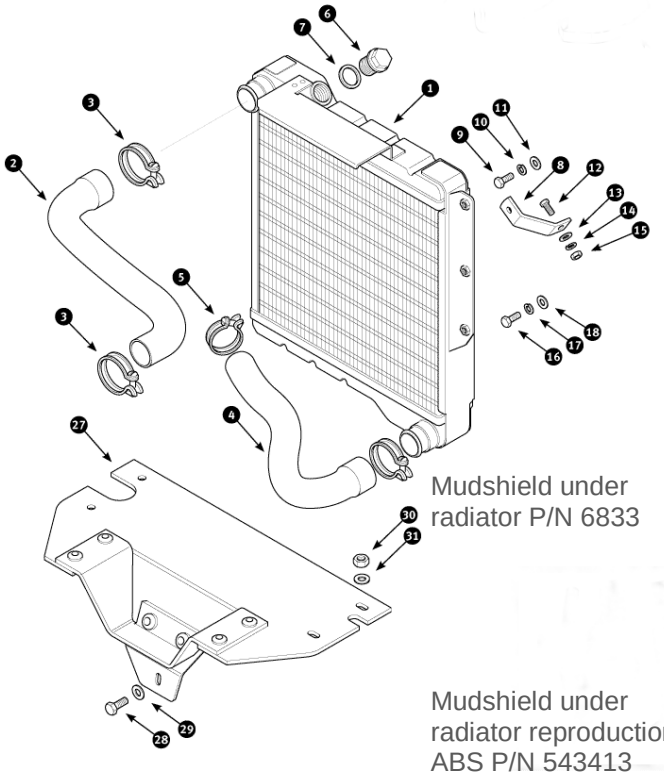

Mudshield under radiator P/N 6833

Mudshield under radiator reproduction ABS P/N 543413

SCparts online

Improving the airflow through the radiator on an MGBGTV8

One of the weaknesses of the MGBGTV8 cooling fans for the radiator arrangement is that they are not ducted so air flow at rest goes everywhere except through the radiator. When stationary or at low speeds there simply isn't enough mass air flow through the radiator from the original cooling fans to cope with heat soak. Here **Tony Lake** describes how he improved the airflow.

Mudshield under the radiator

Tony Lake found the fibre duct that fits between the chassis rails under the radiator fell to pieces on his MGBGTV8 some years ago. So he measured up the space between the radiator and the valance and made a sketch which a local metal workshop turned into a full width duct which fits snug against the valance and the bottom of the radiator. Tony says "I cut a piece of hardboard to reproduce the curve of the valance which allowed him to scribe a line on the aluminium sheet to cut to. Not a very good photo alongside, but you can see the duct through the hole in the valance. It mounts on the same holes as the fibre design. I didn't try to measure the bolt hole positions, just offered up the alloy piece and scribed a position for each hole one at a time."

Tony then mentioned he had just looked at the SCparts book and found they call the part that he referred to above as a duct: **Mudshield under radiator P/N 6833** – see an example alongside from SCparts online.

Cooling fans guard

Tony then aksed his local metal workshop to **make another fan guard** in the same 14-gauge aluminium to replace the factory wire guard, using it as a pattern. He notes that "if I did it again, I would make the alloy fans guard square at each end to fit up against the front of the radiator. It doesn't have to be 14 gauge, 16 is adequate, the metal workshop just happened to have a spare bit of 14 gauge lying about!"

Tony then made up a **pair of cheeks that fit at each side of the radiator** to close that gap.

Tony reports that “the result is that in hot weather the factory temperature gauge stays close to normal at cruising speeds, but runs cooler in winter. In traffic the fans cycle on and off at speeds below 30mph and when the car is at rest. Not a great deal different to the original factory design. All this of course is at 105m average altitude in Northamptonshire, driving in the Alps might be a different story.”

Difference between the temperature of any object and the amount of heat stored within that object

Nic Houslip’s contribution helps fellow members understand “MGV8s and overheating” and cooling system basics because the first point is to establish is the engine “Overheating” or “Just very Hot”? If it is overheating, why is it doing so? Then try and find the causes of overheating which could be weak mixture, over advanced or retarded ignition, coolant loss, lack of airflow over the radiator and other causes like water pump failure or gasket leaks. It’s worth seeing the set of slides Nic used for a presentation he made on “V8s and Overheating” at a V8 Technical Day in 2013. They are available online using this link.

Nic Houslip’s first comment is that “the factory must have been satisfied with the components they chose to get the heat away before the MGV8 models were released to production. The biggest difficulty I see is the failure to comprehend the difference between the temperature of any object and the amount of heat stored within that object. The human is not very good at judging temperature which is why we have thermometers to help us.

The Rover V8 is a compact lump and stores a lot of heat, so opening the bonnet will produce a blast of hot air rising and may be misinterpreted as too much. The old 4 pot 1795cc motor produced only half as much power, and about half the heat, so wouldn't seem to be so hot.

