

Ball Bearing vs. Journal Bearing

The journal bearing has long been the brawn of the turbocharger. However, a ball bearing cartridge is now an affordable technology that provides significant performance improvements.

Ball bearing innovation began as a result of work with the Garrett® Motorsports group for several racing series where it received the term “cartridge ball bearing”. The cartridge is a single sleeve system that contains a set of angular contact ball bearings on either end, whereas the traditional bearing system contained a set of journal bearings and a thrust bearing.

Turbo Response

When driving a vehicle with the cartridge ball bearing turbocharger, you will find exceptionally crisp and strong throttle response. Garrett® Ball Bearing turbochargers spool up 15% faster than traditional journal bearings. This produces an improved response that can

be converted to quicker 0-60 mph speed. In fact, some professional drivers using Garrett® ball bearing turbocharged systems claim that they feel like they are driving a big, normally aspirated engine. Tests have shown that the reduction in power consumption loss is up to 50%. The result is faster time to boost which translates into better drivability and acceleration.

Reduced Oil Flow

The ball bearing design reduces the required amount of oil to provide adequate lubrication. This lower oil volume reduces the chance for leakage. The ball bearing is also more tolerant of marginal lubrication conditions and diminishes the possibility of turbocharger failure on engine shut down.

Improved Rotordynamics and Durability

The ball bearing cartridge gives better damping and control over

shaft motion, allowing enhanced reliability for both everyday and extreme driving conditions. In addition, the opposed angular contact bearing cartridge eliminates the need for the thrust bearing, commonly a weak link in the turbo bearing system.

Competitor Ball Bearing Options

Another option is the hybrid ball bearing. This consists of replacing only the compressor side journal bearing with a single angular contact ball bearing. Since the single bearing can only take thrust in one direction, a thrust bearing is still necessary and drag in the turbine side journal bearing is unchanged. With the Garrett® ball bearing cartridge the rotor-group is entirely supported by the ball bearings, maximizing efficiency, performance and durability.

