

Do you smell gas inside your Avanti?

This is a very important article as it is safety related, you could have gas leaking inside your car or do you just have garbage inside your fuel filter, which could put you along side of the road.

By Dan Booth
Nostalgic Motor Cars

Dan Booth has over 45 years of exclusive, hands on Avanti sales, service, collision and parts, not Studebaker cars or trucks, just 1963-1985 Avantis.

I have been asked to write an article on the many different gas tanks, and related parts that were installed on 1963-1985 Avantis. Since these Avanti tanks are between 36 and 58 years old. They have become a source of reoccurring problems of getting clean fuel to the carburetor and/or a gas smell inside the Avanti. The rust and junk that has accumulated in these tanks over the last 36-58 years has been causing a lot of problems for the Avanti owner. In the last 15-20 years I have had a lot of gas tanks sent to me for reconditioning. The reconditioned gas tanks I sell are actually better than new, because they should never rust or leak again, and has a lifetime warranty against that occurring again.

This article may be some what lengthy, as I will give the history and about when the parts were superseded by a new part. I will show the illustration and part numbers for N.O.S. parts , along with the current prices. I will also show you the fast and easy way to change those parts on a individual basis or changing all of them at the same time. To the best of my memory, there have been at least 3 different fuel tank senders, Illustration #0307-20, installed from 1963-1985 2 different gas tank to fuel pump hose elbows, illust# 0308-8, three different gas tank filler neck hoses, illust# 0307-11, two different fuel tank sender gaskets illust# 0307-21 three different filler necks illust# 0307-9 and many different vents, and gas caps.

The 1963 -1985 Avanti gas tanks illust# 0307-1 in the parts manual were made of 20 gage steel with 2 baffles spot welded in 10" from each end. They were rated at approximately 21 gallons, according to the original blue prints, but I have always told my customers they were 19 gallons.

Studebaker and Avanti Motors engineering, never felt it was necessary to make them out of stainless or aluminum, as the location of the gas tanks was in a fiberglass compartment, above the rear axle and behind the back seat and this compartment should always be dry and away from elements of mother nature.



Studebaker drilled a large 1 3/4" hole in the floor pan in front to the gas tank just behind the rear seat back panel ill# 2160-119, I believe this large hole was to allow gas and/or fumes to escape to the outside of the car If the tank ever had a leak. This 1 3/4" hole was eliminated some time in the 1963 product run. This large hole can allow moisture to collect inside of that normally dry compartment.

If the rear window leaks because of an old or improperly made weatherseal, not N.O.S. like I sell, and or/the rear window was not installed properly with correct sealants, this allows water and moisture to collect, under the back seat bottom and in the trunk-which also allows water and moisture to collect inside the normally dry gas tank compartment.

I have personally tried almost all the different brands, on the market, of gas tank cleaning chemicals and sealers. They have all worked, but unfortunately have eventually all failed, because the sealers fail to stay adhered to the steel.

This is most likely because you can't clean and prepare the inside good enough for the sealer to get good adhesion, even if the tank is new (that's why you have to sand blast the steel). This just simply creates a much larger problem as now instead of rust and junk plugging the filter, you have now added the coating that is flaking off the



I have seen Avanti gas tanks that were severely rusted on the bottom, from setting in water between the bottom of the tank and fiberglass floor pan, from years of a leaky rear window.

Since the Avanti gas tanks are now 36-58 years old, rust , old gas residue and what ever else that has collected inside the tank is very difficult to remove, because of those 2 baffles.

If you study this picture, at the right, of a 1963-1985 Avanti gas tank, that I cut a large hole in the front. It clearly shows why it's almost impossible to clean the inside of an Avanti gas tank good enough to eliminate the rust, old dried up gas residue, and whatever that is being trapped in the fuel filter.



The unit sticking down from the top of the tank (you will not have this in your tank) it's a N.O.S. fuel gauge I installed for setting up the floats for correct calibration.

This picture is showing what the baffles look like inside of a 1963-1985 Avanti gas tank.

entire inside of that tank. Over 35 years ago, a system was developed that will permanently resolve any leaks or rust issues on a new or used or badly deteriorated fuel tank. It also stops any future rust problems inside or outside. I have been selling these reconditioned fuel tanks, for over 35 years, and never had a leak or rust problem reoccur.

