

CHOICE OF DESCALING CHEMICAL AND QUANTITY REQUIRED:

Either SCALEBREAKER SR or SCALEBREAKER FX should be used, dependent on the type of fouling.

1. Check the volume / capacity of the circuit to be descaled, and calculate the amount of descaling chemical required.
2. As a guide, for a 100 litre capacity heat exchanger, use 10 litres of 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.
3. In this situation (point 2), a C40 descaling pump, with 39 litre

tank capacity, will allow all the neat descaling chemical to be placed directly in the pump tank, without first draining out a corresponding volume of water from the heat exchanger.

- For plate heat exchangers with larger volumes, and larger quantities of plates, consider a descaling pump with larger pump and pressure output.
4. A descaling pump with a smaller tank would require some water to be run out of the heat exchanger before commencing, and the tank of the pump would need to be filled with descaling chemical two or more times, each time operating the pump briefly to transfer the chemical into the heat exchanger before commencing normal circulation. The chemical will rapidly dilute to the working strength on commencing circulation.

PREPARATION

1. Ensure an adequate water supply is available to dilute or neutralise any chemical leaks, or the spent descaling chemical, so that disposal does not contravene local regulations.
2. Isolate the heat exchanger from the heating/cooling system by closing the supply and return water valves, or use blanking plates if necessary.
3. After disconnecting the heat exchanger, couple flow and return hoses from descaling pump to the water inlet and outlet of the plate heat exchanger circuit to be descaled.

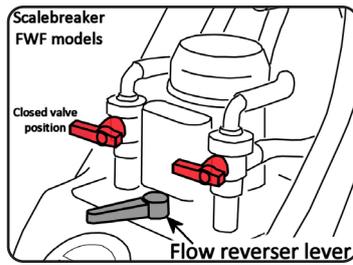
Scalebreaker pumps have threaded female hose connectors in 3/4" or 1" sizes, but it may be necessary to fit the heat exchanger

with special blanking flanges with a 3/4" or 1" threaded connection..

4. Position a ball valve on the lower connection point on the heat exchanger. Connection to the heat exchanger should always be through a valve which can be closed to prevent backflow. Failing this, power failure to the pump could result in the head of water in a larger heat exchanger overflowing the pump tank.
5. Flow and return connections should be made so that there is a closed circuit between the Scalebreaker pump output hose, through the plate heat exchanger, and back through the return hose.
6. Attach the Scalebreaker flow and return hoses so that cleaning solution is pumped into the bottom of the heat exchanger, and

returns to the pump from the top connection.

NOTE: All Scalebreaker pumps have a flow reversal device which enables flow to be sent in either direction. However when descaling plate heat exchangers the flow reverser should be set that flow only goes to the lower connection of the heat exchanger, and this flow direction should be maintained in this direction for the duration of the descale.



7. The exit connection should be at the highest point of the heat exchanger. If the exit point is lower than the top of the plate pack, adjust the exit hose position so that it rises up to a higher level before falling back to return to the Scalebreaker pump.
8. This will ensure that the entire plate pack is flooded and that Scalebreaker solution comes in contact with all internal wetted surfaces. It also ensures that the upper internal areas do not become 'gas bound' with CO₂ or foaming generated by the cleaning process.

9. NOTE: Try and avoid draining down the heat exchanger before descaling (or opening up to inspect the plates) otherwise air trapped at the top of the heat exchanger when it is subsequently refilled with water may prevent descaling chemical from reaching those areas.

10. Venting of the carbon dioxide gas generated during cleaning is through the Scalebreaker pump tank filling aperture. The 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 splashes.

11. Connection of hoses for Scalebreaker FWF models

If you have a FWF (fresh water flushing facility) model pump,

- a) connect the dump/discharge hose to the marked connection point on the hose connection bracket of the pump, and run the other end of the hose to waste or to a collection vessel.



- b) Connect the water inlet hose to the orange water inlet valve on the hose connection bracket, and the other end to a suitable water supply.

12. 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.

THE CLEANING OPERATION

1. The flow reverser handle points in the direction of flow. Turn the handle so that it directs the flow to the lower heat exchanger connection.
2. Before adding descaling chemical to the pump tank, first 'test' the circuit with fresh water alone. Add water to tank to approx. 4" (10cm) above minimum liquid level, switch on pump, and immediately open the valve detailed in point 4 above, to allow circulation to commence. If the water level drops, add more water to the tank, and check that all connections are tight. If using an FWF model pump, extra water is simply added to the tank by opening the orange water inlet valve.
3. To commence descaling, slowly add descaling chemical into descaling pump tank. As circulation commences, bubbles will be seen in the return hose to the pump, indicating that limescale is being dissolved. If foam formation is excessive, carefully remove tank cap, and add FOAMBREAKER to the pump tank to suppress the foaming. This is more likely to occur when there is a large amount of limescale in the heat exchanger.
4. Circulate the Scalebreaker solution for the suggested time, checking regularly that the solution remains active. Periodically check all connections and tighten if necessary.
5. SCALEBREAKER descaling chemicals contain a built-in colour change to monitor strength. An alternative simple check may be made by dropping a sample of limescale into the solution, and observing if there is any effervescence.

