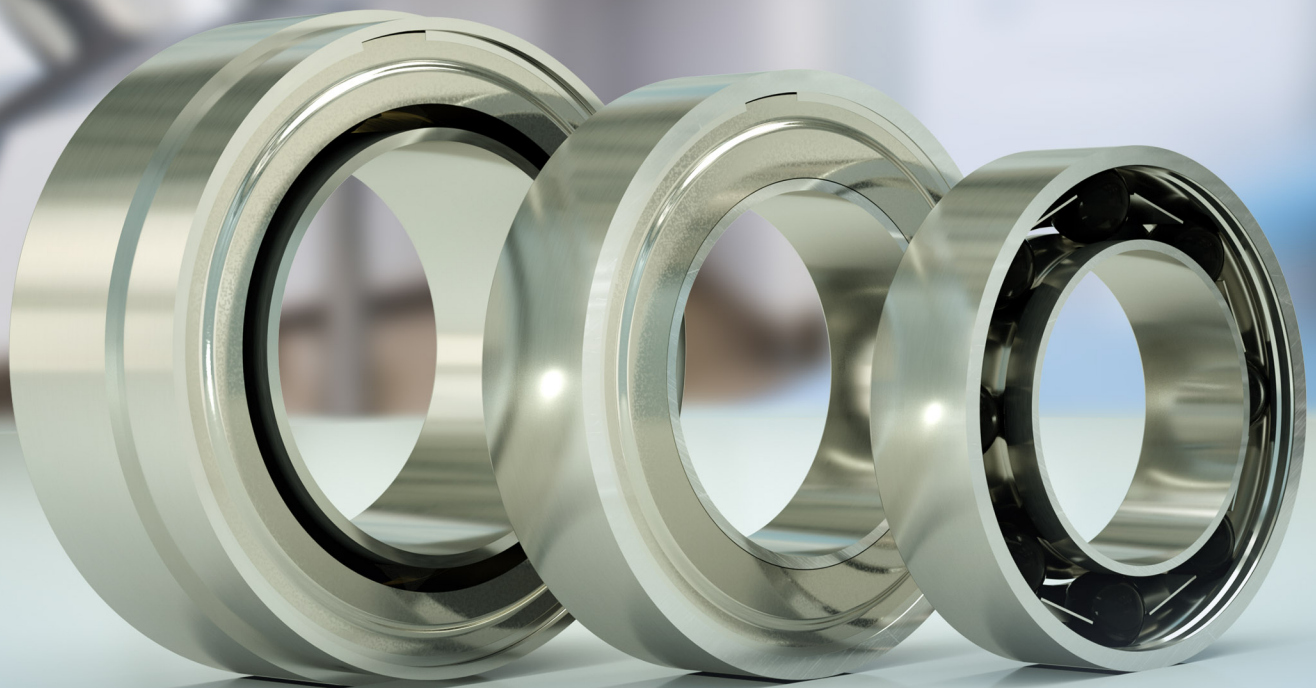


DENTAL HANDPEICE BEARINGS

Choosing the right bearings for a longer lasting handpiece

by Nason McCombs



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When it comes to dental handpieces, the most common cause for repair and for handpiece failure comes from the bearings. If you can eliminate this problem then you will be one happy doctor! Unfortunately, it is entirely impossible to fully fix the problem of failing dental bearings, you can only make them last longer. The longer your bearings last, the longer your handpieces last, and the less you spend on repairs... happy Dentist!

There are plenty of options that you can choose from when picking what bearings you can put into your handpieces; however, all of these options stem from the two types of balls that are used in these bearings; steel balls, or ceramic balls. The most common bearings put into handpieces are steel balls as they are less expensive, and they should last long enough to get your handpiece through the warranty. However, if you don't mind spending a little bit extra, ceramic bearings could really increase the life of your handpieces, experts say it can increase life by 30%.

There is a plethora of reasons why dental professionals recommend ceramic ball bearings in your handpieces. Among these reasons is they :

1. Run at a cooler temperature,
2. Lubricant stay on the balls longer
3. Bearings have a higher RPM rating,
4. The handpiece will run quieter.

Another reason why ceramic bearings last longer is the fact that they are ["50%-60% lighter than that of steel balls."](#) This helps when the bearings are spinning at full RPM, as the centrifugal force is much less, which allows the bearing outer ring to receive less wear than that of traditional steel ball bearings. Another great advantage of ["ceramic bearings are that they are 25% harder than steel"](#). This helps the handpiece last longer as debris entering the bearing may not cause detrimental damage.

Some other available options that can help with your handpiece life are the type of shielding that it uses. Some bearings don't have any shields, but they are needed to be lubricated after every sterilization cycle. Shielded bearings are able to hold lube in the cage for longer periods of time, and the more lube the better! Another thing to look at is if the bearing has a radial internal raceway or if it is angular. Angular raceways cause even less friction on the bearings, and can increase the life of handpieces even farther.

The best bearing you can buy? An angular contact, integral (built in) shielded, ceramic ball bearing. The only downfall? The price is a little bit more than what usual repairs cost, just because the parts cost a little bit more to acquire. However, in the long run, the extra cost that some repair companies may charge for high quality bearings can be offset by the long length that the handpiece can go without being repaired.

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Ceramic Bearing vs. Steel Bearing Material Comparison Chart

Item	Unit	Si3N4	ZrO2	Al2O3 (99.5%)	SiC	Bearing Steel
Density	g/cm ³	3.23	6.05	3.92	3.12	7.85
Water Absorption	%	0	0	0	0	0
Coefficient of Linear Thermal Expansion	10 ⁻⁶ /k	3.2	10.5	8.5	3	12.5
Modulus of Elasticity (Young's Mod.)	GPa	300	210	340	440	208
Poisson's Ratio	/	0.26	0.3	0.22	0.17	0.3
Hardness (Hv)	MPa	1500	1200	1650	2800	700
Flexural Strength (@ R.T.)	MPa	720	950	310	390	520 (tensile strength)
Flexural Strength (700°)	MPa	450	210	230	380	/
Compressive Strength (@R.T.)	MPa	2300	2000	1800	1800	/
Fracture Toughness, Kb		6.2	10	4.2	3.9	25
Thermal Conductivity (@R.T.)	W/m*k	25	2	26	120	40
Electrical Resistivity (@R.T.)	Ω*mm ² /m	>10 ¹³	>10 ¹⁵	>10 ¹⁶	>10 ³	0.1~1
Max. Use Temperature (no loading)	°F	1050	750	1500	1700	300
Corrosion Resistance	/	Excellent	Excellent	Excellent	Excellent	Poor