To restore a (to better than new because it can't rust) fuel tank of any kind, any make or model, of any car or truck with or without baffles. Bird house holes are drilled in the tank. Then the gas tank is sand blasted inside and out. If rust holes are discovered, they are repaired and the drilled holes are welded up. liquid red pvc plastic is poured inside the sandblasted tank and rotated to completely coat the inside and then it's baked in an oven. The sand blasted outside, is then coated with black pvc and again baked

The gas tank is now like a ham sandwich, the bread is the pvc coating and the ham is the steel tank. The steel being completely coated inside and outside, it simply can't rust again, and it does come with a lifetime warranty.

Since the Avanti gas tank is hidden in a fiberglass compartment, completely out of sight, nobody will every know it's coated inside and out and won't hurt any kind of judging at shows for correctness.

I hear some complaints, of where Studebaker designers and engineers located the 1963-1985 Avanti gas tank. They state it's hard to fill the tank and not chip the paint and that as the fuel expands from temperature changes it can over flow in the quarter panel and damage the paint.

I think safety was the main driving reason Studebaker designers and /or engineers chose the location over the rear axle, behind the rear seat. This was not a new idea on Studebakers part, as Chevrolet located that gas tank on the 1953-1962 Corvette, behind the seats and in a fiberglass compartment below the convertible top.

Avanti's spare tire was located just like the 1953-1962 Corvette. Below a removable panel in the trunk. To support my safety thoughts I want to share with you some things that took place in the early 1980's

As a new and used car Avanti Dealership. I used to advertise the new and used Avantis in Hemmings Motor News and other places, this was before the internet. I received a letter from a law firm, wanting to purchase the rear half of a Studebaker Avanti or an Avanti II, which had to have the complete gas tank in the body.

I was both concerned, and puzzled by this letter and was unsure of what to do. I chose to call a very good friend for advice. I called Bob Lee at home, for you that my not recognize the name. He was one of the owners of Avanti Motors and was also one of their attorneys. I read him the

letter and asked his opinion on what to do. His thoughts were, that Ford Motor Company was at that time, being sued over the fuel tank and filler neck location on some of their automobiles. Which was at the very rear of the cars below and/ or part of , the trunk floor and the filler neck was located in the center of rear panel

The Avanti fuel tank was located over the rear axle for 20 plus years and probably would not have been affected by the same collision. The attorneys were probably trying to prove that technology of a safer location for a gas tank had been around for years. I chose to not get involved, and declined to sell them a rear half of an Avanti.

Again, in the early 1980's another Avanti gas tank story comes to mind. A gentleman that I know from a town about 10 miles away, purchased a 1963 Studebaker Avanti at an estate sale from another small community about 10 miles away. It didn't run and was a little rough. He stopped in my dealership to purchase some parts and told me he had just purchased it from an estate sale. A few weeks later he stopped back in and told me he sold the Avanti. He went on to say that he heard at a swap meet that there was a man from General Motors looking purchase an Avanti. It didn't need to be a running drivable car, it just had to be complete. He sold the Avanti to the GM proving grounds in Milford, Michigan, about 10 miles away. He asked what they were going to do with the Avanti. He was told that GM was going to use chains and deliberately roll the Avanti over to simulate a roll over accident to try to make the gas tank fail. He called back a couple weeks later and asked if they did their test on the Avanti. They said yes and the tank did not fail. He asked if he could purchase the Avanti back, and they said no.

To the best of my knowledge, the 1963-1976 Avanti gas tanks didn't have any problems. At that time, the rust was not any problem as the tanks were less than 15 years old. Problems with the gas tanks surfaced in the 1977 Avanti production run. I got a complaint, from a good customer of gas odor inside his new 1977 Avanti. I pulled the back seat and panel. The gas tank showed leakage on the bottom right hand side. I pulled a new gas tank, from my stock and sent Avanti Motors an invoice, as the car was under warranty. I returned the leaky tank to the factory. They sent me another gas tank for my inventory and sent me a check. Time went on, more and more Avantis were coming in with gas odors. With exactly the same problem. Now about a year and a half after I installed a new gas tank in that 1977 Avanti. It had the gas odor return. The Avanti was way out of warranty, by mileage and time. I called the factory about the problem

of being out of warranty with mileage and time. I was instructed to pull a new tank from my stock, install it and send them an invoice for labor and they would send me another new tank for inventory to replace the one I installed. This particular 1977 Avanti received a 3rd gas tank and it was way out of warranty, the factory took care of the bill yet again.

He finally traded it to me for a new 1984 Avanti. Avanti Motors was always unbelievably fair, with customers cars that were out of warranty by time and /or mileage for something that should not have happened. The Altman's truly knew how to take care of customers and their dealers.

