

THE SIMPLE GUIDE FOR CLEVER HOMEOWNERS WHO NEED TO CHANGE A HOT WATER SYSTEM.



**MY HOME
PLUMBING**

WHAT YOU NEED TO KNOW SO
YOU CAN GET THE BEST VALUE
OUT OF YOUR CHANGEOVER.

Thanks for taking the time to read my guide on hot water systems. For context, my name is Sandy Johansson and I am the founder of My Home Plumbing, a plumbing company that works exclusively with homeowners in the inner west. For over 12 years I have been a plumber and have learned the good and bad ways to do most jobs. I've worked on high-rise buildings and large shopping centres, but found that I'm happiest working at home, in the inner west.

I developed this guide after realising that none of my clients had much idea of what hot water system they wanted and I thought it would be useful for them to read-up a little before we arrive at their home.

In this guide you will learn:

1. What styles of system exist
2. To understand the risks of owning a Hot Water System (HWS)
3. How to know if you have a problem with your HWS
4. How to troubleshoot, maintain and do basic repairs to your HWS
5. How to pick the correct size for your HWS
6. How to ask for the best materials to install with your new HWS



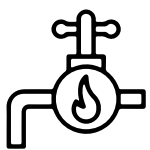
When you know all of these things, you will be prepared for the day that the HWS finally calls it a day. By knowing this you can ensure that you get the BEST VALUE out of your swap over. This guide will help you to make the decision that is best for you, your family and your home. I hope you enjoy the read.



