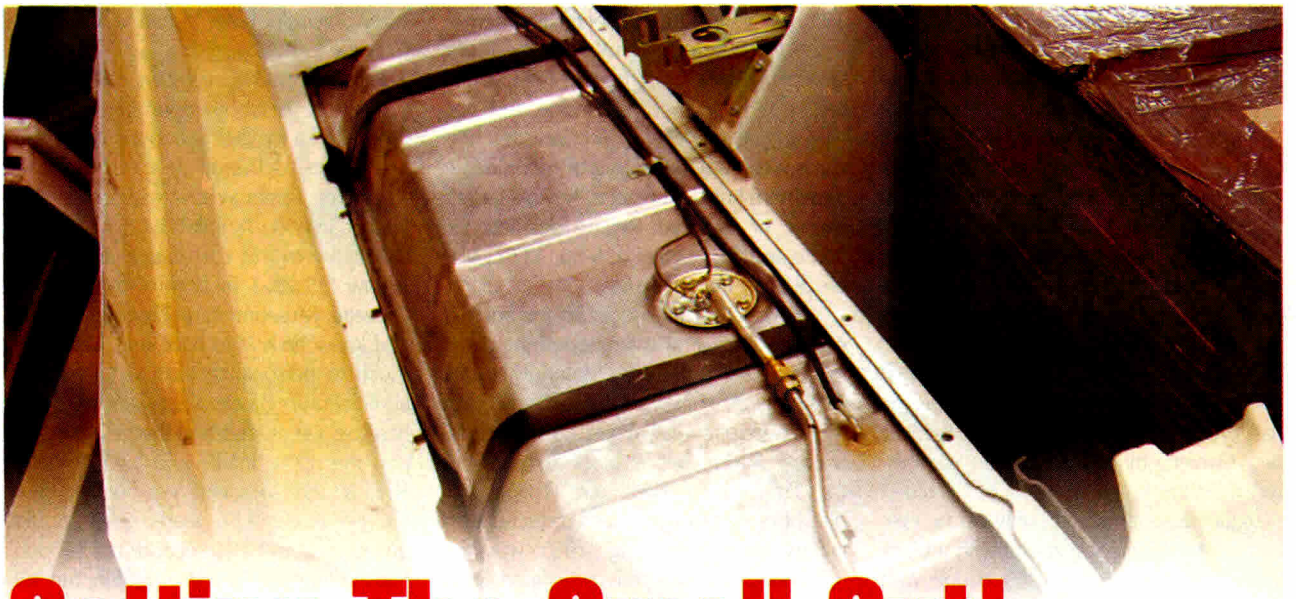


Getting The Smell Out!

RIDDING YOUR STRAIGHT-AXLE OF ITS STINKING GAS

BY JOHN HINCKLEY

Almost everyone who has owned a solid-axle Corvette has complained at one time or another about a persistent "gas smell" in the cockpit or in the garage, and wives or girlfriends have refused to ride in the car "because it stinks," and "you always smell like gas after you drive that thing."

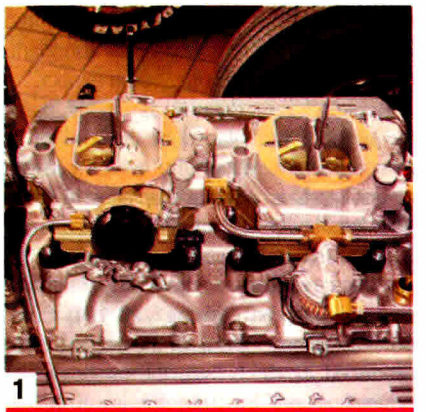
There are reasons for the gas smell, most of which arise due to lack of knowledge about the design and correct original configuration of the fuel system, well-meaning but improper maintenance, or just plain neglect by previous owners. We'll examine the root causes of the infamous gas smell and show you the cures for each one of them. None are rocket science, and any one or all of the fixes can be done at home in an afternoon without special tools.

Let's start at the engine and work our way back to the fuel tank; 99 percent of all C1 gas smell issues are caused by one or more of the following conditions.

