Making a 170^0 Thermostat for my '99 Corvette

This project began because the stock thermostat didn't allow for a low enough temps to re-program the fans without them coming on too often or for too long. I couldn't find a 170^0 thermostat, thought 160^0 was too cool, and wasn't ready to pay over $50 for a thermostat that should sell for $20. I also wanted a thermostat that would stay in all year around.

DISCLAIMER: I am advising you DO NOT try this at home (or anywhere else). I just wanted to show how I solved this problem. If you incorrectly modify or mess around with your thermostat, you may cause severe engine overheating, engine damage, and possible personnel injury from extremly hot coolant and unsafe vehicle operation caused by severe overheating and resulting mechanical problems and additional unnecessary expense. YOU SHOULD NOT ATTEMPT THIS MODIFICATION even if you use safety glasses, gloves, and any other safety equipment. This modification could void you warranty or cause engine performance problems. So, if you go ahead and do this anyway, you (and/or your lawyer) should not complain to me about any of your problems because I told you not to do this modification and tried to warn you of possible problems or results. Have a nice day.

I started with a thermostat & housing to modify and a thermostat to be used as a parts donor. Both of these were purchased at PEP Boys. The original factory thermostat & housing was kept intact in case something went wrong or as a back-up/spare if needed. The original Corvette and the PEP boys STANT are almost identical with only some casting differences. Stant's web site list them as a supplier to GM. I had called Stant to ask them to rebuild my thermostat as a 170^0, sell me the parts to make one or identify what parts I could use from another thermostat to make a 170^0 and they would do nothing. A trip to PEP boys followed, eyeballing their stock resulted in these choices.

Corvette replacement was p/n #14298 .... ($30)

Donor thermostat was p/n #35947.... ($19)

First, the Corvette thermostat was disassembled by slipping the bridge piece out from the two cast prongs. On my large spring one coil was removed (with dremel) to allow me to pry the end of the spring overtop of the bridge and rotate the spring so it would coil on top of the bridge. This relieved enough tension to enable me to push down on the bridge (with pliers and hand) and rotate it to disengage it from the prongs. This part and the reassembly were the hardest part of the mod.

This is the parts donor. The internal gold part is what is needed and must be removed without damage. The large spring and gray housing are not needed. I have no idea what car it fits.

The bridge on this one does not disassemble like the Vette thermostat so the cutting began.

Next, the spring took two cuts so the bridge would drop down and then that got cut that too. Then two pliers were used to pull the bridge apart and remove it as shown; then the spring coils just slipped off. Care was used not to bend the diaphram or cut or damage the gold parts

This is the most delicate part, great care is used not to damage the part that is to be used (on the right). To seperate these two parts you must dremel a slit into the part on the left so it will relieve its grip (with a little help) on the rest of the thermostat. If you look carefully you will notice that the cut scored the part on the right but it is still good. I should have stopped just a little earlier but it is difficult to tell visually when you are through the outer sleeve. NEXT TIME, I'LL BE MORE CAREFUL.

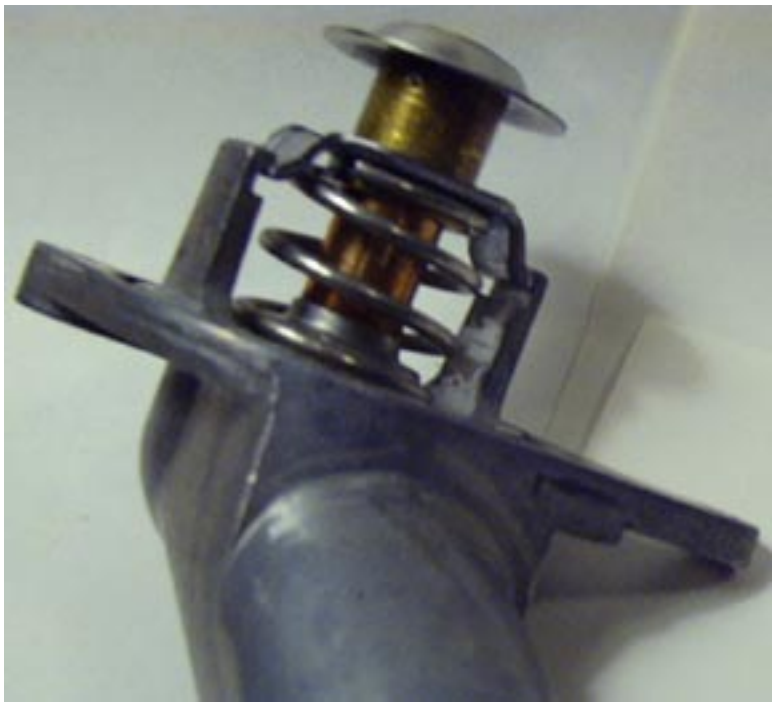
<u>The part on the right is the heart of the thermostat.</u> This is the part that actually OPENS the diaphram. There is a stainless steel pin that fits in the top; when heated up, it pushes the pin out and that pushes the diaphram away from its seat. The big spring only provides closing pressure.

