# WHEN YOUR CAR USES TOO MUCH OIL

BY PAUL STENQUIST

● You push on the throttle when the light turns green. A cloud of noxious blue smoke quickly forms behind you. The six or seven cans of oil that are in your trunk roll toward the rear and bang against the bulkhead. Your fellow motorists hurl insults at you as they pass by. The nation's petroleum reserve is in jeopardy.

Some oil consumption problems are the result of serious engine damage —like holes in pistons, for example. But similarly severe oil loss can be caused by relatively simple problems and can be fixed just as simply.

## Outy or inny?

The first step is to get down on the ground and have a good look at your parking space. If there's a puddle of oil, you can assume that at least some of your difficulty is caused by an external leak.

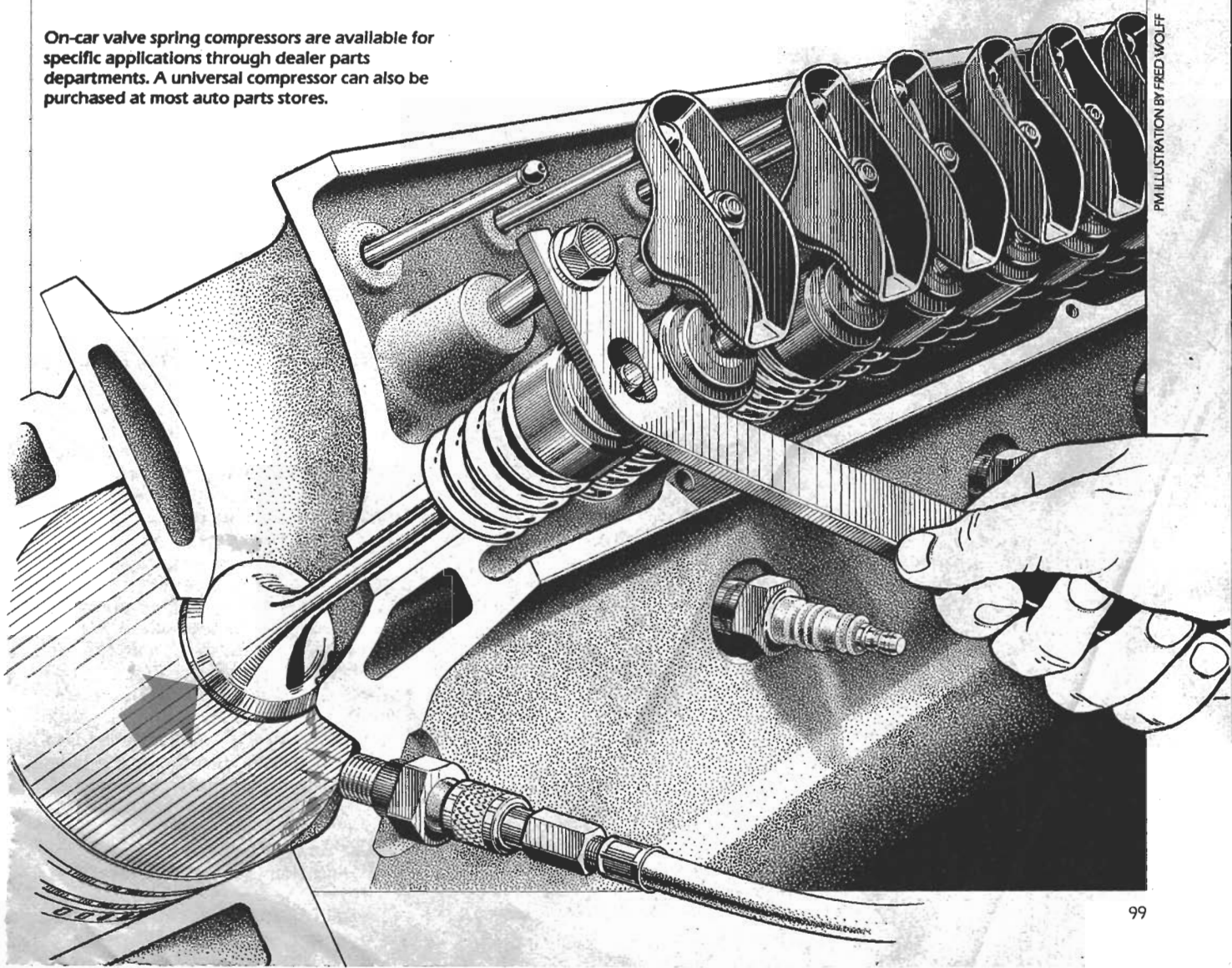
If you don't find any oil on the ground, inspect the underside of your car. If everything rear of the engine is coated with wet oil, suspect a gusher that only activates when the engine is running. But make sure you don't confuse leaking trans oil or differential oil with engine oil.

