

Volvo V8 Valve Cover Replacement

Yamaha built a 300hp V8 for Volvo to power both the S80 and XC90. A strong engine, but often neglected due to the costly nature of simple repairs (requires lots of time); because a V8 was stuffed into a small engine compartment.

The V8's valve cover gaskets are prone to leaking oil after a number of heat/cool cycles. Why? Because the neoprene gaskets harden and no longer seal, thus allowing oil to leak and run down both sides of the motor, burning on the hot the exhaust manifolds, also saturating the alternator and AC compressor and hastening failure. Ordinarily a quick repair on other Volvos, the V8 requires much plumbing to be removed and cleaning; hence adding time and cost.



The photo shows oil leaking from the 1-3-5-7 cylinder valve cover is dripping from the oil cooler. A quart of oil is lost every 2-3K miles. Similarly, oil leaking from the 2-4-6-8 valve cover drips directly on the exhaust manifold.

The scent of burning motor oil prompted me to replace the valve cover gaskets. This project is tedious, dirty and time consuming, but not outside the scope of a DYler. There are a few videos on Useless-Tube which can be consulted for background. One fellow begins his video stating he's not going to tell you how to take it apart. Duh!

Valve gasket replacement is not a difficult task when performed slowly and methodically. The dirt and grime collected between the intake manifold and the cylinder heads adds cleaning time. The dirt must be cleared, or it'd fall into the cylinder head intake ports creating serious problems.

Once the intake manifolds are removed, use the opportunity to replace the spark plugs and service the fuel injectors.

Parts and Supplies:

You will need two upper intake manifold gaskets, sold separately; two lower intake manifold gaskets, sold separately; left and right valve cover gaskets, sold separately, 8-sparkplugs, 8 rebuilt fuel injectorsⁱ (\$50) or one or two spareⁱⁱ used fuel injectors; 4 cans of brake cleaner; nylon tie wraps to seal hoses and hold wires in place; 4 bottles of fuel system/injector cleaner plus cotton rags.

Procedure:

Remove the strut tower torsion bar and the upper engine mount (4 bolts). If it's cracked or broken, replace it.

Disconnect electrical connectors to the throttle body and the sensor at the left rear (passenger side) of the upper intake manifold, the front vacuum and coolant hose to the throttle body and the multi-pin fuel injector connector. Next remove the 20 odd hex bolts fastening the upper intake to the lower intake manifold. Gently lift upper manifold and remove coolant hose to underside of upper intake and the PVC hose from the rear valve cover to the upper manifold. Lift off to expose the lower manifold.

Use a wet vacuum to remove as much debris on and around the lower manifold. A stiff brush will loosen stuff. A non flammable cleaner will loosen dirt and grime; a flammable solvent (brake cleaner) will explode in the vacuum canister sending shrapnel into your face, eyes, legs and/or body. Once the area is very clean; disconnect the electrical connector to the fuel pressure regulator, then remove the three 10 mm fasteners holding the fuel injector rail to the lower manifold and the two bolts fastening the fuel pressure regulator to the water plenum.

Next remove the fuel injector rail complete with injectors. It is not necessary to disconnect the feed wire to each injector. Carefully twist each injector left-right to loosen. Using a large screwdriver or pry bar, carefully lift each fuel injector feed tube to release the injector from the head. It'll pop up. Once all are loosened, lift the fuel rail, injectors and all to the right side. Remove the injectors from the fuel rail and soak in fuel system/injector cleaner. If the injectors have more than 100K miles, one or more may show an open circuit following cleaning and reinstallation, check with a multimeter. It is prudent to have spare injectors on hand. I harvested a fuel injector rail, complete with wire harness and injectors at a salvage yard for \$50. I also purchased 8 Bosch reconditioned injectors (eBay) for \$55 because I've two V8 engines to repair; I like having spares.

Once the fuel rail is aside, vacuum all debris from the area then remove the lower intake manifold and carefully lift it away so as not to drop dirt into the cylinder head intake valve area. Remove the two gaskets and vacuum again being certain to suck any dirt from the valve intake ports. Now clean the entire area, especially the "valley" between the heads. This area is usually loaded with dirt and grime cemented together by baked leaking oil.

Observe your intake manifolds; they will be covered with baked oil obstructing the air flow. Brake cleaner can aid the removal of this contamination. Spray each tube, and then push a soft cloth through. Repeat until the rag emerges clean. Once clean use a 1" wire cup brush (hex shaft) attached to a drill by a 7" flexible hex extension to polish each tube. Flexible hex extensions are available at hardware or home improvement stores. Mine was purchased at Northern Tool (not a sponsor) for \$7. Polish the mating surfaces with a fine sanding block. A water hose bath will remove any particles.

