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### How to Remove and Clean your Radiator

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This tech paper will discuss the removal, exterior cleaning, and installation of the radiator on a 1985 L98 C4 Corvette. Other years are very similar in procedure, and utilize the same overall technique.

#### Overview

C4 Corvettes seem to have chronic overheating/run hot problems, especially after about 100,000 miles.

The radiator on a C4 'Vette is an aluminum and plastic, single-row unit. It is remarkably small and light, and looking at it, you just know that it can't possibly be big enough to handle the cooling for a high performance, V8 engine...

The design of this compact radiator is right out of state-of-the-art NASCAR radiator designs: Every single little fin in the radiator is a multi-piece, serrated fin – not a solid fin like on the old “heavy duty 4-row” radiators in our old Musclecars. This makes the 'Vette radiator highly efficient, and allows the use of a very small radiator.

But this small, efficient design is also extremely sensitive to anything that changes its efficiency. Anything that slightly reduces airflow, or which restricts the frontal surface area, will dramatically reduce its cooling ability, causing your 'Vette to run hot. You can change the thermostat, flush the cooling system, change your “fan-on” settings, replace your waterpump, and tear your hair out, and your 'Vette will still run hot if the radiator has this one, eensie, weensie little problem....

The radiator in your C4 is shrouded together with the A/C condenser. The Condenser is in the front (clearly visible from the front, underneath side of the car), and the Radiator is in back. Only the back surface of your radiator is visible or accessible – there is no access, even visually, to the front surface of your radiator. The plenum that is created between the condenser and the radiator is a low-velocity air flow area. This area will become the resting place for every single dead leaf, hot dog wrapper, grass, and hairy varmint that your car has ever made contact with. How all this stuff gets in there is one of those mysteries that nobody can explain. After 100,000-or-so miles, the front surface of your radiator will be packed with grass, leaves, oil, dirt, grime, rodent hair and other things that I have yet to be able to identify. You can blow a garden hose through from the back side, but it will not clear out the front surface of your radiator, and you do not know that it has happened (since you cannot see it).

If you want your 100,000-mile (and often less) 'Vette to run 20 degrees cooler, you have to pull the radiator and clean all this garbage out of the plenum and out of the front surface of the radiator. This should be a mandatory service process for every high-mileage, hot-running C4.

## Tools and Equipment Required

As a minimum, you will need the following tools:

1. Long & short flatbladed screwdrivers. One really small one.
2. 10mm socket with long extensions and a 3/8" drive ratchet
3. 14mm 3/8" drive socket
4. 7mm socket with 1/4" drive ratchet and extensions
5. 9/16" Flare Nut ("Lion") wrench
6. Soft, long-haired, nylon brush
7. Antifreeze
8. Dish Soap or K&N Air Filter Cleaner

## Procedure

Pulling the radiator on a C4 is remarkably simple. Nothing at all like the C3 boys have to go through. You can do this in about 15 minutes:

- Drain the radiator. I do this simply by pulling the lower radiator hose off at the radiator.
- Pull the upper radiator hose off at the radiator.
- Remove the overflow hose from the radiator.
- Remove your Mass Airflow Sensor (MAF) with its duct. Be careful disconnecting the electrical connector so as not to damage the wires or the connector.
- Remove your air cleaner and the air cleaner plenum from the top of the radiator shroud. The two plastic hand-nuts that hold the plenum to the shroud will often times not come off. This is because the studs on the back side are spinning. You can keep the studs from spinning by jamming a screwdriver between the plenum and the shroud, up against the studs. To fix this, here is a tech tip I received from "LWesthaver" (Wes) on the CorvetteForum: "Lars, I just faced this problem last week. Since I had never seen the underside of my plenum I didn't know how it was attached to the shroud. Finally, after figuring out how to remove the thing, I started looking for a fix. I ended up drilling a 1/8" hole through the studs' metal tangs and the shroud. Once the studs were re-installed into the shroud's key-hole opening, I pop-riveted the tangs to the shroud. No more spinning studs! And it even looks like something the factory might have done." Great tip, Wes. Thanks!
- Remove the 2 10mm screws that attach the A/C receiver/drier bottle to the frame crossover.
- Remove the 2 10mm screws that attach the A/C receiver/drier bottle to the fan shroud (using your long extensions).
- On some years, you may need to remove 2 10mm screws and loosen a 3<sup>rd</sup> 10mm screw attaching the Power Steering Reservoir and rotate the reservoir out of the way.
- Remove the rest of the 10mm screws attaching the upper fan shroud to the lower fan shroud.
- Remove the 7mm screws running along the front edge of the upper shroud.
- Remove the upper & lower transmission cooling lines using your flare nut wrench. Place a drain pan under the area to catch the few drips that will be lost (you won't lose much fluid).  
Tech Tip from Forum Member Todd Powell: On later year cars, the tranny cooling lines can be accessed easier if you remove the right front wheel. This also makes it easier to re-install the tranny lines.
- Remove the bolts attaching the fan assembly to the upper shroud.
- Remove the upper shroud.
- Carefully pull the radiator straight up, taking care not to bump the fin surfaces against the cooling fan assembly or anything else.
- Take a look at all the debris inside the plenum and all the crap on the front surface of your radiator. Be aghast.

The first thing you want to do is to scoop all the garbage out of the plenum. Once you've scooped it out with your hands, take a garden hose and blow it out good.

Your radiator needs some care. The fins are EXTREMELY fragile – much more so than on the old type of radiators. First, lay your radiator face down on the ground and blast the big chunks out of it with your garden hose. Now, pick the debris out of it that didn't get blasted out by the hose.

Next, spray the entire face of the radiator down good with K&N Filter Cleaner, or dilute some dish soap into a spray bottle and douse the radiator down good. The front face is most likely covered in grease, grime, and unidentifiable road dirt. Taking EXTREME care, gently brush the front face of the radiator with your soft nylon brush. DO NOT brush from side to side; brush only up and down (you know – like the dentist told you to brush your teeth when you were a kid). If you brush from side to side, even with your soft brush, you will fold the fins right over. Once you have brushed the cleaner or soapy solution into the front face, removing all of the oily, greasy crap and build-up, blast the entire unit off really good with the garden hose again.

Next, sit down on your front steps with a cooler full of beer beside you, place the radiator on your lap, and straighten every one of the bent, folded-over, damaged fins on both sides of the radiator using a very small, flat bladed screwdriver. If you have a lot of damaged fins, this will take some time, but it's the only way to get your radiator up to its intended level of efficiency.

Once you have cleaned and repaired your radiator in this manner, install it back in the car by reversing the above steps. Fill it up with new antifreeze, check your transmission fluid level, and enjoy a 'Vette that will often run as much as 20 degrees cooler than it did before.

## **Questions, Comments & Technical Assistance**

If you have questions or comments regarding this article, or if you notice any errors that need to be corrected (which is quite possible since I'm writing this from memory...), please feel free to drop me an e-mail. Also, if you need any technical assistance or advice regarding this process, or other maintenance issues, feel free to contact me:

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