

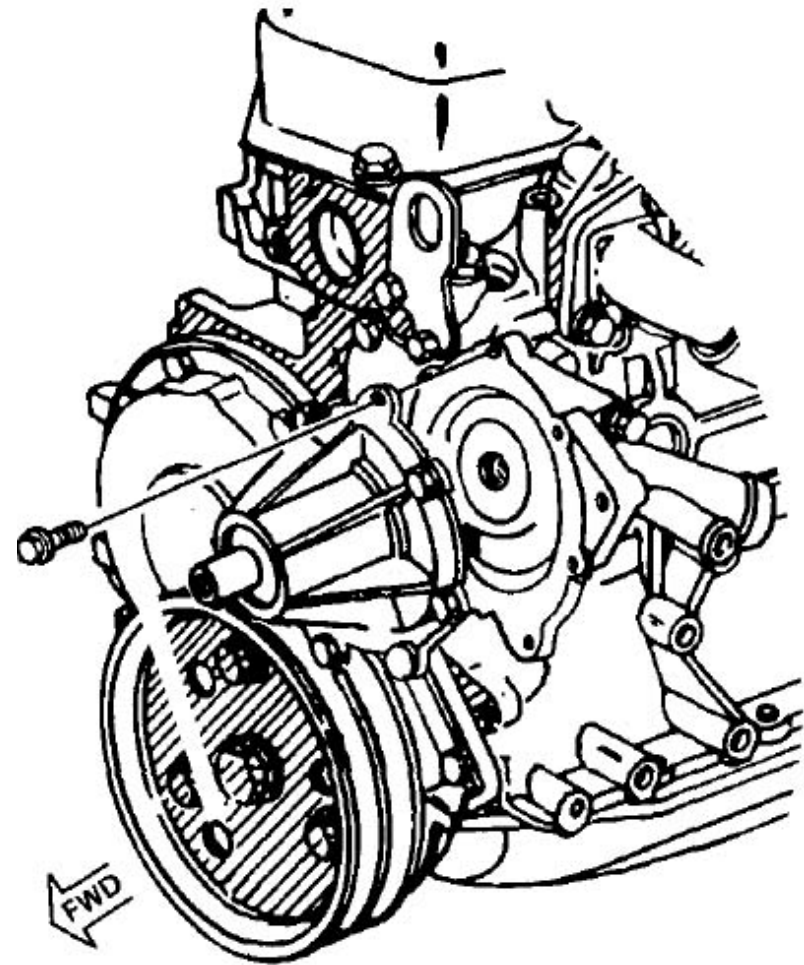
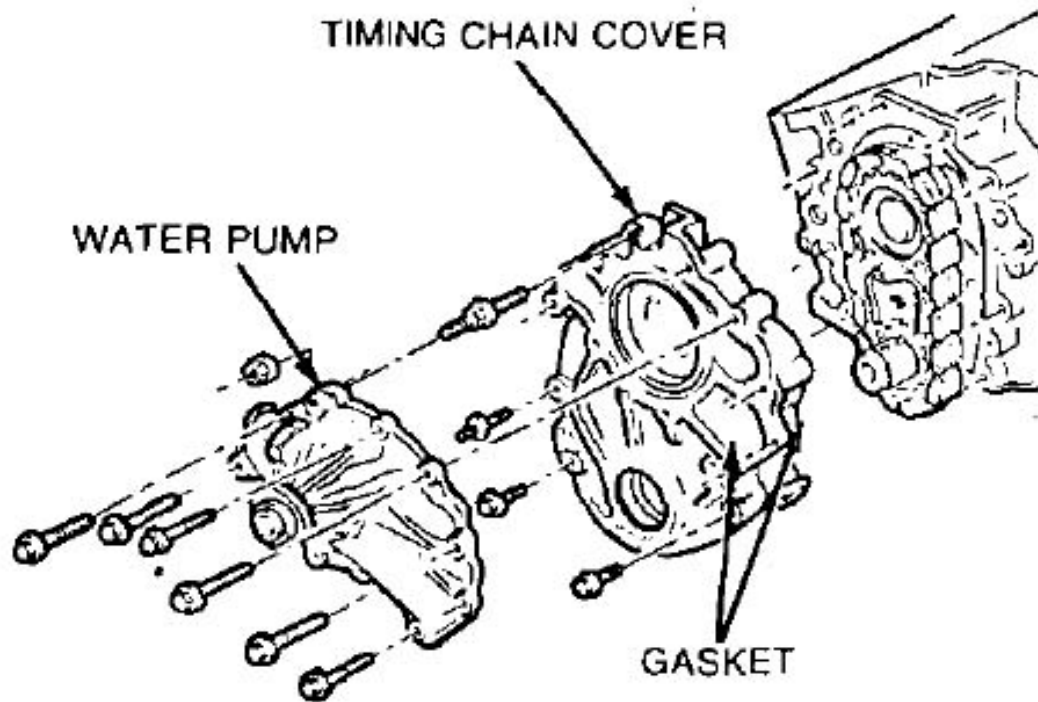


# Cooling Systems

Water Pump Change and System Filling

# Changing the Water Pump

Locations: 2.8L 2.5L



# Water Pump Warnings

Always drain the system first.

- **WARNING! NEVER OPEN A HOT COOLING SYSTEM!** Scalding hot water can and often will shoot several feet if you do this.
- **WARNING!** Ethylene Glycol antifreeze is **POISON!** **DO NOT** ingest or inhale it. Ethylene Glycol can cause kidney damage and death. If the cooling system has a leak that is producing a cloud of mist or steam leave the area until it dissipates.
- **NEVER** dump coolant into septic systems or cesspools! The coolant can contaminate the entire system to the point it will have to be replaced.

# Water Pump Caution

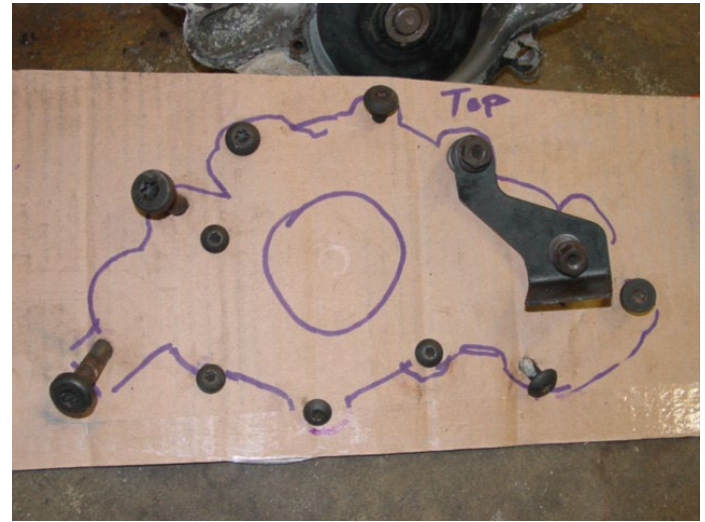
- Some new water pumps use plastic impellers.  
**DO NOT USE THEM.**
- They will slip or crack in a short amount of time.
- Only use pumps with metal impellers.



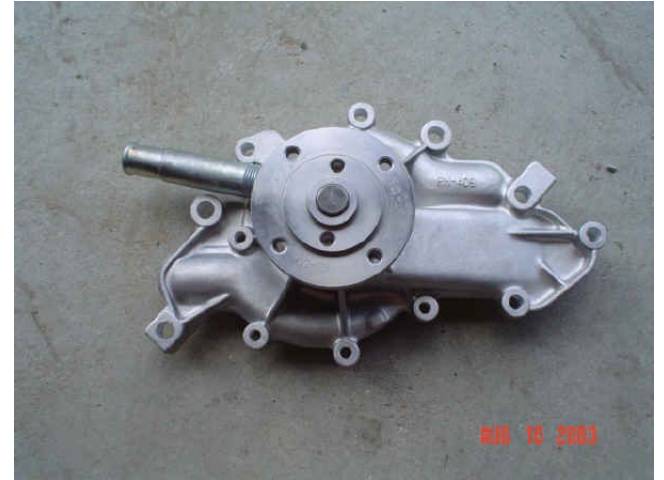


# Water Pump Notes

- When removing bolts, Keep them organized since there are different sizes used. (V-6 pumps)
- Make sure gasket surfaces are clean and dry before attaching gasket.
- Use a quality sealer.



# Water Pumps



# Upgrade Note

The V-6 water pumps use TORX style bolts to attach the water pump to the timing cover housing. One thing that can be done is to replace the various size bolts with metric stainless steel hex head bolts.

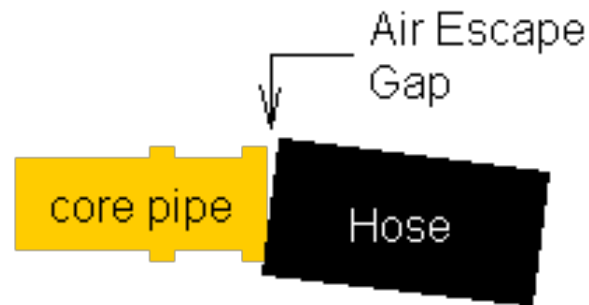


# Filling and Burping of the Cooling System.

- This method is longer than the ones most people use. It was developed by “Ogre” on Pennock’s Fiero Forum based on filling many other systems and the special needs of Fiero. It takes longer to do this way but it solves several issues all at once. While it can be used during any fill, this procedure was developed for filling dry systems or systems where the heater core has been worked on.
- Raise the rear of the car slightly either on jack stands or pointed down a sloped driveway.
- Remove the front and rear filling caps. Pull the thermostat out.
- Pour premixed coolant into the rear cap until the radiator is full. ((Filling from the back helps push air bubbles out of the coolant pipes under the car.))
- Cap the radiator when it is full.
- Fill the coolant tank to the “add” mark with the same mix you are using in the rest of the system. Remember the tank says check hot... We want to leave room in there for coolant to expand out of the radiator.