If, on the other hand, your engine's leak is internal, oil will be drawn into the combustion chamber when you drive and your car will smoke. When will it smoke? Perhaps at idle, when accelerating, when decelerating, after long periods of idle or right at startup. Pinpointing the driving condition that generates smoke can help you track down the cause.

## Internal leaks

Smoke is the most obvious symptom of internal oil consumption, but not the only one. Oil mixing with the air/

**On-car valve spring compressors are available for specific applications through dealer parts departments. A universal compressor can also be purchased at most auto parts stores.**



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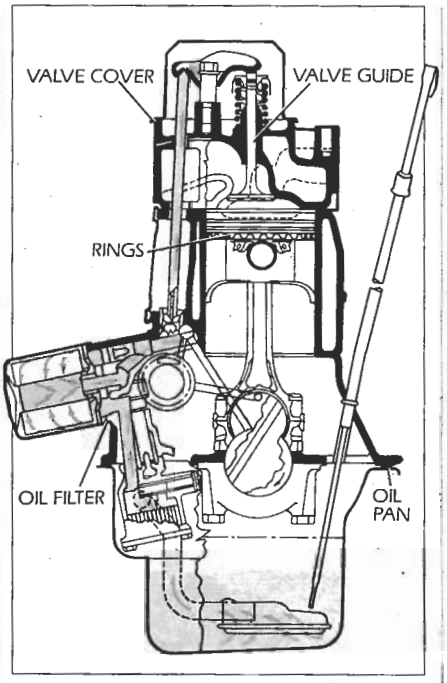



**There are plenty of potential internal and external leakage points on an engine.**

fuel charge can cause spark knock. And, when the engine operates low on oil much of the time, clicking and clacking noises—along with accelerated wear—will result.

There are several ways that oil can get into the combustion chamber: through the valve guides, the piston rings, the PCV system or past a blown head gasket. On some engines, particularly V8s where the intake manifold does double duty as a valley cover, oil can leak past the intake manifold gaskets.

Here's where that smoke can help you shorten the list. If your tailpipe smokes only when the car is first started after several hours at rest, valve guides are probably the culprit. Ditto if the smoke belches out only when the engine is first accelerated after extended idling.

If the engine smokes throughout the rpm range, worn or stuck oil rings are the likely cause.

Although these rules can help you narrow down an oil-consumption problem, they aren't hard and fast. For example, as guide wear increases, smoke may be obvious at all speeds and loads.

Removing all the spark plugs may help you localize the problem. What you're looking for are the heavy, black oily deposits that indicate oil consumption. If they're limited to one or two cylinders, you can focus your troubleshooting on those cylinders.

## PCV system

The PCV system allows crankcase gases to escape to the intake manifold where they are drawn into the engine and oxidized. One PCV system hose joins the PCV valve and engine crankcase (via the rocker cover on most applications). The PCV valve is connected to the intake manifold. On some systems, the valve may be located at the rocker cover end of the hose, but its function is the same.

Under high engine-vacuum conditions, such as idle or light load, crankcase gases flow through the PCV valve into the intake manifold. On most PCV systems, a second hose connects the crankcase (again via the rocker cover) to the engine air cleaner. In many cases, a small separate filter is provided for the PCV hose. This hose allows fresh air to be drawn into the crankcase as the gases are purged.

