

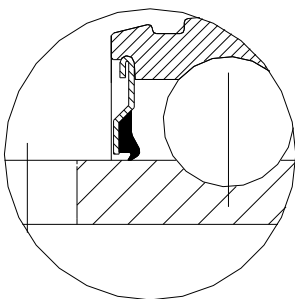
Dodge® mounted ball bearings and tapered roller bearings: contact seals

Seals are often an overlooked and misunderstood component that plays a major role in bearing life and performance. Seal performance and operating principals are common topics of discussion with our customers. In Dodge bearing products contact seals are most widely utilized. First it is important to discuss some of the more common misconceptions about Dodge seals. Below are some frequently asked questions regarding Dodge contact seals.

1. Re-lubricating a bearing will cause the seals to 'blow' out. FALSE
2. When lubricant is observed around the seal it is an indication that the seal has failed. FALSE
3. Seals have no effect on bearing performance. FALSE
4. Seals should prevent lubricant leakage. FALSE
5. All seals are the same. FALSE

Yes all of the above statements about Dodge bearing seals are FALSE. Dodge bearing products are designed for grease lubrication and the seals are designed to achieve the following:

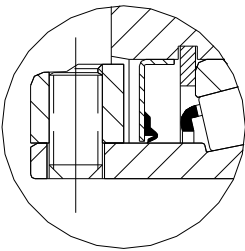
1. Provide a barrier to assist in the exclusion of water and contamination from entering the bearing cavity.
2. Allow excessive grease to purge from the bearing. This helps lubricate the seal lip and minimize heat generation within the bearing cavity.
3. Expel old grease and contamination from the bearing and seal area.
4. Provide a balanced design to ensure high bearing speed capability while limiting the ingress of contamination.
5. Ensure maximum bearing life when properly applied.
6. Prevent 'blown' seals due to over-lubrication.



The standard design used in a Dodge Ball bearing product is the Dodge Proguard™ seal, and the seal used in the Dodge tapered roller bearing product is the XTS seal. This seal has a single lip that provides positive low drag contact to the inner ring and is made from Nitrile rubber material. The lip is oriented outward, acting similar to a valve that allows grease to purge out of the bearing and resists contamination from entering the bearing. Grease is meant to purge from the bearing as it will allow the bearing to seek its proper lubrication level at its operating speed. The dynamic nature of the lip seal will pull lubricant

into the seal area allowing the lip to ride on a thin layer of oil much like the balls in the bearing raceway. This lubrication reduces the frictional heat, frictional drag, and wear while the bearing is in operation.

The heat generated from most bearings is primarily from the friction of the contact seals while in operation. Therefore, the rated catalog speed of a bearing with lip seals is limited to a maximum operational temperature. It is important to have a balanced seal design based on the seal drag and speed capability. Seals that have high contact force result in greater power loss and frictional heat due to the rotational resistance, and as a result the bearing will have a lower maximum speed rating. Bearings with little contact force, such as clearance or labyrinth seals, are less effective in preventing the ingress of contamination and moisture; however they will have higher speed capability. The beauty of both the Dodge Proguard and XTS seal is that they are designed to provide both high speed capability and superior contamination resistance.



Another design feature of the Dodge Proguard and XTS seal is the metal retainer that the lip is molded to; it is designed to provide shielding to the rubber lip to minimize contamination build-up that could create seal wear. The seal is crimped into the bearing outer ring during the bearing assembly process. Quality audits are performed on the process to ensure that the force to push the seal out of the outer ring meets engineering standards. This force is sufficient to ensure the seal will not eject from the bearing insert with normal pressure exerted from a standard grease gun. Excess grease will be purged from the bearing under the lip of the seal without pushing the seal off of the bearing.

Bearings' operating at speeds greater than 50% of their maximum published capacity, operate most efficiently when the sealed bearing cavity is approximately 1/3 full with grease. The dynamic / centrifugal forces created by the rolling balls and cage will raise the pressure within the sealed cavity until excess grease is purged beyond the seals. Additionally the best practice is to lubricate the bearing while they are operating, provided it can be done safely, until fresh grease can be seen purging from the seal area.