Remove the electrical connectors to the 8 Coil Over Plug (COPs) ignition coils and the coils. Loosen the 10mm fasteners holding the valve covers to the cylinder head being careful not to damage the COP ground connectors. Remove the 1-3-5-7 cylinder valve cover clean, install a new gasket and replace, and then tackle the 2-4-6-8 valve cover. Exposing one cylinder head to dirt and grime at a time minimizes the risk of introducing dirt and grit into the upper cylinder head. *Seal the cylinder head intake ports with a strip of duct tape until such time the lower intake manifold is replaced.*

Plan to spend 2-3 hours cleaning the valve covers. Place each open side up on a flat surface, pour in a bottle of fuel system/injector cleaner and wait for it to do its magic. Use a stiff nylon brush to loosen the baked on deposits. Once clean, place a new gasket on it and reinstall.

Caution: valve cover gaskets tend to fail where the timing chain cover fits the head due to a tiny square hole where the cover meets the head. Place a dab of form-a-gasket in this spot to guarantee a perfect seal.

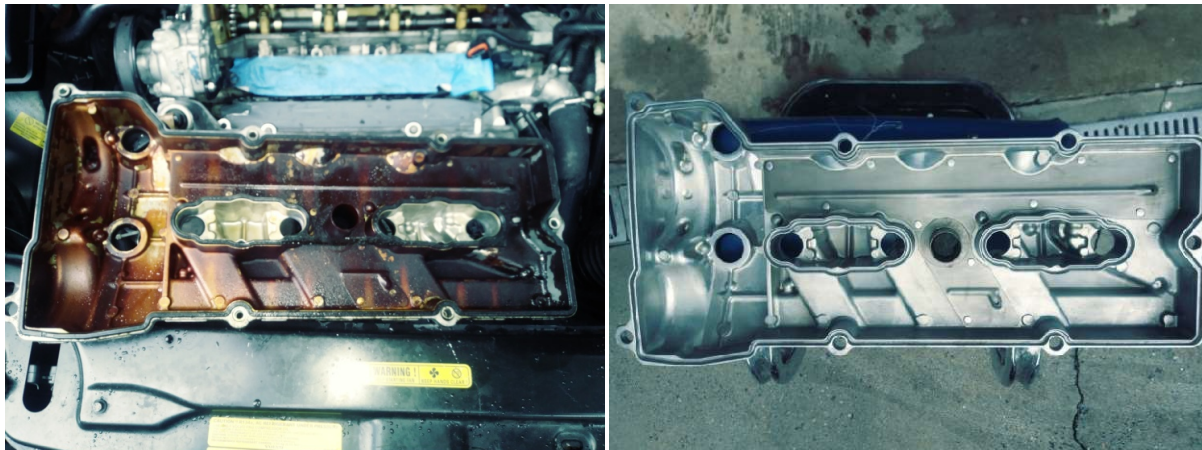
While the valve cover is removed, use the opportunity to replace the 4 spark plugs and clean the spark plug tube and seat. Insert a telescoping compressor powered air blow gun to pressurize each cylinder while simultaneously loosening dirt around the sparkplug seat with a long flat thin screw driver. The outward rushing air will blow the loosed particles out the tube.

Replace the 1-3-5-7 valve cover; tighten the 10mm fasteners until the metal spacer touches the mating surface to apply the proper nominal torque. Do not over tighten. Now direct your attention to the 2-4-6-8 valve cover, remove, clean and replace. Use care to reconnect all COP ground wires. Install new "eye" connectors as needed.

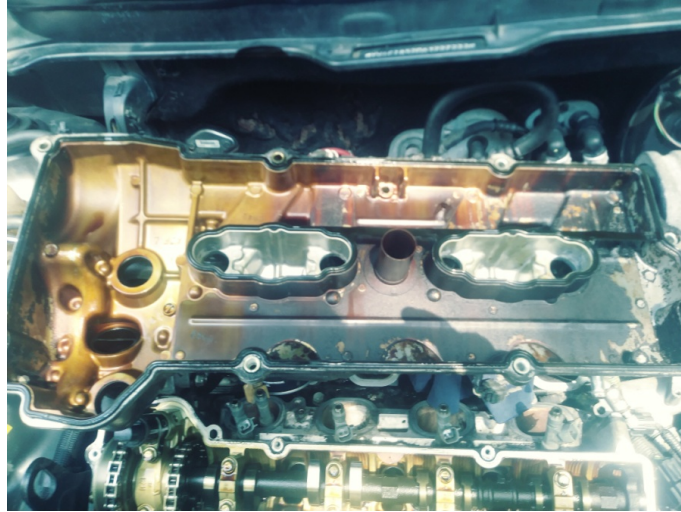
Install the cleaned and polished lower intake manifold and gaskets, hand torque nominally, followed by the fuel injector rail, complete with injectors, the upper intake manifold using care to reconnect the hoses. Should you connect the coolant hose to the manifold vacuum port; the engine will be flooded with coolant and may experience hydro-lock and bend a piston rod. Not good! I mark all hoses with color tape or color paint to aid in reassembly. I made this mistake once; the outcome was not fatal because I realized the problem when the engine started.

