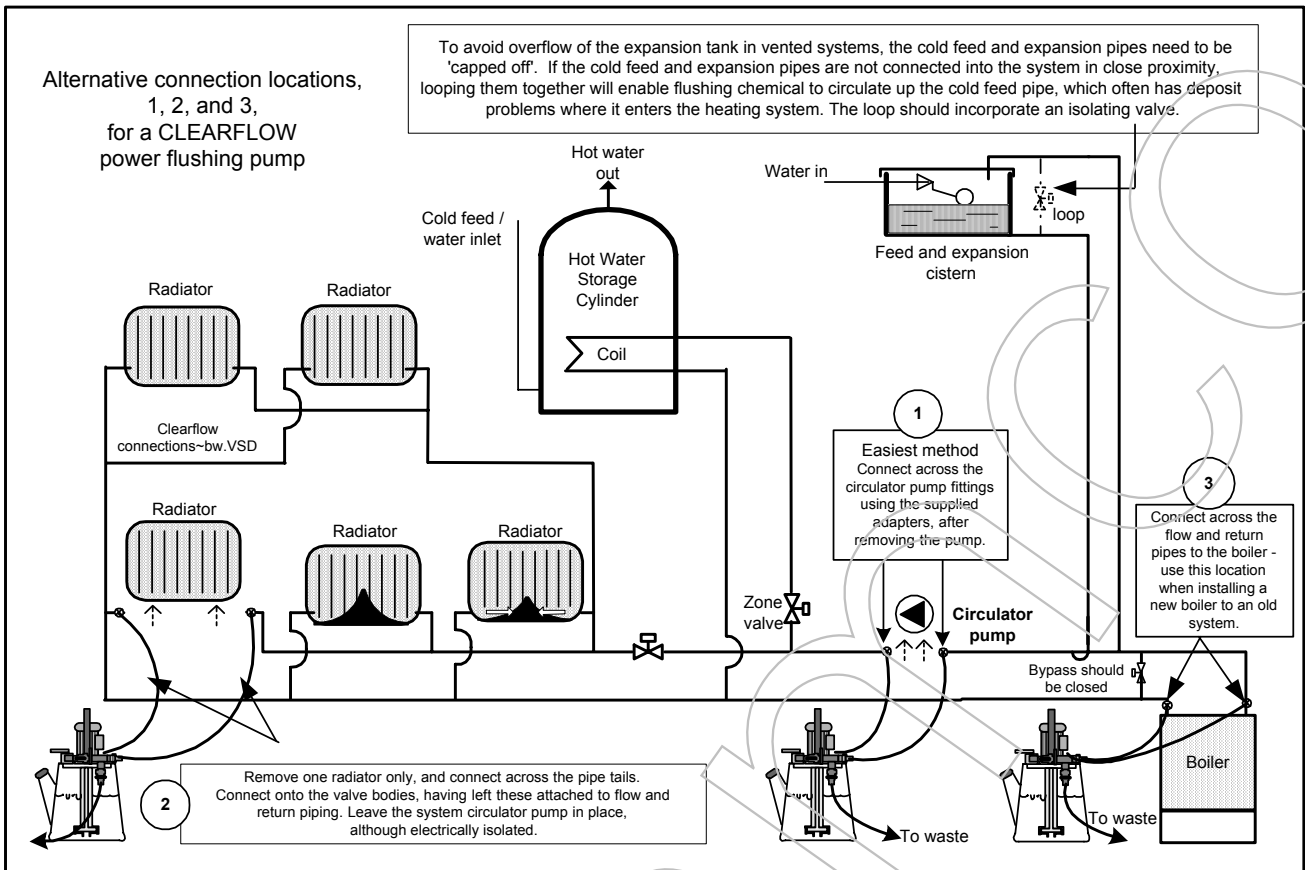


## How to use your CLEARFLOW CF30 to power flush a heating system

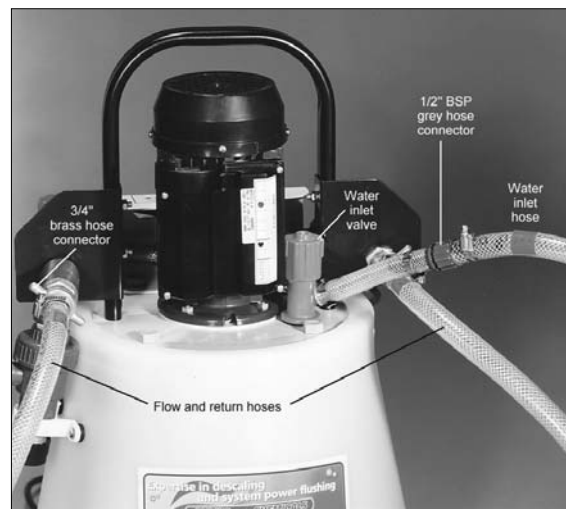
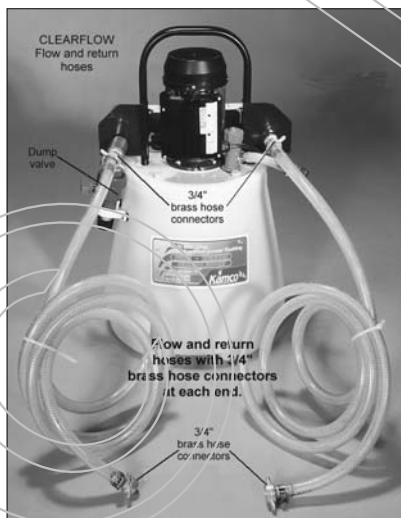


CF30 SD guidance notes3d08.doc

The CLEARFLOW CF30 pump is designed to power flush heating systems with minimal dismantling, by circulating water and flushing chemicals at high velocity, and then purging the dirty water from the system with a high flow of fresh, clean, water. Radiators may be individually flushed without removing or disconnecting them from the system.

Your Clearflow pump may be used with any commercially available flushing and descaling chemicals, including strong acids or alkalis.

Pumps with 220 volt motors are single phase, for use on a standard domestic supply. A five ampere fuse should be fitted in the plug top. We recommend the use of a residual current circuit breaker plug or adapter for extra protection.



## SECTION A – System inspection and preparation

1. Turn on heating system in order to identify problem flow areas, cold radiators, or those with cold spots, etc. Switch off system.
2. Note how many turns are required to shut off radiator and lock shield valves so that settings may be re-instated after flushing to avoid system balancing.  
Open all (both sides of radiator) valves fully.
3. Set any thermostatic radiator valves to the fully open position. Remove the heads and check that the plunger pin moves freely. Check that diverter or zone valves are in the fully open position, setting manually if necessary.
4. If an anti-gravity / check valve is present, this must be by-passed or bridged to allow the flow reversing action to be used. It may be possible to disassemble the anti-gravity valve, and remove internal components.
5. Tie up the ball cock or turn off the mains water supply by another means.
6. Drain enough water from the system to empty the F&E tank. This can be drained into the CF30 if it has been connected (connection details are in the next section).