Sandy Johansson
Founder

My Home Plumbing





HOT WATER SYSTEMS



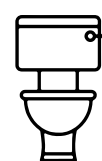
GAS LEAKS



RAINWATER INSTALLATIONS



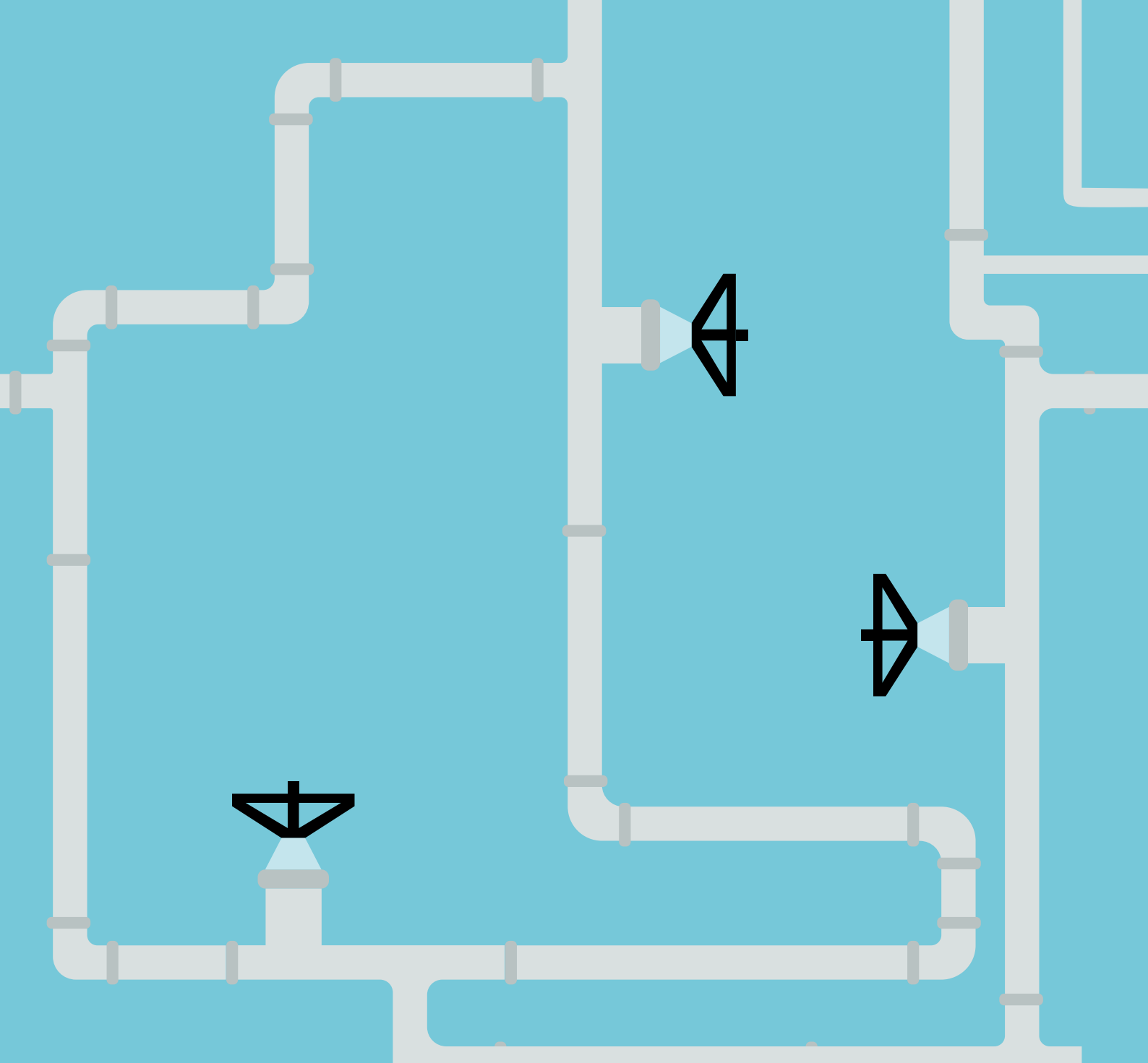
LEAKING TAPS AND TOILETS



TOILET UPGRADES



BURST PIPES



TYPES OF SYSTEMS

Hot water systems come in many different forms and below is the break-up of how they come, but let's quickly first explain how they work. Did you know that the average home can use up to 25% of its total energy on heating water? With the rising cost of both electricity and gas, it is important to ensure that you pick the hot water system that is best for you and your family.

Cold water is fed into a hot water system where it is then heated up by a source of energy to make it hot. There are 3 main sources of this energy that we will look at:

1. Electricity
2. Gas (Natural or LPG)
3. Solar

ELECTRIC STORAGE

Electric storage hot water systems are typical of older homes and units. They work by heating up a cylinder that is holding water. Normal storage tank sizes range between 50 litres (approx. 50cm tall and 40cm wide) and 400 litres (2 metres tall and 70cm wide) depending on the size of the home. Generally, these are simple to maintain and install but they cost the most to run. They are nearly always a cylinder and have an electrical cable entering at the bottom of the unit to power them up.

GAS STORAGE

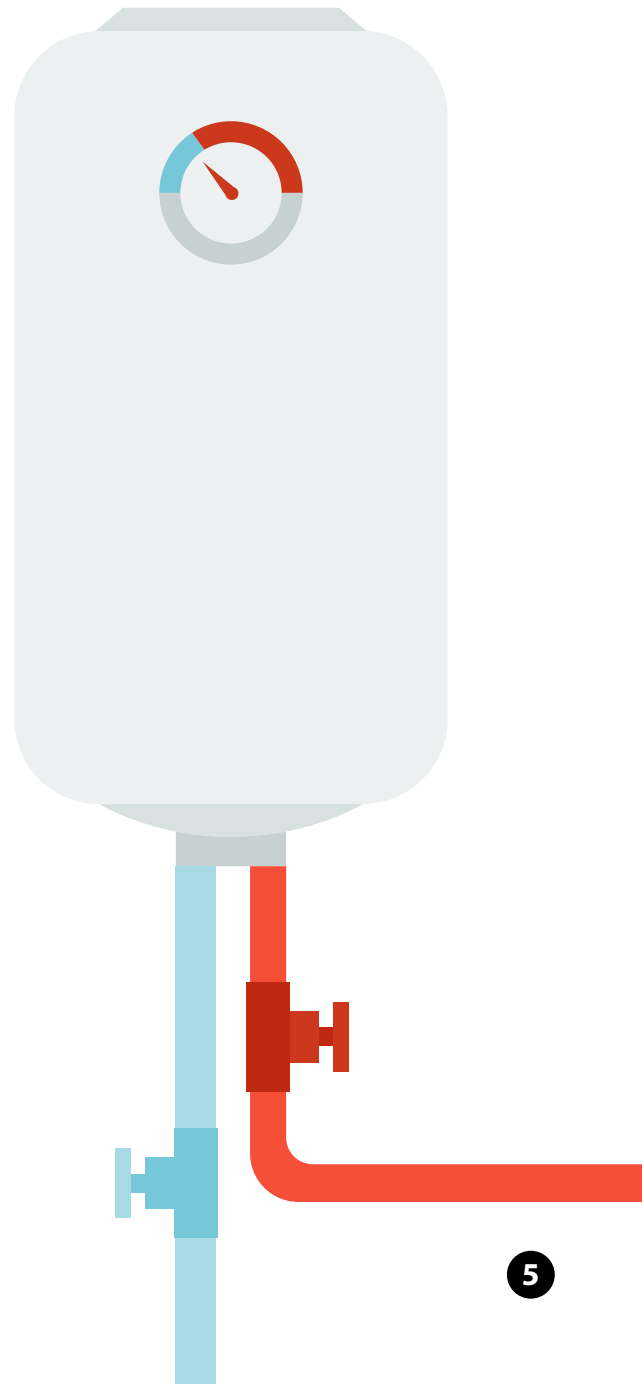
Similar to electric storage, gas storage tanks are found in older homes, however one big difference is that the fumes of the gas need to be extracted (or "flued") to the open air (or atmosphere). This is because when natural gas is burnt, carbon monoxide is created, which is dangerous to inhale. For this reason they are mostly found outside, unless they have a flue (large metal exhaust pipe) taking the fumes to the atmosphere (outside, above the house or away from windows and doors, etc.). They are powered by a big gas burner at the bottom of the cylinder, which heats up the cylinder and water inside it (think kettle on a gas cook top). Simple to maintain and cheaper to run but it requires a small amount of know-how to avoid the plumber visiting too often!

