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Thursday, May 17, 2007

### PART I - BACKGROUND.

#### What is a coil pack?

Thanks for asking. The coil pack replaces distributor caps on "new and improved" ignition system. Instead of having a rotor and distributor cap "distribute" the ignition spark to individual cylinders at the right time and order, the spark is controlled electronically through the electronic ignition system. The coil pack is where the actual electrical current (spark) is sent to each spark plug via the wires.



The pack is generally comprised of a

### PART II - DIAGNOSIS.

If you have noticed that on cool, damp days or after driving in the rain (especially on the highway, especially behind cars/trucks) the engine is running rough and misfiring, chances are the coil pack has a crack(s).

When this happens, the "check engine light" WILL come on immediately, because the emissions just went to hell.

If possible, pull over and pop the hood ASAP. If it is a cracked coil pack you will notice (at least I did each time there was a problem):

**(A)** a fairly loud "snapping" or "clicking" sound immediately followed by a rough spot in the idle.

**(B)** visible sparks running along the coil pack, generally from the wire terminal (where the spark plug wires attach) towards the metal part of the coil pack. Each spark is tracing a water filled crack and grounding the spark to the engine block rather than travelling along

metal base with a plastic top (insulates the metallic parts so the current is not immediately grounded).

The coil pack is located on the right side of the engine (look from the front) under the plastic manifold covers. Just follow the pretty spark plug wires to the end and they attach to the coil pack.

It seems that the VR6 coil packs (at least pre 98's) just suck. I am not sure if the plastic is not formulated properly, if the molding is not performed properly or if the design does not distribute stress/heat well but by listening to the problems people on this list have had, the coil pack is NOT a quality part. Either that or it is designed obsolescence, keeping the dealer stocked with easy, \$500 repairs every 30,000 miles.

#### PART III - REPAIR OPTIONS.

**(1)** Take car to dealer, tell them the coil pack is bad. They will respond "that's nice but we will have to confirm" (\$56.49). They will then call back several hours later saying "you have a bad coil pack" (duh) and that for just \$350 in parts and \$100 in labour we can put on a new one. So pony up \$500.

**(2)** Lucky for you, there are engineers out here who just can't stand it when a biased party tells me that an inferior part needs to be replaced with the same inferior part. So like all good men, especially engineers, I start to tinker. Leading to a "fix" that has worked for 11,000 miles so far - The \$3.49 Epoxy Solution.

#### STEP 1.

Coil pack removal. This is very easy. First remove the plastic manifold covers. This requires torx head wrenches/driver. **IMPORTANT.** Before trying to loosen the screws, bang the top of the wrench/driver with a hammer while the wrench/driver is on the screw.

the spark plug wire. Try to remember or draw the location of the sparks.

**(C)** If you cannot pull over, or if you want to check later after the weather gets a bit nicer you can easily simulate rain. Get a plant spray bottle/mister and fill with clean water. Start up the engine and give the coil pack area a good misting with the bottle. It may take a few sprays to get the pack nice and wet. This should start the light show again. Try to remember where the crack(s) is or make a sketch.

You now know you have the dreaded cracked coil pack. But have no fear, there are options...

#### PART IV - THE \$3.49 EPOXY SOLUTION.

Drive a different car to Home Depot, Lowe's, etc. and get a package of high strength, high temperature epoxy. I \*think\* the brand I used was "Poxy-Weld"? It is the classic twin tube syringe, silver in color with a cardboard packaging display that unfolded to give product information. It is made to repair metal, plastic, etc. with higher operating temperatures. It has Kevlar flakes to add strength. I think the one I used was rated to 250 or 350 degrees. It was like \$3.49 for the tube.

In order to make the repair you will need:

- \*torx wrenches or driver
- \*allen (hex) wrenches or driver
- \*damp rag
- \*hair dryer
- \*epoxy
- \*12 hours (1 hour working, 11 hours waiting)

#### STEP 2.

Unplug the wire harness attached to the top of the coil pack and move it out of the way. If I remember right it has pinch clips on the side to unlock the harness. Unplug the spark plug wires. Make a diagram of which plug number goes where.

Aluminium tends to "corrode" quickly (look at the manifold) and slightly bond to itself. By hitting with a hammer, the bond is broken and the screws can be easily removed. I know this from experience (i.e. partially stripped screw heads). If you strip the screw heads, I used a slightly larger allen wrench and literally hammered it into the torx grooves. Of course you then need new screws (\$12). Once the four screws are out, plastic covers come off easily. You can now see the whole coil pack.

#### STEP 3.

The coil pack is held to the engine block by four, long allen (hex) screws. I found a hex driver with an articulated joint made the removal easier. A socket wrench should also work. Unscrew and remove the pack. It is a bit heavier than you might think so be careful when removing the last two screws.

#### STEP 5.

You are now ready for the epoxy. Mix a healthy amount in a small disposable container. I used a popsicle stick to mix and spread. Start applying a liberal coat of epoxy. The first time I did it, I only covered the places I had seen sparks. Of course about two weeks after the first fix, a new crack or one I had not seen developed so I did it again. This time I covered the entire plastic portion of the coil pack. Concentrate on the area between each terminal and the edge of the pack. No problem since. So either coat the cracked areas or just do the whole thing. I would recommend the whole thing. The epoxy tends to get a bit sticky so it may work best doing two batchings.

#### STEP 7.

Start car and she should be running like new. It will take at least 3 warm-

#### STEP 4.

Take coil pack inside. Ignore the "you are not a mechanic" insults coming from the living room (be the ball Danny). Take off plastic cover on the top of the pack (just pop over the small clips). Wash off the coil pack with a damp cloth. If it is really dirty, a bit of Dawn can work wonders. Just make sure to wipe off the soap well. You will now want to dry the pack WELL with the hair dryer. I was probably a bit anal about it but I sat in front of the TV for like 20 minutes just drying the pack. Since there is no real way to tell if all the water is out of the cracks, I was conservative.

#### STEP 6.

Set coil pack in a warm place to dry overnight. I did this in December so by a radiator worked well. Just don't put outside since it makes the curing take a lot longer. Reinstall the next morning. I actually did this before work one day and it took all of about 10 minutes. Put plastic cover back on pack. Install pack with four hex bolts and reattach the wire harness. Plug in spark plug wires in **SAME LOCATIONS**. Install plastic manifold covers (I put some grease on the aluminium screws before installing to prevent locking).

up/cool-down cycles to reset the "check engine light" I hope this helps those interested. It has worked like a dream for me. And at 3.49 vs. 500.00 it is a no brainer to at least try it. Worst case you know how to install the pack and can just order the part from a mail order place (Adirondack, potter, etc.) saving the dealer rape. I would actually recommend doing this as preventative maintenance. It's cheap, easy and can save some significant bucks. If I ever HAVE to get a new pack I will do it before installing, just to reinforce it against cracks.

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