

MECHANICAL FACE SEALS COMPACTOR DRUM BEARING HOUSING



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HEAVY DUTY FACE SEALS DESIGNED FOR CHALLENGING APPLICATIONS

1. Compactors and Its Significance –

A Vibratory compactor is a compaction machine which is used to compact Soil, asphalt and Concrete in construction of roads and foundations and landfills, to increase the Load bearing capacity and durability of the surface.

Compactors may be classified in two types –

- Soil Compactor
- Asphalt Compactor (Tandem)

Soil compactors are basically used for compaction of soils, gravels to make to surfaces smooth and compact. There are various types of Soil compactors like Standard, Pad foot, Sheep foot. Soil compactors comes in category till 11 Ton depending on the nature of compaction.

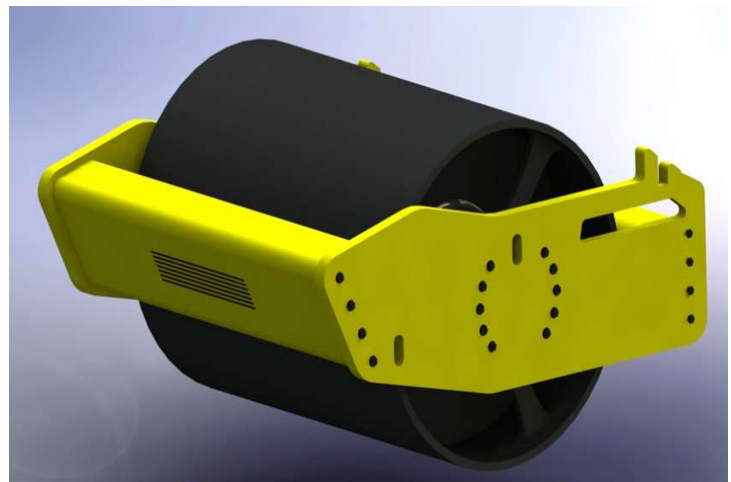
Asphalt compactors are used for compaction of asphalt for the road construction. They are classified as single drum and double drum based on the vibratory arrangement in their drums. Asphalt compactors comes in 3Ton till 11 Ton category.

2. Compactor Drum -

Compactor drum is considered as the heart of the machine and is been designed to withstand the amplitude and frequency of the variable vibrations while compaction. Compaction is the key point that affects the lifetime and uniformity of the mixture itself and the quality of material used in mixed.

Compactor Drum consists of –

- **Drum** – Roll or Horizontal Cylinder.
- **Bearing Housing** – Placed at both the ends of drum at the shaft End to protect Internal components from External dust, dirt, foreign particles and provide rigid protection to the internal assembly.
- **Eccentric Weights** – These are weights placed in the center of the drum or away from the drum center rotating on the shaft. By changing the eccentric mass, it is possible to generate different amplitudes. With this type of system, the drum will vibrate in a revolving motion generating a “circular amplitude”.
- **Shaft** – Shaft is centered to transfer eccentric loads and transfer power from drum motor drum.
- **Drum Motor** – A drum motor is a planetary drive which is assembled either of the side of the drum.



Compactor Drum

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3.Application Challenges in Compactor Drum –

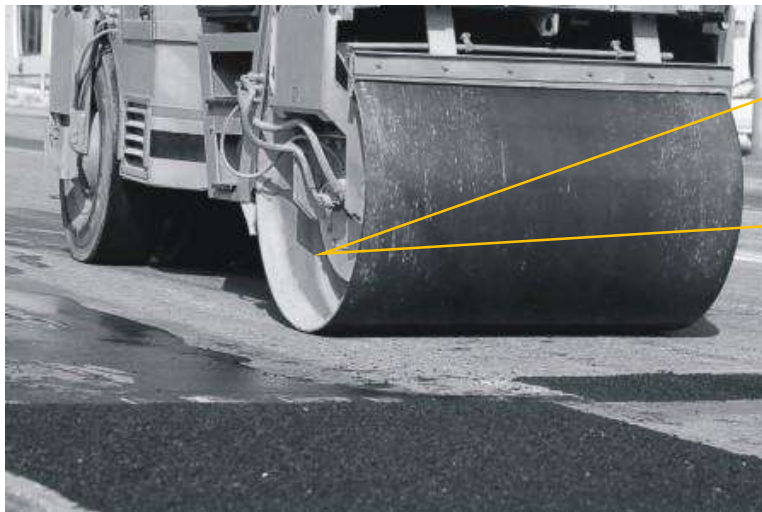
Compactor drum is the most sensitive part of the machine which comprises of the key elements which plays a major role in compactor performance. The drum is typically designed to withstand the extreme application conditions and to provide longer life and durability to sustain in the extreme conditions and to withstand the dynamic forces in both soil and asphalt compactors.