Both pins are from the top part of the thermostats. The longer one is used when re-assembling the thermostat. They are both the same diameter. When inserted, it feels like its pushing back a little from air compression. Do not worry about it, just keep going, it will settle in all the way later.

At this point I wanted to make sure the diaphram and housing work together without binding. This combination did NOT. Filing away about $^{1}/_{64}^{th}$ of an inch around the diaphram, then smoothing out some of the first lip (verticle part only) of the housing opening so the diaphram could move freely away from the seat was the answer. CARE WAS USED NOT TO HIT THE SEAT PART OF THE HOUSING. The fit was tested by pushing the diaphram in with moderate force and to see if it binds in any way; if so, more filing was used so it will not bind while in during operation. When done, it will move in/out easily without any bind. The edges were smoothed to eliminate any sharpness that could dig into the housing and cause a bind. A minute amout of side play could be felt when the final fit was acheived.

The rubber seal around the Corvette diaphram was not used because it could not be removed without damage.

The thermostat is now ready to assemble. Notice that it looks just like the dissambled Corvette thermostat in the 2nd picture except you have removed the Corvette Diaphram (with rubber seal around the edge) and replaced it with the donor thermostat diaphram(170^{0}).



Looking back at the second picture reminded me there is a second smaller spring inside the gold part: I made sure I didn't forget to put it back. Putting the end of the top of the big spring overtop of the bridge and rotating it to get two full coils above the bridge (but under the shiny cap) lessoned the tension. I got the bridge into the notches to seat it then rotated the spring (with pliers) so that it was all coiled back under th bridge as you see it on the left here. When all done that shiny cap should push in and spring back from the tension of the little spring inside the gold part.

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The next thing was to test it to make sure it opens and closes O.K. A meat thermometer and an old pan filled with water was used. The foil underneath the guage is just to keep heat off the underside of the guage and to prevent it from falling into the pan. It also makes it easier to pick up the guage. At 170^0 you could not see it open yet. By 180^0 you could detect it starting to open and by 190^0 its open and by 200^0 thats all it can open. I did not let this worry me. I WATCHED IT CLOSE AND NOTED THE TEMPS. I could see that at 180^0 it is still open a little and that is where it will be at cruising speed on a nice warm day. Even though this is a 170^0 thermostat that doesn't mean the car will cruise at that temp, that only means that the thermostat begins to push open at 170^0, after that its a balancing act. I have found most cars cruise at 11 or 12 degrees over the temperature rating of the thermostat. With my moded thermostat in my stock C5/A4, I cruised at 181^0 with an outside temp of 70^0 while doing 70 mph. Up the speed to 80+ mph and my stat bounces between 183^0 & 185^0. When you turn up the speed or outside temp, it'll climb a little higher. Throw in some stop & go traffic and temps are going to work their way to over 200^0 unless you can get a little non-stop movement to bring them down again. If these temps were not low enough for me, a 160^0 thermostat could be installed and the cruising temps would be about 10 degrees cooler. My C4 with a 160^0 thermostat cruised at 172^0 or 173^0 most of the time. If you want to control how high the engine temps will go, fan re-programming must be performed to make the fans come on at a lower temp to hold the heat down. The lower thermostat just gives you a lower cruising temp and provides a little more cushioning room before you break into the 200^0 ranges.

Good Luck
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