

Even Flow Cooling Kit (2nd Generation)

03-04 Mach 1 and 99-01 Cobra

Description and Operation

The Even Flow Cooling kit consists of a precision machined Aluminum fitting, a custom made Aluminum coolant "T" which is installed into the upper radiator hose, and ½ inch heater hose, with adapters to connect the two. The Aluminum fitting is installed in the rear coolant jacket of the driver's side cylinder head. This fitting allows hot coolant to circulate from the driver's side rear head directly to the upper radiator hose for circulation through the radiator once the thermostat has opened. This coolant jacket is located directly behind the last intake manifold runner on the driver's side and has a freeze out plug installed from the factory.

The stock cooling system on Cobras and Mach 1's, along with other 4.6 DOHC applications, has no provisions for the hot coolant to escape from the rear of the driver's side head. This creates potential hot spots/steam pockets in and around the rear 2 cylinders (#7) as the heated coolant tries to make its way back to the front of the cylinder head toward the radiator. By creating a direct path back to the radiator, coolant flow in this area is increased. Additionally, this system allows the passenger side coolant flow through the heater core to remain factory stock, with the exception of increased flow via removing part of the coolant flow restrictor contained within the inlet hose to the heater core.

Once the modification is installed **both** cylinder heads will be flowing coolant through a restriction averaging **.350**, thus maintaining equal coolant flow through both heads

CAUTION/DISCLAIMER

THE END USER BEARS ALL RESPONSIBILITY FOR PROPER INSTALLATION.

To properly install the fitting the freeze out plug is removed and the aluminum fitting with an O-ring seal takes its place. The bore where the freeze out plug was removed from **MUST** be free of old sealer, grease, dirt, and any scoring which may prevent the O-Ring from sealing. The O-Ring AND the bore should be lubricated prior to installation.

EVEN FLOW COOLING KIT INSTALLATION

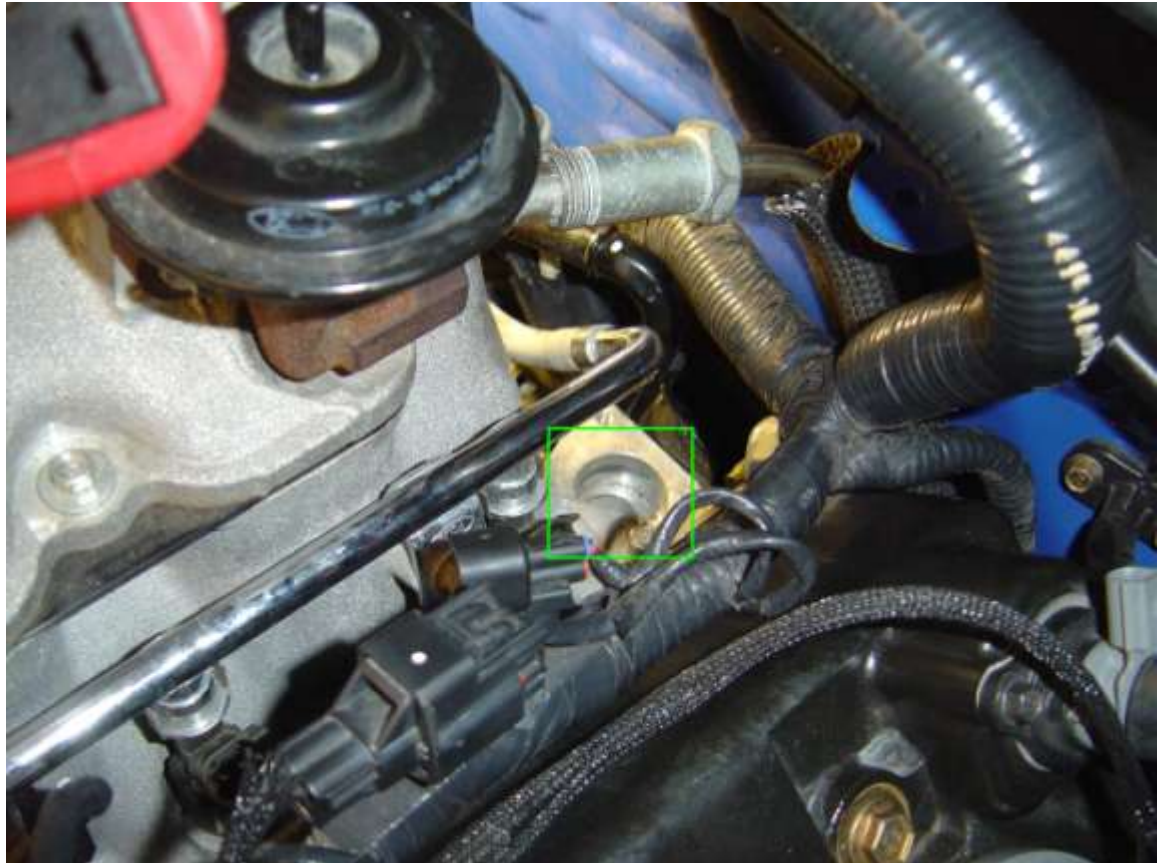
- 1) With the engine cool, pinch the top radiator hose to determine if there is any substantial pressure in the cooling system. Carefully remove the pressure cap for the coolant bottle.
- 2) Drain the cooling system by removing the petcock from the radiator, located on the passenger side at the bottom of the radiator.
- 3) Remove the Shaker assembly (Mach 1 only).
- 4) Determine the location where the coolant "T" will be installed in the upper radiator hose. This area will usually be in the middle section of the upper radiator hose, directly in front of the passenger side valve cover. See Figure A.



