



**CHOICE OF DESCALING CHEMICAL AND QUANTITY REQUIRED:**

SCALEBREAKER HD may be used with mild steel, or copper equipment.

If stainless steel is present, use either SCALEBREAKER FX or SCALEBREAKER SR. Do not use SCALEBREAKER HD with stainless steel equipment.

1. Calculate the amount of descaling chemical required. As a guide, for 30 litres of descaling solution, use 3 kg SCALEBREAKER SR crystals, (ie. a 10% solution by weight). A weaker solution may be used, but will take longer to remove a given amount of scale. Use of warm water will speed up descaling.
2. In the case of most humidifier bottles, with a water capacity of up to 15 litres, use of a C40 descaling pump, which has a 39 litre tank capacity, will allow 30 litres of descaling solution to be placed directly in the pump tank. Upon switching on the pump, it

will first fill the capacity of the humidifier bottle before any descaling solution commences returning to the tank of the descaling pump.

3. If a C20 descaling pump, with 20 litre tank, is used, it will be necessary to add further descaling solution to the pump tank after switching on, in order to ensure that enough descaling solution is present to completely fill the humidifier bottle, and also to ensure that the minimum liquid level in the tank is achieved.

**Caution**

**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. Remove humidifier bottle from humidifier and place in controlled area, away from

other personnel. It is preferable to ensure that the humidifier bottle is maintained in an upright position, in order that the carbon dioxide gas evolved during descaling will rise to the top of the bottle and be vented through the return pipe of the descaling pump.

4. Connect one pump hose to water inlet connection of bottle, and the other to the water outlet. Many humidifier bottles have large diameter tubular inlet and outlets, and suitable adapters terminating in a BSP thread will have to be fabricated.
5. Hose connections should be made so that there is a closed circuit between the pump flow hose, through the humidifier bottle, to the return hose. Venting of the carbon dioxide gas evolved is achieved through the tank filling aperture. The descaling pump 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.
6. 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.
7. 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 lower connection to the humidifier bottle. The hose from the top of the bottle will then be the return to the descaling pump tank.

descaling 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 humidifiers 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.**

8. Add descaling chemical to pump tank, switch on pump, and commence circulation. If water level drops, check that all connections are tight.

9. Once descaling liquid is returning into the descaling pump tank from the humidifier bottle, check if there is a build up of foam on top of the liquid in the pump. This may happen when there is a large amount of reactive limescale in the bottle. If this is excessive, add FOAMBREAKER carefully to the tank to reduce the foaming. If the bottle is heavily scaled, add 10cc of FOAMBREAKER before adding the descaling chemical.

10. As circulation commences, bubbles will be seen in the return hose, indicating that limescale is being dissolved.

11. Continue circulation through the humidifier bottle and descaling pump, briefly reversing the direction of flow periodically.

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

13. Scale removal can be considered complete when bubbles are no longer 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.

14. 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.

15. 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 to the tank of the descaling pump until there is no more effervescence as the crystals are added. If foaming is a problem during this operation, add a few ml. of FOAMBREAKER antifoam.

16. After draining off the spent / neutralised descaling chemical, flush the humidifier bottle 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 with clean water once more.

**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 avoid standing directly over the open neck of either chemical containers or the filling neck of the