I changed a lot of Avanti gas tanks from 1978-1985 all under warranty and the customer never had to pay for that service. What I discovered over those years, was that not all the gas tanks had leak problems, only some of them and just never know when they would leak on the 1977-1985 Avantis.

The gas odor would only surface just after you filled your tank. The next day you would have a gas smell inside the car. After you drove the car and consumed about half the gas in the tank, the odor was gone. What I figured out was when you filled up your tank, it created more pressure on the baffle spot welds, mostly on the bottom right (pass) side. As you used gas, the pressure was less and the leak mostly stopped. so if you have a gas odor in your Avanti (especially 1977-1985) part of the cause could be that bottom right hand side of the gas tank.

If you remove the back seat bottom, back seat back and the back seat gas tank panel (about 20-30 screws) and you see a dried up yellow residue (like dried up apple cider) on the fiberglass floor pan, under and around the gas tank, especially on the right (pass) side. The gas tank is leaking like I just described.

How To Change a 1963-1985 Avanti Gas Tank

1. Disconnect your battery
2. Remove the back seat bottom, just lift up & out.



#WLN Well Nuts (2 required) \$3.50 ea.

3. Remove the 2 bolts that hold the back seat back to the floor. If somebody has installed nuts & bolts this can be a problem, because it may take 2 people. One to turn the nut as the other holds the bolt. All 1963-1985 Avanti originally had a special rubber incased nut that pushed into the holes in the floor and expanded as you were tightening the bolt. If you don't have them I have them in stock @ \$3.50 ea.



4. Remove the screws that hold the back seat back panel ill# 2160-119 remove the panel.



1544868



1701339

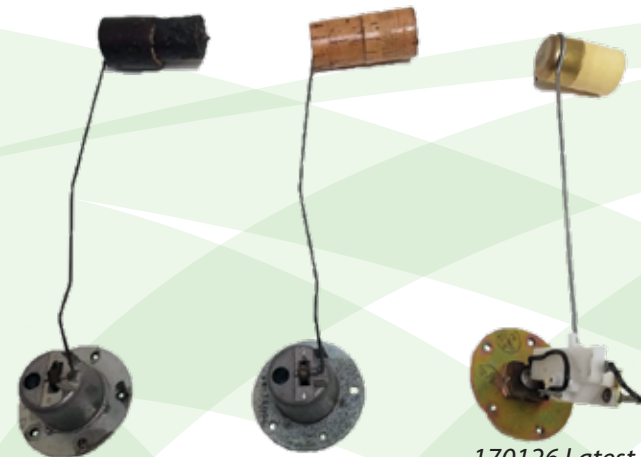
Or you can remove the 3/8" gas supply hose (coming from the bottom of the gas tank) from the fuel pump and connect a piece of 3/8" hose to that hose and place it in your gas cans.

5. Drain the gas tank, I pinch off the gas supply hose on the bottom of the tank, then I cut the hose and splice in a 6'-8' long piece of 3/8" gas hose. run it over to some gas cans. Release the pinched hose, after the gas was drained out. I remove the hose and then remove the elbow on the bottom of the tank ill#0308-8 part # 1544868 or 1701339. In 1973 Avanti Motors improved this elbow. They added a screen sock to the top. This new elbow was assigned part #1701339. The idea was it would stop any debris or small piece of solder from landing in the center of the elbow and stopping the flow of gas, and it worked extremely well.

Now install a 1/4" pipe plug in the hole, preferably one with a hex socket fitting, as they are flat. Instead of sticking down. They make it much easier to remove the tank from the compartment. Remove the wires that are connected to the sender, 18 gage, white is ground, 18 gage red with a black tracer goes to the gas sender insulated post. If you are removing the gas tank the sender can be removed after the tank is removed, but follow these instructions.



If you are only removing and replacing the gas sender. Take a felt tip pen and mark the front of the sender, while it's still in the tank, facing directly forward, towards the windshield.