Cut the hose at this section and remove approximately 1.5 inches of the hose. Install the coolant “T” with the supplied clamps. The ½” barbed fitting on the coolant “T” should point towards the valve cover. Leave clamps loose until final tightening.

- 5) The following components will be the main items that will need to be moved in order to access the area we will be working in:
 - EGR tube
 - Main wiring harness that runs along the back of the intake just under the rear part of the fuel rail
 - PCV valve and associated vacuum lines
 - Some vacuum lines that run at the rear part of the intake
 - EGR pressure feedback sensor
- 6) Disconnect the EGR tube from the EGR valve at the back of the intake.
- 7) Jack up the front of the vehicle and secure with safety stands. Disconnect the EGR tube from the driver side exhaust manifold or header. This will require an open end 1 1/16 wrench. This will allow the tube to be positioned out of the way while working in the engine compartment. It is NOT necessary to completely remove the tube from the vehicle.
- 8) Remove the EGR pressure feedback sensor. This sensor is attached to the rear of the manifold next to the EGR valve. The sensor has an electrical connector and two smaller hoses attached to it.
- 9) Remove any vacuum lines that may pass over the freeze out plug location at the rear of the driver’s cylinder head. This may include the PCV valve and hose connections.
- 10) In order to gain some slack in the main wiring harness that runs behind the intake, unhook the plastic clips that attach the fuel injector harnesses to the valve cover studs. You may also want to disconnect the injector harness from the injector on the driver’s side and the cam sensor that runs to the front of the timing cover. This will give you some slack in the harness and allow for re-positioning.

- 11) The main wiring harness which runs along the back of the lower intake manifold may also have a white plastic “ribbed” clip that holds the harness down against the lower intake. Grab the harness and pull straight up while wiggling back and forth. This should pull the clip out of the lower intake giving additional slack.
- 12) Remove the spring clamp from the passenger side hose that runs from the heater core down to the cylinder head. Remove the spring clamp from the other heater hose that runs from the heater core to the steel return line that runs under the intake. Disconnect both hoses from the heater core by squeezing the plastic clips at the heater core connection and pulling the hose straight off.
- 13) Once the heater core hoses are off, you may want to trim the stud that holds the A/C accumulator to the firewall. This stud runs very close to the heater hose and has been reported to rub through over time. This stud **SHOULD** have a rubber cap on it from the factory.
- 14) Pull back the nylon braiding on the heater core inlet hose. This hose is the larger diameter of the two. As you look under the braiding, you will see a crimp-style clamp just before the major bend in the hose. This keeps the Ford coolant restrictor in place. Note the location of this clamp as it will be re-used. Using two small pocket screwdrivers, pry inside the crimp and open it up enough to slide the clamp off the hose. Use a pair of pliers with a rag over them and carefully squeeze the hose above the restrictor, which can be seen inside the hose. If you squeeze just above the restrictor you can gradually move it down the hose and it can be removed. Another option is to use a coat hanger, form a small hook at the end, and try to remove the inner restrictor, which is consistent with a rubber washer. It may pull right out of the hose. See figure B.



- 15) If you take the entire restrictor out, the restrictor will come apart. Remove the inner restrictor(rubber washer) from the assembly. The outer restrictor can then be reinstalled into the hose and the clamp re-crimped gently with a pair of wire cutting pliers.
- 16) Now we are ready to tackle the driver's side head. On the driver's head just in back of the rear intake runner you will see the freeze out plug that seals the coolant jacket. Using a flat blade screwdriver or a long **BLUNT TIPPED** punch, remove the freeze out plug by tapping the **PLUG** off-center. This will cause the plug to rotate in the bore and it can then be grabbed with set of

- pliers and removed. It may be necessary to use a small thin blade screwdriver to assist the plug in turning enough to get a grip with the set of pliers. **CAUTION:** DO NOT STRIKE THE CYLINDER HEAD OR THE VERY END OF THE PLUG, POSSIBLY NICKING THE BORE.
- *** In the event the freeze out plug refuses to rotate in the bore OR the freeze out plug tends to move further down into the bore, refer to our website at www.evenflowcooling.com in the troubleshooting section. You will find very detailed pictures and information on removing a stubborn freeze out plug.*****
- 17) Once the plug is removed feel inside the bore for any remaining sealant or burrs from the plug removal. Using 220-320 grit sandpaper, lightly sand the inside of the bore to remove any nicks, burrs, or sealant. This action also prepares the surface. A rag with some brake cleaner will remove any contaminants. See figure C.



- 18) Lubricate the bore with petroleum jelly.
- 19) Assemble the brass barbed fitting and the aluminum fitting, using Teflon tape on the threads. A snug tightening will suffice. Do not over tighten. Place the supplied O-Ring on the bottom groove of the aluminum fitting and lubricate with petroleum jelly. Place the supplied blue silicone hose over the barbed fitting and secure with a hose clamp. This is how the assembly should be installed in the cylinder head. Make a note of how the hose clamp will be located once in place in order to have adequate access to tighten the clamp.
- 20) Before installing the aluminum fitting, test fit the retainer plate at the cylinder head. The retaining plate will require a slight trimming with a grinder or a file to clear the metal heater return tube that is bolted to the rear of the cylinder head and runs under the lower intake. Trim retaining plate as necessary to fit.
- 21) Install the aluminum fitting assembly by pressing straight down into the bore with a slight turning motion. The O-ring will pass down into the head and the second machined groove in the aluminum fitting should be almost flush with the cylinder head surface. Using the supplied retaining plate, secure the aluminum fitting assembly to the head. Use blue locktite on the

retaining bolt. The retaining plate will fit into the machined groove of the aluminum fitting for retention.

- 22) Install the provided right angle brass tee to the other end of the blue silicone hose using another hose clamp. The right angle tee should face toward the heater core inlet hose. Do not tighten the upper clamp at this time. The main wiring harness that previously ran under the rear of the fuel injector rail may now be running on top of the installed cooling mod or back in its original position if there is enough clearance.
- 23) Using the provided ½ inch heater hose, connect between the brass fitting listed above and the ½ inch barb at the Aluminum “T” installed earlier. Proper routing will run along the passenger side coil covers, under the throttle body area, and make a gradual turn towards the driver’s side as it gets to the rear of the passenger head. The hose should run **under** the heater core inlet tubes. Once this length has been determined, cut the hose to length.
- 24) This represents what the final installation should be once everything is back in place. All hose clamps should now be tightened **EXCEPT** the ½ inch connection at the Aluminum T.

Helpful note: The two hose clamps on the silicone hose should be tightened securely with a nut driver/socket set-up. This area may be difficult to access once the accessories are back in place.

- 25) Replace both heater hoses to their original locations at the heater core. Re-install all accessories, cables, and vacuum lines that were removed previously. The only cooling system hose clamp that should be loose at this time is the ½ inch connection at the radiator T. This will be used in the coolant refill procedure.

COOLANT REFILL PROCEDURE

Helpful Hint: Even Flow Cooling has installed and/or assisted in numerous cooling system modifications which include the draining and re-filling of the cooling system on these vehicles. The **MOST BENEFICIAL** piece of advice we can give is to fill the cooling system with the vehicle on an incline(front of the car higher than the rear). This assists the air purging by making the radiator/overflow tank at a higher level than the rest of the system and air will always tend to work its way toward the highest point.

- 1) Remove the “burp” plug from the coolant crossover tube.
- 2) The cap should be off of the coolant bottle.
- 3) Radiator petcock should be closed.
- 4) Plug the ½ fitting at the radiator tee. A rubber vacuum plug works well for this.
- 5) Face the ½ inch heater hose straight up towards the hood. This is where all the system air will escape.
- 6) Fill the cooling system with the recommended mixture **through the burp plug**. Fill the system until the proper level is reached in the coolant bottle and standing coolant can be seen under the “Burp” plug. Replace the plug and tighten. A little anti-seize on the threads assists for future removals.
- 7) Remove the rubber plug from the Aluminum “T” and connect the ½ inch heater hose to the ½ inch fitting on the Aluminum “T.” Tighten the final hose clamp and installation is complete.
- 8) Start engine, check for leaks. Heater should be on full during engine warm-up and the coolant gauge monitored for any air pockets. **If gauge is erratic or the heat blowing from the vents alternates between hot and cold, there is air in the system. Shut engine down, let cool, check for proper coolant level in coolant bottle and re-start.** This procedure may have to be repeated several times to circulate air out.
- 9) Once vehicle has reached operating temperature and cooling fan has cycled, test drive and re-check for leaks.
- 10) Installation complete. Reinstall Shaker assembly (Mach 1 only).

***Be sure to visit our website at www.evenflowcooling.com for information about our product, troubleshooting tips, installation questions, custom applications, and technical support. Although Even Flow Cooling participates in discussions on several Internet forums, our primary response to customer inquiries will be handled via our website. We can also be reached via E-mail with any questions at evenflowcooling@hotmail.com. Thank you for your purchase.

Keep it EVEN and Keep it COOL.