

## SB038

# Crankshaft Oil Seal Materials

With the continual requirement for increased performance and efficiency from modern engines, the demands of engine components also continues to increase. This is especially true of crankshaft and camshaft oil seals. While the designs have changed a little, the material selection has had numerous and significant changes. There have been six significant oil seal materials in use over the last forty years - NBR, ACM, HNBR, VMQ, FKM and PTFE. These materials are better known by more their common names:

- |        |  |                                 |
|--------|--|---------------------------------|
| NBR -  | Acrylonitrile Butadiene -                | Nitrile rubber                  |
| ACM -  | Copolymer Ethyl Butyl Acrylate -         | Polyacrylate or Acrylic rubber  |
| HNBR - | Hydrogenated Acrylonitrile Butadiene -   | Highly Saturated Nitrile rubber |
| VMQ -  | Polydimethylsiloxane -                   | Silicone rubber                 |
| FKM -  | Vinylidienefluoridehexafluoropropylene - | Viton™                          |
| PTFE - | Polytetrafluoroethylene -                | Teflon™                         |

ASTM/DIN ISO	Wear Resistance	Oil Resistance	High Temperature Oil Resistance	Low Temperature
<b>NBR</b> (Nitrile)	very good	very good	moderate max. 120°C  (max. 80°C in heavy oil)	-45°C
<b>ACM</b> (Polyacrylic)	moderate	very good	very good max. 150°C	-30°C
<b>HNBR</b>	moderate	very good	good max. 150°C  (max. 140°C oper. temp.)	-40°C
<b>VMQ</b> (Silicone)	moderate	moderate	very good max. 180°C	-60°C
<b>FKM</b> (Viton®)	very good	very good	very good max. 200°C  (max. 150°C oper. temp.)	-35°C
<b>PTFE</b> (Teflon®)	good	extremely good	good max. 200°C  (max. 170°C oper. temp.)	-80°C

**Table 1. Oil Seal Material Properties**

For further details on crankshaft oil seals, refer to:

**SB021 Surface Finish**

**SB025 Crankshaft Journal Finish - Oil Seal and Bearing**

**SB035 Teflon Crankshaft Oil Seals**