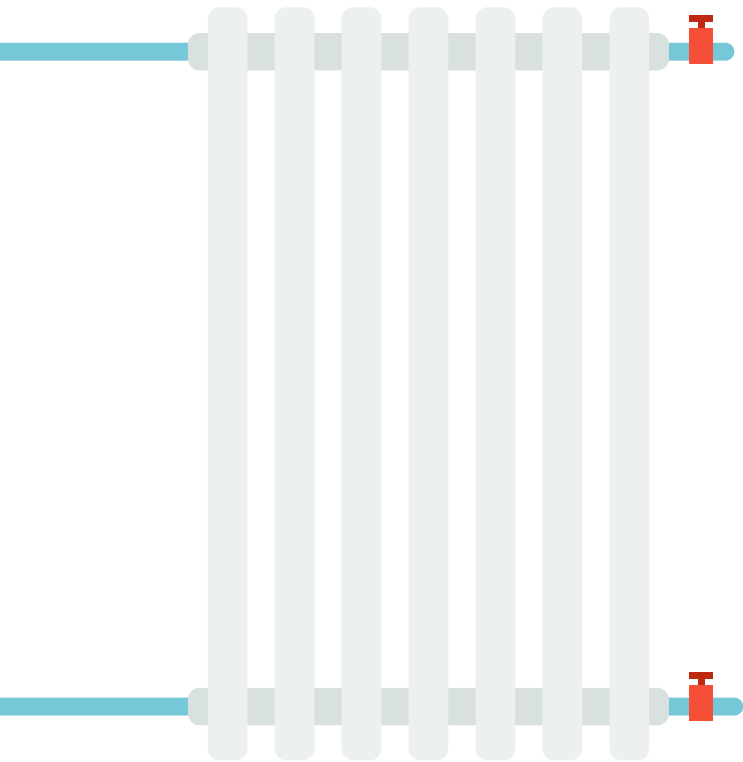
HEAT PUMP

Great when you do not have gas, these are a popular alternative to conventional electric storage. They work much like an air conditioner or a fridge, using heat from the air to heat up the water. They are more expensive to buy but are cheaper to run, especially in a warm climate where the air is hot. Be careful with placement of the system as they can get a little bit noisy (just like an air conditioning unit).

SOLAR

Not always possible to install but very effective when you can. They can provide up to 90% of your hot water by using the sun. Water absorbs energy/heat from the sun and then it is circulated to a storage tank below and the rest is heated up there. They need additional heating for days where there is low/no sun, to ensure you do not run out of hot water. Solar hot water systems are expensive to buy and installation is more difficult as access to the roof makes it harder to put in, which makes it harder to do than a simple electric system swap over.





CONTINUOUS FLOW (OR INSTANTANEOUS)

These units live on the wall and only heat up water when needed. They come in both gas and electric, however gas is by far the more popular option. Continuous flow units are great because they take up very little room and can be installed outside or inside. Even the biggest unit (70cm x 50cm) can be installed discretely against a wall or with good planning, can even be hidden inside a wall. They are simple to install, don't use any more energy than you need them to and NEVER run out of hot water. When installing a continuous flow hot water system, be aware that there are restrictions on where it can be installed around the home due to where the system is being flued to. Consult your plumber about this if you are unsure. Generally, these units will require a power point to power the ignition and power the fan for the flue.

UNDER-SINK UNITS

Under-sink hot water systems are a great option when you need hot water for a basin or a sink and the main hot water is too far away. These are common in offices, where you will find them in kitchenettes. Under-sink hot water systems normally always require a special tap to be used with them that also acts as a vent, for when the heater is heating up. Be aware that if you have one of these systems installed, dripping from the tap is normal and is nothing to be alarmed about. If I had a dollar for every time I have been called out to look at this issue then — wait, I do have a dollar for every time that's happened!

