

minasure[®] RPM



*The new generation of
high-speed dental handpiece bearings
created by Timken R&D*



**Timken Aerospace &
Super Precision Bearings
(MPB Division)**

A UNIT OF THE TIMKEN COMPANY

TIMKEN

WORLDWIDE LEADER IN BEARINGS AND STEEL

Minasure[®] RPM Dental Bearings: The High-Speed Performance Leader



MPB pioneered the development of high-speed dental bearings. In fact, the world's first air turbine, the Borden Airotor, used MPB bearings. Today, as part of the Timken Company, the Dental Business Unit is dedicated to the development and manufacture of dental bearings that provide manufacturers and dentists with a new standard in handpiece performance – higher speeds, smoother operation, longer life and reduced maintenance. Minasure RPM high-speed dental bearings are available with a choice of five different ball cage materials to meet the complete range of high-speed operating environments. And, while these bearings are competitively priced, they deliver better long-term performance than other precision bearings.

All Minasure RPM bearings feature:

N-DUR™ Steel, Smoother Is Better

The Dental Business Unit shared in the development of Timken's N-DUR steel, a revolutionary new stainless alloy that is harder and more corrosion resistant than standard 440C steels. N-DUR is manufactured using a special process that ensures a uniform fine carbide distribution throughout the alloy. As the graphs at right show, this gives bearings machined from N-DUR a superior raceway finish to provide smoother operation.

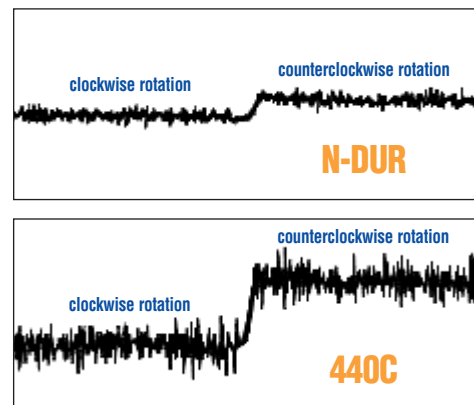
Outer Ring Ball Cage Piloting Improves Performance

By piloting, or guiding, the ball cage on the outer ring, rubbing velocity is reduced by 15% and cage stability is enhanced. While this requires greater precision in manufacturing than inner ring piloting, it is a key factor in prolonging ball cage life, the leading cause of dental bearing failure. At the same time, outer ring piloting utilizes centrifugal effects to direct lubricant to where it is most needed.

7-Ball Complements Extend Life

Flexible O-ring seating frequently causes bearing misalignment when the outer ring cocks or tilts relative to the inner ring. To alleviate this, Minasure RPM bearings utilize Timken's unique 7-ball geometry to minimize these damaging effects. This geometry is more forgiving toward misalignment than conventional 8-ball complements. At the same time, this geometry leaves more material between the ball pockets for greater cage strength.

FRICITION TRACE – N-DUR VS. 440C



Precision That Exceeds ABEC 7 Standards

While some dental bearings meet ABEC 7 standards, Timken has raised the bar. The critical features of Minasure RPM bearings; rolling elements and bore dimension – meet ABEC 9 standards. Only grade 3 high precision balls are used in Minasure RPM bearings. In addition, through strict process control, Timken has reduced the bore tolerance by 50%, from .0002 to .0001 inches to ensure better fit, reduced radial play variation and lessen vibration and noise. To meet these tolerances, Timken has developed manufacturing processes that set a new standard for quality and precision. As a manufacturer with ISO 9001 registration and AS9000 and D1-9000 AQS certifications, the Timken Dental Business Unit has the quality control programs in place to deliver high-speed dental bearings that ensure total customer satisfaction.



Cage Materials to Match Application Needs

Cage wear and fracture are the leading causes of bearing failure. For that reason it is critical that wear and autoclave resistance, as well as price, be considered in choosing cage materials for a particular operating environment. The Dental Business Unit now offers five different cage materials including two new premium materials that provide superior performance.

New **Everclave™** cages are made from a proprietary material that provides by far the best combination of wear and autoclave resistance. Everclave cages significantly extend the life of dental bearings subject to constant sterilization without sacrificing wear resistance or being overly dependent on difficult-to-follow maintenance protocols.

New **Minawear™** is a self-lubricating, modified Phenolic material with lower frictional characteristics and better autoclave resistance than standard Phenolic. Special additives nearly double the wear resistance of Phenolic without sacrificing its self-lubricating properties.

