

EXHAUST MANIFOLD GASKET

ATTACH AND ALIGN GASKET(S). If gasket has only one steel faced side, install steel side towards manifold.

WATER OUTLET, WATER PUMP, FUEL PUMP AND TIMING COVER GASKETS

If a supplementary sealer is desired, apply a thin coat of gasket sealer to both sides of gasket(s).

TIMING COVER REBUILD

IMPORTANT: The metal timing cover seal flange will be re-used with the new cork insert. **DO NO DISCARD.** Remove old cork insert.

CLEAN MATING SURFACES of all foreign material including old gaskets, RTV and oil. You may wish to use a degreaser.

CEMENT SEAL into metal flange using quick-drying adhesive. **MAKE CERTAIN** the three cut notches of the seal are facing outward.

PRIOR TO REINSTALLING TIMING COVER: Apply a 1/8" bead of silicone sealer to the oil pan to block intersections. **IMMEDIATELY PROCEED** to the next step, as RTV normally sets up in 10-15 minutes.

REINSTALL COVER TO ENGINE. Torque bolts evenly and slowly to OEM specifications.

ROTATING SHAFT SEALS

RUBBER SEAL(S): Install seal with its **largest raised sealing lip toward the engine.** Two-piece rubber seals may be installed using a "shoehorn" installation aid placed underneath seals to protect them from sharp edges.

ROPE SEALS: Install seals into grooves of cap and block by firmly pressing packing into grooves with a "packing tool." Ensure that the ends of seals protrude above face of cap and block.

IMPORTANT: Final interference of rope packing seals against crankshaft is critical. To achieve proper interference, it is best to install packings using correct **Packing Tool** for your engine. With "packing tool" in position, cut protruded ends of seals flush with cap and block.

LUBRICATE SEALING LIPS AND CRANKSHAFT with 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.

REAR MAIN BEARING CAP: Prior to installation, apply anaerobic sealant to mating surfaces of cap or block. **AVOID** sealant on ends of seals.

OIL PAN GASKET

ATTACH AND ALIGN GASKET(S). Apply quick-drying adhesive sparingly. Mount gasket and/or seals. **PRIOR TO INSTALLING OIL PAN** apply a dab of silicone sealer where all gaskets and seals meet.



FEL-PRO INSTALLATION TIPS

GENERAL INSTRUCTIONS

CLEAN MATING SURFACES. Use a degreaser.

CLEAN THREADS of bolts/studs; for nuts/threaded holes use a bottoming tap.

BOLT PREPARATION: Those **entering** coolant passages require pliable non-hardening sealer on threads and underside of bolt heads. Those **not entering** coolant passages require oil on threads and underside of bolt heads. **Exhaust Assembly:** Apply high temperature anti-seize lubricant to threadings.

CHECK CASTINGS for flatness. Straighten, resurface or replace if needed. **CYLINDER HEAD AND BLOCK:** Refer to OEM manual to determine flatness tolerances and resurfacing limitations.

FINAL ASSEMBLY: Torque all fasteners to OEM specifications unless noted. CYLINDER HEAD torquing is critical; we recommend that you confirm with OEM.

HEAD GASKET

Follow any directional markings shown on gasket(s). If no markings exist, install gasket(s). **Fiber Faced Gasket(s):** Install dry. **Metal Faced Gasket(s):** Requires a thin even coat of sealer applied to the metal side(s) of gasket.

VALVE STEM SEALS

POSITIVE GUIDE SEAL:

Use plastic installation sleeve(s), to prevent damage to lip of seal. Trim plastic sleeve so it extends 1/16" below keeper groove. Place sleeve on stem. Carefully start valve stem seal over sleeve. Remove and reuse plastic sleeve. **FOR RUBBER JACKET SEALS:** Push seal over valve guide until it bottoms. **FOR SOLID/METAL JACKET SEALS:** Use of OEM service tool is recommended. If tool is unavailable, use deep socket or rigid tube of appropriate diameter. Center tool over shoulder of seal and tap seal down over guide until it bottoms.

UMBRELLA TYPE SEAL:

Start valve stem seal over valve stem; push seal down on seal body until it touches top of valve stem guide. Seal will find its proper position on stem once engine starts.

VALVE COVER/PUSH ROD COVER

ATTACH AND ALIGN GASKET(S): Use quick-drying adhesive, applied sparingly. If gasket has installation tabs, adhesive is not required. **IMPORTANT:** If gasket is rubber, install dry.

INTAKE MANIFOLD GASKET

V-TYPE ENGINES - FIBER SIDE GASKET(S) ALONG WITH FRONT AND REAR END SEAL(S): Attach and align gasket(s) and end seal(s) using quick-drying adhesive sparingly. **PRIOR TO INSTALLING INTAKE MANIFOLD** apply a dab of silicone sealer where all gaskets and seal meet.

INLINE ENGINES: Attach and align gaskets to cylinder heads.

IMPORTANT: WHEN INSTALLING STEEL SHIM GASKET(S): Apply sealer around intake ports on both sides. If gasket(s) have water ports, apply a 1/8" continuous bead of silicone sealer around each water port on both sides. While silicone sealer is wet, install intake manifold.

