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File Server: 3C
Printing Plant: Quebecor World Lebanon
Final Output Resolution: 2540 dpi

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Kodak Approval Specs: 133KPMS on Northwest Gloss White stock

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DeWitt's C5 aluminum radiator upgrade



by Cliff Gaines
photos courtesy of DeWitt's

Late-model Corvettes were designed by GM to run hotter than previous years to meet stiffer emissions standards. While factory controls were made to maintain the engine temperature at levels of 200-230 degrees, many owners are alarmed by these temperature levels.

However, there's nothing wrong with running at the temperatures GM intended. Many people have tried low-cost tricks to knock down the heat, such as modified control chips to make the fans come on earlier or a lower thermostat. But in the end, it's the radiator that has to do the job.

The aluminum radiator was first used in Corvettes in 1960. The radiator was a "plate type," and the flow path was 3 inches wide. The core measured 17 inches high by 22.5 inches long. By comparison, the C5 model uses a single 1-inch-wide cooling tube and the core is 18.5

inches high by 24.7 inches long.

With C5 Corvettes pushing similar horsepower levels as the musclecars of the '60s, why the big difference in cooling capacity? One reason is the introduction of electric fans. Over the years, it became obvious that engine-driven fans made no sense because when you need air the most (idle or traffic), they provide the least. With electric fans, you can sit at a traffic light and the radiator thinks you're going 60 mph. So when you combine the benefits of electric fans with the higher-temperature design, a smaller radiator does the trick—until you add something. Adding aftermarket performance pieces creates additional stress and heat on the engine, which the factory cooling system may or

may not be able to handle.

The stock radiator features a single-row aluminum core. The end tanks are plastic and held in place with crimp tabs. A rubber gasket is used to seal the core to the tank. The most common failures in late-model Corvette radiators are gasket leaks or cracks in the plastic tank. They are designed to be readily replaceable.

Two-row aftermarket aluminum radiators double the factory cooling capacity. They also have aluminum end tanks, which eliminate the common problem with cracking plastic end tanks on the original units. The tanks are TIG-welded in place for a permanent seal. So if this sounds like something you want to do, here's what's involved in installing one.

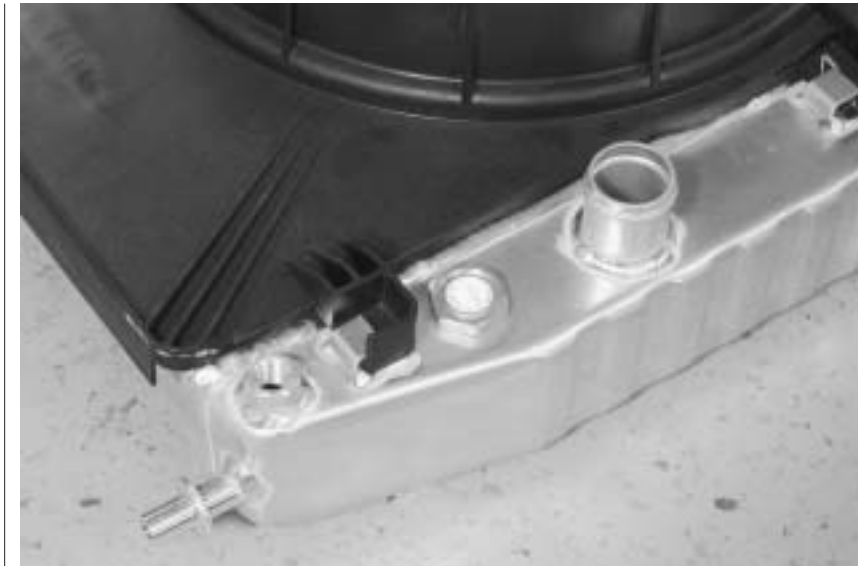
The project car is an '00 Corvette with manual transmission. A car lift would make the job a little easier as the installation requires many trips over and under the car.

The first thing you want to do is drain the system. The drain plug is a unique assembly built into the plastic end tank on the passenger side. This drain, a white plastic knob, has a ¼-inch square "key" hole. A simple ¼-inch ratchet extension works great for opening this valve. If the coolant is new, you can save all the fluid by using a clean drain pan. The new radiator requires exactly one additional gallon of coolant, which you can purchase in premixed (50/50) form. Make sure you select a brand that's compatible with the GM Dex-Cool type coolant.

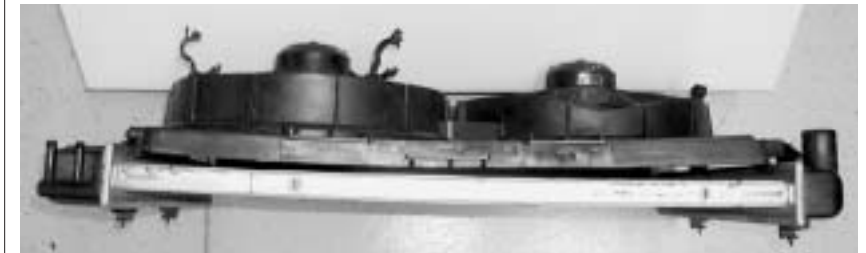
The next step is to remove the air-cleaner duct and all attached electrical sensors. The two straps that hold the air cleaner in place wrap around the plastic housing and hook onto the underside of the duct system. If these straps become unhooked, it's difficult to get them reattached. When you flip the strap handles open, keep some tension on the straps to keep them from sliding forward and becoming unhooked underneath. Tie them down with something so you don't accidentally bump them forward.