Drum Bearing Housing -

Drum bearing housing is the most important assembly of a Compactor drum. It consists of the bearing and sealing arrangement which is placed at both the ends of the drum roller. It includes the spindle and the carrier housing along with the bearings. One of the key elements to protect this bearing assembly is the **seals**. **Seals** contribute majorly to protect the complete bearing assembly from the external dirt and dust to enter in the drum assembly. It also withstands the extreme operating conditions like high temperature, dynamic loads etc.

Hence bearing housings requires the robust **sealing arrangement** to provide longer life, lower downtime and strength to the drum assembly. Major challenges in compactor bearing housings are -

- **Seal Failure** – Sealing arrangement needs to be very robust in bearing housing as it must withstand the challenging operating conditions like external dirt, dust, asphalt, high temperature etc.
- **Bearing Damage** – Failure of the seal arrangement may lead to further failure of bearings.
- **Shaft Damage** – Bearing and Seal failure may Seize the shaft and cause down time.



Drum Bearing Housing



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4.SAP Parts™ Solutions for Drum Bearing Housing –

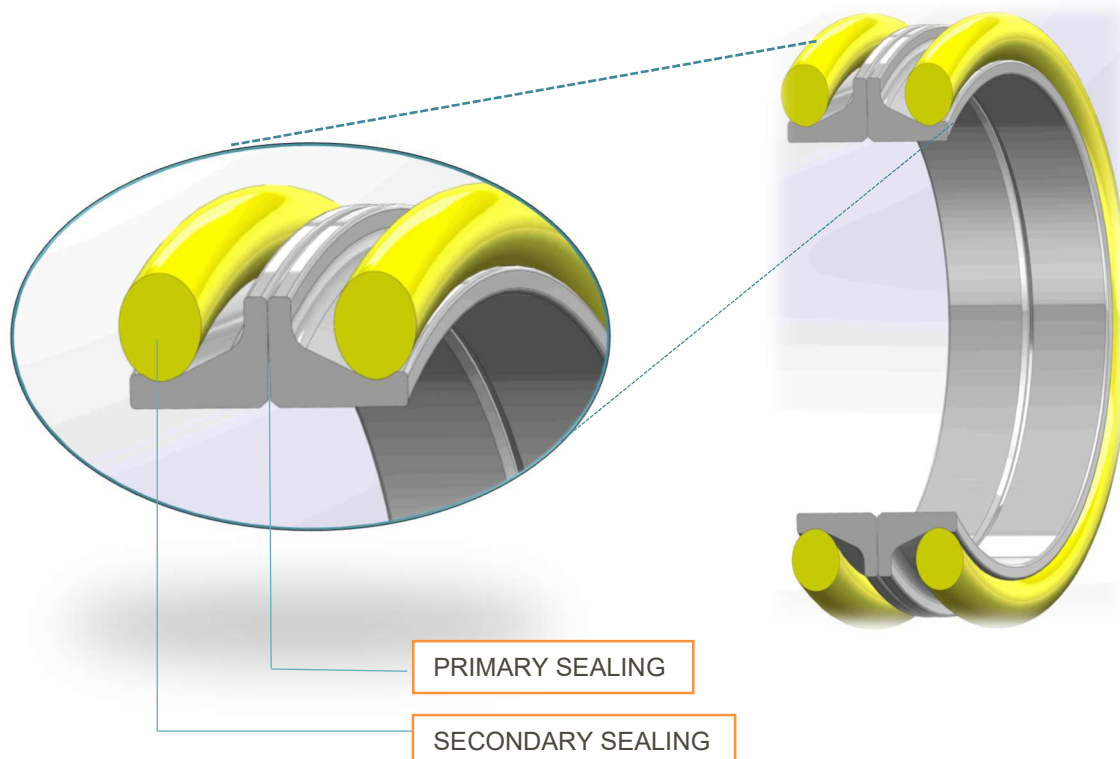
One of the major challenges with the Compactors is the sealing arrangement of the bearing housing assembly as it has to be protected from the external elements like external dirt and dust and to ensure smooth running in the hostile conditions .

SAP Parts™ has been manufacturing **Mechanical Face Seals** for Agriculture, Construction, Mining and Industrial applications since 2009. SAP parts with its expertise has already proven their Mechanical face seals in challenging applications like **Drum Bearing Housing**.

