CROWN WATER HEATERS LTD
SMITH'S YARD, THE BRADSHAWS
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Guidance Notes For Provision Of Water Expansion For 10 & 15 Litre Unvented Hot Water Heaters

When water is heated, it naturally expands and allowance has to be made for this.

Vented water heaters usually direct the thermal expansion up the flow (hot) pipe. Expansion is then relieved through specially designed vented taps, which constantly drip when relieving pressure, or through a feed tank.

Unvented heaters are becoming increasingly popular as they direct the expansion in the other direction. i.e. back down the water main and use conventional taps, not the more expensive vented taps.

In brief, as the water expands back down the water main, provision must be made for this expansion, which under certain circumstances can be taken up within the m.c.w.s. pipework. Obviously, the larger the vessel storing hot water, the greater the expansion volume and consequently the greater the length of pipe needed. The length of pipe generally accepted as sufficient to accommodate this expansion is as follows:

10 Litre storage water heater : 2.8 metres of 15mm mains water pipe
15 Litre storage water heater : 4.2 metres of 15mm mains water pipe

Larger diameters of mains water pipe will require shorter lengths.

If within the 'expansion length', there is something that stops the movement back down the pipe, such as a pressure reducing valve, check valve, water meter or stopcock, then an expansion vessel and check valve should be fitted.

As a rule of thumb the expansion vessel is often 10% of the heater vessel volume. However, with 10 and 15 litre undersink units it is customary to use a 2 litre expansion vessel. A check valve should also be fitted up stream of the vessel to ensure that the expanded water is directed into the expansion vessel.

The recommended position of the vessel, and check valve are shown in the installation instructions. Please note. The expansion vessel can be fitted in any orientation, ie sideways, upside down etc. The heater can only be installed as intended.

It should also be noted that any branch connection on the cold pipe within the 'expansion length' will draw residual warm water from the pipe before it runs cold. It is therefore recommended by the Water Board that cold draw off points are not fitted within the expansion length.

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Guidance Notes On Water Pressure Problems For 10 & 15 Litre Unvented Water Heaters

If water is discharging from the safety valve, it can be for a number of reasons. The first impulse is to assume the safety valve is faulty, but this is not usually the case. First you need to establish the reason for the discharge.

The best approach is to switch **OFF** the electrical supply to the unit.

If the safety valve continues to constantly discharge, then the problem will probably be caused by one of the following:

Swarf can collect under the seat of the valve (especially on new installations) If this is the case, you may be able to clear it by rotating the safety valve head and flushing it clear. If not, then the valve will need to be removed and cleaned or replaced.

Excess Mains Water Pressure. The safety valve is set at 6Bar (but begins to lift at about 5½Bar). It should be remembered that mains water pressure is not constant and often increases at times of low demand such as evenings and weekends. This is usually at a time when properties are unattended, so it is particularly important that the safety valve discharge be piped away to safety and not left open as it can cause a lot of damage.

Thermal Expansion. If however, the safety valve discharge only occurs when the unit is switched **ON**. The problem is probably caused by inadequate provision for thermal expansion along the pipework. It would be expected that in this instance the safety valve discharge would be intermittent, ie discharging for a second or two and then stopping and starting again after some minutes. This is because the safety valve is relieving the pressure then closing, only for the water to heat up, expand and cause another pressure build up.

You should check if there is a component such as a pressure reducing valve, check valve, water meter or stopcock too close to the heater. Any of these can restrict the movement of expanded water back down the mains water supply pipe, causing the pressure build up. If this is the case you can remove the problem item and reinstall it further upstream beyond the minimum pipe length required for expansion (see data sheet Guidance Notes For Provision Of Water Expansion For 10 & 15 Litre Unvented Hot Water Heaters) or install a Kit 'A' Expansion Vessel and Check Valve.

Type of Pressure Reducing Valve. If a pressure reducing valve is correctly fitted, but you continue to have problems, you should check the type of valve installed. For example, the Altecnic 533 range of pressure reducing valves are suitable for dynamic control only and are not recommended

Dynamic means the valve works when water is passing through it.

Static means it will hold that pressure in a static situation ie it is 'drop dead tight' and does not allow the pressure to creep through.

A Static & Dynamic type valve should be used. Altecnic type 535 and 536 valves are acceptable, as are other manufacturers.

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Guidance Notes - Milky Water Explained

Milky water can at times be a common complaint. What causes milky water and why does it occur?

All Water supplies contain varying amounts of dissolved air. The air dissolves in the water when it is stored in open dams and reservoirs.

Air is more soluble in cold water than it is in hot water. Ordinary tap water contains more dissolved air when cold than it can contain when hot. You may have noticed how bubbles of air form on the inside of a saucepan of water when it is heated. This is because as the water becomes hotter, it cannot contain as much dissolved air, so the air precipitates out of the water.

