

# Leak Repair Exclusive, Innovative Technologies

Popular types of leak repair sets include:

- **Valve Cover Gasket Sets**
- **Oil Pan Gasket Sets**
- **Intake Manifold Gasket Sets**
- **Exhaust Manifold Gasket Sets**
- **Timing Cover Gasket Sets**
- **Rear Main Seal Sets**
- **Individual Gaskets**

Leak repair is inherently problematic, so it requires a wider variety of application-specific materials than does the engine repair. The exclusive innovations Fel-Pro® brings to the aftermarket give installers the sealing solutions they need, whether they are professional technicians or do-it-yourselfers.

Those Fel-Pro innovative technologies include:

- **Edge-molded gaskets**
- **Encapsulated carrier gaskets**
- **Liquid elastomer molded (LEM) gaskets**

Fel-Pro also provides another vitally important advantage: world-class molded-rubber manufacturing capabilities from Federal-Mogul. It's an ability no other gasket-maker can offer. Federal-Mogul's in-house expertise brings an unparalleled understanding of molded-rubber chemistry and processes to Fel-Pro Gaskets.

The R&D, engineering, and manufacturing required to create the sealing solutions of the future are cost-prohibitive for many companies. Federal-Mogul, however, has the resources to make exciting new sealing concepts a reality in the Fel-Pro gaskets they offer the aftermarket – now and in the future.

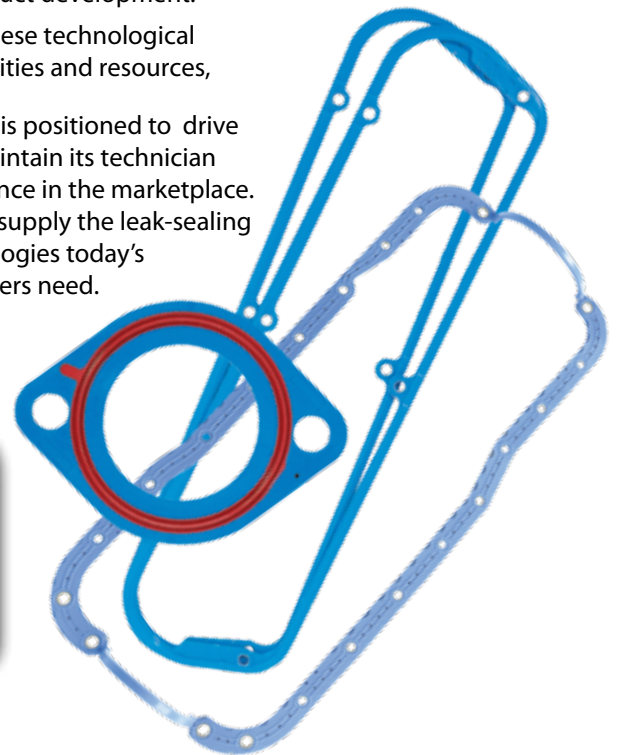
These resources include state-of-the-art testing facilities where new sealing systems are subjected to rigorous tests:

- **Dynamometer Thermal Shock Cycles** – The engine, running on a dynamometer, is overheated, then super-cooled several times to test parts under extreme contraction and expansion.
- **Environmental "Shake and Bake"** – Gasketed components are vibrated and heated on a testing stand to gauge gasket durability during accelerated life-cycles.
- **Nitrogen Pressure Test** – The engine is pressurized with nitrogen to test the combustion seal.

In addition, field testing combines on-the-road driving, tear-downs, and installations to evaluate gasket effectiveness during actual use and in repair environments. And of course, track testing in arenas such as Professional Stock Car Racing, World of Outlaws®, and NHRA® put Fel-Pro gaskets to the ultimate test while aiding in product development.

With these technological capabilities and resources,

Fel-Pro is positioned to drive and maintain its technician preference in the marketplace. And to supply the leak-sealing technologies today's customers need.



## Premium Leak-Sealing Technologies

### PermaDryPlus®

Problem-solving gaskets featuring advanced technologies designed specifically for the aftermarket repair environment

### PermaDry®

Premium molded-rubber gaskets for applications originally equipped with molded-rubber technology

## Leak Repair

# Rear Main Seal Sets (BS)

Rear main bearing seals keep oil from leaking at the rear of the crankshaft. In the case of a vehicle with a manual transmission, a faulty or worn seal can allow oil to leak onto the clutch, causing slipping and chattering.



## Types of Seals

Rear main bearing seals are made of either rope or synthetic rubber materials. The **rope** or **wick** style seal is typically found on older engines. This type of seal, which can be tricky to install, is no longer designed into most new engines. In fact, in certain older applications, synthetic rubber seals have replaced the rope material. However, due to the strict tolerances involved, a rubber seal can **ONLY** be substituted reliably when indicated by the Fel-Pro® catalog.

**Molded synthetic rubber** is the material most commonly used for rear main seals. It offers proven sealing ability, excellent heat resistance, and easy installation.

## Material Choices

**Nitrile** rubber is used on many older engine applications where heat resistance (up to 250° F) is not a problem. Most synthetic rubber, two-piece rear main bearing seals are made of **polyacrylate**. It offers good heat resistance (350° F) and tough abrasion resistance at a reasonable cost.

**Silicone** is often used in higher temperature (480° F) engine applications. The drawback of silicone is that it is fragile and requires careful handling during installation.

**Viton®** combines the abrasion resistance of polyacrylate and the heat resistance (450° F) of silicone – at a premium price. It is required on many high-temperature engines.

**PTFE rubber** is the ultimate in rear main seal design and material. It offers the best in fluid and high-temperature compatibility, and the unique “laydown lip” contact sealing surface can run on undersize shafts, seal minor shaft imperfections, and virtually eliminate shaft wear.

## Seal Designs

Some seals are designed with ribs around the lip. These ribs, or helixes, help direct the oil back into the engine for proper oil control. Other seals have a double lip design. The inner lip has a helix that helps direct oil back into the engine, while the outer lip keeps dust and dirt from contaminating the inner sealing lip. This improves the long-term performance of the seal.

An optional design available for several Chevrolet engines has an offset sealing lip. This can be used when the point of contact of the previous seal has worn a groove into the crankshaft sealing surface. The offset lip contacts the shaft at a different point than the original equipment seal, preventing oil leaking through the groove and eliminating the need for expensive crankshaft repair or replacement.

For certain applications, Fel-Pro offers a choice of single lip, offset lip, or double lip design as shown in the catalog entry.



Single Lip (left) Double Lip (right)

Fel-Pro® gasket sets commonly feature premium National® Oil Seals, also manufactured by Federal-Mogul Motorparts, a global leader in crankshaft seal manufacturing as well as gasket manufacturing.