The **heat produced in the motor by combustion and friction is removed mostly by the flow of water around the inner hot parts and is exchanged to ambient air by the radiator**. The term “radiator” is a misnomer, it actually cools the coolant by conduction, not radiation. The radiator relies on movement of air through its fins, and the amount of heat removed from the coolant is in some way proportional to the air movement. But getting back to basics, if the car is “overheating” until all the possible things that could cause it are eliminated, only then should one suspect some other less common causes like a faulty earth connection for the ignition coil because of rust on the screw fixings.

Checks needed before splashing out on new radiators

Before going for an expensive aluminium radiator the prudent checks are: **ignition timing** (is it too advanced or retarded), the **mixture strength** (are the carburettors set correctly and clean and working properly) or **binding brakes**. A dyno session will reveal all these points.

Next check the **radiator cap** (it must hold the pressure as stated on cap, if in doubt replace it) and then check for **obstructions in airflow** (badges fitted to the grille mesh or spotlights) or **anything added behind the grille**. The **twin radiator cooling fans** on the MGBGTV8 are rather puny but must be running in correct rotation so they are blowing air through the radiator. If the radiator is original and has never been cleaned, consider back flushing it, then if there is no improvement, consider having it rebuilt, if possible with a more modern core with a greater heat transfer capacity. Consider too changing the original cooling fans to a more modern pusher fan in front of the radiator or a puller behind the radiator like the RV8.

Louvered bonnets are probably overkill because when the car is moving the heat from the radiator (and that collected from manifolds and block) are carried away under the car. When the cooling fan is running the same occurs. There is adequate space around the engine and the firewall and tunnel to allow the air to escape. Remember that the engine likes to run about 110 to 120 deg C.

Note that removing the thermostat will not help, it only restricts flow when the coolant is below about 85 Deg C, after that it is wide open.

Directing cooler air to the air cleaners

The modifications to possibly allow cooler air into the carburettors, or throttle body must be done with great care, because if you move the air intake to an area of low pressure you may not get what you wanted. And if you are struggling with too much heat, you do not need to improve the performance or use that gain as the engine produces heat proportionately to the power it is making.

When stationary or at low speeds there simply isn't enough mass air flow through the radiator from the original cooling fans to cope with heat soak

Tony Lake agreed with all Nic's observations and added “when an MGBGTV8 is at rest with the engine running it can be compared to a stationary engine application, albeit with very low power output. Think of a small electricity generating set or an air compressor. In that kind of application there is no ram air cooling. The performance of the cooling system depends entirely on the core area of the radiator, the number of rows of tubes and the number of cooling fins per inch attached to them. Next, the diameter of the cooling fan, its distance from the radiator, the design of shroud to guide the air, fan blade tip clearance, its speed, whether it is a blower or a sucker fan and finally the pressure drop across the radiator which determines the air flow. Then the percentage of the radiator core swept by the fan must be considered to arrive at the top tank temp in the radiator. One must also consider the degree to which the engine compartment is closed and how easily hot air can escape.

The MGBGTV8 has little of this design refinement, time was not on its side during its development. It is a compromise with the largest radiator that will fit in the available space and a pair of electric fans whose output goes mostly in the general direction of the radiator but without ducting that air stream, a good proportion spills and misses the radiator core.

When a MGBGTV8 runs at 30mph or 44ft/sec, the theoretical air flow through the radiator, which has an area of 1.75 sq ft, is 4620 cu ft/min. There are obstructions; the radiator grille, bodywork, oil cooler, cooling fan assembly, all of which can deflect air flow or cause turbulence which combine to reduce the theoretical value to some unknown figure. If the car continues to move coolant around the temperature is normal.

On the road 30 mph is generally considered the lowest road speed at which coolant temperature remains normal in summer. In an ambient of 20 deg C, the cooling fans are off. Once the car slows and comes to rest in a higher ambient temperature the fans start quickly enough, but they are puny, as is the radiator, so coolant temperature rises as heat soak increases the under-bonnet temperature until either the limited air flow is enough to cool the radiator to switch off the fans or an equilibrium is reached, the fans may never turn off until the car moves again.

All that happens, in my experience, is that the coolant gets hotter than it does on the open road, but no harm is done. If V8 is genuinely overheated and boiled to the point where coolant was lost then for years there would have been complaints about scuffed pistons and rings and some engine seizures, but that is not a talking point.

When the fibre board duct under the radiator on my MGBGTV8 failed some years ago, I had a full width aluminium replacement made, replaced the steel mesh fan guard with a sheet aluminium piece and made up some side cheeks to close the vertical gaps between the radiator and its mountings. This had the effect of driving down the coolant temperature on the open road such that I left the inevitable gaps in the assembly open allowing some air leakage otherwise I feared the open road temperatures would have been even lower. [I've got some sketches and photos somewhere; I'll find them and share the detail.] It made no difference to the way coolant temperature increases at rest, that is simply down to low cooling fan output. Although there is less air leakage with crude ducting there simply isn't enough mass air flow to cope with heat soak at rest."

For "More on V8 engine cooling" it is well worth reading Tony Lake's article contributed as V8NOTE375