TECHNICAL BULLETIN
NO: 40

PTFE Oil Seals

New Demands on Oil Seals

Ongoing developments in engine design result in ever higher demands on this type of oil seal. Higher engine speeds and oil temperatures, longer intervals between oil changes and lubricants with modern additives that react aggressively with the sealing materials require new and lasting solutions. The material for future oil seals is named POLYTETRAFLUOROETHYLENE or simply PTFE.
This synthetic material is more commonly known under it trade name TEFLON.

Trend Setting Advantages

Low friction and minimum power consumption are the decisive advantages offered by PTFE oil seals. These seals can be used without problems also with dry operation or insufficient lubrication. The materials thermal properties, with an operating range of -130°C to +200°C, are unrivalled. Moreover, PTFE is featured by high chemical resistance and a low breakaway torque after standstill.

PTFE Material with a Memory

When heated, PTFE attempts to return to its original form. In other words: The material “remembers” it’s original condition. This phenomenon is known as the plastic memory effect, and permits seals to be built without a pretensioning spring. During manufacture, the sealing lip is shaped as a flat ring, which is molded to the reinforcing ring. During assembly onto the shaft, the initially flat sealing lip expands and folds to match the shaft diameter. As soon as the sealing lip heats up during engine operation, it attempts to return to its original shape.

Design and Construction.

The outer housing is made of stainless steel. An O Ring of fluoroelastomer ensures optimal static sealing. The internal diameter is perfectly concentric with the outer diameter. The actual sealing lip is made of highly wear resistant and low friction PTFE. An additional dust seal (rubber lip or felt strip) provides an effective barrier against contaminating particles.

Care and Installation of PTFE Oil Seals.

Only remove PTFE oil seals from their protective packaging immediately before installation to protect them from dust and other contaminants.

The sealing lip of PTFE oil seals is protected by a plastic sleeve which can normally be used as an assembly aid. Therefore, the sleeve should remain in place until the seal has been installed.

If the seal is to be installed without the sleeve, use the special tool provided by the vehicle's OEM manufacturer.

Both the PTFE sealing lip and the shaft surface must be completely dry.
DO NOT use grease or oil.

The shaft may not exhibit any sharp edged chamfers – if necessary, have the edges removed by an engine expert.

The shaft surface must be in perfect condition – also here, possible damage must be repaired by an engine expert.

Position the assembly sleeve with the PTFE oil seal on the shaft.
Make sure that the sealing ring is aligned correctly – the sleeve must be located so that the seal can be pushed onto the shaft smoothly. Push the sealing ring onto the shaft with an even motion. You can now remove the assembly sleeve.

Do not start the engine sooner than FOUR HOURS after installation. This permits the new sealing lip to adapt perfectly to the shaft

When installing integrated oil seals (Oil seal / housing assemblies) please note that it is usually necessary to slightly loosen the oil pan to enable the radial seal to be pushed onto the crankshaft.

Damaged PTFE Sealing Lip.

The most frequent cause for failure is damage to the PTFE sealing lip during assembly. If the seal is installed without the help of a sleeve or special tool, and is shifted or even turned inside out, reliable sealing will hardly be possible. Similarly, the use of oil or grease – as with classical oil seals – will result in total failure of the PTFE oil seal immediately after installation.

Remember – these instructions are general and installation can vary from manufacturer to manufacturer.

ALWAYS refer to the OEM workshop manual for full and precise fitment details to avoid early failures and costly reworks.

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