If the PCV valve clogs, crankcase gases won't be purged, pressure will build up, and oil may be pushed back up the fresh-air hose into the air cleaner. In some cases, the high crankcase pressure may allow oil to be pushed past oil rings that might otherwise be adequate.

You can check the PCV valve by disconnecting it from the crankcase end, starting the engine and checking for vacuum at the valve with the engine idling. Next, remove the valve from its hose and shake it. You should hear a rattling sound. If you don't feel vacuum at the valve and/or the valve won't rattle, replace it and check the hose for obstruction. Since the valve is quite inexpensive, it might be a good idea to replace it in any case. (Always replace the PCV valve at your 15,000-mile maintenance intervals.)

If the PCV system continues to deliver an excessive amount of engine oil to the air cleaner even when the PCV valve is functioning correctly, it may be that the engine's compression rings have worn to the extent where the crankcase is overpressurized. A cranking compression or leakdown test can help you verify this.

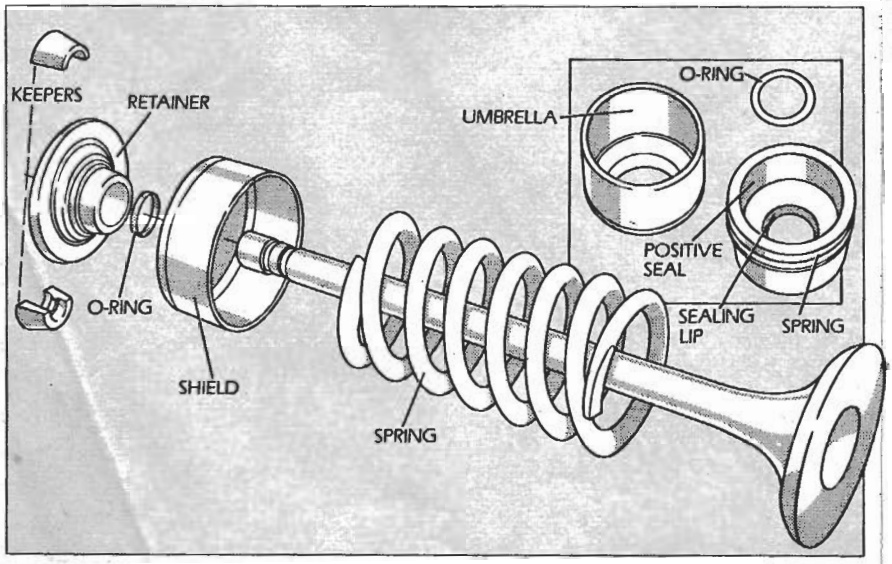
## Valve guide and seal failure

Even if smoke emissions suggest that your problem is a likely case of oil-ring leakage, you'll probably want to check the valve guides and valve seals first as this can be accomplished without removing the cylinder heads.

The valve guides are the bushings that support the intake and exhaust valve stems. When the valves open and close, they slide up and down in the valve guides. The valve seals limit the amount of oil that reaches the top of the guide. Both guide wear and seal failure will allow oil to enter the combustion chamber via the guides.

There are two ways to check valve guides and seals. One way requires removal and disassembly of the cylinder head(s). The other easier way is an on-the-car method. To do the job the easy way, you'll need an air compressor and a spark-plug-hole/air-chuck adapter. This last item plugs into an air hose disconnected on one side and screws into the spark-plug hole on the other side. This allows you to pressurize each cylinder while you remove the valve keepers and retainer to check the seal and guide.

In addition to the compressor and




**Valve stem seals might be O-rings, umbrellas or the positive-lip type.**



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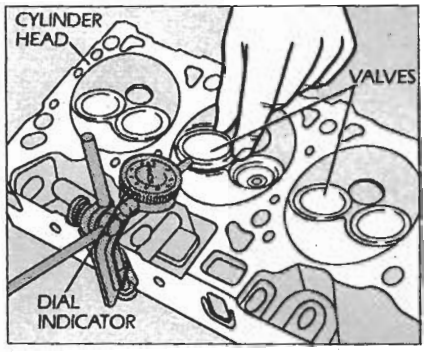
adapter, you'll need a new rocker cover (or cam cover) gasket, a set of engine valve seals, some quick-drying gasket adhesive and some nonhardening gasket adhesive.