1555957 NLA

1701026 NLA

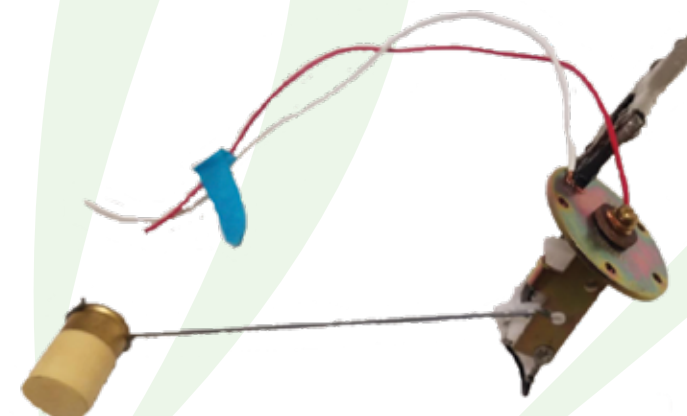
170126 Latest Style

These are the only style senders ever installed by Studebaker and Avanti Motors. Illustration #0307-20

If the sender you have does not look like the ones in the above picture. It is a reproduction like others sell.

The original Avanti gas sender from 1963-about 1985 used a cork bobber, they took 2- 1 1/4" diameter x 1 3/8" long corks, glued them together and then coated them with some type of sealer then attached them to the float rod. As time went on, the corks would start getting heavier as they started to take on liquid. That's normally why the gas gauge starts to become inaccurate, plus the electronics just wear out

The last style sender Avanti Motors installed is a lot different. It has totally different electronics and the bobber is no longer cork. It appears to be some type of Styrofoam.



If you are replacing the gas sender, I take the new sender and clamp the white 18 gage ground wire to the top and hold the red/black wire on the insulated screw head.

I have somebody connect the battery and turn on the ignition switch. I move the float up and watch the gauge to make sure it reads full and let it back down for an empty reading on the gauge. I want to know the sender and gauge are working properly before I install it in the tank. Then if it is not working after it's been installed, I will know something is screwed up.



This is a new Avanti gas tank that I cut a large hole in about 35 years ago. I installed a N.O.S. 1963-1973 chrome bezel fuel gauge part #1557110R and a N.O.S. 1974-1985 black bezel gauge part #1700893 in the top. I use this tank to adjust the float rod on the N.O.S. gas senders. I adjust the float rod so when the gauge needles is pointing to the empty mark, you will have about 3 gallons of gas left in your tank. Doing it this way it does limit where the full reading will be. In other words when you fill up your tank it will probably only read 7/8" full I personally like to know I have about 3 gallons of gas left in the tank. when it's on empty.

If you want your sender to read on the full mark, when full, I will set it up for that way, upon request. I have had customers call and state "I just installed your N.O.S. gas sender, filled the tank up and I only registers 7/8 full I reply, why do you have to know, that the tank is full? You just filled it up. I explain why I set it up that way, they normally laugh and say that's a very good idea.

Remove the 4 remaining #10 x 3/4" screws part#3228x1 and the remaining 4 special copper washer part # 187763



Lift up on the back of the sender as you rotate it up and out of the hole. Give yourself a small file mark on the old sender where you marked it with a felt tip pen. Transfer this file mark to the new sender with a file mark.



From inside the car, facing the fuel tank If you are holding the fuel sender in your right hand the bobber will be directly to your left 90 degrees away from the file mark This file mark will let you know for sure when the sender is in the tank all 5 holes will be lined up correctly for the 5 screws and washers. Blue arrow points to the bobber.

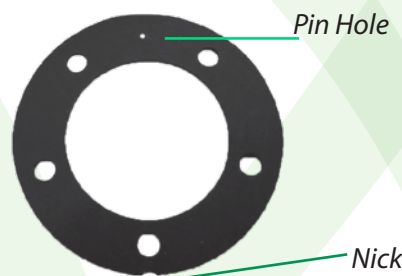


1556074

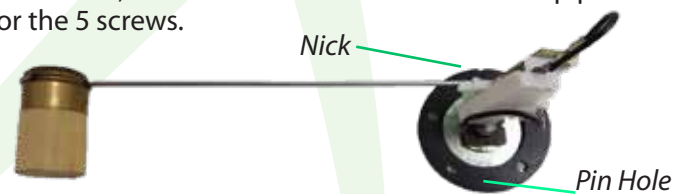


1701454
Neoprene

The original gas tank sender gasket illust#0307-21 part #1556074 was cork, I have them in stock \$1.00 ea. This was supersede by part # 1701454 in 1978 and was made out of neoprene for better sealing. It was installed dry. No added sealant was needed.