Also, water under pressure will contain more dissolved air than at atmospheric pressure. This is similar to how a bottle of soda water stores gas until the bottle is opened and the gas is released. Air dissolved in cold water entering the water heater remains dissolved when the water heats, because it is under pressure. As soon as the pressure is reduced, by opening a tap, air, in millions of tiny bubbles, is released with the water. Therefore, the water has a milky appearance because of the presence of all these bubbles. This milky appearance is harmless and quickly disappears as the air bubbles rise to the surface.

If soap is used while the water is still milky in appearance, the air bubbles become trapped in the lather. This may lead to complaints the water is hard. If soap is not used until the water clears of the air bubbles, then the "hard water" effect does not take place.

The Milky water appearance often occurs when pipe services are new and clean or in areas close to a reservoir or dam. This appearance tends to disappear in old pipe services where the oxygen in the dissolved air is consumed by pipe corrosion.

In some instances, this effect stops after a few weeks.

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Guidance Notes on Thermostatic Mixing Valves

With domestic hot water installations there are conflicting considerations, i.e. scalding due to high temperature and the risk of Legionella from low temperatures. It is generally accepted that installation of mixing valves is the best solution, that is to store water at a high enough temperature to avoid Legionella, and then mix it with cold water to reduce it to an acceptable temperature at the point of use.

An average of 20 people die and 437 children under 5 are severely burned every year from scalding so the risk is very real. Legislation is already in place in Scotland and is expected to follow in the rest of the UK in the near future, requiring thermostatic mixing valves to be fitted in many applications. The penalties are severe should recommendations not be followed, up to a £20,000 fine and/or 2 years imprisonment.

In essence, there are two types of fail safe thermostatic mixing valves. The TMV2 which has been around for years, and the newer TMV3 valve with faster reaction times and improved accuracy, for the more critical applications such as children, elderly and infirm etc.

To summarise the recommendations for risk assessment, valve selection and positioning would be too lengthy for this information sheet and is already provided in detail on the Thermostatic Mixing Valve Association web site. Just go to www.tmva.org.uk and select the 'applications table'. It will give you the requirements for most installations. Another very useful source is Reliance Water Controls site www.rwc.co.uk

Crown Water Heaters stock TMV2 and TMV3 mixing valves with 24 hour delivery service.

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Guidance Notes On 'Leaking' Water Heater For 10 & 15 Litre Unvented Water Heaters

From time to time we receive complaints that water is leaking from the bottom of a heater. Usually this is **NOT** the case. In fact leaks only occur in less than 1 in every 1,000 units.

If the problem is with an undersink unit, it is much more likely that the installers own pipe connection on top of the unit is weeping and resulting in water passing through the unit and out the bottom giving the impression that the unit is leaking. This leak can be difficult to detect externally as the pipe connections are very close to the unit.

To be sure that the connections are 'sound' the following simple check needs to be made.

1) Turn off the electrical supply to the unit.

2) Undo and remove the single cross head screw between the two pipe connections

3) Slide off the grey access cover off towards you exposing all of the heater's internal components.

4) Feel around the two vertical pipes inside the unit that come down from the connection to the heater tank. It is very likely one (or both) of these pipes will be wet, indicating that the connection above is leaking and running down the pipe. The connections will need to be tightened or re made.

5) You should also check that no water has leaked onto any electrical components.

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Guidance Notes On Reduced Quantities Of Hot Water

If, after allowing adequate time for the stored water to heat up, the water heater is only supplying about a third of the expected quantity of hot water before it runs cool, this may be due to excessive mains water pressure or flow rate.

The most common cause is high mains water pressure although it is very difficult to differentiate the two.

The cold water supply to the vessel (as with most hot water cylinders) is designed to enter the vessel at the bottom. The plastic inner sleeve of the inlet pipe holds a stainless steel tube which directs cold water to the bottom of the heater where it is gently discharged via a spreader so as not to disturb the layer of hot water above.

If the pressure is too high, it can overcome the spreader and cause turbulence, which mixes the entering cold water with the hot stored water making the contents run luke-warm or cold.

In this case a pressure reducing valve should be fitted to reduce the pressure to say 1½ bar, which is quite adequate for most purposes and will help conserve water. If this fails a flow restrictor should be inserted in the mains water supply. These can be obtained from Crown Water Heaters.

It is recommended that you read the Crown data sheet on 'Provision for Thermal Expansion' which explains where the flow restrictor or pressure reducing valve should be positioned

ADJUSTING THE MAINS WATER PRESSURE

If you need to install a pressure reducing valve, the location of the valve is important. (See data sheet on 'Provision for Thermal Expansion').

If an expansion vessel and check valve have NOT been fitted, then due allowance for thermal expansion must be made i.e. the pressure reducing valve must not be installed too close to the heater or you will fix one problem and cause another.

When adjusting the pressure reducing valve, remember that water is incompressible, so before making any adjustments make sure that you isolate the supply and open the hot tap to release the pressure, otherwise you may damage the valve trying to compress trapped water.

This method will require some trial and error, but will avoid damaging the valve.