INSTANT BOILING/CHILLED/SPARKLING TAPS

More and more we are installing instant boiling/chilled taps before people sell their home. They are an absolute selling point. They look great and function the same. Perfect for people who entertain and also for those who want to get rid of the kettle and free up some room on the bench top! Be aware, there is a unit that will need to live under the sink. For the unit you will need a vent cut into your cupboard door so it doesn't get too hot. Also be aware that these taps drip too when the hot water is heating up. In my opinion, and that of a lot of real estate agents, these are a classy touch.

STAR RATINGS

When picking your HWS look for a star rating associated with it. The higher the stars, the more efficient the heater is with its energy source. Heaters over 7 stars can deliver more than 20% extra efficiency compared to 5 star rated models.



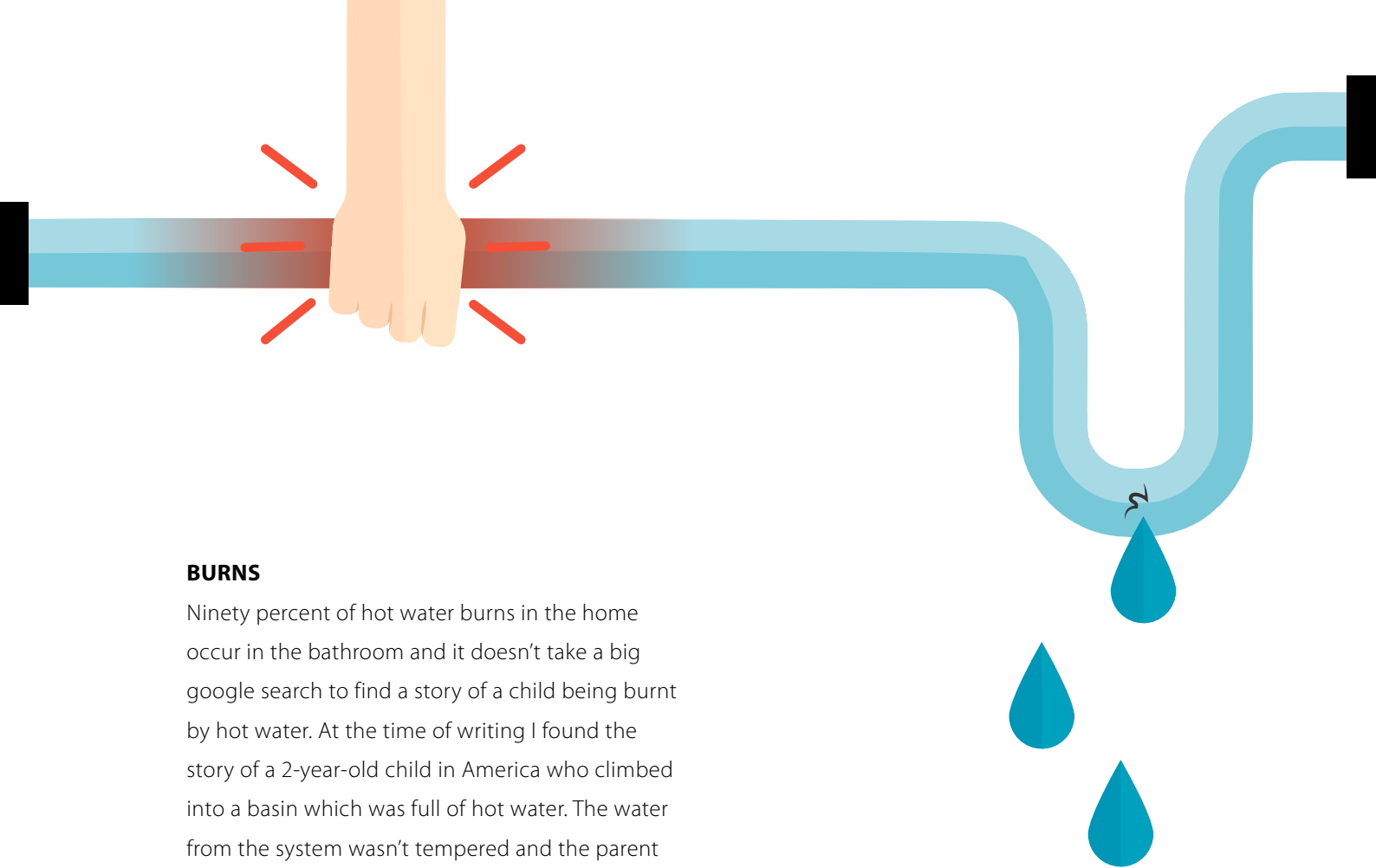


RISKS OF OWNING A HWS

LEGIONELLA

Hot water storage tanks must store water at above 60°C to avoid the build-up of legionella bacteria in water. Legionella can cause pneumonia-like symptoms and thrives in water between 30 and 50°C but can live in water up to 60°C. Older hot water systems are prone to this as they do not heat up as efficiently as they once had and they may not reach 60°C any more.