Photos:

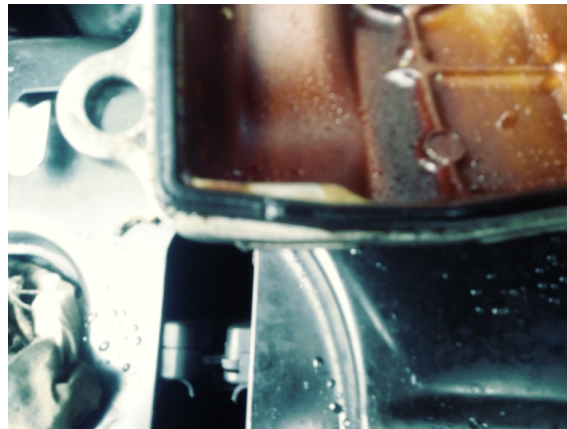
Dirty and clean 1-3-5-7 valve cover. Use fuel system/injector cleaner to remove the baked hydrocarbon deposits.



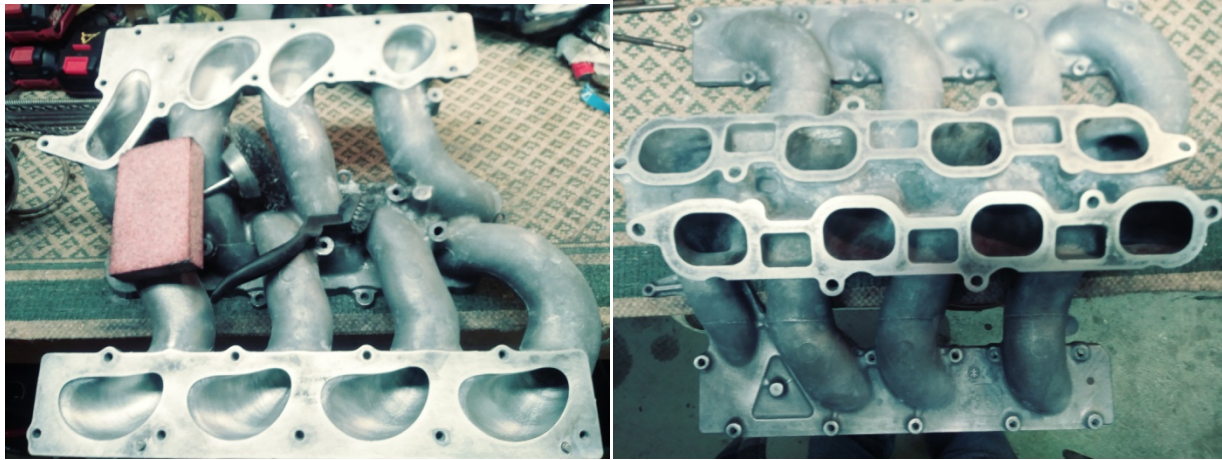
Dirty 2-4-6-8 valve cover



Note notch (below) in old gasket where timing chain cover meets the 1-3-5-7 cylinder head. Oil seeped through this area, dripped down to the oil cooler. Be certain to place a dab of form-a-gasket on the two mating surfaces before replacing the valve cover with its new gasket.



Clean and polish the lower manifold intake ports: top and bottom views. The lower manifold was nasty. It was coated with congealed oil vapor and combustion by products. Brake cleaner would not cut the grime, so I used a spray foamy oven cleaner. If you do this, use extreme caution because the oven cleaner, sodium hydroxide, will corrode the aluminum casting. Don't spray oven cleaner and leave it, you'll have a corroded oxidized intake manifold. In short a mess to recondition. A little bit used repeatedly, rinsing often with water does the trick.



Mounted lower intake manifold; fuel injectors and fuel rail installed.



Place the fuel injectors in a jar, cover with fuel system/injector cleaner to soak. Shake the jar occasionally. Soak as long as possible, remove replace O-rings, install on fuel rail, attach electrical connectors. (Yellow electrical connectors fit to the 2-4-6-8 injectors.)



This product was selected because it was on sale: 2 for price of 1. Purchase 4 bottles to clean all parts: one for the injectors and 1.5 poured into each dirty face up valve cover.

Like any job, most time is spent cleaning, followed by more cleaning and reassembly. Before installing the strut tower torsion bar, start the motor to determine whether all cylinders are firing. If a fuel injector connector is loose or has developed an open condition, remove the upper manifold to change it. Use an OBDII scanner to diagnose the non-firing cylinder and hopefully you did not attach the coolant hose to the vacuum port.



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He'll respond pleasantly to Volvo questions.

ⁱ Available from eBay.

ⁱⁱ New Bosch injectors are \$350 each.