

TECHNICAL TIPS – “Wench With A Wrench”

By Gail Wagner - Midstate Miata Club of NY

Greetings, Miata Folks,

This month's column is on the cooling system, literally, the life's blood of your Miata. Failure to realize potential problems and address them before they happen can cost you a great deal of heartache, lost driving time and costly repair.

Please remember that all of my previous columns are listed on our website (www.midstatemiata.net) under TECH.

Like Paris Hilton famously says, “ That’s Hot !! ” **Radiators, Overheating and Maintenance**

What is a radiator?

The radiator's job is to remove heat from the engine's coolant. As hot coolant passes through the radiator it is cooled before returning to the engine where it absorbs heat and returns to the radiator. This cooling process keeps the engine from overheating.

How does the radiator work?

The engine generates heat when it is running; this heat must be removed to prevent damage to the engine. Coolant circulates throughout the engine and absorbs this heat. The water pump pushes the coolant through the radiator (where it is cooled) and returns it to the engine once more to absorb the engine's heat before returning it to the radiator to be cooled again. When a vehicle is traveling fast, rushing air flows through the radiator and cools the engine. When a vehicle is in stop-and-go traffic or stuck at a traffic light, the engine's cooling fan pushes air through the radiator.

What are the symptoms related to a bad radiator?

A failing radiator can cause the engine to run hot or overheat. Most radiators are made of metal and plastic. The plastic parts, usually black when new, can become brittle and crack over time, causing a leak of coolant (typically green or pink in color). The "brown death" is common to all radiators with plastic tanks. As they age and heat cycle, the color of the plastic end-tanks changes from black to a greenish-brown color, indicating they are becoming brittle and susceptible to cracking and breaking, often with no notice. (See below.)



(Top of greenish-brown radiator above with the yellow radiator cap.)

All manufacturers have a recommended service interval for coolant flush and 100% replacement. Check your Miata owner's manual or your repair shop. As the coolant ages, the additives breakdown and being to form solid deposits. These deposits will build up in the passages of the cooling system and will eventually clog components including the radiator. A leaking or clogged radiator must be replaced. Some automatic transmission cars will also have a transmission cooler integrated into the radiator. If this integrated cooler fails, it can allow transmission fluid and coolant to mix. This will cause shifting issues in addition to overheating.

Can I drive with a radiator problem?

A failing radiator has far reaching effects. An inoperative heater, loss of coolant, or engine damage from overheating could occur. Overheating causes severe damage to an engine, including failure of the head gasket. Continuing to drive an overheating vehicle may disable the motor. **If you see your temperature gauge flipping over to the "H" side or steam rising from under the hood, pull over and stop the engine and have your car towed to prevent engine damage.**

How often do radiators need to be replaced?

Replacement intervals vary greatly by vehicle and driving conditions. Typically, radiators are replaced at approximately 80,000 miles. While the radiator does not wear the same as a belt or brake pad, the repeated heating and cooling cycles the radiator experiences will eventually cause the degradation of its plastic end-tanks and seals.

How Do I Keep My Radiator Healthy?

Keep a 50/50 coolant mix.

Water is a better thermal conductor than anti-freeze, however you need the anti-freeze, even in hot weather, for its anti-corrosive and lubricating properties to keep your cooling system running efficiently. If your mixture has more than 50% coolant, you're cooling ability is substantially reduced. You can even go down to about 30% in the summer to get more cooling efficiency from the added water.

Mix the coolant with distilled water only so that you have a combination of 50% coolant and 50% water. Some coolants will come premixed, that is, you don't need to add any water. These coolants will typically say 50/50 or pre-mixed on the front of the coolant bottle. Check your Miata owner's manual or repair shop for the correct coolant for your Miata.

Make sure your coolant level is correct

With the engine cold, fill the overflow reservoir to the "Full" line with your coolant mix. Do not fill it while the engine is hot. This will cause extremely cold mixture to be sucked back into the radiator as the engine cools, possibly causing thermal shock. In addition, you won't have the proper coolant level. Add coolant to a cold engine.

Be sure your thermostat is operational

Thermostat's, over time, have a tendency to freeze up. They may freeze in the open position, which will result in slower engine warm-up and, in winter (which most of us don't have to worry about with our Miata's), lack of heater output. Or they may freeze in the closed position, causing your engine to overheat. Replacement is recommended every few years - they're cheap.

Check your radiator cap

Your cooling system is a closed system designed to build up pressure as the temperature rises. The higher pressure raises the boiling point of the coolant mixture. When the temperature/pressure rises to the proper level, the valve in the radiator cap (yep, they have a valve - ever wonder what that spring is for?) causes the cap to open and the coolant to flow out to the overflow reservoir. As the coolant flows out, the pressure drops and the valve in the cap closes. As the engine cools, the valve opens in the other direction and the pressure drop in the radiator sucks the coolant back into the system, re-establishing equilibrium. Similar to a thermostat, the cap can freeze up causing pressure problems in your cooling system leading to an increased possibility of overheating. One symptom of a bad cap would be hearing a sound like a coffee percolator when you shut down. These are really cheap enough that you should just plan on replacing yours every year or so from any automotive supply store or Mazda dealer if you prefer OEM.

In addition to the above, if you're still having trouble, you can try some of these methods of gaining a bit more from your cooling system.

Try Redline Water Wetter

Water Wetter is a product designed to maximize the efficiency of the coolant by reducing the surface tension of the coolant. Without going into all sorts of physics, basically it makes the coolant transfer heat to the radiator fins a bit better. Does it help? Many think so and all race car drivers use it as they certainly operate at higher than normal temperatures and need to keep that engine cool.

Be sure your fan(s) work

If your fans aren't working, you'll overheat. Period. Check under the hood and see if the fan on the driver's side is running after the engine gets good and hot. If not, you have an electrical problem. It may be as simple as a fuse or an unplugged connector. Or it could be a bad sensor or broken wiring. The passenger's side fan only comes on when the A/C is running. Check it and be sure it operates properly.

Your water pump may be shot ☹️

When a water pump dies, it usually leaks. If you decide it's almost time to replace your timing belt (about every 60,000 miles), you should change your water pump anyway

Take care of your Miata and it'll take care of you!

Zoom Zoom Safely!

Gail 😊

DISCLAIMER

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