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Water Heaters - Poor Hot Water Delivery

Instantaneous water heaters have no hot water storage and so heat the water as it flows through the appliance. The appliances are categorised by the maximum amount of hot water that they allow to flow through them in 1 minute:

- D51 range – 5 litres per minute max.
- D61 range – 6 litres per minute max.
- G101 range – 10 litres per minute max.
- G11/G111 range – 11 litres per minute max.
- F11E/EL – 11 litres per minute max.
- MP6 – 6 litres per minute max
- MP11 – 11 litres per minute max.
- EUP11RS* – 8 litres per minute max.
- EUP11 - 11 litres per minute max.

The maximum flow of water can be adjusted down to approximately half by the temperature control knob on the front of the boiler. *The EUP11RS does not allow the flow to be altered. The amount of gas burned can also be adjusted down to approximately half using the other control knob although it is unlikely that you would want to do this as it would halve the temperature of the water leaving the boiler. *Again the EUP11RS does not allow the gas to be altered. There are 5 main reasons for poor hot water delivery:

1. Temperature Lift

This is the amount of heat that the water heater gives to the water flowing through it. With the temperature control set to minimum and gas control knob set to maximum all the models listed above will provide a 25° C temperature lift (35°C for the EUP11RS). If the water coming into the home from the mains is 10°C then the temperature of water leaving the water heater will be 10+25 = 35°C. This is just warm enough for a shower. If the water entering the home is 5 degrees (typical winter water temperature) then the water heater will provide hot water at 5 +25°C which is not sufficient temperature for a shower or washing up.

Solution In this case the only way of increasing the temperature is by slowing the flow through the heater by using the temperature control knob. If you turn the knob to maximum, the flow is halved and the temperature lift is doubled to 50°C. During winter months when the water temperature entering the home is cold, use of this control is vital to ensure hot water delivery. As the temperature lift for the EUP11RS is 35°C it is less likely that this will be a problem.

Water Heater	Approx. Maximum flow rate	Temperature lift at maximum flow
D51 Range	5 litres	25°C
D61 Range	6 litres	25°C
G101 Range	10 litres	25°C
G11/G111E	11 litres	25°C
F11E/F11EL	11 litres	25°C
MP6	6 litres	25°C
MP11	11 litres	25°C
EUP11RS	8 litres	35°C
EUP11	11 litres	25°C

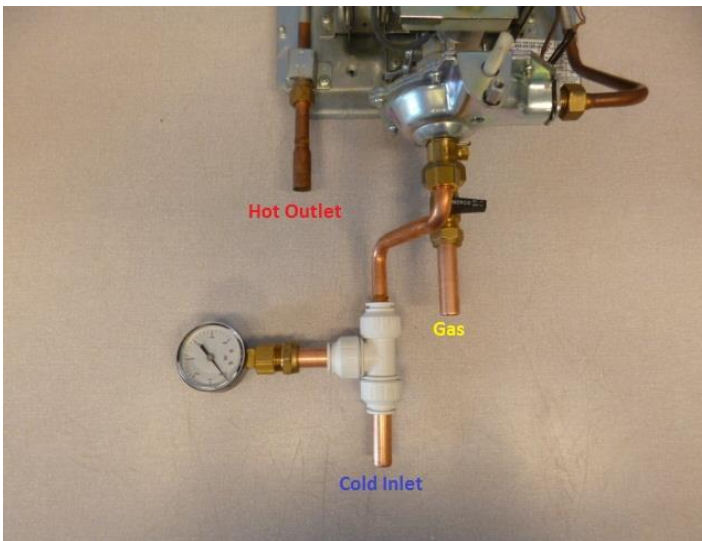
2. Low Water Pressure

The amount of gas that the water heater burns is dependent upon the pressure of the mains water flowing through the heater. This is because the gas valve is opened by the pressure of water flowing through the heater. If the water pressure is low the water heater will operate on reduced power or in extreme cases it will not work.

The problem is usually experienced at busy times on the park when many people are using the water supply or during water maintenance work or on new pitches where insufficient water pressure has been supplied.

Solution

You will need to prove to the park that they are not providing you with sufficient water pressure. This can only be done by asking an engineer to place a pressure gauge in a tee on the cold water supply pipe below the boiler. See photo on the following page.



The photo shows a tee placed in the cold water supply pipe and a pressure gauge with a range of 0-10bar connected to that tee.

Open each tap and shower in turn and read the “operating pressure” from the gauge for each. If it is less than 1bar (or in the case of the F11EL, EUP11RS, MP6 or MP11 less than 0.2bar) for one or more of the outlets then the water operating pressure is too low to operate the appliance. DO NOT make the mistake of placing a pressure gauge on the end of the incoming water supply as this will provide you with “standing pressure” and this is not relevant in this instance. A high “standing pressure” DOES NOT ensure an acceptable “operating pressure”. It is not unusual for a boiler to work correctly at midday when water demand is low and not work at 7pm when demand for hot water on the park is high. As the operating pressure varies by hot water outlet it is not uncommon for, as an example, the water heater to work when a bathroom tap is opened but not to work when the kitchen tap is opened. The reason for the variation in operating pressure is caused by the length of pipework and the number of bends being different for each water outlet.

