Engine Overheating

Keeping Your A's Temperature in the Cool Zone

Tech Corner

...Ken Nelson

Engine overheating has been around as long as the automobile and the Model "A" is not exempt from the problem. However, the "A's" cooling system, if working properly, is more than adequate for almost any set of driving conditions you might encounter. There are many causes for engine overheating, but once identified, most can be easily corrected.

Fan Belt - Fan belts are prone to slippage and a belt that's loose will not turn the fan and water pump at the proper speed. Belt tension can be adjusted by loosening the generator mounting bolt and pulling the generator away from the engine to take out the excess slack. A ½ to ¾ inch of belt play between the pulleys is about right. After the adjustment is made, tighten the generator bolt securely. Unfortunately, an unmodified Model "A" has no means of locking the generator in place and over time, the belt will loosen again. To alleviate this problem, you can use a "belt tensioning bracket" to hold the generator securely in place when driving. The bracket can be easily removed if the car is to be shown.

Fan - Fans can cause a problem if a "modern" type has been installed and the diameter or blade angle is too small to provide adequate airflow through the radiator. If you're determined to use this type of fan, check with other Model "A" owners to see what they have on their car. There's nothing wrong with the original two blade propeller type fan that came on the Model "A" but it should be checked frequently for cracks or other damage that could make it unsafe to use.

Hoses/Clamps/Petcock - A plugged radiator hose will restrict coolant flow and a leaky hose will cause coolant loss over time. Either condition can cause the engine to overheat. It's a good idea to replace both hoses even if only one is bad because the other hose is probably living on borrowed time. Check all hose clamps for tightness and if you're more interested in driving than showing the car, consider replacing the original wire hose clamps with the modern screw-adjust type. Also, make sure that the drain petcock located in the water return pipe is not leaking.

Water Pump - The Model "A" water pump is simple and robust but it can fail. If the impeller is loose on the shaft, the pump won't circulate the coolant. On the other hand, the pump may deliver too much coolant at highway speeds causing coolant loss through the radiator's overflow pipe. The new “leak-less” water pumps appear to have a higher output capacity and have the capability to overflow a poorly maintained system. Once again, check with others to see what they're doing.

License Plates and Other Radiator Obstructions - The headlight bar seems like the ideal place to mount the license plate, but the plate does block a sizable chunk of the radiator's cooling fin area. A radiator ornament or plaque will do the same thing. On a hot day, consider removing the ornaments and flipping the license plate into a horizontal position to expose more fins to the airstream.

Incorrect Ignition Timing - An incorrectly timed engine can run hotter than normal. Check your car's timing using the standard timing pin. While running in high gear the advance should be all the way down. On heavy inclines listen for any spark knock and reduce the amount of advance to eliminate the knock. Watch your water indicators for any sign of excessive heat.

Incorrect Fuel Mixture - If the fuel mixture is too lean, the engine will run hot. Check your carburetor settings and reset to specifications if necessary.

Brakes/Wheel Alignment - Dragging brakes and poorly aligned wheels can increase the rolling resistance of the car and force the engine to work harder resulting in over-heating. The bad wheel alignment won't help your tire life either!

Bad Head Gasket/Cracks in Block - These can be classified as serious problems and if uncorrected, you'll have more to worry about than overheating! To check for exhaust leakage into the cooling system, remove the radiator cap and briefly accelerate the engine. If bubbles appear in the coolant, you could have a bad head gasket or a crack in the engine block. Oil in the coolant may also indicate a cracked block. After the necessary repairs are completed, check the integrity of the block by magnafluxing. This process will detect any minute cracks that cannot be found by other means.

Radiators - The key word in any radiator discussion is ***flow rate*** - how much water a radiator will actually pass in a given period of time. A good Model "A" radiator should have a flow rate of at least 38 gallons per minute. 1930-31 "AA" truck radiators should pass about 48 GPM. Anything less can result in overheating problems. Disconnect the upper and lower hoses and fill the radiator. A good radiator should empty in 4 seconds or less. Radiator troubles can be traced to broken or blocked tubes, an inadequate number of usable tubes remaining in the core after damaged tubes have been removed, so-called "stop leak" pellets clogging the tubes or leaky upper/lower tanks. Blocked tubes can be opened by "rodding" or ultrasonic cleaning. Damaged or rusted tubes can be replaced but if a large number of tubes are in bad condition, it may be less expensive to replace the radiator. The condition of the overflow pipe should also be determined during the radiator check. A broken or rusted pipe can cause the coolant level in the radiator to be lower than normal. A broken or missing baffle plate may allow the water pump to push the coolant directly into the overflow pipe and out of the radiator. To reduce the amount of water going out the overflow pipe, add a short piece of plastic tubing to the top of the pipe. Just make sure it is below the radiator cap. Loose tube fins can also contribute to over-heating. If the fins are not making good contact with the tubes, heat will not be transferred into the radiator's airstream. Sometimes over lubricating the original type water pump rear bearing can cause excess grease to be introduced into the water system and clog the tubes.

Coolants - The Model "A" was designed to run using plain water as a coolant. Most era drivers either drained their car's radiator before winter storage, or added some type of antifreeze for cold weather operation. Alcohol was common as an anti-freeze and worked reasonably well but boiled away at about 170 degrees F. Kerosene was also used but it attacked rubber parts and boiled at such a high temperature that the engine could be damaged before overheating was detected. Today's modern automotive coolants contain ethylene glycol and are designed to remain in the cooling system at all times. The boiling point of the coolant is higher than water and the solution contains a built-in rust inhibitor and water pump lubricant. When mixed 50/50 with water, ethylene glycol will protect your "A" to about 34 degrees below zero F. There are

some disadvantages to using ethylene glycol in your Model "A" - the coolant may attack some types of paint and the Model "A's" water pump can whip the solution into a green, frothy foam, impairing the cooling action. To eliminate this problem there are two products on the market that will help. Prestone “LowTox” and Sierra antifreeze is formulated with propylene glycol (PG). As compared to ethylene glycol, propylene glycol is less toxic and safer for children, pets, and wildlife in the environment. One final consideration - some automotive experts believe that ethylene glycol does not work as well as water in a non-pressurized cooling system. In actual tests, some Model "A" overheating problems disappeared after switching back to plain water. If you decide to use water as a coolant, make sure that you add a good rust inhibitor to help keep the system rust free. At one time, soluble oil was suggested as a rust inhibitor. It worked, but the oil coated the inside of the radiator, degrading its heat transfer characteristics. The experts all agree - don't use oil of any kind as a rust inhibitor! Also, consider using distilled water to eliminate “other” minerals being introduced into the water system. I see a lot of lower water pipes that are powder coated. They look nice, but the inside will be affected by the solution and will flake and clog up your water system. Go to a stainless steel pipe to solve the problem.

Thermostats - According to many Model "A" owners, a good thermostat offers two important benefits:

- Coolant flow through the system is reduced so that less is pumped out of the upper radiator tank at high speeds.

- The thermostat will maintain an engine temperature of at least 160 degrees F that many feel is optimum for complete fuel combustion and clean plugs.

On the down side, a thermostat that sticks closed will prevent adequate coolant circulation and overheating can result. To prevent this make, sure that there are two 3/16 inch holes drilled on the surface opposite the sensor so some water will still flow.

If you install a thermostat, use the kind that fits inside the upper hose and has a short pipe welded to the end instead of the type that mounts with tabs. Some owners have experienced leaks with the tab-mounted variety.

A good running engine makes EVERYONE happy.

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