6. 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 and corrosion deposits is effectively spent, and more descaling chemical or a fresh solution will be required.

7. Scale removal can be considered complete when bubbles are no longer seen in the return pipe, and yet the descaling solution is still sufficiently strong to remove hard water deposits.

8. When descaling / chemical cleaning is complete, switch off the descaling pump. Undo the hose connection to the top of the heat exchanger and run this to a suitable drain / discharge point. Allow the spent descaling solution to drain back through the other hose into the pump tank. If the level in the pump tank rises above the maximum mark, the pump may be briefly

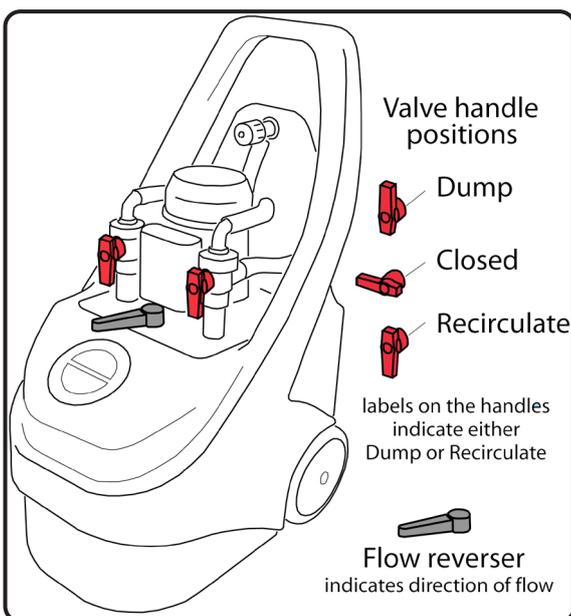
operated after setting the flow reverser lever to point in the direction of the previously disconnected hose now leading to waste. This will pump out the tank contents to waste.

10. Many facilities need to conform to pH waste disposal limits. Operators may neutralise the spent descaling solution “in situ” whilst the liquid is still circulating, by carefully adding Kamco Neutralising Crystals to the solution until the pH is brought up to a value of 7, and then flushing to drain. If foaming is excessive during the neutralizing process, add FOAMBREAKER to the descaling pump tank, and add the Neutralizing Crystals more slowly.

Many natural waters are slightly alkaline (hard water areas), and water flushing may be all that is required. As a matter of prudence, after this process, circulate a 0.5 to 1% solution of NEUTRALISING CRYSTALS through the heat exchanger for 15 minutes, drain, and then flush again with clean water.

11. When using a Scalebreaker FWF pump model, pumping the spent liquid away can be done without first disconnecting one of the flow / return hoses. Ensuring that the flow reverser lever is again set to pump liquid in to the base of the heat exchanger, turn the isolating valve on the OPPOSITE side of the pump from the direction in which the flow reverser lever is pointing through 180 degrees, so that the red valve handle is pointing upwards, in ‘dump’ mode. This will divert the return flow from the heat exchanger to waste along the discharge hose provided.

12. Immediately open the orange water inlet valve to feed the pump tank (and the heat exchanger) with fresh water, pushing the spent descaling solution to waste ahead of it.



13. Continue flushing the heat exchanger with fresh water until the pH of the water leaving the discharge hose is 7.

This action will also flush out your Scalebreaker pump system.

13. Finally, before completion of the work, it is prudent to briefly reverse the direction of flow of your Scalebreaker pump, using the integral flow reverser, so that pumping is into the top connection to the heat exchanger, and out of the lower connection. This action will flush away any debris that may have settled out in lower areas at the base of the heat exchanger.

14. Disconnect the flow and return hoses from the heat exchanger, removing any temporary isolation valves, and restore the plate heat exchanger to service.

ADVISORY NOTES:

1. 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.

2. 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 descaling pump whilst pouring or adding chemicals.

3. When descaling with any acid, there is the possibility of hydrogen being evolved. Hydrogen is a flammable gas, and the working area should be well ventilated. Avoid smoking nearby, or any other means of ignition.

4. Scalebreaker descaling chemicals contain components to ensure minimal corrosion rates. However the application of Scalebreaker may reveal pre-existing under-deposit corrosion or microbiologically induced corrosion (MIC). These types of corrosion can present themselves in the form of pin holes or similar types of damage.

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 heat exchangers 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.