from one another. Your high priced ABEC 9 bearing might as well be a 50 cent ungraded cheapie.

What features of a bearing are covered by the ABEC standards?

The attributes of a bearing that affect its performance are many and varied, but the most important features that would affect the performance in a skating application are as follows ...

- Lubricant type and quality - Heavier lubricants such as grease for longer life. Lighter lubricants such as oils for freer running.
- Quality of the bearing steel - Bad quality steels can fail very quickly. (Stick with known bearing brands)
- Internal axial and radial clearance (how much movement there is in both directions when the rings of the bearing are pushed in opposite directions). Too little or too much clearance can be detrimental to bearing performance. You can usually feel this movement with your fingers but you will not be able to determine whether it is within acceptable limits just by feel. Check the manufacturers specifications on the bearings and try to stay within the "MC3" range for normal skating applications. The terminology "MC3" will be recognised by most bearing suppliers. If you want more speed, you will want to use a higher internal clearance to allow the bearings to spin more freely. We have had some very good success supplying "MC5" clearance with a very light oil lubricant for speed skating. These are not available in a serviceable shield type though, and they will need replacing on a regular basis.
- Manufacturing quality control and cleanliness.

(None of the above attributes are covered by ABEC grades).

The best way to ensure that you get a good bearing is to stick to the well known manufacturers, and by this we do not necessarily mean "well known skating brand names". If you are buying pre-packaged sets it can be beneficial to check if the actual bearing shows a bearing manufacturers name and country of manufacture. Of course, not having these details doesn't mean that the bearing is no good.