7. With vented systems, it is necessary to cap off, or loop together, the expansion and cold feed pipes in order to avoid the powerful CF30 filling and overflowing the expansion tank.

The F&E pipes may be capped with push fit end caps, such as Speedfit, Prestek, or Hep2O, or a temporary compression fitting gate valve.

Looping the feed and expansion pipes together will enable these pipes to be flushed during the cleansing process, which can be beneficial when the cold feed pipe contains corrosion deposits.

NOTE 1: This will only be effective when the F&E pipes are not close coupled, or connected via an air separator, and will not remove deposits which have hardened over a long period of time.

NOTE 2: The looping connection may be made with any sturdy flexible tubing, such as CF30 hose, or Hep2O, but should incorporate a valve in the loop to close the circuit when flushing individual radiators.

## **Capping or looping the F&E pipes are only temporary measures which must be removed after the flushing process.**

NOTE: Don't drain water from the system to lower the water level in the F&E tank until after the Clearflow pump has been connected into the system.

Tie up the f & e tank ballcock or otherwise turn off the cold water feed, and return to the Clearflow pump. Open both the isolating valves, without switching on the electric motor. The head of water in the house means that heating system water will run down the flow and return hoses and into the Clearflow tank. Let the water run until the tank is over half full, and close both isolating valves.

You should now have emptied the f & e tank sufficiently to carry out the necessary valving or capping off of the cold feed.

## SECTION B – Location and connection of Clearflow pump

The optimum location for the Clearflow power flushing unit will vary depending on the system to be cleaned, and availability of suitable connection points.