Avanti Motors also did something else that made life a little easier, if you study the new neoprene gasket # 1701454 (which I have in stock and are \$2.00) you will notice a very small hole in between 2 holes. This small location pin hole gets lined up opposite that file mark I had you install, that faces straight ahead, towards the windshield. I give myself a nick in the edge of the neoprene gasket as shown in picture, so when the sender is in the tank, the file mark and the nick is lined up perfect for the 5 screws.



If you don't understand or maybe slightly confused. Turn your new sender up side down and place the new gasket on the sender, keep turning the gasket to align the holes. You will discover that when the nick and file mark are aligned all 5 holes are perfect. You will also notice that one position they are almost lined up and the the 3 positions they are way off.

Some aftermarket or reproduction senders have gaskets with elongated holes for ease of installation. you will also notice that the #10 x 3/4" screws are quite snug in the new neoprene gaskets. This little tick helps seal out gas odors around the threads. Also take note that the 5 little washers are copper to also help seal out gas odors.



The filler neck hose should always be changed on preventative maintenance, for safety reasons. These filler neck hoses do deteriorate, crack and some turn almost into gelatin. Since all the gas you put in the tank has to pass through this hose and if it ever starts to leak you have big safety problem. The leaking gas will flow into the normally dry fiberglass compartment, then into the trunk. Then under the rear seat. Then onto the carpet. Now after putting gas in the tank you open the door and have a strong smell gas. Do you start the car? HELL NO, you disconnect the battery, now you purchase an N.O.S. filler neck hose and do a complete clean up and wish you would have purchased a N.O.S. filler neck hose from me before this happened!

To Change The Filler Neck Hose

Open your gas tank door. Remove the gas cap, mark 12:00 on the filler neck with a felt tip pen. Remove the 3 Phillips screws go inside the car remove the 2 hose clamps from the filler neck hose. Take a stanley razor knife and slice through the hose from top to bottom. Then peel the hose from the filler neck and gas tank. Remove the filler neck from the sail panel. Be very careful when removing it as the flange with the screws hole in it can chip the paint on the sail panel. Put a file mark on the filler neck, where 12:00 was that had the felt tip mark.

If you are going to remove the gas tank, then skip this next part, until the reconditioned tank is installed.

Clean up the pipe on the tank and the filler neck pipe. Spray some WD-40, inside the hose and on both pieces of pipe. Slide the hose on the tank. I always add 2 extra hose clamps two for the top and two for the bottom, just because the cost is minimal and it doesn't hurt a thing. Slide the clamps on the hose. Slide the hose on the tank. Install the filler neck back through the C pillar and let it rest against the hose. Go back inside and move the hose until it lines up with the neck. Go back to the outside and carefully push down and slightly twist the neck until it slides into the hose. Take a drift or scratch awl and line up the screw holes to 12:00 (file mark). Install the screws, and tighten up the clamps.



Remove the rubber hoses from the tank, on the later Avantis there is a tubing assembly on top of the tank. Remove the 2 line fittings and the 2 nuts that hold the support bracket. Remove this tubing assembly. remove the 2 nuts from the hold down strap bolts. Now the tank will slide out of the compartment.

When you remove the tank, you will see 2 foam pads, illust# 2130-22-1 one at each end of the fuel tank. They are called "anti rattle pads" they do help quiet down the tank.

Reverse the process to install. Before I install the back seat panel, illust# 2160-119 page #218 in the parts manual. I will fill the tank and go to a parking lot so I can do figure eight circles, to make sure I don't have any leaks.

For over 58 years the 20 gage steel that Studebaker engineering, chose to manufacture the tanks from has proved it's safety and reliability. The only problems were rust on the inside from neglect and possibly rust on the outside from a leaky rear window seal. The 1977-1985 leaky gas tanks were caused by too much spot weld heat and/or the heat was left on too long on the bottom, mostly right side baffle. As the gas sloshed from side to side, around the baffles, the spot welds would crack and allow the leak I described. Avanti Motors did not manufacture their gas tanks. They

were manufactured by an outside manufacturer. If the only 2 problems (spot weld leaks and rust) that the 1963-1985 Avanti gas tanks have ever had are corrected, by coating the inside and the outside with liquid PVC plastic on sandblasted steel and you know the tank will fit because it is the one you removed or it's a correct one for your year Avanti that we supplied. Why would you chose a different material like aluminum or stainless steel that wasn't made from the original blue print specifications. They also don't have the safety track record of 36-58 years that the original steel gas tank has.



The cost to recondition your tank is about \$525.00 plus shipping. Call for pricing on other makes and models of fuel tank. they can do all makes and sizes.

**all prices subject to change without notice*