



### CHOICE OF DESCALING CHEMICAL AND QUANTITY REQUIRED:

SCALEBREAKER HD may be used with mild steel, glass lined or copper cylinders.

For stainless steel water heaters, use SCALEBREAKER FX. Do not use SCALEBREAKER HD with stainless steel.

1. Calculate the amount of descaling chemical required. As a guide, for a 250 litre heater, use 25 litres descaling chemical (ie. a 10% solution by volume). A weaker solution may be used, but will take longer to remove a given amount of scale. Heat may be applied briefly, if practicable, to a maximum of 45°C and this will speed up the descaling.
2. In the above example, a C40 descaling pump of 39 litres tank capacity will allow all the descaling chemical to be placed directly in the pump tank, without any need to first drain out a corresponding volume of water from the heater.
3. A C20 descaling pump, with 20 litre tank, would require some water

to be run out of the heater before commencing, and the tank of the pump would need to be filled with descaling chemical several times, each time operating the pump briefly to transfer the chemical into the heater before commencing normal circulation. The chemical will rapidly dilute to the working strength on commencing circulation.

4. If possible, always use a descaling pump with a larger tank capacity. With heavily scaled water heaters there can be a rapid build up of foam. A larger tank gives the operator more reaction time to add FOAMBREAKER before the foam reaches the tank neck and overflows.
5. A chart to calculate volume of a cylinder from height and diameter is available from Kamco.

**NB. When descaling with any acid, some hydrogen gas may be evolved. Hydrogen is flammable, and the working area should be well ventilated. Avoid smoking nearby, or any other means of ignition.**

### PROCEDURE

1. Disconnect / isolate cold water supply pipe, hot water outlet piping, pressure relief valve connections.
2. Remove any sacrificial corrosion anode, and blank off aperture.
3. If there is a drain valve on water heater, use this as pump connection point, in preference to the cold water inlet. Check that valve is clear and will pass water through at a reasonable rate. If necessary clear a passage through any blockage - there may be several inches of scale accumulation on the base of the heater.
4. Connect one pump hose to hot water outlet (or pressure relief valve connection if of suitable size), and the other hose to drain outlet (or alternative).
5. The pump connection to the drain point should be through a valve, as a precaution. A power failure may result in the head of water in the heater overflowing the pump tank, unless prevented by closing the valve. (Scalebreaker FWF models have integral valves suitable for this.)
6. Hose connections should be made so that there is a closed circuit between the pump flow hose, through the heater, to the return hose. Venting of the carbon dioxide gas evolved is achieved through the tank filling aperture. The filler cap should be screwed on by no more than one quarter of a turn. This is sufficient to vent the gas, but will reduce fumes and prevent splashes.
7. Connect the pump to a suitable earthed power supply. As the pump will be used in a damp location, a residual current circuit breaker plug should be used.
8. The flow reverser handle points

in the direction of flow of the liquid. Operate the handle so that initially it points towards the hose connected to the drain valve. The hose from the top of the water heater will then be the return to the pump tank.

9. Prior to adding descaling chemical to pump tank, first 'prove' the circuit with fresh water alone. Add water to pump tank to approx. 4"(10cm) above minimum liquid level, switch on pump, and open the water heater drain valve to allow circulation to commence. If water level drops, add more water, and check that all connections are tight.

10. To commence descaling, slowly add descaling chemical in to pump tank. Once liquid returns into the descaling pump tank from the water heater, check if there is a rapid build up of foam on top of the liquid in the pump tank.

This may happen when there is a large build up of reactive limescale in the base of the heater. If this is excessive, add FOAMBREAKER carefully to the tank to reduce the foaming. If the heater is heavily scaled, add 25cc of FOAMBREAKER before adding descaling chemical.

11. As circulation commences, bubbles will be seen in the return hose, as the limescale is dissolved.

12. Continue circulation through the water heater and descaling pump, briefly reversing the direction of flow periodically.

13. Check all connections regularly for tightness, and absence of leaks, and if foaming is excessive, carefully remove descaling pump tank cap and add more FOAMBREAKER to the descaling pump tank.

14. Scale removal can be considered complete when no bubbles are seen in the return pipe, and the descaling solution is still sufficiently strong to remove hard water deposits. SCALEBREAKER descaling chemicals contain a built-in colour change to monitor strength. A simple check

may be made by dropping a sample of limescale into the solution, and observing if there is any effervescence.

15. Alternatively a pH meter, or pH indicator paper, may be used to check the pH of the descaling solution. Once the pH has risen to 3.5 to 4, its ability to dissolve limescale is effectively spent, and more descaling chemical or a fresh solution will be required.

16. If, after descaling has ceased, the pH of the descaling solution is still below 5, then the remaining solution must be neutralised to bring the pH level above 5, and as close to 7 as practicable.

Slowly add NEUTRALISING CRYSTALS or Neutralising Liquid to the tank of the descaling pump until there is no more effervescence as the crystals are added. When using Neutralising Crystals, if foaming is a problem during this operation, add a few ml. of FOAMBREAKER antifoam.

17. After draining off the spent / neutralised descaling chemical, flush the water heater with fresh water. Many natural waters are slightly alkaline, and water flushing may be all that is required. Alternatively, circulate a 1% solution of NEUTRALISING CRYSTALS through the heater for 15 minutes, drain, and then flush again with clean water.

If you have a Scalebreaker FWF type descaling pump, this has an integral fresh water flushing facility: When descaling is complete, the spent descaling solution may be pumped to waste along the dump hose as follows:

If the flow reverser lever is to the left, twist the right-hand dump valve through 180° to show the word 'dump', ensuring that the left-hand valve remains in the 'circulation' position.

(If the flow reverser lever is to the right, twist the left-hand dump valve through 180° to show the word 'dump', ensuring that the right-hand valve remains in the 'circulation' position.)

When 'dumping', the water level in the pump tank will fall by the same volume as is being dumped. Open the mains water supply valve and adjust to allow fresh water to enter the tank at the same rate as water is exiting the dump hose. Make sure that the tank water level remains at least 10 cm (4") above the minimum mark.

Continue dumping until fresh water is leaving the end of the dump hose.

Turn the valve which is in 'dump' mode through 180° to restore full circulation through the pump and the system. Close the water supply inlet valve once the level in the reservoir has stabilised between minimum and maximum markers. Allow fresh water to circulate through the descaled equipment for ten minutes.

**Before leaving the premises it is prudent to draw a sample of water from the nearest tap to the heater, and check that the pH is comparable with a sample taken before descaling was commenced. If necessary, flush the system further with fresh water.**

**IMPORTANT: When working with acidic descaling chemicals, always wear suitable protective clothing and goggles. Refer to instructions on labels of descaling chemicals, and refer to Material Safety Data Sheets.**

Caps should be kept securely on all chemical containers whilst not in use. To avoid splashes, operators should not stand directly over the open neck of either chemical containers or the filling neck of the pump whilst pouring or adding chemicals.

**Legal disclaimer: It is stressed that these are guidance notes only, and the above information is based on the present state of our knowledge of water heaters in general. It is given in good faith, but due to the diverse and varied nature of such equipment, the user must satisfy himself that the above procedure is viable in the prevailing situation.**