Generally the unit should be located in a room with a suitable drain point, and near to a convenient mains water supply, such as a bathroom or kitchen. The cold water supply for a washing machine or dish-washing machine is a convenient source when a mixer tap makes connection of a hose difficult.

The normal precautions during work on any heating system should be taken, and it is prudent to place a drip tray or waterproof groundsheet underneath the pump and surrounding area.

### **1. Hose connections to the CF30**

- 1a. Ensure that the isolating valves either side of the Clearflow flow reverser are in the closed position.
- 1b. The Clearflow CF30 has two 3 metre flow and return hoses, fitted with 3/4" female brass hose connectors on either end of each hose.

One end of both flow and return hoses should be screwed onto the corresponding 3/4" brass nipples on either side of the Clearflow pump itself, adjacent to

the blue metal valve support brackets. The other ends of these hoses will be connected into the heating system itself.

- 1c. Connect the plastic overflow hose connector to the 3/4" BSP male overflow fitting on the pump tank, and lead to a suitable drain pipe gully or bucket.
- 1d. The 8 metre dump hose has a 3/4" brass hose connector which should be attached to the 3/4" male outlet of the dump valve, and the hose lead to a toilet pan or drain pipe gully leading to a foul sewer.
- 1e. Connect mains water supply hose 1/2" BSP female hose connector securely to the 1/2" BSP male fitting attached to the orange needle valve / water inlet on the top flange of the pump. Fill Clearflow tank with water to 15 cm above the minimum liquid level, and then close the water inlet valve.
- 1f. Plug in the CF30 to a suitable 13 ampere supply fitted with an RCD adapter.

## 2. Connection to the system

Connect the flow and return hoses of the Clearflow pump to the system at the selected point. This may be either:



2a. Across the "tails" to a radiator (having drained and disconnected this radiator) using appropriate 1/2" or 3/4" BSP female adaptors to connect to the valve bodies.

The radiator valves should be closed to isolate the flushing pump from the system until power flushing is commenced.

### Combination boiler systems.

The above connection method is generally used when power flushing a system with a combination boiler, when the system circulator pump is located in the boiler casing, and is difficult to access.

2b. Across the 1.1/2" BSP female couplings left once the circulating pump has been removed. The circulating pump isolating valves should be closed to isolate the flushing pump from the system until power flushing is commenced.



A pair of 2 metre long adapter hoses, enabling the Clearflow unit to be connected across 1.1/2" female pump couplings, is supplied as standard. If used, these are screwed directly onto the 3/4" female brass

hose connector ends of the standard flow and return hoses, giving an overall hose length of 5 metres.

- 2c. Across the flow and return connections at the boiler, isolating the boiler itself. This is the preferred method when flushing a heating system prior to installing a new boiler, as all corrosion debris may be purged from the heating system before the new boiler is attached. This is important with all modern boilers, but particularly so if the new boiler incorporates a plate type heat exchanger with complex and narrow water passages.
- 2d. By breaking into and connecting across the cold feed and expansion pipes if these are easily accessible, such as in an airing cupboard, and not adjacent to each other in the same pipe run (isolate the water supply to the F&E tank first!)

This method can clear deposit accumulations at the lower end of the cold feed pipe. The powerful action of Powerflush FX<sup>2</sup> will be required to achieve this.

## SECTION C – Initial flushing procedure (water only stage, before chemical addition)

Note: In the following procedure, the Clearflow CF30 is first used to loosen and mobilise loose silt and debris, before forcibly expelling it together with the existing heavily contaminated system water. This rids the system of as much debris and sludge at an early stage, before establishing full, chemically treated circulation through the Clearflow pump.

By removing loose corrosion products from the system before addition of any chemical, the full effect of the chemical is available to disturb, loosen, and dissolve more stubborn accumulations of debris.

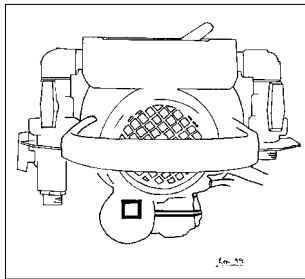
### Additional advice relating to combination boiler systems.

During power flushing, there is no circulation through the secondary heat exchanger of combination boilers.

However, to minimise the possibility of debris being pushed into the secondary heat exchanger circuit, and subsequently drawn into the heat exchanger itself when the boiler is returned to normal operation, it is prudent to close the boiler isolation valves during this first stage of the power flushing process.