Water stored at over 60°C for over an hour will kill any of this bacteria. This is particularly harmful bacteria that causes an infection of the lungs by breathing in water vapour and can be fatal. When I was researching around this subject I found numerous articles about people who had been hospitalised, including a man in New Zealand who spent time in intensive care due to exposure to the bacteria.



BURNS

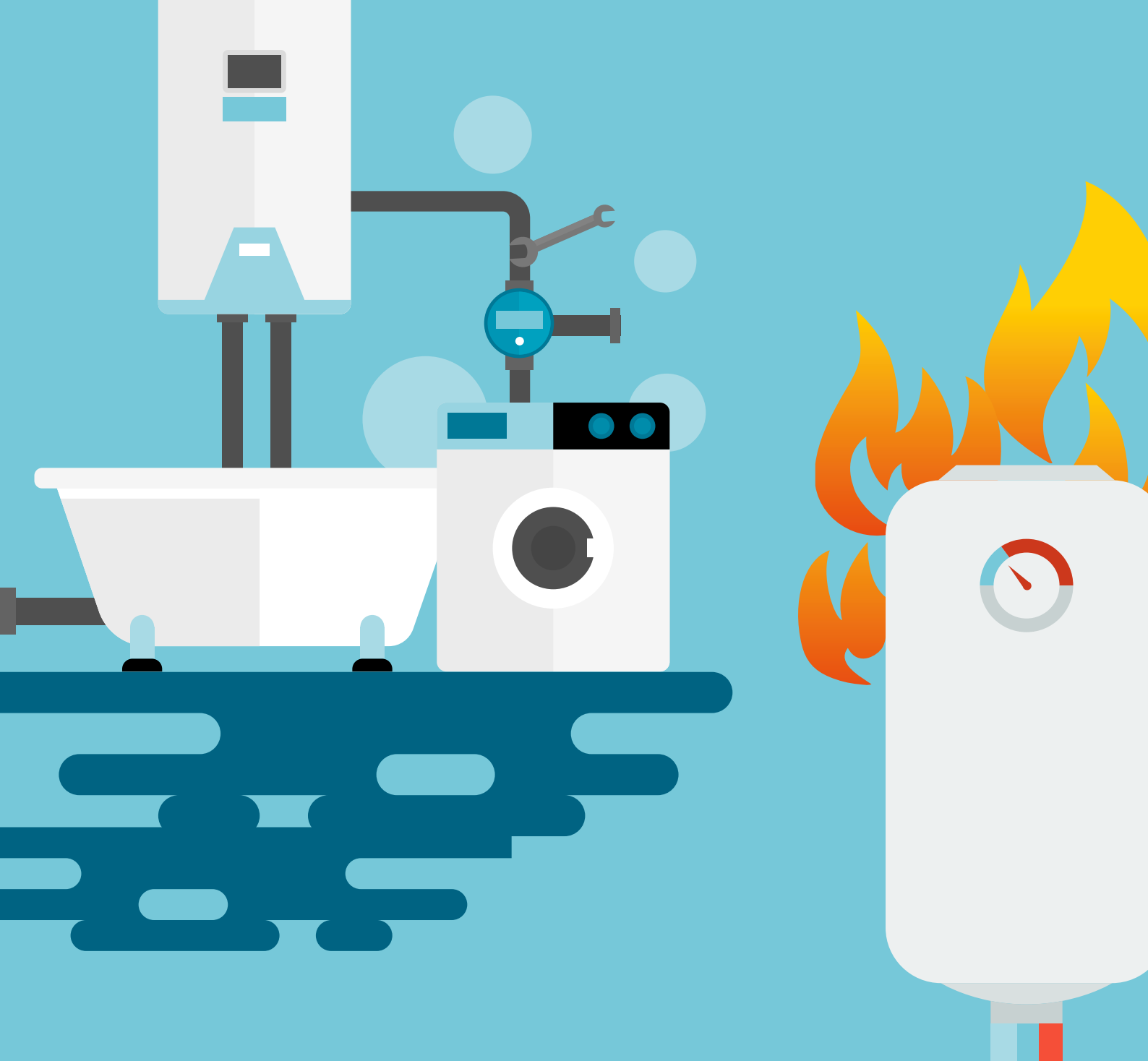
Ninety percent of hot water burns in the home occur in the bathroom and it doesn't take a big google search to find a story of a child being burnt by hot water. At the time of writing I found the story of a 2-year-old child in America who climbed into a basin which was full of hot water. The water from the system wasn't tempered and the parent had to rush him to hospital with 3rd degree burns to the lower half of his body.