5.SAP Parts™ Seals Working Principle –

Mechanical Face Seal consists of Two Metal rings and two O-rings .

- One pair of Metal seal and O-ring is mounted in the static cavity and the other pair of metal ring and O-ring are mounted on the dynamic cavity.
- There is a relative motion between the metal faces which acts as primary sealing at the metal to metal contact area.
- O-rings are used as secondary sealing Elements providing static sealing on housing and uniform axial pressure on metal rings transmits torque to the metal faces.
- The seal tapered surfaces allow lubrication to the precision lapped metal faces via centrifugal action.



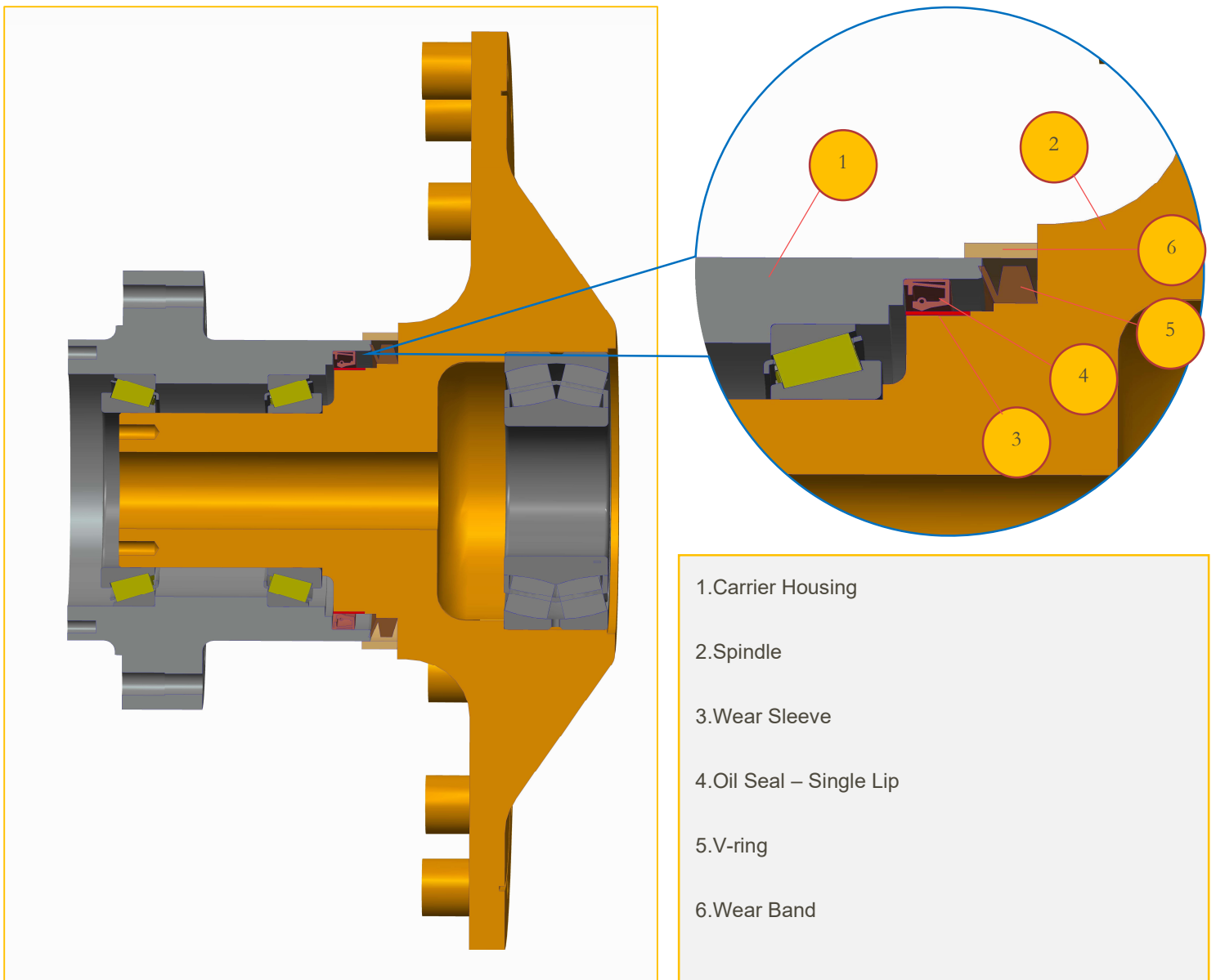
6.SAP Parts™ Case Study – Present Sealing Arrangement

Existing Sealing Arrangement – The client is using a wear ring, oil seal and a dust band arrangement in their drum bearing housing.