3. Gas Supply

Insufficient gas reaching the water heater will result in poor hot water delivery. Do not be fooled into thinking all is well just because the hob and/or the gas fire work – they use very little gas compared to the water heater and they can continue to operate even though some of the problems below are present:

- Gas regulator is damaged or of the wrong size – a minimum of 3.5kg per hour is recommended
- Gas type – Propane is recommended as it will continue to work even at the low temperatures we experience in the UK. The water heater will work on Butane ONLY when the weather is warm
- Bottle size – at least a 19kg propane bottle is required to operate a water heater

4. Damaged Mixer Taps or Shower Mixer Valve

Many Caravan Holiday Homes have monoblock taps and TMV2 shower mixer valves. These are very susceptible to frost damage even when the home has been drained down due to the fitting of non-return valves in the shower mixer (see our factsheet on Winterising your home). The damage caused by frost to these items is internal and so no leak shows. However it causes cold water from the mains supply to enter the hot water supply and diluted the hot water delivery. Carrying out the solutions in section 1, 2 and 3 of this sheet will not solve this problem.

Diagnosis

If you are getting cool water at any one of the hot water outlets you can diagnose the above problem by measuring the hot water flow rate at the hot tap in the kitchen (if the tap is a mixer, ONLY switch on the hot side). Turn the temperature control knob on the boiler to minimum (fully anti - clockwise) and turn the hot tap on fully and run the water into a washing up bowl or similar for exactly 1 minute. Then measure the water in the bowl using a measuring jug or even an empty 1 litre milk bottle. If the volume of water exceeds the list below then it is very likely the shower mixer or taps are frost damaged.

Solution

You will need to establish which tap or shower mixer is damaged and replace them. This is usually best done by calling an experienced engineer.

Advanced Diagnosis

A more involved but failsafe way of checking the boiler is working correctly is as follows:

- Switch off the main water supply to the van at the stop cock.
- Gain access to the van under the water heater and locate the hot feed pipe from the water heater. It is the left hand 15mm copper pipe as you look at the front of the water heater.
- The copper pipe will either have a 15mm push fit tee or 15mm elbow connected. (see below)



- Turn the wheel on the fitting that is closest to the copper pipe anti-clockwise until it stops
- Press the collet that is between the wheel and the copper pipe into the fitting as you pull on the fitting
- This should disconnect the fitting from the pipe
- Now place a bucket under the pipe and switch the cold water supply onto the van
- Hot water should now leave the copper pipe at a flow rate and temperature lift that matches the table above
- If the flow rate is too high, the flow regulator in the water heater is likely to be faulty, this is likely to be caused by frost or excessive water pressure. If the flow rate is correct and the temperature lift is too low then you have established that the problem lies with the water heater, the gas supply or the water supply pressure.
- The benefit of this procedure is that it operates the water heater independent of the rest of the hot water pipework, taps and shower valves. If the temperature and flow rate are correct then you can safely assume the problem is not the water heater.
- Replacing the fitting is the reverse of removal.

5. Crossed Pipes

It is not unheard of for a caravan to be supplied with hot and cold pipes connected the wrong way around to a pair of taps or a shower mixer valve. This mistake can also be caused when repair work is carried out on the van, especially as a common repair is to replace the shower mixer tap due to frost damage. The effect is the same as a damaged mixer tap/shower mixer and the diagnosis and solution are highlighted in section 4 of the factsheet.

6. Scaled up Heat Exchangers

Over a period of time heat exchangers scale up and the amount of heat passing from the burner flame to the water is significantly reduced. This is particularly the case in hard water areas.

Solution

You will need to contact a heating engineer and either descale the unit or replace the heat exchanger.

7. A water saving shower head is Fitted

All combination boilers are designed to work with a certain working or operating pressure (see section 5) and a certain minimum flow rate of water passing through the boiler. Both of these parameters are influenced by the pipework and outlets on the hot water system. Certain shower heads, especially those advertised for water saving, can cause the boiler to either not fire or to fire with a low gas burn. The latter provides less heat and hence less hot water. The shower heads only usually create the problem when the mains water pressure is relatively low. You may find that the hot water tap in the kitchen works fine but the shower does not. As water pressure on caravan sites can vary throughout the day, the problem may be intermittent.

Solution

To assess the situation, simply remove the shower head and turn on the shower. If the water coming out of the pipe becomes hot then:

1. The shower head needs replacing for a "full flow" type and/or
2. The water pressure on the site needs increasing

Obviously the first solution is the easiest to carry out!