The wire harness is attached to the fan housing and it must be removed. The problem is, the harness retainers are designed only to close, not reopen. They open with needle-nose pliers and a lot of twisting. The leads going to the two fans have plugs at each end. The plug ends have a typical electric retaining lock that must be released before the plug comes off. It's easier to get to these from under the car. Once you have all the harness clips open and the fans unplugged, the harness is free to move.

Next disconnect the radiator inlet and outlet hoses from the radiator. The clamps are spring-type steel, and a good pair of channel-lock pliers works on them. We replaced them with the standard worm-gear type because they're easier to install, especially on the lower outlet.



The lower right mount must be pulled straight up to exit the retaining clip.



Here you can see just how thin the factory radiator is. The gap between the radiator and fan makes this conversion possible. Since the fans have no room to move backward without hitting the engine, the new, thicker radiator uses all this extra space.

You'll need every inch of working space to pull out the fans. With two or three plastic tie wraps, temporarily fasten the harness to the engine (you pick the attachment points). You can also fold the lower radiator hose up to the engine and attach it to something or just remove it completely.

Our project car had a manual transmission and we didn't have to deal with transmission cooling lines. Obviously, these lines would have to be disconnected. There are two types of cooling lines on C5s. The '97-'01 models use a typical ¾-inch inverted flare connection. The '02-'04 models have a unique, metric, quick-disconnect fitting that has to be converted, as most aftermarket radiators don't offer this connection.

Now remove the electric fans. The fan shroud is attached to the radiator in four places by a plastic clip molded into the end tanks. Pull up the housing on the passenger side first to exit

these clips. Then continue to raise the right side while turning the assembly counterclockwise. Once the assembly is turned about 90 degrees from the original position, it can be moved to the passenger side and lifted out. Remember this procedure because it's going to go back the same way.

Once the fans are removed, the next task is to get the radiator out. The goal is to pull the radiator and leave the evaporator in place. Do not open the air-conditioning lines and discharge the system. One of the A/C lines is supported by a molded plastic hook on the lower right side of the radiator. You should be able to fish this line out of the hook without bending or breaking any seal. If the radiator is going to be scrapped, this piece could also be broken off; but, either way, the line must be disconnected before the radiator can be lifted out.

Twice As Ice



We applied a piece of masking tape to illustrate the shroud area that has to be trimmed out.



This photo shows how the notch fits over the larger core.

Next separate the radiator from the A/C evaporator. This unit attaches to the radiator on the front side just like the fans did to the rear. The A/C unit needs to be pulled up enough to disengage from the retainers. The problem is, as soon as you let it go, it drops right back into the slots. Use two strips of old wood molding to keep the A/C unit separated from the radiator. Now you should be able to lift the radiator straight up and out of the vehicle.

The new radiator features step-down tabs to allow the larger core to

fit into the same mounts as the smaller radiator. Each side of the radiator includes metal clips for mounting the fans and the A/C unit. Both upper corners of the fan housing need to have two small pieces of plastic removed so the fans sit inside the core end tanks. It's a good idea to test-fit the fan housing to the new radiator outside the car, just in case the metal clips have closed up or something else doesn't line up just right. It's a lot easier to see what's going on and/or make an adjustment when it's on the table.

Now you can install the new radiator, using the same stock lower cushions. The left side is a rubber-molded pad and the right is a round donut shape. Make sure the radiator is sitting correctly in these cushions. Pull out the wood strips and lift the A/C unit high enough to clear the mounting clips. Then apply some pressure on the A/C unit while sliding back into the mounts. This is easier with two people, as it's difficult to monitor all four slips at the same time.

Now reinstall the fans in the exact reverse procedure they came out. Remember, the housing will be turned up high on the passenger side and twisted down as you work it into place. It's tight, but it will go. It's clear sailing from this point on. Those nasty wire harness clips you had to fight with to open are pretty easy to reuse. Use the worm-gear-type hose clamps, as it's much easier to work with a screwdriver in tight places. Trying to get a pair of channel locks at the lower connection is almost impossible. Replace the upper radiator-support housing and reinstall all of the air intake ducts, air cleaner, and monitoring sensors.

If you were able to capture all of the drained fluid, pour it back into the system and add one premixed gallon of coolant. Make sure to recheck this level after the system has been tested. You have now doubled your cooling-system capacity and should be running much cooler. Consider investing in a reprogrammed computer chip to instruct the engine to run at a lower temperature. It is not recommend to run lower than 180 degrees, as this promotes excessive engine wear.

CF

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