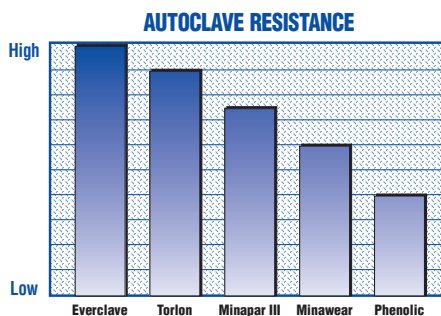
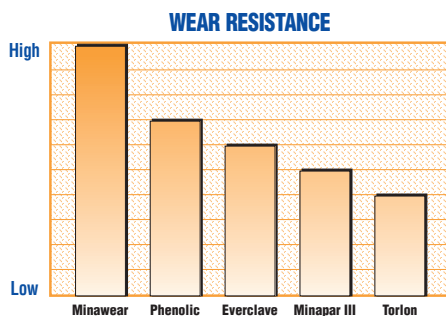
Minapar III™ cages offer a proven combination of wear and autoclave resistance at competitive prices. Using an exclusive Timken technology, Minapar III cages are molded from a polyamide resin impregnated with special lubricants and reinforced with carbon fibers. The molding process creates a unique geometry that improves high-speed stability by interrupting frictional contact with the outer ring.

MINIPAR III CAGE GEOMETRY



Torlon (Polyamide-imide) provides very good autoclave resistance when proper maintenance protocols are followed.

Phenolic is a good choice for operating environments with minimal heat or chemical sterilization. It will maintain low friction characteristics even in the absence of proper lubrication.



Better Lubrication with Minasure® Grease

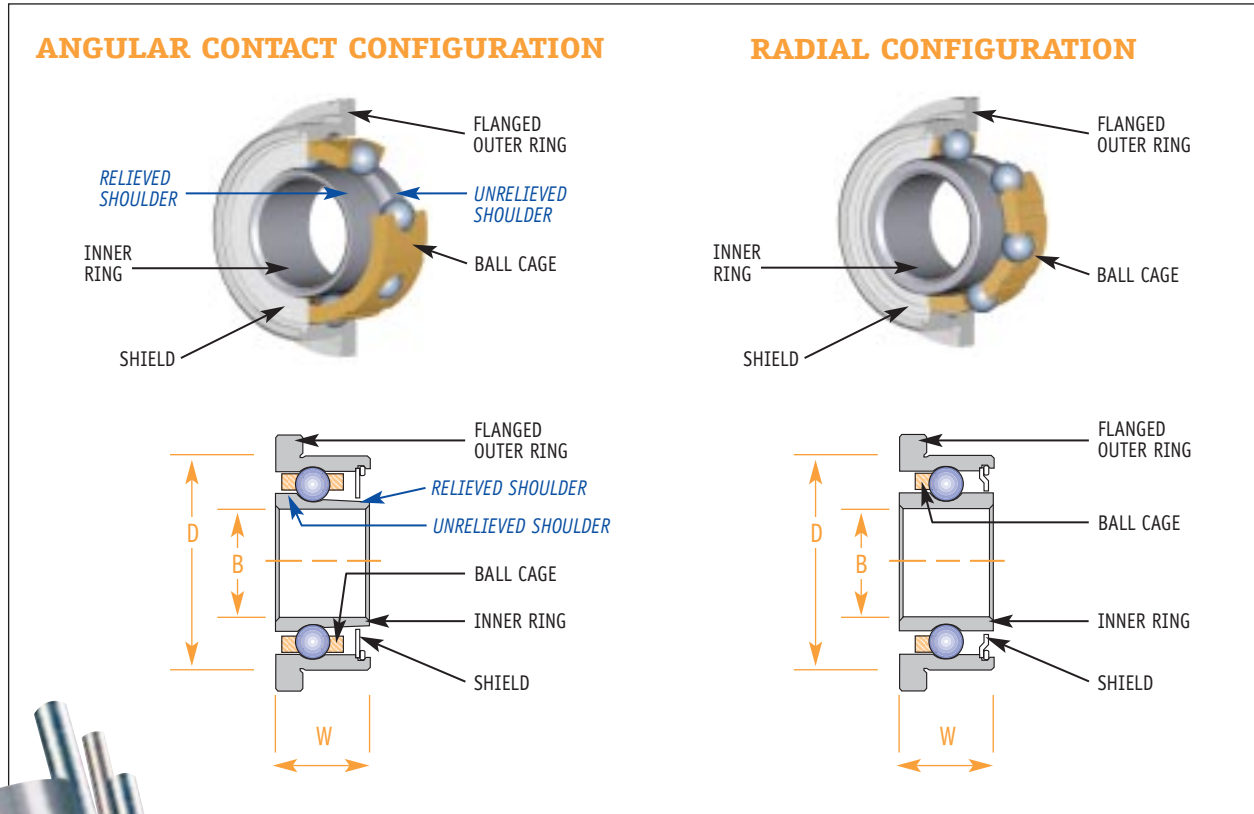
Timken research has shown that grease can enhance the life of high-speed bearings as it is less likely to dissipate at high speeds. Timken's new heat-resistant Minasure handpiece grease is designed to stand up under repeated sterilization. It is an inert, non-toxic synthetic that's specially formulated to help ensure that handpieces will run smoothly and reliably.

