Oil seal

Switch from FPM to PTFE

One question that our Elring Service Team is being asked a lot at the moment is whether conventional oil seals with elastomer sealing lip, like the traditional FPM oil seal, can easily be replaced by a modern PTFE oil seal. This assumes that the dimensions (inner/outer diameter/installed height) and seal type are identical.

“Our research has indicated that although this is certainly possible in specific cases, there are some factors to be considered that can really only be properly evaluated by experts,” warns Mario Rauch, Head of Technical Marketing. If these parameters are incorrectly interpreted there is a not inconsiderable risk of failure that would then be attributed to the mechanic/fitter. So the relevant parameters need to be clarified.

Basically, and regardless of the material of the sealing lip, oil seals leave various degrees of scoring on the shaft surface, generally caused by abrasive particles embedded in the rubber. In addition there is also the possibility of material build-up on the sealing edge due to carbon deposits. "This is often difficult to remove during repair," Rauch points out. In short, a used shaft is very rarely in a perfect condition. So remedial action has to be taken! For example, the polished grooves have to be machined if they are outside the admissible tolerance range. Burrs and deposits have to be removed, because it is this specific running surface that is the mating face for the sealing lip of the oil seal.

In individual cases you can try to use a oil seal with another sealing lip position but this requires a bit of experience to get right.

In addition, we recommend carrying out a visual inspection on the oil seal that you have removed. "Look for wear on the sealing edge, discoloration or hardening or any fouling," notes Rauch.

As PTFE and standard shaft rings have different sealing lip designs, it is likely that sealing lip and mating surface of the shaft will not fit together exactly. As a result – depending on the height of the deposits and the depth of the running traces – this may result in a faulty sealing function. Moreover, there is the possibility of damaging the PTFE seal if it is pushed over an old running trace and/or deposits or build-up of material. "In this conjunction we would like to point out that PTFE oil seals absolutely must be installed using the right kind of special tool," says Rauch. Often, slightly tapered plastic sleeves will suffice and these are usually included in the scope of
supply. For example, Elring will be offering the two oil seals 155.560 and 129.780 complete with assembly sleeves in future.

Advantages of PTFE oil seals:
- they have a much wider sealing surface without metal spring
- they are resistant to high temperatures and modern engine oils
- they offer low friction losses and
- they have very good sealing properties

In addition, PTFE also allows for use where there is insufficient lubrication and dry running, or on untempered shafts. The PTFE sealing lip and PTFE protective lip are molded on and can be pointed inwards or outwards depending on fitting conditions. Due to the dry running properties of PTFE there is no need for a grease fill between sealing lip and dust lip.

If all these points are taken into account, it is possible to use a PTFE oil seal instead of a conventional FPM ring. The benefits gained are significant.

- Old, hardened oil seals became too hot and were damaged by the lubricant. This does not happen when using PTFE.
- The return feed capacity of PTFE oil seals is higher than in old versions, so sealing performance increases in operation.

The installation of sealing rings in general and the PTFE versions in particular is not easy in practice and calls for a very high level of cleanliness during installation. Observe the following:

- Do not use lubricants with PTFE rings! Make sure your hands are not greasy! For all types make sure that there are no foreign bodies like fibers or fluff, grinding dust or small burrs!
- The dust lip has to sit well. Due to the high return feed capacity of the PTFE sealing lip, dirt is more easily sucked into the sealing area than in the case of elastomer oil seals.
Professional installation of a PTFE oil seal: