Radiator cover cold air modification and intake scoop installation by Dave68

1.0. This procedure defines the steps necessary to cut an opening in and install a wire mesh screen and intake scoop on a C5 Corvette's lower radiator cover. This modification will allow outside air to cool an aftermarket airfilter such as the Halltech Stinger-R Warhead or Donaldson Blackwing filter. It is not as effective if used in conjunction with an OEM airbox assembly.

2.0. Parts required:

Figures 1 and 2 • Deflect-o Wall Pocket, model number 63202 (Staples)

Figure 3 • 12 x 12-inch stainless steel wire mesh, part number 9319T547(McMaster-Carr, www.mcmaster.com)

3.0. Tools and equipment required: See figure 4 below

- ♦ marker or pencil [mark outline of filter element]
- ♦ large blade-type screwdriver
- ♦ small blade-type screwdriver
- ♦ socket wrench, ¼ or 3/8 drive with extension
- ♦ 7mm socket [lower radiator cover screws]
- ♦ 10mm socket

♦ appropriate driver for 8-32 screws
♦ needle-nose pliers [to pull off demon pin press-nuts]
♦ 12-inch ruler [to mark cutout boundaries]
♦ flashlight
♦ (6) 8-32 x ½-inch or M4x0.7x12 button head or pan head screws [to fasten wire mesh to radiator cover]
♦ (8) 8-32x5/8-inch or M4x0.7x16 button head or pan head screws [to fasten scoop to radiator cover]
♦ (14) #8 or M4 large O.D. flat washers
♦ (14) #8 or M4 standard O.D. washers
♦ (14) #8 or M4 split-lock washers
♦ Box cutter (utility knife) [to cut radiator cover]
♦ Heavy-duty scissors
♦ large nail [to create initial holes in wire mesh]
♦ 1/8 punch [to open up holes in wire mesh]
♦ electric drill with a drill bit to provide clearance for the 8-32 or M4 screws in cover
♦ RTV sealant (Dow Corning 732, Loctite 595 or equivalent) [to seal mesh and wall pocket to radiator cover]

Figure 5: Materials used

4.0. Procedure

4.1. Disconnect the negative battery terminal. (Although this may not seem necessary, leaving the hood light on for extended periods may result in severe battery drain.)

4.2. Mark an outline of the airfilter. See figure 5.

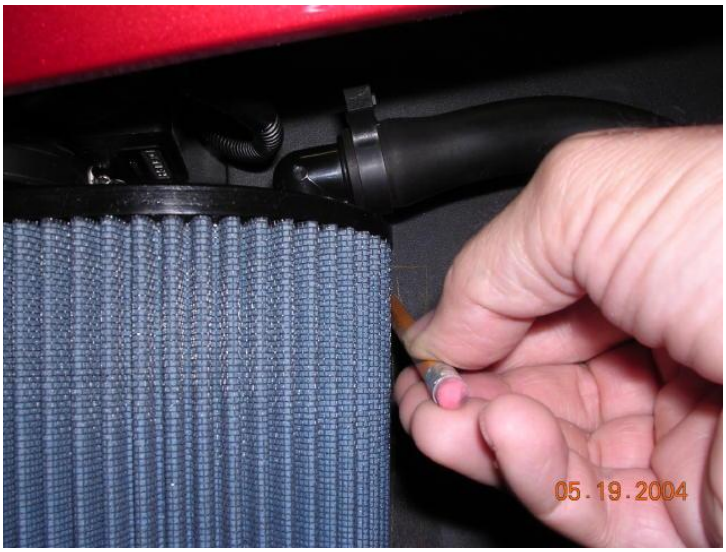

Figure 6: Drawing filter outline on radiator cover

4.3. Unplug the MAF connector and remove its cable from the top of the radiator cover by pulling the cable hold-down from the cover. See figure 7. Drape the cable over the engine and away from the radiator.

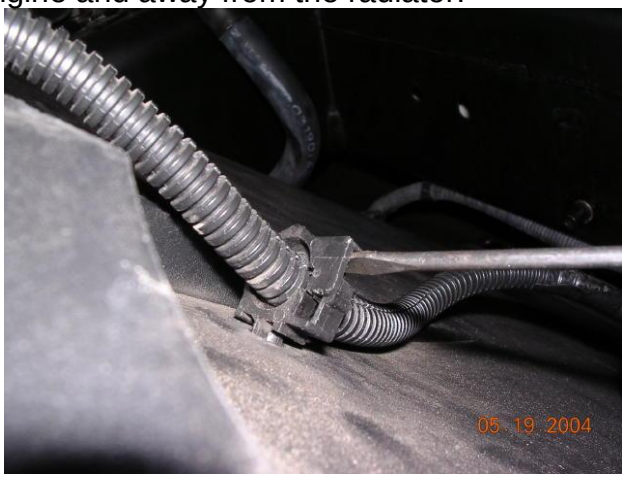

Figure 7: MAF cable clip (attached to radiator cover)

4.4. Remove the hose end from the air filter. Drape the hose as shown in figure 8.

Figure 8: Airfilter hose

4.5. Remove intake system. It is not necessary to remove the throttle body coupler but it may be removed if more convenient.

4.6. Remove the four upper radiator cover screws (2 on each side) with a 10mm socket. See figure 9.

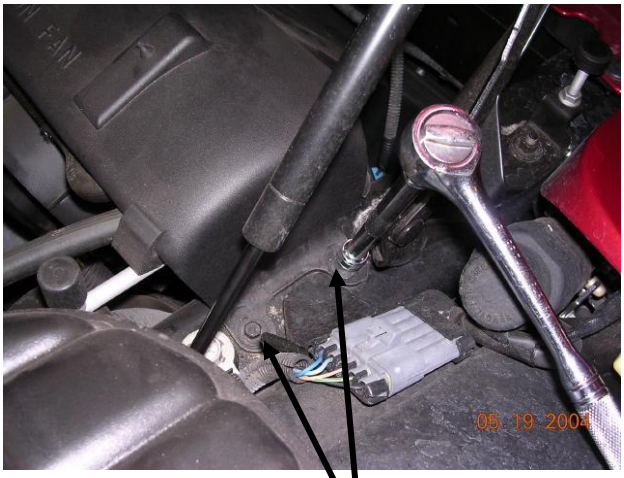

Figure 9

4.7. Remove the upper radiator cover.

4.8. Remove the 5 lower radiator cover bottom screws using an M7 or 9/32 socket. These screws secure the cover to the front bumper. See figure 10.

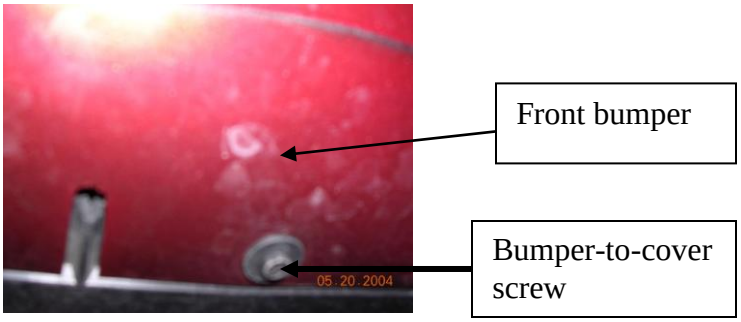

Figure 10: Lower cover bottom screws

4.9. Now remove the two side screws. You will have to pivot the middle section of the air dam to see each screw (one at each side) See figure 11.

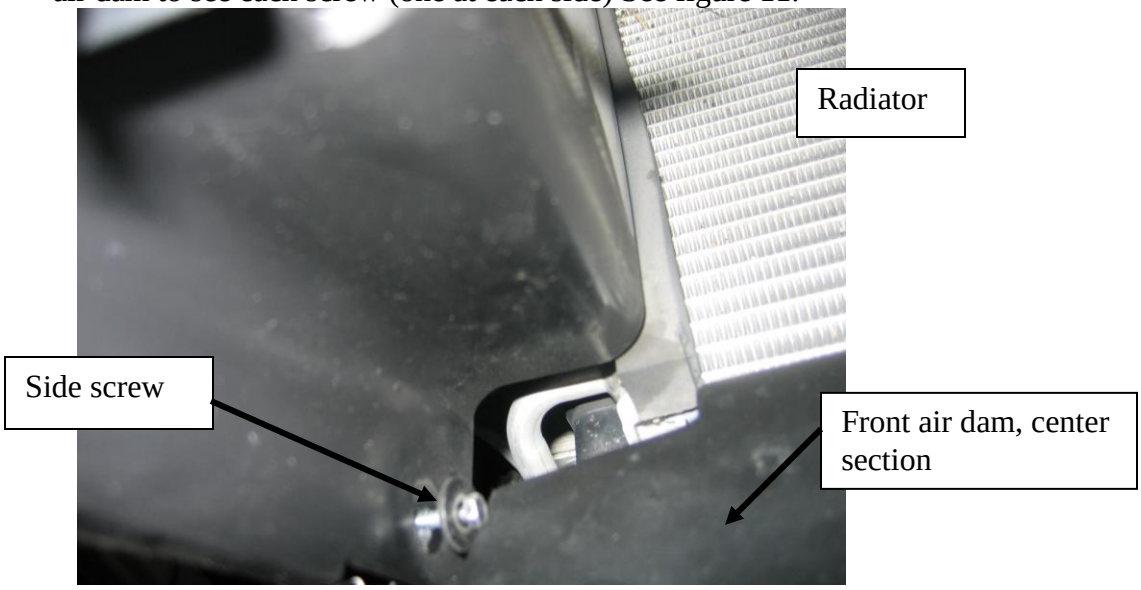

Figure 11: Lower radiator cover side screw location

4.10. Pull the front latch on the courtesy lamp wiring connector and detach the upper part of the connector by lifting it upward. Pull the lower connector out of the radiator cover hole (fairly stubborn). This connector is located on the left side (facing the front of the car) of the radiator cover. See figure 12.

Figure 12: Courtesy lamp connector

4.11. Disconnect the air temperature sensor connection. This is located at the very lower left side of the radiator cover. You can't easily see it if standing at the front of your car, but it is visible if you stand near the passenger side front fender and look down toward the front of the radiator cover. See figure 12.

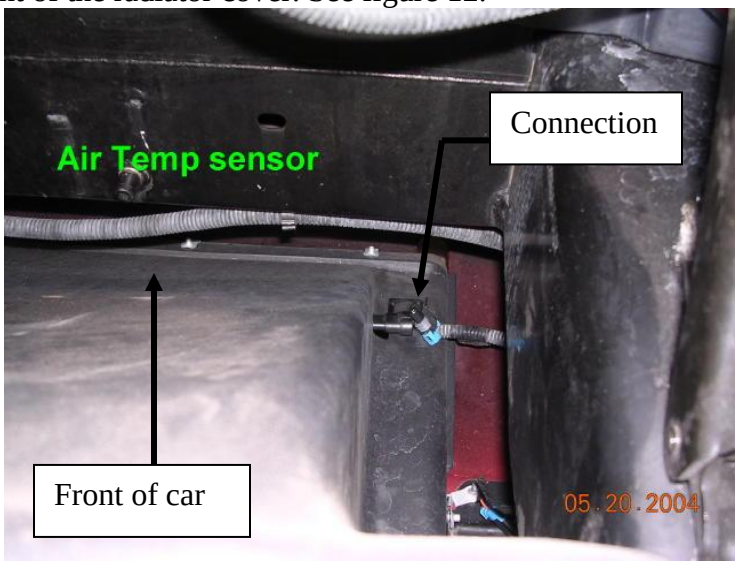

Figure13: Air temp sensor connection

4.12. The only things holding the cover in place are plastic ribbed pins – one on each side. They are held in place with thin press-on, sheet metal retainers which grab onto the pin ribs. If you simply pull on the radiator cover (toward the front of the car) as I did, the pins will pullout from a metal channel. See figures 14 and 15.

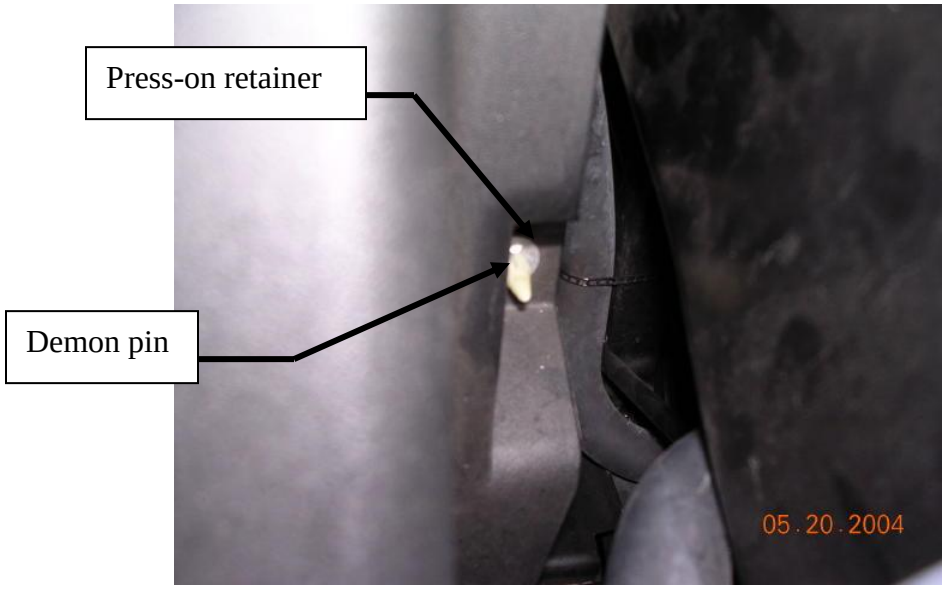

Figure 14: The demon pin

Figure 15: Closeup shot of the demon pin

4.13. Pull out the radiator cover. You may have to twist it a bit to get it out completely. See figure 16.

Note: Upon removing the radiator cover, I noticed that there were many leaves, twigs, papers, etc crammed into the top of the radiator. Clean this stuff off with a soft bristle brush before reinstalling the cover. Over time, this debris may contribute to overheating if left intact.

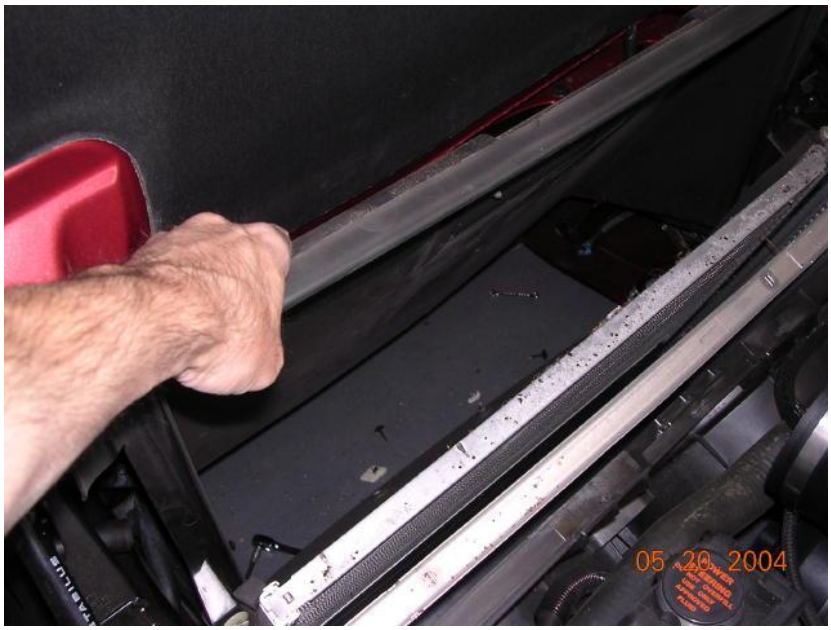

Figure 16: Pulling out radiator cover

4.14. Lay the cover down so that the bottom (opposite the filter side) is face-up. Center the wall pocket so that its rear flange is just below the raised area of the cover, with the open part of the pocket facing the bottom of the cover. Mark the wall pocket's hole locations by tracing each hole with a thin marker or pencil. Now trace the outer perimeter of the wall pocket's flange. See figure 17.
Drill the screw holes using a 3/16 or 11/64ths drill.

Figure 17: Wall pocket on radiator cover

4.15. Flip the radiator cover over and center your wire mesh in between the outline (that you created at the very beginning of this procedure) of the filter. **Note**: At this point you may want to trim the wire mesh. To do so, cut it with heavy-duty fish/poultry scissors. See figure 18.

Figure 18: Cutting stainless steel wire mesh

4.16. Using a large nail (The one I used had a body diameter of a little bit less than 1/8 of an inch.), poke a hole near each corner (approximately ¼-inch away from the side of the mesh). You will need to wiggle the nail to get it to push through. Once it is through, use your 1/8 punch or other tapered object to enlarge the diameter of the hole. Wiggle and push the punch until the hole is large enough to allow the short screws to pass through. **Note:** Depending on the screen size, you may be able to use only four screws to retain the screen to the radiator cover. If you choose to use the screen full-size, I recommend that you use 8 screws, equally-spaced.

Food for thought: It is my opinion that the radiator cutout size be approximately equal to the filter profile – too large and your opening will allow dirty air to coat much of your engine bay, too little and excessive pressure may build along the inside of the wall pocket (intake scoop). Remember that it is always easier to open up a cutout that is slightly too small. You will have to replace your radiator cover if your opening proves to be too large. **Note:** Most air filters will not rest at the exact center of the radiator cover. Because airflow should be directed at the center of the air filter, your cutout and screen may not be centered within the wall pocket. Since the inside of the wall pocket is larger than 12 inches across, there is ample space to position the cutout off-center as I have done.

4.17. With the screen still centered within your air filter outline, trace the perimeter of the screen using a 12-inch ruler. See figure 19. Now trace the screw holes.

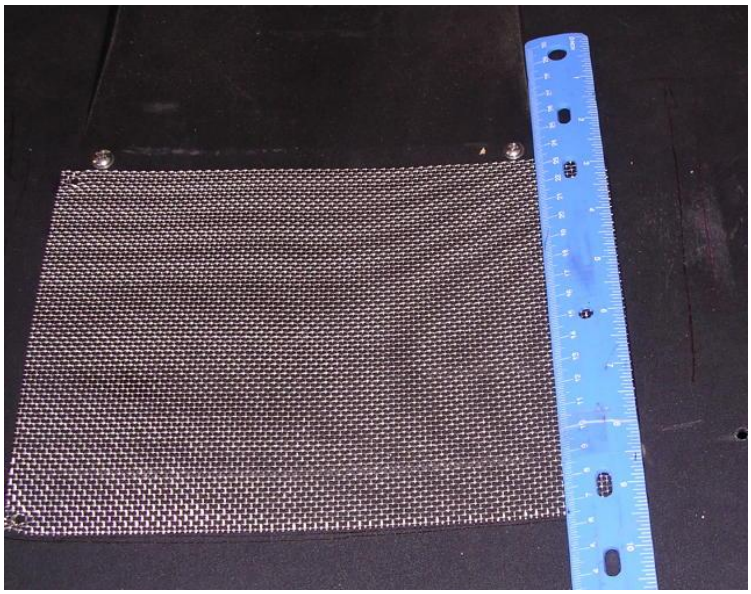

Figure 19: Tracing wire mesh outline

4.18. You will now need to outline a cutout area. The cutout area perimeter should be approximately ½-inch inside of the wire mesh perimeter. Use the ruler to create the inner perimeter. Make sure that the cutout area will not come too close to the screw holes.

4.19. Drill the screw holes using a 3/16 or 11/64ths drill.

4.20. Now use a 3/8-inch drill to create a hole in each corner of the cutout area. See figure 20.

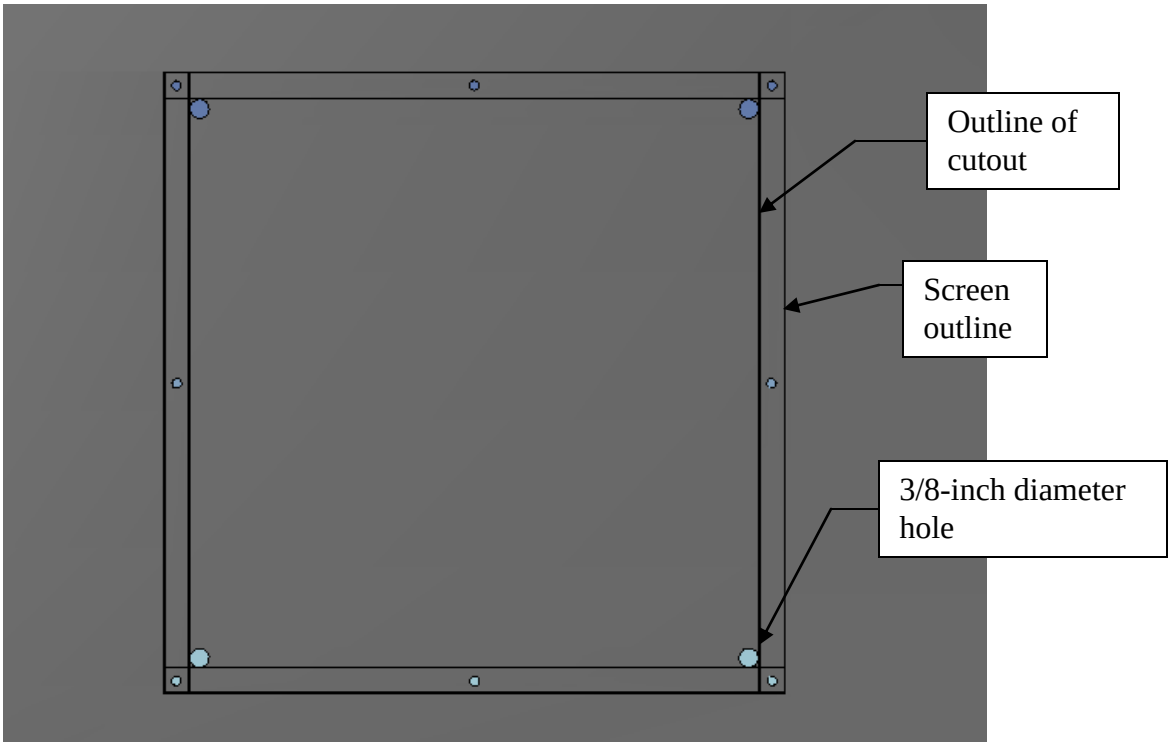

Figure 20: Outline of cutout and corner holes

4.21. Starting at the side of one of the holes, trace the cutout outline using light and then medium pressure with your utility knife. The knife will start to cut through the radiator cover. See figure 21.

Figure 21: Cutting through radiator cover

4.22. Repeat this step over the remaining inner lines, being careful not to create any sharp corners; rounded corners will minimize any chance of plastic tear propogation.

4.23. When you have finished cutting the hole, flip the radiator cover and spread a bead of RTV silicone along the outside of the cutout.

4.24. Attach the wire mesh screen using the four or eight 8-32 x 1/2 (or M4x0.7x12) screws, washers and lock washers. See figure 22.

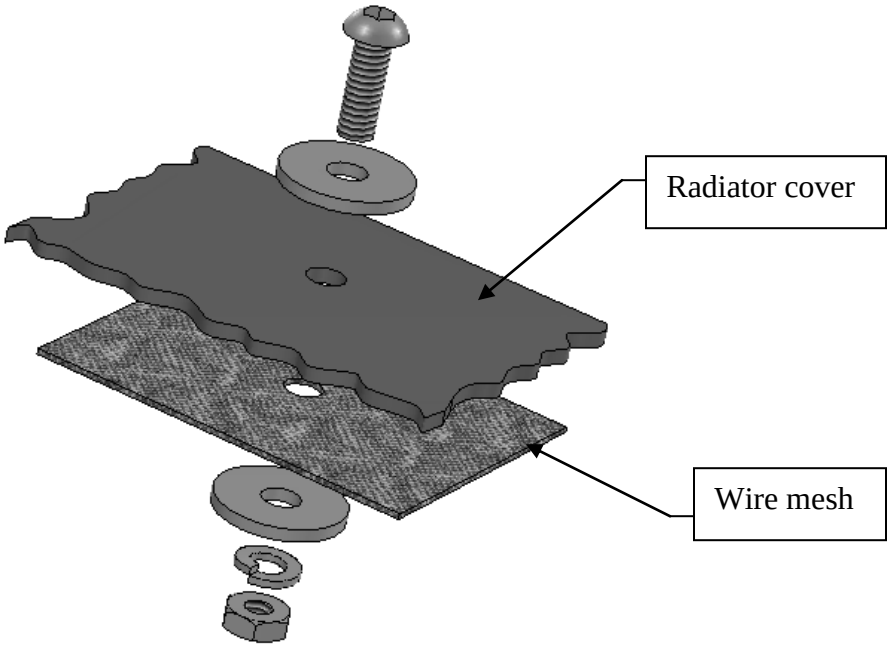

Figure 22: Attaching wire mesh to cover

4.25. Apply a bead of RTV silicone along the underside of the wall pocket mounting flange. See figure 23.

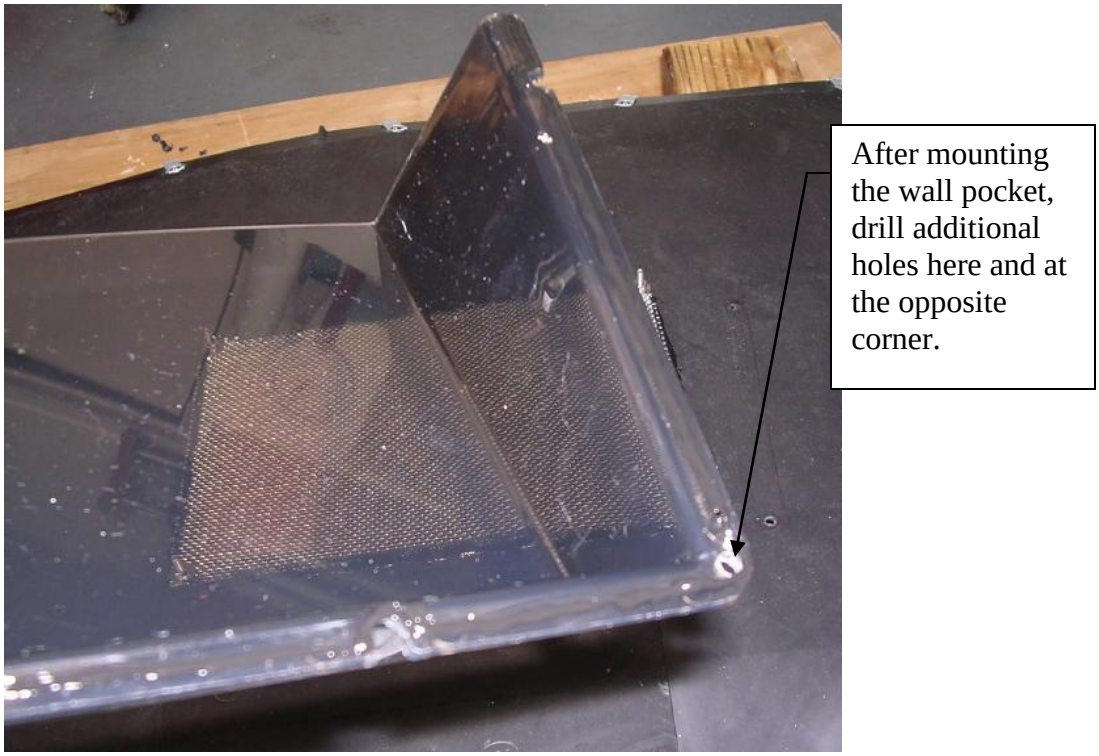

Figure 23: Sealing the wall pocket flange

4.26. As noted in figure 20, drill two additional holes through the wall pocket flange – one at each corner and the radiator cover. Now line the flange with 3M VHB tape or equivalent. **Note:** This tape will help distribute any externally introduced forces on the flange and thus prevent stress cracking at the holes.

4.27. Mount the wall pocket using the #8-32 x 5/8-inch (or M4 x 0.7x16) screws and hardware with the open end-opposite the raised portion of the radiator cover. See figure 24.

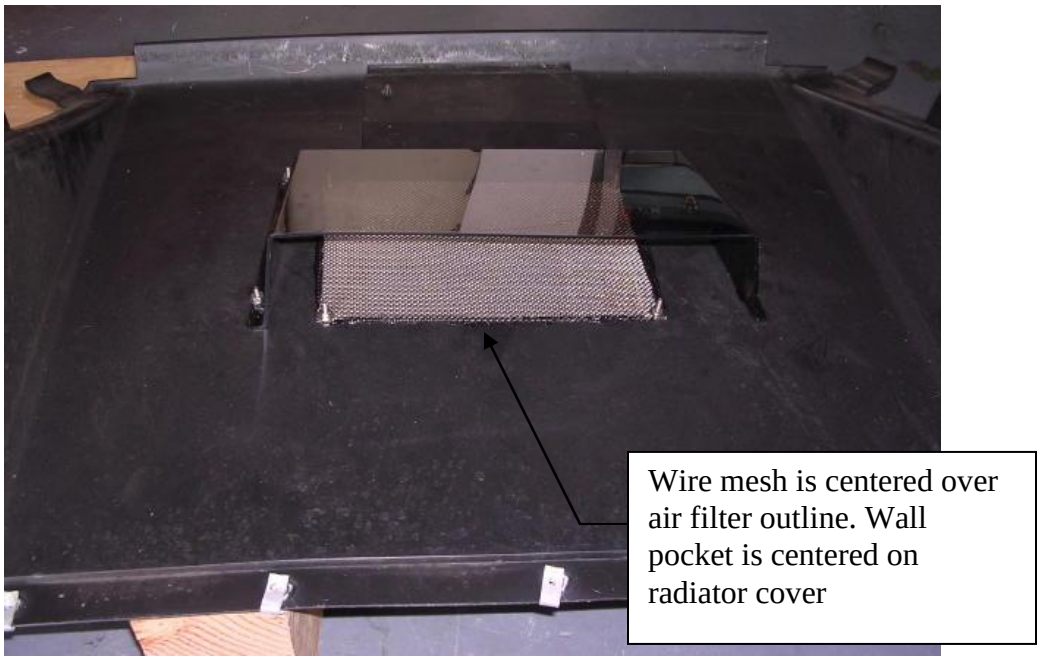

Figure 24: Wall pocket and wire mesh

4.28. Reassemble the radiator cover to the engine bay, reversing the removal steps. See figures 25 and 26.

Note: If the cover was removed with the demon pins still attached to it, you must carefully remove the thin, push-on nuts before reassembly. The pins would then need to be inserted in their prospective holes before you install the radiator cover. Once the pins are in place and the cover is installed, a long, thin object must be inserted behind each pin to prevent it from moving back when a press-on nut is inserted over the pin. I used a long socket to press each nut over a pin.

This may be the most difficult part of the procedure, but if you examine the pins and the method by which they retain the cover, you will be able to achieve success. Please let me know if you discover an easier way of installing and uninstalling the pins and I will update these procedures accordingly.

Figure 25: Installed radiator cover

Figure 26: Allllmost done!

4.29. And almost last but not least is the depressurization mod. Simply cut off a 2-inch long section of the hood seal at the drivers end to allow any crowded-out warm air to escape. See figure 27:

Note: If you drive your car often in monsoon rain storms, skip this step.

Figure 27: Cutting hood seal - for non-rainy weather drivers

4.30. Check that all connections are secure, including

√ MAF connector
√ air filter hose
√ lamp wiring harness
√ temperature sensor
√ negative battery connector

Happy note: After leaving my car battery disconnected all night, I reconnected it to find that all of my radio presets were intact! What a pleasant surprise. Enjoy your cold air/cool engine bay mod.

Side note: I have found that this modification lowers intake air temperatures by as much as 30 degrees F on warm days and during slow moving conditions. This means that no loss of HP occurs because of timing retardation due to high intake air temps. A stock or non-CAI-modded system will lose up to 10 RWHP during the aforementioned conditions.

Dave