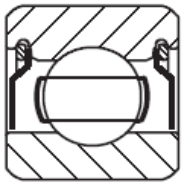
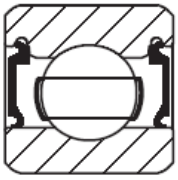
Bearing Closures – Shields and Seals

Ball and roller bearings are available with different types of shields and seals. These are commonly referred to as closures. Closures can extend bearing life by preventing contaminants from reaching the critical surfaces inside the bearing, and they help retain the lubricant in the bearing. Different types of closures may be supplied on the same bearing. Special designs are also available. The following are descriptions of the most common types AST can supply.

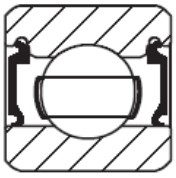


Type ZZS – Removable non-contact metal shield retained in the outer ring with a snap wire. This type of shield is manufactured from 300 series stainless steel and is available only on miniature and instrument series bearings. Max operating temperature is 600° F. Since there is no contact made with the inner ring there is no appreciable impact on torque or speed and operation can be compared to that of an open bearing. The removable closure allows for cleaning and re-lubrication. The code for a single shield is ZS.

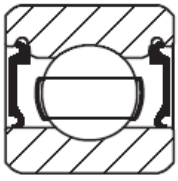
Type ZZ – Non-removable, non-contact metal shield retained in the outer ring via crimping, or pressing. This type of shield cannot be removed once installed. This type of shield can also be manufactured from 300 series stainless steel. On larger bearings, this type of shield is manufactured from 1008 or 1010 strip steel. Max operating temperature is 450° F. Since there is no contact made with the inner ring there is no appreciable impact on torque or speed and operation can be compared to that of an open bearing. The code for a single shield is Z.



Type 2RS – Molded rubber seal. This type of seal is Buna-N bonded to a steel insert. The seal is fixed into a groove in the outer ring. This type of seal can be removed but care must be used not to bend or cut the seal lip. Max operating temperature is 240° F. This type of seal makes contact with the inner ring providing better protection in contaminated environments than a metal shield. However, this results in an increase in torque and reduces the max speed capability of the bearing. Certain lubricants and chemicals react with rubber. The code for a single seal is RS.



Type 2RU – Molded rubber seal, non- contact. This type of seal is Buna-N bonded to a steel insert. The seal is fixed into a groove in the outer ring. This type of seal can be removed but care must be used not to bend or cut the seal lip. Max operating temperature is 240° F. This type of seal has a very thin lip adjacent to the inner ring but does not make contact. It provides better protection than type ZZ or ZZS, but without the increase in torque exhibited by type 2RS. Certain lubricants and chemicals react with rubber. The code for a single seal is RU.



Type 2VS – Molded Viton seal. This type of seal is made of Viton bonded to a steel insert. The seal is fixed into a groove in the outer ring. This type of seal can be removed but care must be used not to bend or cut the seal lip. Max operating temperature is 400° F. This type of seal makes contact with the inner ring providing better protection in contaminated environments than a metal shield. However, this results in an increase in torque and reduces the max speed capability of the bearing. This seal has excellent chemical resistance. The code for a single seal is VS.

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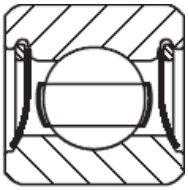

Type TTS – Glass reinforced PTFE seal is retained in the outer ring with a snap wire. This type of seal can be removed but care must be used not to bend or cut the seal lip. Max operating temperature is 400° F. This type of seal makes contact with the inner ring providing better protection in contaminated environments than a metal shield. However, this results in an increase in torque and reduces the max speed capability of the bearing. This type of seal exhibits less torque than type 2RS, but is more delicate. This seal has excellent chemical resistance. The code for a single seal is TS. Teflon seals are only available on certain series of bearings.

As mentioned previously, it is possible to get a combination of closures on a single bearing. For example, a seal and shield combination, such as RSZ, can provide increased protection from contaminants compared to a double shielded (ZZ or ZZS). The RSZ combination would exhibit less torque than a 2RS configuration. The side of the bearing with seal would be oriented so that it is facing the contaminated environment.

On miniature bearings the width of the bearing can be different between an open and shielded configuration. Check the catalog dimensions carefully.

Other types:
On larger bore bearings (above 10mm), **labyrinth type rubber seals** are available. These bearings have a groove on the inner ring as well where the seal lip makes contact. This creates a more effective seal without increasing torque.

Double lip rubber seals are also available and or normally of the labyrinth type. These are more effective in extreme environments.

Felt seals – The felt seal consists of two metal plates fixed in the outer ring of the bearing. Between the two plates is a felt washer. The felt washer is saturated in oil before assembly and contacts the ground OD of the inner ring. These seals exhibit minimal frictional drag.

Shrouded seals – These seals consist of rubber seals retained by two steel caps or shrouds fixed to the outer ring. These types of seals can have up to three seals (or lips) contained between the two metal caps. These are used in the most extreme environments and they exhibit heavy drag.

Both felt seals and shrouded seals take up extra space and are typically only available on larger bore bearings.

Due to their construction, shields and seals are not typically available on tapered roller bearings or angular contact bearings. External seals are normally incorporated into the design for harsh or extreme environments.

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