CARBURETOR FITTINGS: All C1s have all-steel fuel lines from the fuel pump to the fuel filter and carburetor(s). If your car has any rubber hoses and clamps between the pump and the carbs, "Bubba" has been there and rigged up a substitute of some sort instead of using the correct parts. Rubber hoses are NOT a good idea on the pressure side of the fuel pump; they deteriorate and dry-rot, and fuel spraying out of a ruptured old fuel hose at seven psi will feed an underhood fire like you wouldn't believe.

2x4 carb setups have a total of 10 metal-to-metal fittings between the pump and the carbs; six are SAE inverted flare fittings that seal on the flare seats, not in the threads, and four are tapered pipe threads (adapter fittings on both sides of the fuel filter and an adapter fitting at each carb's fuel inlet). Make sure each of these 10 fittings (or the five on a 1x4 setup) is tight and dry.

THREAD SEALANTS: Although the SAE inverted-flare fittings don't seal at all in the threads, a light application of Teflon® pipe dope (only on the threads) will help overcome thread friction when tightening the fitting and will create a tight mechanical seal at the flare with less applied torque and will eliminate any galling of the threads. It will accomplish



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1 2x4 C1s have 10 fittings between the fuel pump and the carb inlets. Make sure they're tight and dry, and get rid of any Bubba-installed rubber hoses and clamps.

2 This is the original Eaton VENTED gas cap used on '53 to early '57s without vented fuel tanks. You don't want this cap on any car except for judging.

the same thing on tapered pipe threads, where the seal is created by thread interference. Don't use Teflon® tape – it can shred and clog filters.

FUEL PUMP: There should be no wet fuel stains on the outside of the fuel pump, and no evidence of fuel leakage from the housing vent holes. If you see wet fuel stains, it's time to rebuild or replace the pump. The flexible hose from the main fuel line on the frame to the inlet of the pump is a special Corvette-only part; it has an SAE inverted-flare fitting to the main line, and a male tapered pipe thread on the other end that connects to the 45-degree brass adapter fitting at the pump inlet. These hoses get old and deteriorate (and delaminate internally, causing fuel starvation problems). Inspect yours and replace it if it shows signs of deterioration; all the Corvette vendors have them.

GAS CAP: At least half of the C1s I've looked at have the wrong type of gas cap. Using a VENTED cap on a C1 virtually guarantees fuel spillage and odors, and I see them all the time. They use a NON-VENTED gas cap, as the fuel tank is already vented through a rubber vent hose from a fitting on top of the tank that terminates inside the fuel filler cavity where the cap is.

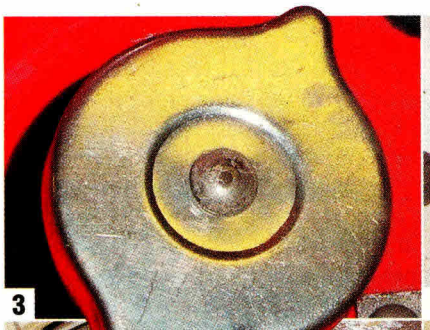
The exceptions to this are '53-'56 and very early '57 Corvettes that left the plant with a non-vented fuel tank and didn't get modified by a dealer to add the tank vent fitting and hose and non-vented cap per the Chevrolet Service Letter issued in late 1956 to address the fuel odor complaints. The vented tank and vent hose and non-vented cap went into production on '57s in mid-December 1956, around S/N 1425.

The simple fix for early '57-up cars is to get a Stant #10810 or Standard #CST-6810 NON-VENTED gas cap, to keep fuel in the tank on right turns. On '53 to early '57 cars without vented fuel tanks, you'll need to add a vent fitting to the top of the tank or to the flange on the sending unit and add the rubber vent line to the filler cavity in order to use a non-vented cap. Either the tank or the cap must be vented in order to allow air to replace the volume of fuel as it's used (but not both).

FUEL FILLER NECK HOSE: The short section of special rubber hose from the fuel tank to the filler neck with the cap on the end is almost always dry-rotted or deteriorated. Its barrier qualities are history, and both raw fuel and odors permeate it easily. Inspect it and replace it if necessary, using only "fuel filler hose" that's laminated with a barrier material; NAPA sells it by the foot. DO NOT use a section of radiator hose – that's Bubba's favorite substitute, and it's both unsatisfactory and dangerous.