Hot water can be extremely distressing on our body. At 60°C our skin will form 3rd degree burns in 5 seconds and at 50°C it will take 5 minutes to form the same burn. It is recommended that the maximum bathing temperature for a child is 38°C. By law, when you install a new hot water system you need to temper it to a maximum of 50°C for any bathrooms. Kitchens and laundries are allowed to have separate, un-tempered hot water supplies that can go hotter than 50°C.

There are three main methods of tempering hot water: with a tempering valve, a thermostatic mixing valve (TMV) or through the heater already having a pre-set temperature (continuous flow only). Tempering valves and TMVs are in the shape of a T and have three areas for pipes to connect. One for hot water to enter, one for cold water to enter and one for warm water to leave. Tempering valves are less accurate, come pre set to 50°C and must be changed every five years to ensure that they are working correctly. Plumbers must install

these with every hot water install. In some cases the plumber may be required to install a TMV. A TMV is a more accurate warm water mixing valve which is installed for disabled bathrooms and aged care homes, where people may not have the same reaction speed to burns from hot water. These are adjustable and are normally set at 42°C so that you can leave your skin underneath it for as little or as long as you require. These need to be tested annually and servicing depends on the manufacturer's guidelines.

Most continuous flow hot water systems are available as a 50°C maximum pre-set temperature. These heaters do not need to store hot water, instead they just heat it up as it is required. Continuous flow systems do not require much ongoing maintenance or extra valves like storage tanks do.



EXPLOSIONS/BAD LEAKS

It is possible to blow up a hot water system, as MythBusters proved in 2013 by pumping them up with a large amount of pressure and watching it fly! A temperature and pressure relief (TPR) valve needs to be installed on every storage tank to prevent this from happening. It is normal for these to leak a little bit and very important to know not to plug them off! When these systems do not have a TPR valve on them your system is at risk of exploding.

Rust is the other thing to look for in your HWS. Rust can eat through the tank of your system and end up all over

the floor where the system is located. Heaters located inside the home are at high risk when not serviced so it is important to regularly check for rust, and flush out sediment. You can do this by opening the hot water tap over your bath and filling it up. If the water is changing to a yellow/brown colour by the end, it's time to think about a new heater.

If replacing a hot water tank inside the home, ensure it is fitted with an emergency shut-off valve and a tray underneath it to catch leaks.

DO I HAVE A PROBLEM WITH MY HOT WATER SYSTEM?

How can you tell if there's even a problem? Depending on your system and the age of it, hot water problems can present themselves in many ways.

- 1.** Brown water. This occurs when your storage tank is older and begins to rust on the inside. It's never that obvious until you run the hot water tap for a little while and yellow/brown water comes out. Very obvious in baths where lots of hot water is used. I have removed plenty of hot water systems where, when we get to the bottom, the water is completely orange! This can lead to the HWS bursting, as mentioned in the section about risks. As mentioned above, you should test this every six months by running your bath and checking if the water goes yellow/brown.
- 2.** Leaking from the hot water system. Unfortunately this only ever gets worse. The rust from the inside has weakened the tank and is now showing up on the outside of the system. Water leaks only start small but as the material that they are leaking through gets weaker, the water will find its way out more until your home is flooded!
- 3.** It becomes noisy. This can be caused by the system being blocked up with its own sediment. Water is trapped under the

sediment and is trying to find its way out. A regular flush-out of the hot water system can help to remove sediment.

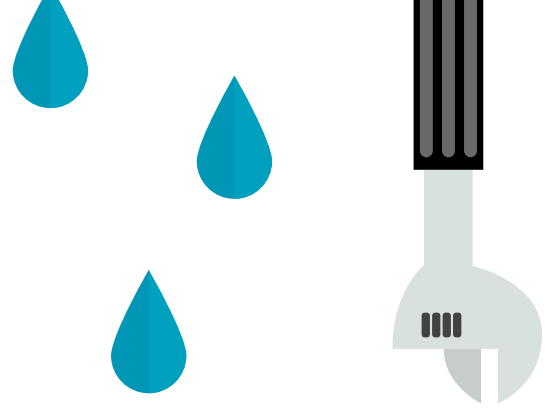
- 4.** No hot water. This can mean there is a fault in the parts that control the hot water or in the supply of energy to it. Remember that storage tanks storing water under 60°C are at risk of developing legionella.
- 5.** Water is too hot. Your system may be working too hard and making the water too hot. Check for a tempering valve to be installed on the system to prevent burns to skin and also check that your TPR valve is operating properly by pulling the lever. There is more about this below.
- 6.** Hot water taking too long to heat up. This can be caused by a range of issues and is often noticed in the shower. Try running the kitchen tap on hot only to see if it is coming through and, if not, contact your plumber.

