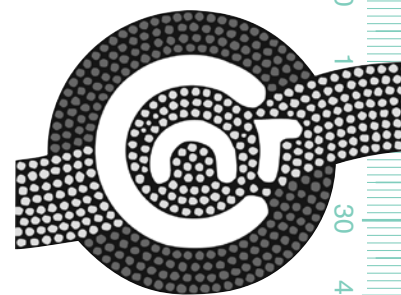


# BUSH TECH #39

## Removing scale from household fittings and appliances



This BUSH TECH focuses on tips for maintenance of household appliances that are affected by scale build up.



Scale build up on taps.

### WHAT IS SCALE?

Scale is the white, crusty coating that forms on surfaces that are in contact with hard water, such as in the tap pictured. In central Australia much of the drinking water which is sourced from bores is hard. The hardness in the water is mostly due to dissolved calcium and magnesium minerals in groundwater. This is naturally occurring due to local rocks such as limestone or dolomites. Drinking hard water is believed to have no negative health affects however it does affect the taste of the water (NHMRC 2004).

When water is heated or evaporation takes place, scale minerals cause layers of rock like deposits inside pipes, water heaters, equipment, and on taps and glasses. Scale can act as an insulating layer on the element in hot water heaters and can shorten the life of hot water elements and kettles. Scale also builds up on shower heads, toilets and damages rubber valves and seals, causing them to fail. It may eventually clog valves and pipes in homes, and has been known to cause pipes to block and tanks to split in remote communities.

### AVOIDING SCALE

The accumulation of scale on appliances can be reduced by:

- Connecting rainwater to hot water systems or evaporative air conditioners; you need to determine how much water you will use, how much it rains and the amount of rain that can be stored. (Grey-Gardner 2002, Wilson 2002);
- Use of a treatment system; treatment systems can be costly and would still require regular maintenance. (Newman 2007).

- Regular maintenance such as replacing taps and removing scale build-up.

### CLEANING SCALE

Scale can be hard and very difficult to clean, particularly when wet. It is removed from plastic easier than metal, so where possible plastic appliances should be used in hard water areas.

Surfaces can be cleaned of scale by scrubbing with a stiff nylon brush. In addition, there are cleaners sold that contain sulfamic acid or other organic acids that could be used. An alternative cleaning agent is vinegar because it contains acetic acid, a weak organic acid. Pour equal amounts of vinegar and water into a tub and place the item to be cleaned. Let the item sit over night, then throw away the vinegar and rinse the item with fresh water. If scale is still present, use more vinegar than water or soak it longer. After scrubbing or using chemicals the item needs to be rinsed well with water before it is reused. Do not use strong mineral acids like hydrochloric, sulfuric or nitric to clean metals as these will cause corrosion damaging stainless steel and aluminium.

As well as using special cleaning products available from the supermarket the white marks that scale leaves on surfaces can be stopped by wiping wet surfaces dry with a cloth, chamois or towel immediately after use.

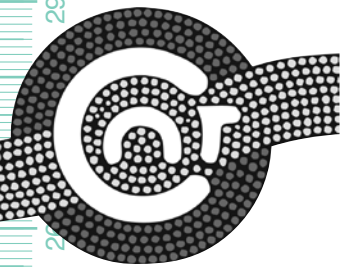
### ELECTRIC HOT WATER SYSTEMS



Hot water system elements can only be replaced by a qualified plumber or electrician, so the regular cleaning of parts in the hot water system is not routine. There are some things that can be done to make the hot water systems affected by hard water last longer:

- Pressure valves should be released for a few seconds each month to prevent scale build up in the pipes.
- Avoid using immersion heating elements and if possible use a 'bobbin' element. This is coated with a double layer of glass, which does not attract scale as rapidly as immersion elements (Beard 2007, Lloyd et al. 2000).
- Keep the temperature of the system below 60°C to reduce the formation of scale on boilers, heating elements and in hot water pipes. This can be done by

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moving the thermostat or temperature control knob on your boiler. It will also save on your heating bill.

- If possible, regularly place rainwater into the tank and flush the boiler with it until the water has been softened down.
- Use an aluminium sacrificial anode in the hot water system rather than a magnesium anode (Lloyd et al. 2000).
- Use aluminium elements of size less than 2.4 kW.
- Regular servicing by a plumber will keep it efficient and stop unexpected failures.

When buying a hot water system ask the manufacturers advice for the best system for hard water.

### EVAPORATIVE AIR CONDITIONERS



Heating element with scale.

Correct maintenance will make air conditioners last longer and run more efficiently. Regular maintenance will not only prevent scale but will ensure good air hygiene by removing other sediment, fungus or algae.

As water evaporates in the air conditioner pure water vapour is lost and dissolved solids concentrate in the remaining water. Eventually the solids precipitate in the form of scale on hotter surfaces, such as condenser tubes.

Using a bleed-off valve on the water circulation system can reduce scale but will increase water use. The valve is usually located on the vertical water pipe after the water pump or built into the sump of the unit. This allows regular dumping of part of the water and allows the refill valve to replace it with fresh water. Due to the high salts in bleed water, roof mounted air conditioning units can also corrode building roofs if the bleed water is not piped safely to ground.

Clear plastic bleed pipes should be used instead of copper ones in hard water areas, as they can be squeezed firmly, or tapped with a rubber mallet and then shaken out to loosen scale. If not cleaned, the bleed pipes can clog and cause the unit to continue to retain water, increasing scale build-up in the air conditioner.



LEFT: Scale build up inside a pipe.

### PREVENTATIVE MAINTENANCE

Changing bathroom and kitchen items like taps, shower heads and toilet parts before the build up of scale affects their usefulness is sometimes the only way to manage hard water. A regular program of renewal will reduce the frustration when these items stop working.

In order to do this you will need plenty of spare parts like washers, taps, valves, shower heads and toilet parts. You will also need some tools including an adjustable spanner to unscrew and replace parts. These are available at hardware stores. Ensure that you get the right size and part for your own house by taking in the part that you are going to replace.

'Low flow' devices, such as showerheads, are designed to reduce the amount of water you use. Because they have smaller holes for the water to flow through they also tend to clog up quickly with scale if your water is hard. If you need to conserve the amount of water you are using and choose to use low flow devices, they will need to be replaced more frequently than standard flow devices.

Remember to turn off the water supply at the water mains outside your house before changing taps! Also turn off the water to your toilet before cleaning or changing parts in the cistern.

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