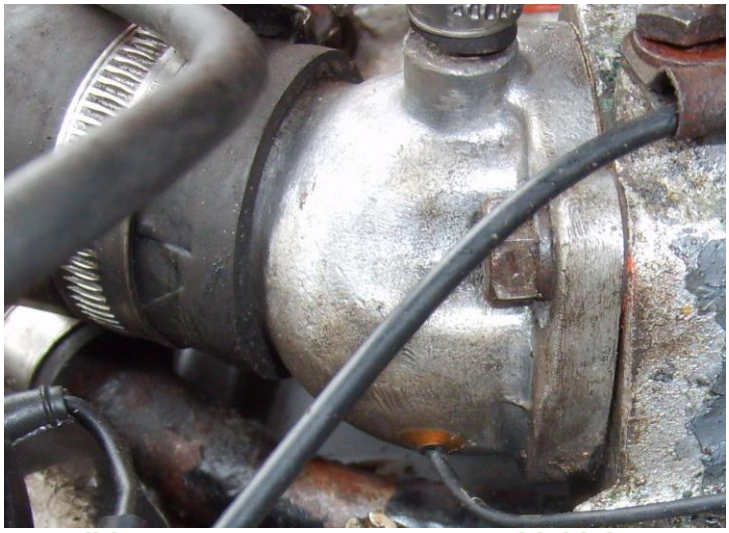

How did a Factory MGBGTV8 cope with high temperatures in Spain and Portugal?

When Andrew Collins first started making plans to join the Club's European Event of the Year in Portugal this year, his planned route added up to about 1,500 miles in Spain and Portugal in July and August. He thought about engine cooling, and decided that at the least he needed some way of accurately knowing the temperature of coolant leaving the engine. To provide this information he bought a small LCD temperature monitor which attached to a remote sensor element. The sensor element is housed in a stainless tube, 4mm in diameter and about 15mm long. He drilled a 4mm hole in the V8 thermostat housing and fitted the sensor. The LCD monitor was fitted in the centre console inside the car.

Here he describes his preparations and the information the sensor provided on how his MGBGTV8 coped with the very hot conditions.

What did the sensor show?

It was quickly established that the thermostat was opening at 82 degrees C, and the Otter switch was putting the fans on at 92 degrees C – in both cases the correct temperatures. So far, so much as per the vehicle specification. Having a temperature readout in the car is an interesting diversion, but subsequently it became a source of reassurance.

Preparations before setting off

Before setting off for Spain and Portugal I removed the cylinder heads to check the coolant passages and of course new gaskets were fitted. The coolant passages were in excellent condition. The **coolant used is 50:50 ethylene glycol (blue) antifreeze and deionised water**. At 15psi above normal atmospheric pressure this has a boiling point of about 129 degrees C.

I decided that a coolant temperature in the eighties would be absolutely normal and no cause for concern. In the nineties I would also be content, but over 100 degrees would require monitoring and a prompt decision about how to get the temperature down. If the temperature ever exceeded 110 degrees I would be looking for some remedy immediately.

It may be stating the obvious, but the radiator loses heat because of the temperature difference between the coolant inside the radiator and the air outside it. All other things being equal, if the ambient temperature increases then the temperature of coolant inside the radiator must also increase to provide the same heat loss.

With all this in mind, coolant level and oil level were checked before driving off the ferry at Bilbao. Ahead was a motorway run.

Features of the route

As is well known, much of central Spain is on a plateau at an altitude of 2000 feet or more. About 40 miles into our journey, the motorway started climbing and ahead it was clear that there was a long haul upward. Maintaining about 80mph required a fairly high power setting, and the coolant temperature began to increase. The ambient temperature at this point was about 35 degrees – Spain and Portugal were experiencing a heatwave. The road climbed to about 3000 feet altitude, and the coolant temperature passed 100 degrees. There was a little more climbing to do and the coolant temperature peaked at 105 degrees at the summit at 3200 feet. Normal oil pressure was still maintained, and I continued to our destination for that day.

A week later in Portugal we were on a similar stretch of motorway – ambient temperature between 35 and 40 degrees C, a steady climb at more than 70 mph to a maximum altitude of 3200 feet. This time the coolant temperature reached 108 degrees, again with normal oil pressure and no indication that the coolant temperature would climb any higher.

At 3200 feet, standard atmospheric pressure is 13.1 psi, not the 14.7 psi at sea level. Thus a 15 psi radiator cap will vent at an absolute pressure of 28.1 psi at altitude, and at this pressure the boiling point of a 50:50 coolant mixture will be about 128 degrees – not a huge difference from the sea-level boiling point. However, the reduced air density will reduce the rate at which heat is taken away from the radiator. On the other hand, the reduced air density will also reduce the available engine power output and thus the cooling demand.

I have **often heard the assertion that "the V8 cooling system is marginal"**. **After the run in Spain and Portugal I don't agree**. The cooling system on our car is totally standard, but in good order throughout. The radiator flows well, the coolant pump works properly, the pressure cap works, the fans work, the thermostat is correct, the coolant passages in the engine are clear and the coolant is a 50:50 mix. After the experience of a fortnight which included a good deal of 'hot and high' driving, I cannot see the need for holes in the bonnet, waterless coolant, baffles around the radiator etc.

My observations

At a road speed of 50 mph or more, I doubt that the fans contribute much to cooling the radiator and at these speeds whether the fans are running or not is probably irrelevant.

Water is a better coolant than water/ethylene glycol mixtures. Ethylene glycol has a lower specific heat than water, and at sensible concentrations (50% ethylene glycol or less) the ethylene glycol does not contribute much to raising the boiling point of the coolant. However, it is probably unwise to run on 100% water because the addition of antifreeze provides some anti-corrosion protection and also some lubrication for the coolant pump.

The temperature of coolant leaving the engine appeared to be the same whether or not the heater was on.

A key component in managing high temperatures is the pressure cap. Oil is also a part of the engine cooling equation. Make sure that the oil quantity is correct and that the chosen oil brand will still perform at elevated temperature.