1. Leave the pump tank cap off, or on by no more than a quarter turn, whilst flushing / descaling.

2. Ensure dump valve is closed.  
Open the isolating valves between flushing pump and heating system and switch on pump immediately. Ensure that liquid level in tank remains at least 10 cm above the minimum



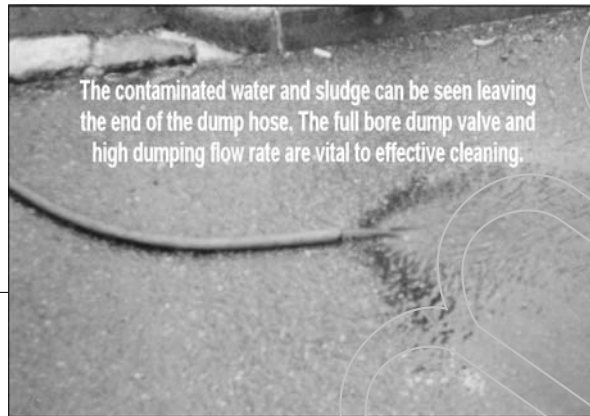
mark, adding more water if necessary.

Position of pump valves during normal operation with full circulation through heating system – both isolating valves open, and dump valve closed.

3. Allow Clearflow pump to run for ten minutes, reversing the direction of flow regularly. If there is sludge and debris in the system, the water returning into the tank will be heavily discoloured as the high flow rate picks up looser debris.

4. Check all hoses and connections for leaks.

5. Change the Clearflow into dumping mode as follows:



By doing this, system water is diverted to waste down the dump hose, instead of returning back into the tank. The liquid level in the Clearflow tank will immediately begin to fall.

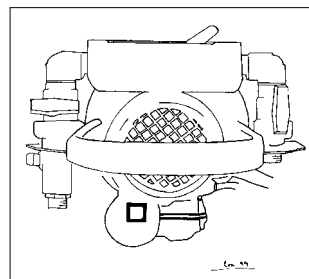
5c. The mains water inlet supply (orange tap) should now be turned on and adjusted so that the volume of incoming water compensates for that being forced out of the system to waste. Continue dumping until the waste water runs relatively clear. Ensure that liquid level in tank remains at least 10 cm above the minimum mark at all times.

6. Once the water remains reasonably clear, restore circulation through the Clearflow pump by re-opening the closed isolating valve, closing the dump valve, and closing the water supply inlet valve or tap.

7. Check that the liquid level in the tank remains stable. Add more water if necessary. Vent all radiators to ensure that there are no air pockets. Use a cloth to absorb any liquid expelled, as the system water may

be discoloured and likely to stain.

Leave the pump tank cap off, or on by no more than a quarter turn, whilst flushing / descaling.



Position of the CLEARFLOW pump valves when dumping contaminated water to waste through open dump valve and out along dump hose.

SECTION D -  
Addition of chemical -  
choice of chemical, and usage

Which chemical to use?

POWERFLUSH FX<sup>2</sup>, or HYPER-FLUSH?

Both of these chemicals will remove sludge and scale from a central heating system.

Use Powerflush FX2 when:

- You consider the system to be heavily sludged, although basically sound and in reasonable condition.
- There are no aluminium heat exchangers or radiators present in the system.
- The system does not have elderly galvanised steel or stainless steel pipework installed during the 1960s copper shortage crisis.
- You consider that there may be limescale deposits present in the boiler or system.



How much to use?

- 2.1/2 litres per ten radiators (or a little more if you consider the system to be heavily sludged).

Where and when to add FX2?

- Into the tank of the CF30 whilst powerflushing, **but not beforehand.**

Temperature required?

- FX2 may be used cold (necessary when changing a boiler), but works faster with a higher temperature. The very high flow rate of the CF30 means that it is not necessary to work at temperatures above 50°C.

Use HYPER-FLUSH when:

- The system contains aluminium radiators or heat exchangers.
- You consider the system to have suffered severe internal corrosion and metal wastage.



- The system has elderly galvanised steel or stainless steel pipework installed during the 1960s copper shortage crisis.

How much to use?

- 1 litre per ten radiators (or two litres if you consider the system to be heavily sludged).

Where and when to add HYPER-FLUSH?

- Into the system 3-14 days prior to power flushing (via the F&E tank, or a SYSTEMSURE injector unit),
- Directly into the CF30 tank whilst power flushing.

Temperature required?