FUEL TANK VENT LINE: A piece of rubber hose about three feet long runs from the vent fitting on top of the tank into the fuel filler cavity through a grommet, and the downward-pointing end is secured with a clip. Hardly anyone ever looks at this either, as it requires removal of the tank cover panel in order to inspect it and as a result, it's usually dry-rotted or has separated, and becomes a source of raw fuel or fuel vapors in the tank compartment. If there's any question about its condition, just replace it. While you have the tank cover panel off, check the fitting between the main fuel line and the sending unit and make sure it's tight and dry.

FUEL FILLER CAVITY DRAIN NIPPLE AND HOSE: If you look closely, you'll notice a hole at the bottom of the fuel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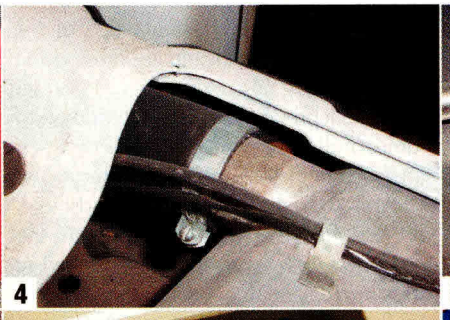
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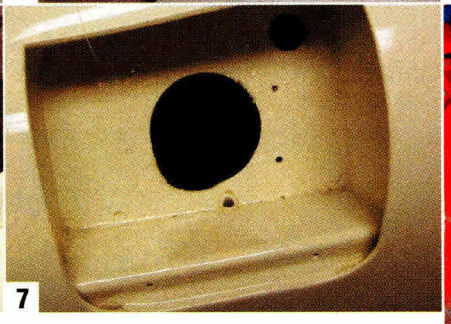
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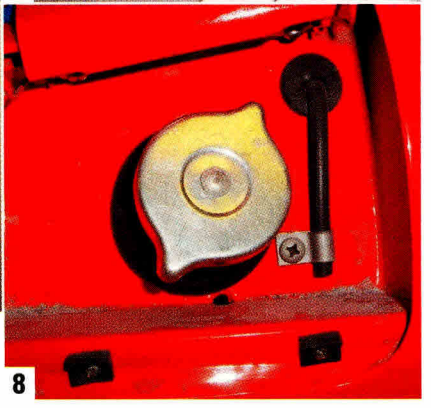
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3 A typical sealed NON-VENTED cap as noted in the text. This is almost identical to the original factory cap, and is the one you want on cars with a vented tank.

4 The often-neglected and frequently dry-rotted special fuel filler neck hose. "Bubba" occasionally replaced it with radiator hose.

5 This is the vent fitting on the passenger side of the fuel tank. It entered production early in the '57 model year, and was retrofitted to many earlier cars by dealers per a Chevrolet Service Letter.

6 Typical C1 fuel tank – note the rubber vent hose routed across the tank toward the fuel filler opening.

7 '58-'60 fuel filler cavity. Note the drain hole and nipple and grommet for the vent hose. The hole and nipple must be intact in order to drain fuel spillage.

8 A correct mid-'57-up NON-VENTED gas cap and filler cavity with vent hose and clip, grommet, drain hole and nipple. A drain hose runs from the bottom of the nipple out through the underbody.

filler cavity, with a nipple in it. If you don't see the hole, a well-meaning body or paint guy has "done you a favor" by filling it in. That hole has a purpose. It's there to provide a drain for fuel spilled during refueling, spillage through the gas cap and gasket, and any spillage from the tank vent line that terminates in the cavity. Where does the spilled fuel drain to? The bottom end of that nipple (which you can't see) is supposed to have an 18-inch length of rubber hose on it, and the bottom end of the drain hose exits through a grommet that fits in the nice, round, empty hole you'll see in the underbody, just above the front of the rear spring. That arrangement allows fuel spillage to dribble out on the pavement, outside the car.

This drain hose (and usually the grommet) is missing on probably 90 percent of C1s, as most folks don't know it's supposed to be there. When it's missing, the fuel spillage from the filler cavity drains through the nipple and pools INSIDE the underbody, and really stinks up the cockpit, especially when the top is up. The fix is simple – add the hose and grommet after removing the tank cover panel so spilled fuel dribbles on the pavement, not inside the underbody. I've also seen cars set up with the end of the fuel tank vent hose stuffed into the nipple. Don't do that, as it won't allow fuel spillage in the filler cavity to drain – it'll just pool in the cavity and "stink," and bubble the paint.