You'll also need an on-the-engine valve spring compressor. There are several types available. Some are specific to a certain type of engine. Others are universal. Most auto parts stores carry this tool.

To check the guide, carefully reroute or disconnect any wiring or tubing that might interfere with rocker cover removal. Tag any lines that you disconnect, so you'll be able to reconnect them properly.

Remove the rocker cover(s) and screw the air hose adapter into the first spark-plug hole. (If you've isolated the problem to certain cylinders, you can move right to those locations.) With the adapter in place, turn the engine until that cylinder is at top dead center (the highest point of piston travel) on its compression stroke. You can tell when the cylinder is approaching top dead center/compression stroke because air will come shooting out of the adapter. When the airflow stops, you've reached approximate top dead center, which is close enough for our purposes here.

On cam-in-block engines or overhead cam engines with rocker-arm actuated valves, remove the rocker arms from the first cylinder's valves. On some engines, including most domestic V8s, this is merely a matter of unscrewing the jam nut from the shaft that supports the rocker. On other engines, you'll have to unbolt a rocker shaft that supports the rocker arms for the entire bank of cylinders.




**Measure valve guide clearance on the chamber side of the head with a dial indicator.**

On overhead cam engines where the cam is positioned directly above the valves, you'll have to disengage the timing belt or chain and remove the cam. Procedures vary widely here. Consult your service manual for specific cam removal instructions.

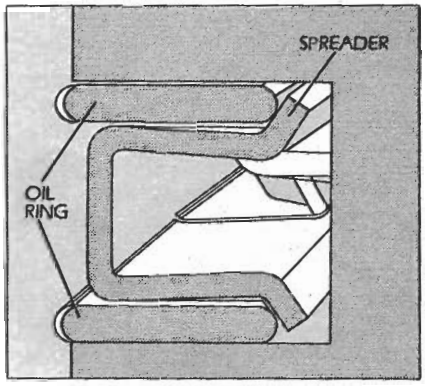
Once rocker arms or camshafts are out of the way and you can see the top of the valves, connect your air compressor hose to the adapter. If the engine turns due to air pressure pushing down on the piston, you'll have to hold the crankshaft in place with a wrench on the front pulley bolt or with a screwdriver wedged against the flywheel ring gear. A helping hand may be necessary here.

With the cylinder pressurized, tap the retainer of the intake valve with a worn socket and hammer, locating the socket over the end of the valve stem in such a way that it contacts the retainer but not the keepers. Compress the valve spring and retainer with the compression tool and remove the keepers. Use needle-nose pliers if your fingers are too big to grasp them. Make sure you don't drop a keeper into the engine.

Once the keepers have been extracted, remove the valve spring and retainer. Air pressure will prevent the valve from dropping into the cylinder.

Examine the valve stem seal. If it's an umbrella stem seal, you'll find it on top of the valve guide. If it's an O-ring seal, it should be in the second groove on the valve stem, just below the keepers. In either case, the seal should be soft and pliable. If it's hard or cracked, it may be the cause of your oil-consumption problem. Upon reassembly, replace all valve stem seals.

To check the intake guide, release the air pressure from the cylinder while holding the top of the valve stem. Be careful. If you drop the valve, you might have to disassemble the engine to retrieve it. Try wiggling



