

### CASE STUDY

#### Engine Overheating - updated 7 August 2018

There are many reasons a boat engine, such as the 'Sea Tiger' in a Birchwood 25, to overheat. The obvious one is weed and other detritus in the filter stopping the flow of river or sea water around the engine block and heat exchanger. But there are other causes.

When Wild Garlic recently had this problem John Pridmore checked the usual problem areas. The sea-cock filter was clear so he had an engineer check and change the impeller. The engineer did but the problem persisted. The engineer\* suggested the thermostat needed changing. John did that himself. Actually he put one in as there was not one there before! The one recommended by a local boatyard opened at 88°. Having read up on WaterMota engines and this problem John did query this but was advised it was the one.

Apparently it is not unusual that direct cooled engines, particularly the earlier models, do not have a thermostat. However, the FAQ page on Freeman Cruisers website states that "on an engine that has not previously been fitted with a thermostat it is important not only to fit the correct thermostat, but that there is a bypass and that it is operational." It also says that WaterMota petrol engines should be fitted with a low temperature thermostat (up to 75°).

Normal car thermostats break at a too high temperature. The sudden contrast in temperature between the cold river water and the temp at which the thermostat breaks can seriously damage the engine. The reasoning is simple. A car has a circulating pump, a boat has a full pressure pump. The pressure pump sucks the water constantly from the river and passes it around the engine and the heat exchanger, then through the exhaust out of the boat. When the thermostat is closed, while the engine heats the water, unless there is a bypass the constantly running pump builds up pressure and something has to give!

Referring to the Freeman website again, it says the build-up of calcium in the head can also restrict the true water flow. At this stage John was convinced that something was stopping, or reducing, the cooling water flow. John decided that a descaling intervention would not harm and turned to his trusty car mechanic (and son-in-law) Tony.

Tony arrived and suggested that he first blow-out the cooling system with a high pressure airline. He connected his line to the onboard compressor in his van and proceeded to move logically through the system.

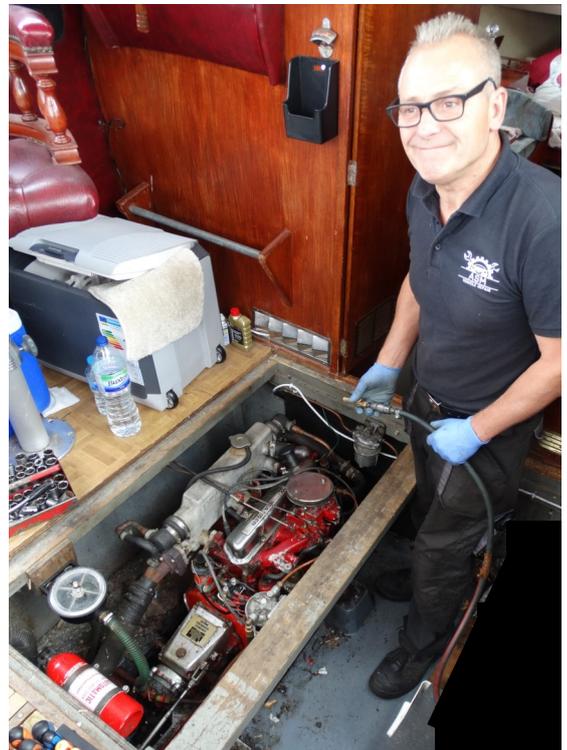
He disconnected each removable pipe as he went around the block and heat exchanger and blasted out all the cr\*\*. A lot came out! He also removed and discarded the thermostat!

After re-connecting all the hoses and pipes and securing the circlips, he filled the heat exchanger with coolant and started the engine.

After a run of over two hours the temperature gauge has not moved over the 70° it has been running at for the last 26 years! Also, the heat exchanger required very little topping-up.

In addition the bilges are dry after a run. It is assumed that we have had this problem for some time and that the bilge water was due to the pressure build up and the water exiting through the overflow pipe.

(\*The bill for the engineer to change the impeller was £170! This included 3 hours labour. John can change the impeller himself but after many stops to cool the engine down and with the heat on such a sunny day, he decided he'd had enough and would ask a local engineer to fit it. It takes John less than an hour to change the impeller so was expecting less from the engineer. Also the thermostat cost £20 and was an unnecessary cost. In addition the 'engineer' should have realised that there was no need to change the impeller and advised John accordingly.)



Thanks to freemancruisers.com, Jones Boatyard, Riverside Marine Services, sheridanmarine.com and WaterMota for advice and information.  
Also to Tony Martin of ASM for relieving the pressure!