Type – Soil Compactor.

Category – 11 Ton.

Problem Statement – Existing oil seal failing within 50hrs to 400 hrs. Working in high vibration environment as well as temperature ranges till 180°C. Customer was looking for a robust sealing arrangement to withstand the challenging application conditions.

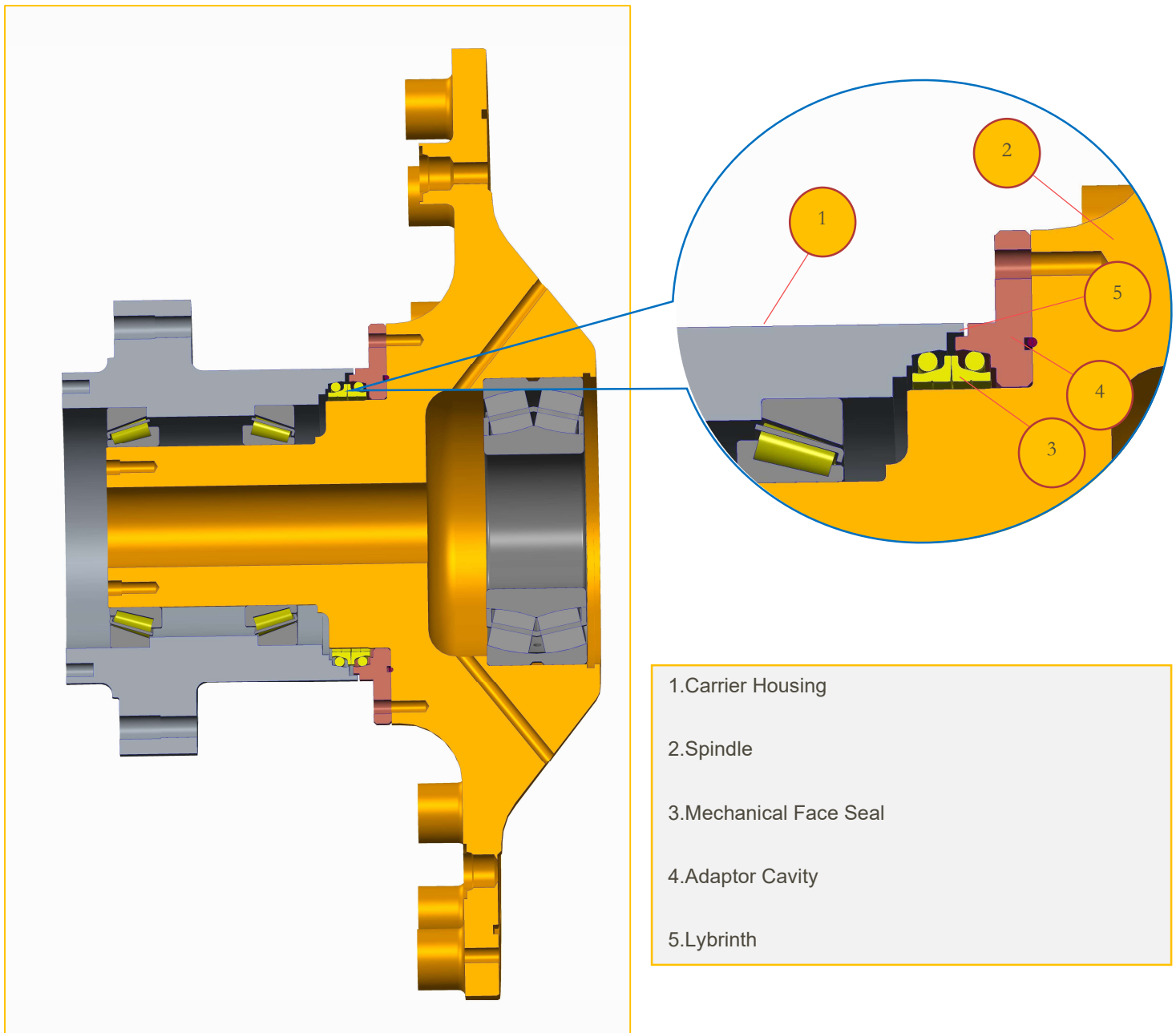


7.SAP Parts™ - Mechanical Face Seal Solution

SAP Parts™ Solution with its Application expertise studied the problem statement of the client and proposed a bespoke solution to implement Innovative Mechanical Face Seals replacing the oil seal. With very few changes in the mating parts.