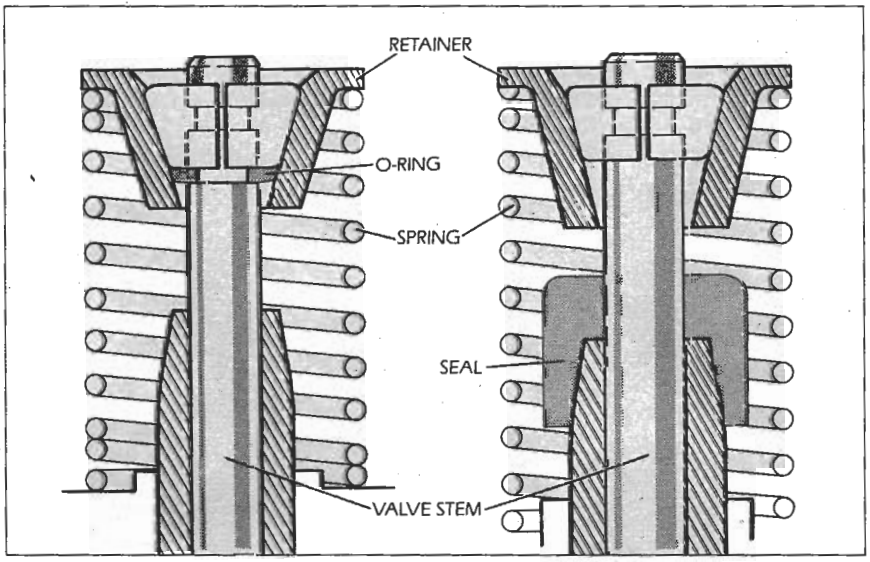

**The oil-ring spreader (or expander) pushes the oil-ring rails against the cylinder wall.**

the valve stem back and forth. If it moves a visible amount, the guides are excessively worn, and the heads will have to be removed for guide replacement and grinding of the valve seats.

If you're not sure whether clearance is excessive, mount a dial indicator perpendicular to the valve stem and wiggle the stem. A typical intake valve specification calls for 0.001- to 0.003-in. valve stem clearance from the factory. The high-end tolerance for used parts is about 0.004-in. on most engines.

Check the exhaust guides in a similar manner, but note that exhaust guides are usually engineered with a bit more clearance than the intakes. Here, a slight amount of lateral movement is okay. More than 0.005-in. clearance is excessive on most applications.

If the guides are okay, reinstall all valve train parts with a new valve seal. If your engine is equipped with




**O-rings are installed on the valve stem, and umbrellas or lip seals fit over the guide.**



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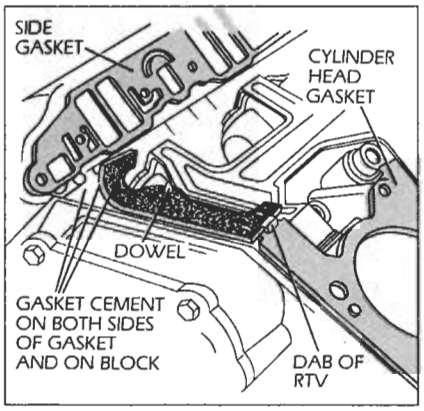
O-ring type seals, you can push them into the proper groove with a keeper half before the split keepers are installed. If you found cracked or broken seals, they could be the sole cause of even serious oil consumption.

Attach the rocker cover or cam cover gasket to the cover with fast-drying adhesive. Apply nonhardening gasket compound to the engine side of the gasket before installing.

If you found excessive guide wear, the head(s) will have to be removed for guide replacement and valve-seat grinding. (Because the guides locate the valves in respect to the seat, you can't replace the guides without grinding the seats.)

## Oil rings

Once you're certain that an internal oil-loss problem isn't due to some simpler cause, you may have to bite the



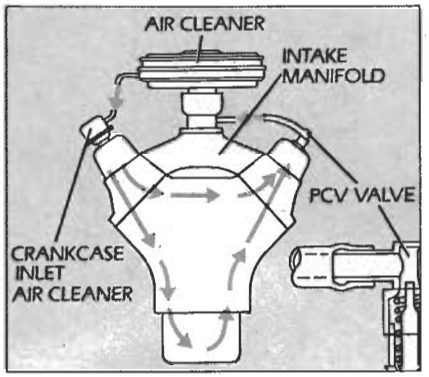

**The gasket must be firmly cemented to the block before installing the manifold.**

bullet and consider the oil rings. But before you do, perform a quick compression test with a handheld gauge. Crank each cylinder four to five times with all plugs removed and compare readings. If one cylinder is way off (and one spark plug was oil soaked), you might be looking at a blown head gasket, a hole in a piston, broken rings or other major damage.

If all cylinders are quite low, both the compression rings and oil rings may be worn. As noted earlier, worn compression rings can cause oil loss through the PCV system and/or past seals and marginal gaskets.

