

# What is a Thermostat?

And why is it so important?

The Thermostat in a car's motor is a heat activated "flapper valve" which works to regulate the temperature of the coolant in the motor's cooling system. At one time the only real concern of this was to keep the coolant hot enough to have heat to keep you warm in the winter. Since the cars now come with Fuel Injection and a Computer to regulate and direct every function in the motor, the thermostat has become an extremely important part of the entire computer system. If you drive any type of car, the first half of this article may concern you. If you have an early NC (2006+) Miata, the last half may concern you too. Please read on.

The Computer in our car monitors many things, and directs many things to happen. It monitors outside air temps, the rpm of the motor, the position of the gas pedal, the speed of the car, the temperature of the coolant, the mix of air to fuel as it is burned and exits the exhaust system, and what gear the transmission is in. It also monitors the condition of the Catalytic Converter to be sure it is working properly.

Based on all the information the computer receives from the sensors, the computer directs the fuel injection to inject the proper amount of fuel into the motor. It also regulates the ignition timing to help develop the needed horsepower based on the load you have put on the motor. On today's "drive by wire" cars like the newer series Miatas, it also regulates how far the throttle plate is to be opened to give the amount of power it thinks we are asking for.

The Air to Fuel Ratio is the important part the Thermostat is involved with. When the coolant is cold, the computer tells the fuel injection to spray a richer gas mixture into the air flowing into the cylinders, or in other words more gas per volume of air. As the motor warms up, the computer senses this and adjusts the air to fuel ratio to a leaner state, in other words less gas per volume of air. So when the motor comes to the proper operating temp, the computer directs the fuel injection to spray the most efficient gas to air mix for the load placed on the motor.

The Thermostat has a key position in the proper operation of the motor, and to get the best fuel economy out of the motor. If the thermostat goes bad, and sticks closed, the motor will quickly overheat. If you continue to drive the car you may destroy the motor. If the thermostat sticks open, it can allow the coolant to flow thru the motor so fast it never lets the motor come up to operating temps. This "cold motor" causes the fuel injection to constantly run too rich, using more gas than normal. This hurts gas mileage, and after a while can foul the spark plugs with soot. So if your gas mileage starts to drop off, it just could be the fault of the thermostat!

Here comes the part about the early NC (2006+) Miatas. I have learned on the Miata.net web page where Mazda redesigned the thermostat sometime in the first year or two of the NC production. It appears there was a high failure rate of the thermostat as it would stick in the open position. You can see in the pictures below the new and old versions of the thermostat.

In both pictures below, the old version is to the left, and the upgraded one is to the right. The old version has a shorter neck for the hose connection, and the new one has a longer neck. The older thermostat has an all plastic base, and you can see on the right the newer one has more metal in the base. This makes it have a more solid base section less affected by motor heat. The newer version is not prone to failure as the original version is.



You can NOT tell if you have this problem by watching the Temp Gage in the dash. This gage does not totally show the coolant temps. The coolant should run about 185 degrees at normal operating temperature. The gage stops moving upwards at 158 degrees. Why?? Who knows?? The gage only goes higher if you have an overheating problem.

During the summer, the temps can still go up to normal even if it is stuck open, but during the winter is when a problem will show up. "IF" the thermostat sticks open, and the coolant temp stays below 160 degrees for a period of time, you can get a "Check Engine Light" in the dash. The error code you would get for this would be "P0126", Insufficient Coolant Temperature. The heater would not throw much heat, and you would get poor gas mileage.

If you have this problem, and are mechanically inclined to where you want to replace the thermostat yourself, you could get an upgraded Mazda replacement, or go to the parts store and ask for either "STANT # 48728", or GATES # 34046". Both are high quality replacements. Or you could have your local dealer or garage replace it for you.

Here is a link to an excellent article on Miata.net on how to replace it if you want to do it yourself: <http://forum.miata.net/vb/showthread.php?t=436650&highlight=replace+thermostat>

One other way to find if you have a problem is to attach a "Scan Gage" as I have to the OBD II port and go drive the car, You can monitor the coolant temps thru this digital readout gage and see if the thermostat is properly controlling the coolant flow and temperature.

So just keep in mind that this is Not "just a thermostat" anymore. It is an important part of the motor's computer operating system. Plus the heat is nice in the winter. If replacement is not needed sooner, a good time to replace the thermostat is when changing the coolant,.

Zoom-Zoom!  
Bill Latsha