# Jeep Find Evap Leak

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## Background

For several years now I had been struggling with “evap leak” check engine warnings. I even took it to the dealer and had them fix it, but it just came back a few weeks later.

Usually I would just clear them, but it was a pain every when I had to smog check the vehicle because I would have to wait for the check engine light to turn on, then drive about 50 highway miles and some city miles (to re-populate the emissions data in the computer.) and then hope I could get to the smog test and pass before the light came back on again.

I started shot-gunning the problem by simply replacing different parts of the system with new components, but this got tedious and expensive and didn’t solve the problem.

I finally broke down and purchased a smoke test tool to identify the issue. There are many available but I chose this one on Amazon because it was reasonably priced, made in the USA and had good reviews.

Amazon.com: AutoLine Pro Automotive Smoke Machine Leak Detector EVAP Vacuum Diagnostic Tester | Shop Series | Made in The USA : Automotive


I found a great video describing how to perform smoke tests and what to look for:

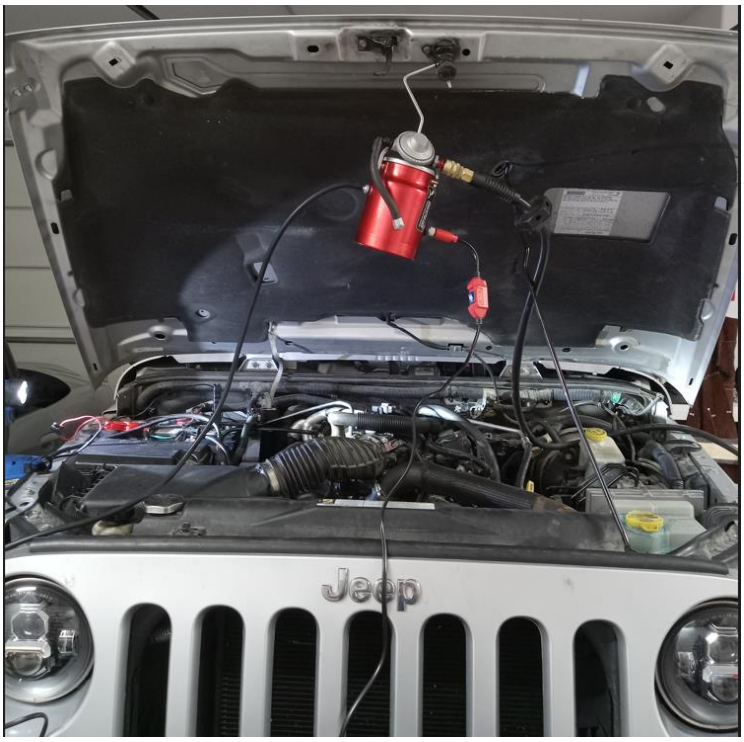
How To Perform An EVAP Smoke Test To Look For Leaks - YouTube

# Steps Taken

## Hook-up the Tester

The tester has 3 hookup points as follows:

1. It must be connected to a running air compressor.
2. It must be connected to the vehicle battery (to heat the smoke fluid.)
3. It must be connected to the input side of the evap purge valve (the entry point of the smoke into the system.)



## Run the Tester

Once you turn it on, it will start pumping thick smoke into the evap system. I then went under the vehicle and spent several minutes looking around but couldn't find any leaks on any of the evap hoses or components. I was kind of frustrated - because clearly there was an evap leak – so I got back up from under the vehicle and immediately noticed a huge cloud of smoke billowing out of the gas cap area (photo on the left)!

Further investigation also showed a much smaller smoke leak from the evap air intake filter (photo on the right – take from underneath looking up at the inside of the gas filler tube.)

Clearly this was the cause of the evap leak!

# Solutions

## Gas Cap Issue

This is one of the most common causes of evap leak issues on a Jeep as you will see in all the forum discussions. I doubted that this was my issue because I had replaced my original cheap gas cap with a really fancy and expensive billet cap – but, though it looked nice, it failed to produce a good seal even with some silicone grease applied to the gasket.

So I dug around and found my old Jeep gas cap and put it back in. This immediately fixed the problem. You can see in the photo below: the fancy but leaking gas cap on the left, and the old working gas cap on the right.

## Evap Air Intake Filter Issue

The evap air intake filter is connected to the Evap System Integrity Module (ESIM) underneath the vehicle. The ESIM normally only opens when the engine is running and the system is venting the trapped gas vapor into the intake manifold. For the ESIM to be opening when the engine is off is most likely caused by a faulty ESIM. I have this on order and will replace it shortly. It is noteworthy that this is the same module that the dealer replaced last time it brought it in for an evap leak problem.

This is a clever departure from the usual “evap pump” and “evap pressure sensor” combination found in most vehicles. For a full description of how this works, please refer to the following:

Evaporative System Integrity Modules (ESIM) | Standard (standardbrand.com)

## Replaced the Evap Canister as well

I had ordered the evap canister before finding the gas cap leak so I would be prepared in case it was leaking as well. When I removed the ESIM, I noticed that the inside of the canister had a solid black circle in the mating area. After I unpacked the new canister I realized that this was not normal, and that the old canister was full of crud. Note the difference in the photo below – left canister is the old one, right canister is the brand new one.

So I ended up replacing the canister as well. I test drove it for a few miles and there are no check engine lights anymore. If this holds out for a few weeks then I will feel confident that the problem has been solved.

## Gas Tank Leak

Sadly, the check engine light came back on a week or two later so I had to dig deeper into what was going on.

There turned out to be another leak on the top of the gas tank where the pipe was almost completely broken. It almost looked like someone had taken a saw and cut it almost (but not quite) all the way through. You can see the smoke escaping from the crack in the picture below.

At first, I tried just applying super glue around the cracked area, however this didn't work and the piece completely broke off when I tried to re-attach the hose after the glue dried.

My first attempt to solve this was to buy a new replacement part for the white plastic piece that was broken. After hours of searching, it became apparent that this part cannot be purchased separately and the only way to get a new one is to buy the entire gas tank which was more money and time than I wanted to spend on this problem.

I was able to take a standard ¼" poly tube barb adapter, remove the large end, and insert the remaining brass tube into the broken piece after drilling the hole slightly larger.



Sadly, I couldn't use the same simple technique to get it to go into the fuel tank because there was no room to get a drill into that area of the Jeep without dropping the fuel tank (a major job.)

So, I had to grind down the brass insert until it was small enough to fit into the existing hole in the top of the fuel tank. As I didn't have a lathe, I ended up putting it in my drill press and applying a file to the side until it was thin enough. I was then able to re-attach the broken piece to the gas tank using the modified brass tube. After super gluing the two pieces together, I was left with a very sturdy repair job.


This appears to have resolved the check engine light but, of course, I'll have to drive it for a while to see if there are any other leaks that pop up.