- Here's where most procedures being used leave out an important item. Air bleeding the heater core. If this isn't done you might never get all the air out of it and that will reduce its heating capacity considerably. It's also a likely cause of people having a hard time getting all the air out the thermostat cap. The heater core and hoses can trap allot of air.
- This part is allot easier with 2 people. If you're by yourself fill the back then vent the heater. If you are starting from dry then you may need to go back and forth a couple times.
- Carefully move the top hose clamp out of your way and loosen the hose. Don't pull on the hose. If it is stuck make a hook from some thin rod or bar stock and work it under the hose to loosen it. Pulling or twisting on the hose can crack the solder joints at the heater core tank.
- Once the hose is loose work it slowly off the core tubing to let the air out of the system. If need be add coolant to the back until the heater fills. Try to hold the hose as shown below. You want to keep the opening as small as you can to eliminate as much air as possible without spilling coolant all over the place.
- When the air is gone put the hose back and clamp it in place.
- This will eliminate the vast majority of air from the heater core and its plumbing. It should make heater core replacement and filling the system from dry allot less of a headache.



Viewed from side

- Now we're back to filling in the rear. This varies a bit from person to person just what the best method is. Here's what I do on mine. Don't forget to keep checking the recovery tank. If you let it run low air will be pulled into the radiator when the system cools.
- Fill the engine until you reach the top of the hose connected to the thermostat housing.
- Start the car and let it run with the thermostat cap off. This will burp out the big air bubbles.
- Pour in more coolant mix if the level drops below the top of the hose.
- Once the engine stops spitting up air put the cap on.
- Run the car to normal operating temp. This will happen fairly quickly unless the fan is on.
- Let it run a few minutes. Keep an eye on the temperature to make sure you don't over heat. If you have an ECM scanner hook it up for this. Watch the coolant sensor. If it warms up then drops, or fails to warm up, shut off the car. You likely have a big air bubble in the thermostat neck. (This shouldn't happen but it's something to watch out for. Gives you one more thing to use your scanner for.)
- Shut it off and let it cool.
- Open only the rear cap to check the system and top it off.
- Install the thermostat now and cap the system.
- Run the car to operating temp
- Check the overflow tank. Fill it to the full line.
- Shut off and let it cool.
- Check the level in the engine again. It should not need more than a little bit if any.
- Some air will always be trapped in the radiator. This is normal for side tank radiators. Most of it will work itself out through the coolant recovery tank. It is critical the recovery tank is never allowed to run low on coolant. If it gets too low air can be pulled into the radiator. Not a good thing.

# Radiator Cap Info

- **Warning!** There is an error in Stant listings, which means all catalogs listing Stant parts share the same error. The correct caps for Fiero are Stant part numbers 11230 or 10230 non-vented caps.
- You want to use a 15-16psi cap as recommended by OE specs
- Radiator Cap Part Numbers:

AC Delco: RC27

GM : 10409635

- Thermostat Cap Part Numbers:

AC Delco: RC40

GM: 6410941

# Vented vs. Non Vented

- The Stant xx231 cap is what everyone has been calling a "vented" cap. The xx230 is what has been called a "non-vented" cap. The difference is the check valve, that dime size metal disk on the cap. On the vented cap, the check valve is simply hanging loose. On the non-vented cap, the valve has a small spring holding it tight to the seal.
- *The two caps are identical in all other ways.* In fact on cars with DEX-COOL, GM recommends all vented caps be replaced with non-vented. (In that case it is intended to help reduce coolant contamination...)
- **A bit of background**
- In the Fiero cooling system, the radiator and more importantly it's filler neck, are not the highest point in the system. Some coolant in the engine is above the radiator neck. Exactly how much coolant is above that level depends on which engine is involved.
- When the system is cool, this layout creates a slight vacuum in the engine. In a perfect system this isn't a problem but what happens when there is a microscopic air leak or the rear of the car is jacked?
- The problem with the vented cap is that if there is even a tiny air leak in the system then coolant can drain through the cap and out the overflow line to the reserve tank. This happens because the flow rate is too slow to push the check valve shut.
- If the cooling system were perfectly sealed then this wouldn't be much of an issue. In reality there is often some tiny spot that leaks air even if no coolant is getting by. The reason this problem usually doesn't show up when you open the thermostat housing is that the sudden flow pushes the check valve of a vented cap shut and holds it there. The problem will only show up under a slow leak condition.
- When the car is tipped nose down, we add another issue. Coolant is heavy and wants to run down hill. This increases the vacuum back in the engine. Even if the cooling system is perfect with no leaks to let in air, we run into a design problem with the water pump seal.
- The water pump seal is designed mainly to keep pressure in the system. It's often not designed to deal with the amount of vacuum that the Fiero cooling system can develop when it pointing nose down. Air is literally sucked past the pump seal by the coolant running down hill. Again, we have a slow flow of coolant, so the vented cap check valve may not close when this happens.
- The non-vented cap prevents this simply because it has a sprung check valve. All the shifting coolant can do is push it tighter against the seal.



# Questions and Comments

