

## Engine cooling tips

Keeping our air cooled engines operating at peak performance includes getting the engine up to operating temperature as quick as possible and also keeping the temperature in the operating range partially dictated by fuel quality and ambient temperatures. This article addresses the items that we can control or improve on. Some items require major engine work and would be on a list of things to do when that occurs; others are easily completed. Previous owners may have done strange things so be thorough. The more you can accomplish the better the engine will perform and the longer it will last. Turbo engines differ only in carburetion approach.

**First, simply make sure your engine cooling system is functioning properly in its stock condition.** Check for proper belt tension, lower shroud exhaust air doors working properly, all engine sheet metal in place, all engine to body seals are in place, proper spark plug boots installed, dipstick grommet in place, all crankcase vent tubes cleaned out, correct weight of clean oil in the crankcase, air baffles in place under the cylinders, heat shields installed between all mufflers and valve covers, oil cooler cover in place over the (clean) cooler, and recirculation plate installed for summer if applicable (or block the recirculation holes). The fresh air hose at the front of the engine needs to be in place and for automatics, the access cover on the converter housing needs to be installed. Bent exhaust pipes or loose baffles in mufflers that restrict exhaust are rare but possible. Check the air inlets from the outside on Greenbriers for loose insulation.

**Carburetor work.** The carburetors must be balanced off idle to insure that one carburetor does not lead the other when accelerating or cruising. Out of balance will cause pinging, overheating and poor mileage. Correcting this may include replacing or repairing the cross shaft, down links, throttle shaft holes and look for loose throttle shaft ends where they are peened. Check that there are no vacuum leaks to include base gaskets, balance tube hoses, vacuum advance ports, vacuum modulator hoses, choke pull-offs and PCV hoses. You must have the correct PCV valve or proper size of fixed orifice or the engine may run lean (and hot). Disassemble carburetors to match venturi clusters and re-jet carburetors to 0.052- 0.055 depending on your preference. Be sure all parts match between both carburetors and specs match. If you have hot idle valves be sure they are open at idle and closed off idle.

**Distributor work.** Look for a worn distributor shaft inside the distributor cam (where you are supposed to place grease). Check the pivots, weights and springs for wear and lube everything that moves. If you have a point system check the breaker plate pivot for wear; a common cause of pinging and loss of power. All of the distributor curves are published in pamphlets and you can use a tachometer and timing light to check your distributor performance. Distributors can be a significant cause of overheating if they do not function properly for your engine.

**Oil coolers.** Installing a 12 plate cooler on an 80 – 110 HP engine would be a good upgrade. It does require sheet metal modification (cutting on late models and some welding on early models) and the 12 plate cooler uses a longer bolt, bigger cover, and end plates that keep the air directed out of the engine compartment. If you already have a 12 plate, be sure you have the end plates installed.

**Head work.** De-flashing the heads is the big item. This can be done by removing the top cover and lower shrouds, putting a light on the floor and using a long 1/8 drill bit, key hole saw and other tools to remove dirt and aluminum flashing from the finned head areas. In particular check the holes next to the spark plugs. If you have the heads off, you can remove the valves and clean up the runners in both intake and exhaust areas with rotary burrs. If you are rebuilding the engine and using oversize pistons, you may want to consider using cylinder spacers to bring the compression back to original.

**Additional cooling items.**

- I checked engine temperature on a two way highway run with heater shrouds on and shrouds off. My temperature gauge showed a 45 degree difference. The initial warm up time is longer but in the heat of the summer I would think the gain in lower operating temperature would easily be worth the tradeoff. Be sure your choke coils are tight after you remove the shrouds in case a rivet is missing.
- I also like to avoid extended tip spark plugs because they start the flame front closer to the piston. I would think the engineers would have used an extended tip if they thought it was a good idea – which they never did.
- If you have an air conditioned car, be sure and clean the condenser. I have a '66 style condenser so I extended the air cleaner intake with a hose to pick up air from in front of the condenser. The modification included relocating the vent tube hole so I could turn the air cleaner. This puts cooler air into the carburetors and adds available air for cooling that is not being sucked in the air cleaner. Might be hard to prove that last one.
- Be sure the inlet fuel line on the left side of the engine is not touching the head; the additional heat added to the fuel can cause vapor lock in the fuel pump.
- For those not familiar, air cooled engines run hottest under a load in high gear on the highway and coolest while driving slow or idling (they do not overheat in a parade!).
- The single most common cause of significant overheating is a mouse nest on top of the head or cylinders under the top cover. Lower shrouds can also be mouse houses.
- Cylinder head temperature gauges are available; a good project would be to install one, make a list from the above suggestions and watch your temperature go down!