EXHAUST MANIFOLD GASKET

ATTACH AND ALIGN GASKET(S). If gasket has only one steel faced side, install steel side towards manifold.

WATER OUTLET, WATER PUMP, FUEL PUMP AND TIMING COVER GASKETS

If a supplementary sealer is desired, apply a thin coat of gasket sealer to both sides of gasket(s).

TIMING COVER REBUILD

IMPORTANT: The metal timing cover seal flange will be re-used with the new cork insert. **DO NO DISCARD.** Remove old cork insert.

CLEAN MATING SURFACES of all foreign material including old gaskets, RTV and oil. You may wish to use a degreaser.

CEMENT SEAL into metal flange using quick-drying adhesive. **MAKE CERTAIN** the three cut notches of the seal are facing outward.

PRIOR TO REINSTALLING TIMING COVER: Apply a 1/8" bead of silicone sealer to the oil pan to block intersections. **IMMEDIATELY PROCEED** to the next step, as RTV normally sets up in 10-15 minutes.

REINSTALL COVER TO ENGINE. Torque bolts evenly and slowly to OEM specifications.

ROTATING SHAFT SEALS

RUBBER SEAL(S): Install seal with its **largest raised sealing lip toward the engine.** Two-piece rubber seals may be installed using a "shoehorn" installation aid placed underneath seals to protect them from sharp edges.

ROPE SEALS: Install seals into grooves of cap and block by firmly pressing packing into grooves with a "packing tool." Ensure that the ends of seals protrude above face of cap and block.

IMPORTANT: Final interference of rope packing seals against crankshaft is critical. To achieve proper interference, it is best to install packings using correct **Packing Tool** for your engine. With "packing tool" in position, cut protruded ends of seals flush with cap and block.

LUBRICATE SEALING LIPS AND CRANKSHAFT with 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.

REAR MAIN BEARING CAP: Prior to installation, apply anaerobic sealant to mating surfaces of cap or block. **AVOID** sealant on ends of seals.

OIL PAN GASKET

ATTACH AND ALIGN GASKET(S). Apply quick-drying adhesive sparingly. Mount gasket and/or seals. **PRIOR TO INSTALLING OIL PAN** apply a dab of silicone sealer where all gaskets and seals meet.



FEL-PRO INSTALLATION TIPS

GENERAL INSTRUCTIONS

CLEAN MATING SURFACES. Use a degreaser.

CLEAN THREADS of bolts/studs; for nuts/threaded holes use a bottoming tap.

BOLT PREPARATION: Those **entering** coolant passages require pliable non-hardening sealer on threads and underside of bolt heads. Those **not entering** coolant passages require oil on threads and underside of bolt heads. **Exhaust Assembly:** Apply high temperature anti-seize lubricant to threadings.

CHECK CASTINGS for flatness. Straighten, resurface or replace if needed. **CYLINDER HEAD AND BLOCK:** Refer to OEM manual to determine flatness tolerances and resurfacing limitations.

FINAL ASSEMBLY: Torque all fasteners to OEM specifications unless noted. CYLINDER HEAD torquing is critical; we recommend that you confirm with OEM.

HEAD GASKET

Follow any directional markings shown on gasket(s). If no markings exist, install gasket(s). **Fiber Faced Gasket(s):** Install dry. **Metal Faced Gasket(s):** Requires a thin even coat of sealer applied to the metal side(s) of gasket.

VALVE STEM SEALS

POSITIVE GUIDE SEAL:

Use plastic installation sleeve(s), to prevent damage to lip of seal. Trim plastic sleeve so it extends 1/16" below keeper groove. Place sleeve on stem. Carefully start valve stem seal over sleeve. Remove and reuse plastic sleeve. **FOR RUBBER JACKET SEALS:** Push seal over valve guide until it bottoms. **FOR SOLID/METAL JACKET SEALS:** Use of OEM service tool is recommended. If tool is unavailable, use deep socket or rigid tube of appropriate diameter. Center tool over shoulder of seal and tap seal down over guide until it bottoms.

UMBRELLA TYPE SEAL:

Start valve stem seal over valve stem; push seal down on seal body until it touches top of valve stem guide. Seal will find its proper position on stem once engine starts.

VALVE COVER/PUSH ROD COVER

ATTACH AND ALIGN GASKET(S): Use quick-drying adhesive, applied sparingly. If gasket has installation tabs, adhesive is not required. **IMPORTANT:** If gasket is rubber, install dry.

INTAKE MANIFOLD GASKET

V-TYPE ENGINES - FIBER SIDE GASKET(S) ALONG WITH FRONT AND REAR END SEAL(S): Attach and align gasket(s) and end seal(s) using quick-drying adhesive sparingly. **PRIOR TO INSTALLING INTAKE MANIFOLD** apply a dab of silicone sealer where all gaskets and seal meet.

INLINE ENGINES: Attach and align gaskets to cylinder heads.

IMPORTANT: WHEN INSTALLING STEEL SHIM GASKET(S): Apply sealer around intake ports on both sides. If gasket(s) have water ports, apply a 1/8" continuous bead of silicone sealer around each water port on both sides. While silicone sealer is wet, install intake manifold.