TIMKEN BEARING CHOICES

A Choice of Angular Contact and Radial Configurations

Angular Contact Bearings feature symmetrical cages. These enhance performance and extend bearing life as each ball is fully supported and completely surrounded by the cage. Angular contact bearings must be axially preloaded with a spring or O-rings to assure contact with the full unrelieved shoulder.

Radial Bearings are less expensive and easier to work with than angular contact bearings. They have full shoulders on both the inner and outer raceways so they won't disassemble during handling and installation in the handpiece.



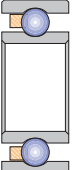
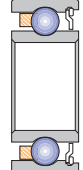
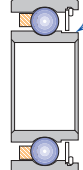
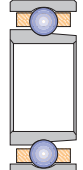
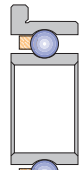
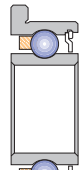
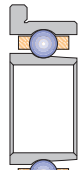
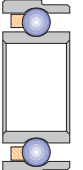
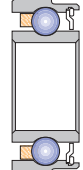
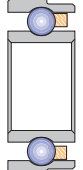




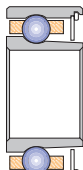

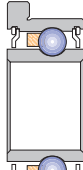


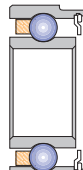

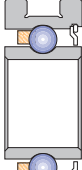
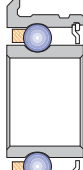

Ordering the Right Bearing Is As Easy As 1,2,3...

DR13A 5 G






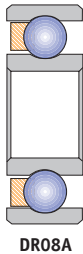
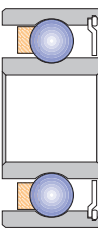




1. Determine **part number** by matching size, configuration (angular contact or radial) and features (smooth, flanged or grooved) to selection guide.
2. Add a digit representing desired **cage material**:
5 - Everclave
4 - Minawear
3 - Minapar III
2 - Torlon
1 - Phenolic
3. Add a letter to indicate desired **lubrication**:
L - Oil
G - Grease














BEARING SELECTION

INCH SIZES			SELECTIONS				
Bore-B (mm)	O.D.-D (mm)	Width-W (mm)	Features	Radial Bearings			Angular Contact Bearings
0.125 (3.175)	0.250 (6.350)	0.0937 (2.380)	Smooth	 DR02A	 DR02B	 DR73B	 DA02A
			Flanged	 DR13A	 DR13B	 DA13A	
			Groove	 DR21A	 DR21B	 DR21H	 DA21J
		0.1094 (2.779)	Smooth	 DR55A	 DR55B	 DR55F	 DA55B
			Flanged	 DR01B	 DR01E	 DA01B	
			Groove	 DR70B	 DR70K	 DA70B	
			Unique	 DR56B	 DR54B	 DA54B	

GUIDE - INCH SIZES

INCH SIZES			SELECTIONS			
Bore-B (mm)	O.D.-D (mm)	Width-W (mm)	Features	Radial Bearings	Angular Contact Bearings	
0.0937 (2.380)	0.1875 (4.763)	0.0625 (1.588)	Smooth	 DR04A		
		0.0937 (2.380)	Smooth	 DR05B	 DR05E	
			Flanged	 DR03B		
0.125 (3.175)	0.250 (6.350)	0.0752 (1.910)	Smooth	 DR74A		
	0.3125 (7.938)	0.1094 (2.779)	Smooth	 DR08A		
		0.1406 (3.571)	Smooth	 DR09B  DR09C  DR09D  DR09F	 DA09B	

METRIC SIZES

METRIC SIZES			SELECTIONS			
Bore-B (inch)	O.D.-D (inch)	Width-W (inch)	Features	Radial Bearings	Angular Contact Bearings	
2.35 (.0925)	5 (.1969)	1.5 (.059)	Smooth	 DR30A		
	5.5 (.2165)	2 (.0787)	Smooth	 DR83A		
3 (.1181)	7 (.2756)	2 (.0787)	Smooth	 DR31A		
			Flanged	 DR97A		
	2.5 (.0984)	Flanged	 DR69A	 DR69B	 DA69A	
4 (.1575)	7 (.2756)	2 (.0787)	Smooth	 DR32A	 DR32B	 DA32A
	9 (.3543)	2.5 (.0984)	Smooth	 DR67A		