

Thermostat housing corrosion of a 2000.

On my return from Spain and 7 miles from Market Harborough, the temperature gauge fell over to the right at an amazing speed, and the hot anti-freeze smell entered the cockpit! Immediate pull over, stop and turn off engine on A14! On inspection under the bonnet, nothing was untoward, just smelling HOT! Returned to cockpit, temperature had returned to 80°C, re-started and with no more excitement arrived home.

So, what caused it?

After a further 100 miles locally, and to the Annual Rally, without problem, diagnosed with other learned Roadster Owners that it was more than likely to be the thermostat jamming.

The car was fitted with a new Club thermostat and housing March 19, 2007 (9311 miles), removed top hose to replace thermostat June 26, 2009 (19693) miles. After fitting the new housing, the cooling system was filled with 50% distilled water and 50% anti freeze.

The following was found after 2 years 3 months 7 days, and 10382 miles.....

The whole of the top end of the housing had been eaten away to the top retaining "grub" screws. The left hand screw had the top 15% missing, the right less than a millimetre intact.

The following pictures speak for themselves.



When new.....



Right view.



Left view.....

And overall view showing corrosion and old thermostat. (The pictures looked ok on camera but unfortunately the sun (!!!) has deleted the clarity of the excessive corrosion)

The old thermostat was heavily corroded into place and careful digging was needed to clear the area down to the thermostat lip. The grub screws were wound out very gingerly till the inner end was clear of the lip, and did not offer much resistance. The thermostat had to be “nudged” by a rubber hammer to loosen it before it came free. The top end of the housing was cleaned as far as possible without damage to the grub screws, before replacing the new thermostat, and the grub screws gently eased to trap the lip, with no pressure against the thermostat.

Conclusions:

The new housing has been fitted for 2 years 3 months 7 days – mileage 10382.

The thermostat being copper re-acts with electrolysis against aluminium and needs a zinc anode to arrest this corrosion. Any ideas.

One idea I have had is that the housing should be machined within to allow a rubber grommet to be fitted between the aluminium housing and thermostat thereby removing direct contact of aluminium/copper/brass.

I shall be need to replace the existing housing within a year, however this does not resolve the ongoing problem.

Also, I was not happy with the 82°C thermostat supplied, the engine was running too near boil in a open system. I have found a 71°C, and fitted it prior to my journey back to Mallorca. Due to problems not connected with thermostats the engine was running far too hot and if I had had the 82°C thermostat in place would surely have boiled only adding to basic problem.

I shall be taking 8 x 71°C thermostats to the AGM, for the club to purchase and hold in stock if they so wish, in the mean time I am happy to sell at £5.00, the cost price.

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Since part 1 was written, the club now has the 8 x 71° thermostats and I have fitted one into my car prior to my journey back to Mallorca. The engine ran at a lower temperature, that I was greatly thankful for as I had ignition and timing problems on the start of the journey which caused a higher running temperature, had I had the old 82° thermostat in I would no doubt have boiled. Contrary to beliefs, the reduced running temperature made no difference to the journeys fuel consumption, 22.5 mpg.

At the AGM, I placed an open question about the housing and excessive corrosion, to those at the meeting, I was the only one to experience corrosion, this I found odd because even the original Standard Triumph mushroom thermostat and housing (all in one unit) used to corrode and need replacing.

However, to progress, suggestions were from the AGM group, 1) change the type of anti-freeze, 2) use no anti-freeze, 3) remove thermostat.

On returning to Mallorca I drained and flushed the system, refilled with distilled water, and cleaned the thermostat housing which as you will see was 3 months growth or corrosion on the housing, and decided to use remedy #2, this I will leave for a month. Remedy #3 is not an option as the engine will not reach normal operating temperature.

September 2009 clean.

January 2010 removal.



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From January 2010 through to March I used no anti-freeze, and on every outing prior to starting opened and cleared the blocked drain plug of rust debris with a 12" electrical tie inserting "every way which way" clearing the block cooling channels. Every top up was with at least a litre of distilled water (I use a dehumidifier which produces water at the rate of 2 litres per day, yes, Mallorca is very damp in winter). On opening up the system after nearly 3 months the corrosion had continued as before, so it is not the anti-freeze.



So with the 2 options of 3 removed from the equation we are left with change anti-freeze. This has been done from yellow to green ethylene glycol, which according to the March Review is OK. However, up till now with or without anti-freeze has caused corrosion of the top of the thermostat housing and the only solution after trying many experiments with rubber grommets and plastic insertions, (no comments please), is an epoxy coating as used on ships and yachts to protect their hulls against electrolysis.

At present the amount needed to coat the new housing I have is a "thimbleful" and minimum purchase amount is 1 litre of 2 pack epoxy primer. I am looking into this and will be calling on all the local boatyards to see if they will coat my housing, rather than buy and waste a litre minus the "thimbleful".

A side effect of all this experimentation is that having cleared the block of rust debris, with a heater connected into the system, I am running at 60 mph in 16°C ambient temperature, and not reaching the temperature to open the thermostat. After running 15 miles at a steady 60 mph, stopped and found the radiator cap COLD !

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From March till November 2010 (4714 miles) the cooling system has been untouched and as the AGM was coming close decided it was time to inspect.

On draining the system to allow removal the water/anti-freeze was clear and green/blue with little sediment or rust particles.

As you see below the corrosion had continued and as one of the grub screws was now about to become free I decided it was time to replace with my new epoxy resin coated housing.

Time will tell on how effective the coating turns out to be. The following pictures were taken at the time of replacement.



In situ before removal.



After removal.



After removal.



New epoxy resin housing.

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In January 2014 the bronze thermostat housing became available, however, the Epoxy Resin coated thermostat had begun corroding, having done 19,601 miles.

In February 2015, I checked the bronze housing, it was as clean as when it was fitted, after 6,620 miles.

So I think we can safely say that if you fit the bronze housing corrosion is behind you.



Old epoxy resin cleaned up showing pitting and corrosion. Note resin failed to remain attached.



Bronze housing after 13 months