TROUBLESHOOTING AND MAINTAINING MY HOT WATER SYSTEM

Depending on the style of system you have, there are a few tips and tricks that you can apply to save getting the plumber out.

Think that there is something wrong? In this section we'll first explore the normal things that we get called out for ALL OF THE TIME when often the HWS is OK.

- 1.** Temperature and pressure relief (or TPR) valve leaking (pic of TPR). TPR valves are meant to leak! In saying that, they are not meant to flow,



they are just meant to relieve a small amount of heat and pressure to keep your HWS safe. If a small amount of water comes out of it every now and then as the heater expands with heat, you have nothing to worry about. If you are filling up a bucket every day, you have a problem. Test this every six months by lifting the lever to make sure that water comes through. If it is jammed unnecessary pressure and temperature will be stored in the heater and it will be at risk of bursting.

2. Check the gas supply. Check other fixtures around the house to see if they are working OK. Check that the valve is on fully at both the gas meter and the hot water system.
3. Check the electrical supply. If you are running off electricity, check the circuit breaker as it may be off. If this is the case, it is important to know why it is off. Call a professional who can help identify the issue and keep you safe. Electricity is not something you should DIY! If your system is running from a power point (continuous flow systems mostly do), try plugging a phone charger or similar into the power point to check that it is working.
4. Check the water supply. Just like the gas valves, ensure that water valves are open to 100%. If there isn't enough flow, the hot water system may not activate.
5. Check shower heads. Continuous flow hot water systems will only work if there is sufficient flow of water going through the system. If the restrictors in your shower head are blocked up, it may cut the flow of water, causing your system to stop working. If hot water is working fine everywhere else (kitchen, bath, etc.) except for the shower, this is likely the cause of your problem. Try running system on hot only to see if it works.
6. The pilot light is out. This is something that anybody with a gas storage tank should know how to fix as it could save you from calling out the plumber throughout the life of the heater. If your gas has ever been turned off or maybe you have just had a really windy night, the pilot light for the burner may have been put out, meaning that there is no ignition for the main burner. Simply re-igniting the system can be enough to make it work again.
7. On an off-peak system? You may just have to wait for it to heat up again! Some electrical storage systems are wired up so they only heat up at night, making the electricity cheaper to run. These will not heat up at any time other than the designated hours.
8. Continuous flow hot water systems have a filter installed at the entry to the system. You can simply screw out the cap, wash out the filter and reinstall it. This may help to increase flow if there is a sediment build up.
9. Check to see if your unit displays an error code. Sometimes the fix can be as simple as a reset.
10. I've said it before, but make sure you run the bath every six months to ensure that rust is not coming through. It is very destructive!

Once you have explored these options, it is best to seek professional advice as you are at high risk of making an even bigger problem! If you are happy with your hot water system and its current location, then you must look after it to keep it performing well. As far as getting great value out of your hot water system goes it is best to keep it well serviced. It is essential to keeping the safety of your home and your family in good stead.

MAINTENANCE TIPS

STORAGE TANKS:

TPR valve change and a tank-flush-through should happen at least every three years. This is to flush out all of the sediment in the tank to keep it clean and make sure that the TPR will keep the HWS safe and prevent explosions.

The sacrificial anode should be changed every 4–5 years as it will wear out by then and water will start to rust out the tank. The anode is a metal rod that lives in the centre of the tank and is used to protect the tank by being weaker than the tank itself. Instead of rusting out the tank, the anode is rusted until there is none of it left.

We also recommend changing the TPR valve at the same time (or every 5 years) to prevent it from failing.

Tempering valves must be changed every five years, by law. This is important, especially if you have little kids/elderly people inside your home as it could save them a trip to the hospital.

All of these problems and issues mostly arise in storage-tank-style HWS's. This can be mostly avoided if you install a continuous flow HWS set at 50°C.