SENDING UNIT GASKET: The treated paper gasket between the fuel tank sending unit and the tank opening also deteriorates, and fuel will seep or "wick" out on the top of the tank. Replace it. This is also an opportunity to add a dedicated ground wire from a sending unit attaching screw to the frame, following the main fuel line routing through the underbody opening. This will eliminate the chronic C1 problem of the fuel gauge needle "jumping" when the brake lights or turn signals are activated.

The tank itself may also be at fault. If you see any signs of wet staining anywhere on the tank, especially below the weld flange, replace it. Don't even THINK about "repairing" pinhole leaks – if it has a few pinhole leaks, more will follow shortly. $200 for a new tank is cheap insurance, and you'll never have to touch it again.

TANK COVER PANEL SEAL: When the car was built, a strip of sealing material was run all the way around the flange on the opening in the underbody where the tank cover panel attaches before the cover panel was installed, to seal that joint and keep fuel odors out of the cockpit. This seal is usually missing entirely or only remnants of it are in place. Clean any remaining material off the underbody and cover panel mating surfaces and install a new seal, using 3M "Strip-Caulk" or similar material (commonly known as "dum-dum"), available at automotive paint stores or at Lowe's, Home Depot, etc.

REAR HOOD SEAL: Although not always directly related to gas smell, the rubber weatherstrip across the rear edge of the hood that seals to the flange around the hood opening also serves an important purpose. It prevents hot air and underhood fumes of all kinds from flowing out between the hood and its opening and entering the cockpit over the top of the windshield, or pouring directly inside through the cowl vent if it's open. If it's deteriorated or missing, replace it.

STORAGE ODOR: Some folks also have issues with gas smell when the car isn't being driven and is in hibernation in the garage or in a "car bag." These older cars don't have sealed fuel systems with evaporative emission control systems and charcoal purge canisters to absorb fuel vapors, so the potential sources of fuel vapors need to be sealed if storage odor is an issue.

On C1s with fuel tank vent hoses and correct NON-VENTED gas caps, plug the end of the tank vent hose in the filler cavity with a golf tee. On early cars without a tank vent, replace the vented gas cap (only for storage) with a non-vented cap – that will take care of tank vapors.

The other potential source is the carburetor bowl vents. Remove the air cleaner and put rubber or plastic caps on the bowl vent tubes, or install one of the plastic carb top caps (Moroso, etc.) that keep things out of the carb during engine work, or tape a plastic bag over the air horn. Apart from leaks or seepage from fittings or rotten old rubber hoses, the tank vent and carb bowl vents are the only open sources of fuel vapors, and sealing them will trap vapors inside the fuel system.

SUMMARY: Most of these cars have been through many owners and/or restorers over their 45 or 50 years, few of whom understood the design or correct configuration of the fuel system, or why that knowledge was important. The chronic gas smell isn't normal, and you don't have to live with it. Contrary to popular belief, it's not "the nature of the beast." Understanding how the fuel system works and restoring it back to its original design condition will eliminate gas smell and make driving your solid-axle Corvette more enjoyable. Your wife or girlfriend will enjoy it too!


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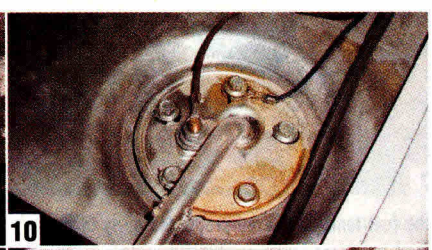
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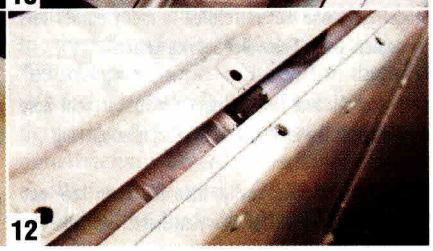
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9 This is the underbody hole for the drain hose and grommet, both of which are usually missing. It's directly above the front of the rear spring.

10 The treated paper gasket under the sending unit probably needs replacing, and you can add a second dedicated ground wire at the same time.

11 The added ground wire for the sending unit can parallel the main fuel line and exit through its hole in the underbody. If the tank is leaking, replace it.

12 The car originally had a seal strip all the way around this joint between the tank cover and the underbody compartment. Clean the surfaces and replace it with strip-caulk sealer. ■