



FEL-PRO INSTALLATION TIPS

Fel-Pro products are the result of exhaustive research and strict quality control. However, no sealing product is better than the quality of its installation.

GENERAL INSTRUCTIONS

CLEAN MATING SURFACES of all foreign material. Use a degreaser.

CLEAN THREADS of all bolts/studs using a wire brush; all nuts/threaded holes use a bottoming tap.

Determine Which Bolts extend into the coolant passages. Those **entering** the coolant passages require a pliable non-hardening sealer on bolt threads and the underside of the bolt head. Those **not entering** the coolant passages require oil on the bolt threads and the underside of the bolt head.

Exhaust Assembly: Apply a high temperature anti-seize lubricant to the threadings.

CHECK ALL CASTINGS for flatness; straighten, resurface or replace if out of flat conditions exists.

CYLINDER HEAD AND BLOCK: refer to OEM manual to determine flatness tolerance and resurfacing limitations.

Attach and align gasket(s) following any directional markings shown on the gasket. If no markings exist, simply install the gasket by matching the gasket to engine deck surface.

Fiber Faced Gasket(s) are to be installed dry. **Metal Faced Gasket(s)** require a thin even coat of general purpose sealer to be applied to the metal side(s) of the gasket.

FINAL ASSEMBLY always requires torquing of fasteners according to OEM specifications. For certain assemblies we have provided specific torquing specifications.

NOTE: CYLINDER HEAD torquing procedures are critical and therefore we recommend to double-check with OEM.

Some procedures may be repeated with additional specific information for your application.

VALVE STEM SEALS

REMOVE SPRING ASSEMBLIES, KEEPERS and the old valve stem seals.

REMOVE BURRS (IF ANY) FROM VALVE STEMS. Use a fine stone or crocus cloth. Clean stems thoroughly to remove all abrasives or dust particles. Lubricate lightly.

INSTALL NEW SEALS.

POSITIVE GUIDE SEAL: Use the plastic installation sleeve(s), included in this set, to prevent damage to the lip of the seal. Trim the plastic sleeve so it extends 1/16" below the keeper groove. Place the sleeve on the stem.

Carefully start valve stem seal over sleeve.

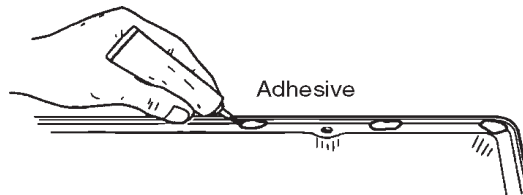
Remove plastic installation sleeve and reuse for installing remaining seals.

FOR RUBBER JACKET SEALS: Push seal down over valve guide until it bottoms.

FOR SOLID OR METAL JACKET SEALS: The use of an OEM service tool is recommended. If tool is unavailable, use a deep socket or rigid tube of appropriate diameter. Center tool (or socket) over the shoulder of the seal and tap the seal down over the guide until it bottoms.

REPLACE VALVE SPRING ASSEMBLIES. Compress springs just enough to install keepers. **IMPORTANT:** Excessive compression can result in spring retainer damaging valve stem seal. Release spring carefully.

VALVE COVER GASKET



ATTACH AND ALIGN GASKET. Apply quick-drying adhesive sparingly in several places on the mating surface of cover. If gasket has installation tabs, adhesive is **not** required. Mount gasket on cover. **Allow time for adhesive to set.** Test for slippage with light pressure. If gasket moves, allow more time.

EXHAUST PIPE FLANGES AND E.G.R. VALVE BOLTS

ATTACH AND ALIGN GASKET.

WATER OUTLET, WATER PUMP, FUEL PUMP, OIL PUMP, TIMING COVER GASKETS AND REAR MAIN BEARING SEAL RETAINER

TO ASSIST IN ALIGNMENT AND SEALING DURING ASSEMBLY, apply a thin coat of general purpose sealer to both sides of gasket(s).

FLYWHEEL BOLTS

REINSTALL FLYWHEEL to crankshaft. Note: On some engines that use a one-piece rear main bearing seal, a condition may exist where the bolt holes in the crankshaft rear flange have been drilled too deep by the manufacturer. This can result in oil seepage which may be misdiagnosed as coming from the oil pan or rear main bearing seal. To prevent seepage, coat bolt threads with a thread locking sealer. Torque securely to OEM specifications.

ROTATING SHAFT SEALS

PRIOR TO INSTALLING THE ROTATING SHAFT AND OR SEAL apply a thin coat of lubricant, such as grease, on the sealing lip and shaft.

IMPORTANT: Do not install any seal without break-in lubricant protection.

REAR MAIN BEARING SEAL

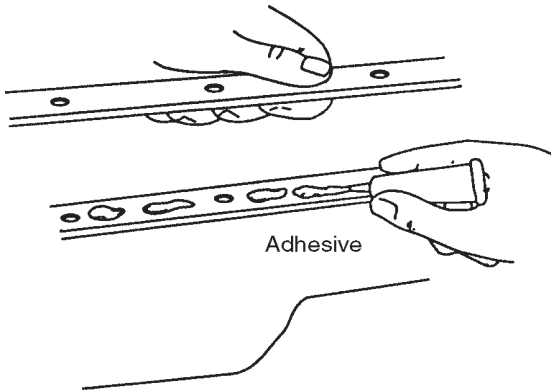
REMOVE NICKS AND SCRATCHES (IF ANY) FROM THE CRANKSHAFT SEALING SURFACE using a crocus cloth.

INSTALL SEAL into the recessed cavity of the seal retainer. The seal is properly installed when its largest raised sealing lip is toward the **front** of the engine. (Seals with a metal garter spring require the spring to face towards the **front** of the engine.)

LUBRICATE SURFACE of seal lip and crankshaft by applying a thin coat of motor oil or grease. If engine will not be started within several days, grease is recommended,

IMPORTANT: Never install any seal without break-in lubricant protection.

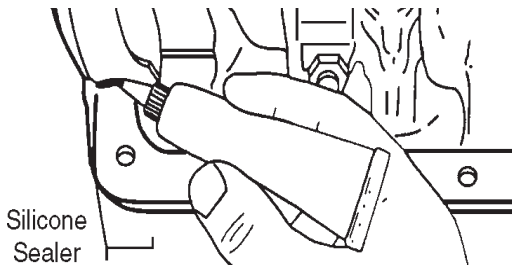
OIL PAN GASKET



ATTACH AND ALIGN GASKET(S). Apply quick-drying adhesive sparingly in several places on the engine casting or oil pan (depending upon engine model). Mount gasket (or gaskets and seals, if multipiece) on surface where adhesive was applied.

Allow time for adhesive to set. Test for slippage with light pressure. If gasket moves, allow more time.

ATTACH AND ALIGN END SEAL(S). Apply quick drying adhesive sparingly in several places on the engine casting or oil pan (depending upon engine model). Mount seal(s) on surface where adhesive was applied. **Allow time for adhesive to set.** Test for slippage with light pressure. If seal(s) move, allow more time.



PRIOR TO INSTALLING OIL PAN apply a small dab of silicone sealer where all gaskets and seal(s) meet.

TEST RUN ENGINE. Check all mating areas thoroughly to determine that all seals hold during operation.