If all cylinders are okay, you may still have worn oil rings. Oil rings sometimes fail (or stick) before the compression rings are worn out, and bad oil rings can help mask bad compression rings by providing plenty of lube to seal the gaps.

Of course the only cure for worn oil and/or compression rings is an engine




**PCV can deliver engine oil to air cleaner if the valve fails to purge the crankcase.**

rebuild, but sticky oil rings can sometimes be loosened. If you want to give it a try, fill the crankcase with SAE 10W oil and a thin oil additive meant to free sticking lifters and oil rings. (Don't use a viscosity booster.)

Drive the car for at least 30 minutes. If engine temperature doesn't reach the maximum end of the allowable range, cover part of the radiator with a piece of paper. Before the engine cools down, drain the oil and refill with your normal engine oil, such as a 10W-30. This treatment is somewhat hard on the engine, but when a total rebuild is your only alternative, it may be worth a try.

## External leaks

If you're simply losing oil rather than burning it, the fix may be less expensive. But it can be equally difficult.

Because there are so many locations from which oil can leak, it's sometimes hard to find the gusher.

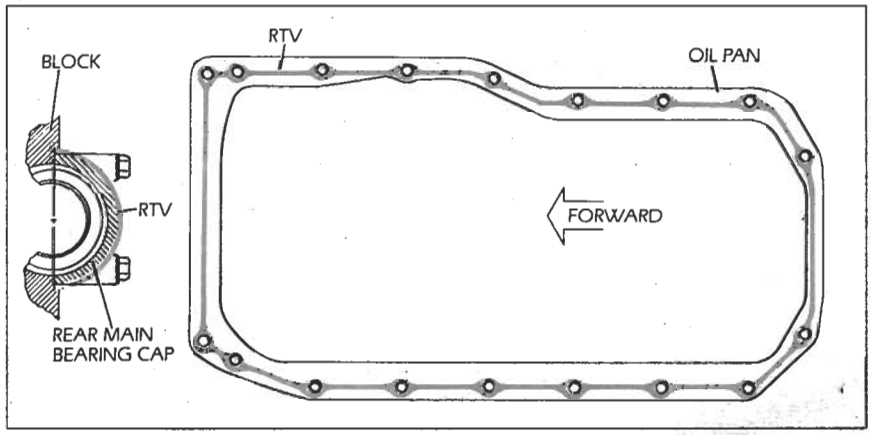
If the oil drip is evident while the car is parked, wash the underside of your car with soap and a high-pressure hose to remove the oil that has probably been blown all over the underside of your car while driving. Then, clean your engine with one of the commercially available engine cleaners. You may have to apply the cleaner several times to clean a really filthy engine. Make sure you protect all electronic parts with plastic bags.

With engine and undercar clean, cover your garage floor or driveway with white paper. Engine oil leaks will leave dirty spots. Automatic trans fluid leaks will leave pink or light brown spots. You can usually locate the leak by concentrating on the area right above the spot on the paper. Likely sources include rocker or cam covers, timing cover, oil pan, fuel pump gaskets and, where applicable, intake manifold end seals. This last location is found only on some V-type engines where the intake manifold seals the valley, an arrangement that is seemingly quite prone to leakage. This is particularly true in cases where the manifold has been removed for service, as the end seals can be quite difficult to install.

If normal methods fail to uncover a leak, try a black-light kit. This oil-detection device comes with a fluorescent oil additive. You simply add the fluorescent stuff and let her leak. Once the oil with additive has leaked, you aim the black light at various locations until the glowing oil can be seen.

Quite a few engines use RTV sealants in place of regular gaskets in some oil-sealing locations. Bathtub caulk is for bathtubs—get an RTV sealer intended for automotive use at the auto parts store. Apply a continuous bead inside of the component's bolt holes.

Some gasket makers supply a conventional gasket for certain applications that were originally RTV from the factory. In many cases, the gasket provides a superior seal. If an RTV joint has failed, you might ask your auto parts counterman whether or not a conventional gasket is available. **PM**




**A uniform, unbroken bead of RTV must be applied inside of the bolt holds.**

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