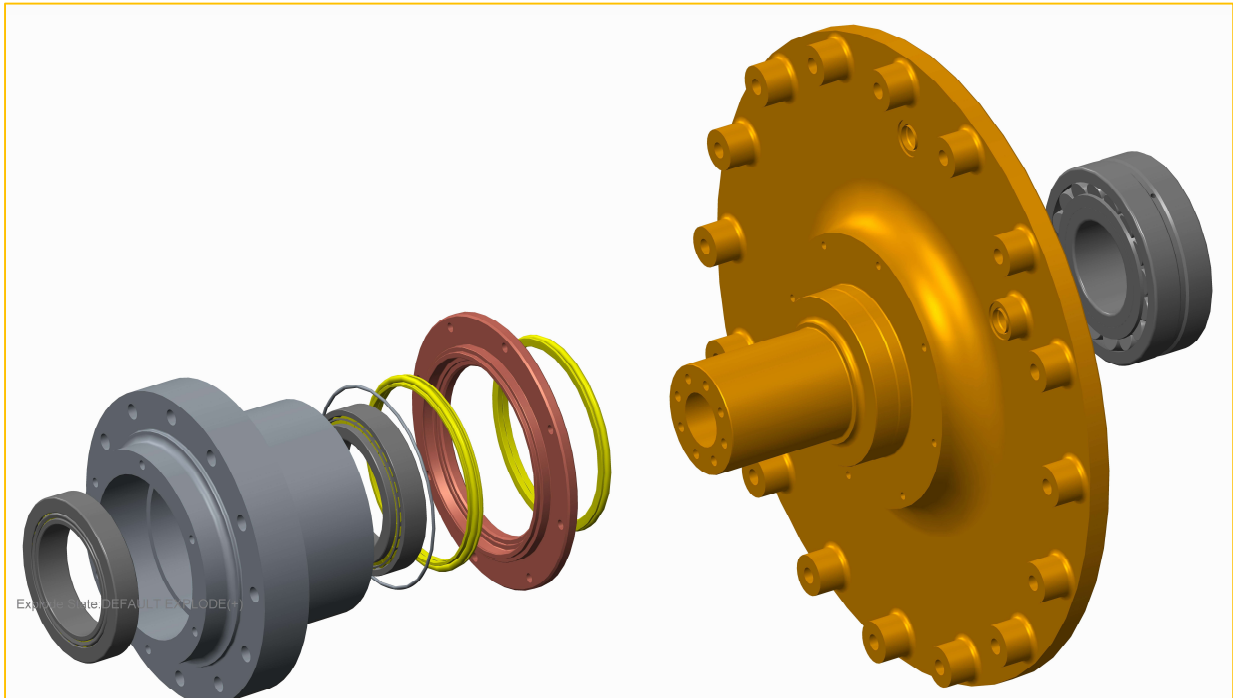
Position 03 shows the Mechanical face seal arrangement. One half of the seal (one Metal ring and One O-ring) are mounted on the carrier housing whereas another half is mounted on the spindle with a special designed adapter to accommodate the seal. The carrier part is static whereas the spindle part is rotating. SAP Parts Mechanical Face Seals were tested at SAP Seal Technology center and in the fields.

Conclusion – SAP Seals easily crossed 2000hrs successfully in fields and at the test benches of SAP Seal Technology Center.



- 1.Carrier Housing
- 2.Spindle
- 3.Mechanical Face Seal
- 4.Adaptor Cavity
- 5.Lybrinth

8. Exploded View -




9. Mechanical Face Seal – Advantages

Heavy Duty Design – Mechanical Face Seals are heavy duty seals, specially designed to withstand in rigorous challenging environment where an standard oil seal or cassette seals fails to perform .SAP with its application expertise have designed seals to deliver the most reliable seal arrangement for compactor drum bearing housing .

Tested and Approved – SAP Seal Technology Center is a State-of-the-Art Seal performance and testing facility which is capable to Test seals by simulating their actual application conditions. Equipped with around 15 different testing benches which are programmed and Scada Controlled to simulate the actual operating conditions. Mud Test, Saline water Test, high Temperature Test, low Temperature Test, pressure difference test etc. can be performed in SAP Seal Technology Center.

Customize Solutions – With a decade of expertise. Other than off the shelf and standard product. SAP Parts has engineering capability to provide customized solutions which are designed and developed and validated to withstand the most challenging operating conditions.

Extended Life – Compared to the conventional oil seals or cassette seals SAP Parts Mechanical Face Seals offers Higher seal life, reduced service life and Lifetime sealing arrangement, SAP Seals are easy to install without making any major changes in the existing housing cavities

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