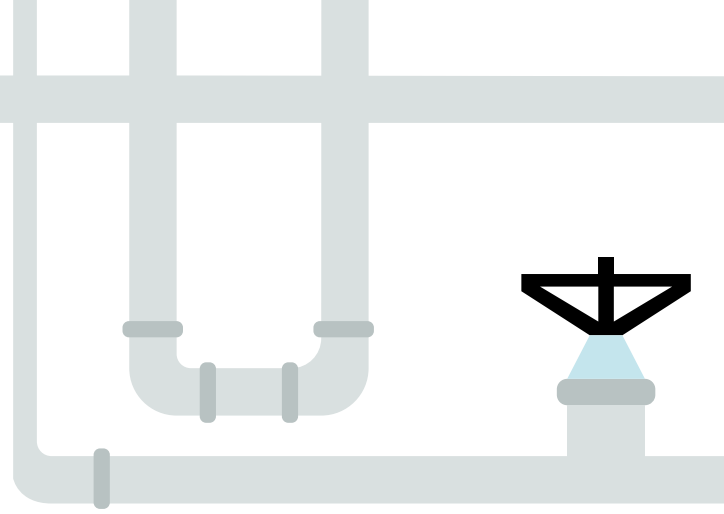
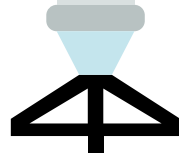
WHAT SIZE HOT WATER DO I NEED?

USING THE TABLE BELOW SELECT THE SIZE OF HWS THAT YOU NEED

System type	Electric storage on-peak		Electric storage off-peak		Gas Storage		Continuous Flow	
	people	size	people	size	people	size	people	size
	1–2	50L	1–2	160L	1	90L	1	16L
	2–3	80L	2–3	250L	2–3	135L	2	20L
	3	125L	3–4	315L	3–4	170L	3	26L
	3–4	160L	4+	400L	4-5	200L	4+	32L
	4+	250L			5+	260L		

(Please note that this is a guide only)

SELECT THE BEST MATERIALS TO INSTALL YOUR NEW HWS



In this section we look at what other components your plumber will need apart from the HWS itself.

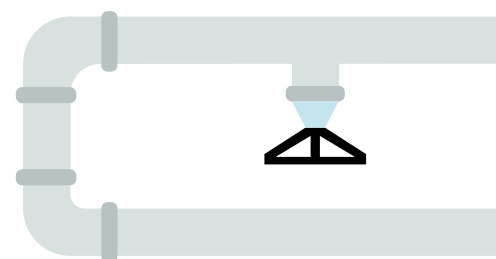
LAGGING PIPEWORK. Heat loss through unlagged pipes can force your HWS to work up to 30% harder than it would otherwise have to. Put simply, pipe lagging is like putting a thick sock on your pipes so they stay warm. Most styles of lagging can either be cut and taped on to the pipe or they can be fed over the pipe at the time of install. This is a simple step that should not be avoided.

RECIRCULATING PUMPS. Recirculating pumps keep hot water moving through your pipes so that you don't have to (a) wait for hot water and (b) waste water waiting for the hot to come through. They draw a small amount of electricity and are great for large homes with large pipe runs (where a bathroom is a long way from the HWS).

COPPER PIPE V PLASTIC PIPE. Every plumber learns the expression "do it proper, do it copper" when they are at trade school, and I am still a firm believer in that. Copper has been used for centuries and when installed correctly can last over 70 years. Plastic pipe has not been used for as long so its longevity is still up for debate. The benefits of using plastic are that it is easier to run and cheaper to buy, however it cannot be installed in any location where it is exposed to sunlight or it will cause the pipe to sag. If using plastic, understand that there are different qualities available and insist on a good quality.

TRAYS. Under every storage tank-style system that is installed indoors, a tray must be installed that runs to drainage. This is in place to protect the system and its surroundings. Over time, as you now know, hot water systems can form leaks and it is important that those leaks have a place to go or you risk ruining the rest of the house. Leaks can cause rot in timber, as well as mould wherever it runs. Recently I attended a job in Annandale where a system had burst upstairs and had leaked all over the floor. Unfortunately nobody was home and the tenants came back to a flooded home. They had to move out for a few weeks and the owner of the property had to replace the hot water system, the carpet and the floor boards, as well as find temporary accommodation for them!

LOCATION OF HWS. It is important to locate your HWS close to the areas that it will be supplying. Simply put, the closer the system is to the areas it supplies, the less work it will need to do and the less you will have to pay to run it. If building, look to group bathrooms, kitchens and laundries close together so your HWS can deliver quicker water more efficiently.





I really hope that I've covered everything that you needed to know! My hope in writing this book is to help the everyday home owner to make the best decision for them when their HWS decides to call it a day.

You should now have an idea of how to:

- 1. Know what styles of system exist**
- 2. Understand the risks of owning a HWS**
- 3. Know if you have a problem with your HWS**
- 4. Troubleshoot, maintain and do basic repairs to your HWS**
- 5. Size your HWS**
- 6. Select the best materials to install your new HWS**

When you understand these things, selecting a new HWS should be a piece of cake.

I hope that it's been of value to you and if you have any questions please free to get in touch, I'm always happy to have a chat about them.

Sandy Johansson

Founder

My Home Plumbing



www.myhomeplumbing.com.au