- HYPER-FLUSH works best at higher temperatures, and when used to pre-treat a system, it should be operated as hot as possible.

However, the very high flow rate of the CF30 means that during the power flushing process it is not necessary to work at temperatures above 50°C.

Use HYPER-FLUSH and then FX2 when:

- You consider the system to be very heavily sludged.
  1. Add HYPER-FLUSH on a prior visit up to 14 days before the power flush, and ask the householder to leave the system running as hot as possible.
  2. Use FX2 as usual on the day of the powerflush, adding directly into CF30 tank.

Procedure using Powerflush FX2 high power flushing chemical

1. Switch on the CF30.
2. Whilst re-circulating water through the CF30 and the heating system, slowly add Powerflush FX2 to the CF30 tank, to ensure thorough distribution around the system.
3. Switch on the boiler, if fitted, and in safe working order. Allow the system water to reach 50°C, and then switch boiler off.



**NOTE: Even boiler thermostat setting no.1 could exceed 50°C.**

4. Circulate throughout the complete system for 15 minutes, reversing the flow direction regularly, and monitoring the system for leaks.

5. Close off all radiator valves, and allow the full pump flow to go through the coil in the cylinder.

**6. Reverse the flow regularly.**

7. Divert the full flow to the radiator circuit, in preparation to putting the full flow of the CF30 through each radiator in turn.

8. Fully open both valves of the nearest radiator, on the ground floor, to the CF30.

9. Flush this radiator, reversing the flow regularly, until all cold spots have disappeared, and the temperature across the radiator is consistent. Close the radiator valves.

10. Note: If your initial system check identified cold or partially blocked radiators, commence the individual radiator flushing procedure with the worst radiator first, progressing to less problematic radiators. This ensures that the strongest concentration of chemical is directed at the worst areas of the system.

11. Open the valves on the next radiator, and repeat the procedure.

12. Work through the rest of the radiators in turn, so that you have flushed every radiator individually, including upstairs radiators.

13. When you have flushed the last radiator, and it has an even temperature across the surface, switch the CF30 into dumping mode, as previously.

14. With only this radiator open, and the CF30 set to dump, run until the water leaving the dump hose is completely clear, and isolate / close off this radiator.

15. Go back to the previous radiator that you had flushed, ensure both valves are open, and repeat the dumping procedure on this one radiator.

16. Work your way back around the house in the opposite direction to previously, until you have carried out the dumping process on every radiator individually.

17. Finally, with all radiators closed off, put the full flow through the boiler alone for a few minutes, using the flow reverser regularly. Switch to dumping mode on the boiler alone until dump water is crystal clear.

18. If the system has a hot water cylinder, put the full flow through the cylinder coil, with all radiators closed off, for a few minutes. If water discolours, dump with the flow through the coil alone for a few minutes.

19. You have used an acidic cleaner, and therefore a neutralising chemical should be circulated throughout the system to ensure that no traces of FX2 remain in the system to encourage long term corrosion. Whilst FX2 contains specific inhibitors so that its presence during a power flush presents no problems, it is bad practice to leave system water acidic over a long period of time.

20. Return the CF30 into normal re-circulation mode, re-open all radiator and lock shield valves, and the the cylinder coil circuit.

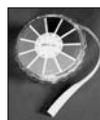
21. Slowly add 100gm of NEUTRALISING CRYSTALS to the solution in the pump tank whilst circulating throughout the system. If the quantity of foam generated is excessive, add a few drops of FOAMBREAKER anti-foam.



22. Circulate throughout the system for ten to fifteen minutes, **reversing flow regularly**.

23. Switch the CF30 into dumping mode.

24. After dumping for ten minutes (with all radiators wide open), test the water exiting from the dump hose with pH paper. Continue dumping until a pH reading of 7 is reached, or the same reading as the mains water supply in the property is achieved (both samples show the same colour).




25. As an alternative, an electronic TDS meter (Total dissolved solids) may be used. The meter should be placed in a sample of water from the dump hose, and a reading taken. This should be compared with

a mains water sample reading, and the dumping process continued until both readings are the same.

26. Close the dump valve and re-open isolating valve on the same side to re-establish flow back into the Clearflow pump tank.

Alternative procedure using  
HYPER-FLUSH flushing chemical

1. Switch on the CF30.
  2. Whilst re-circulating water through the CF30 and the heating system, slowly add HYPER-FLUSH to the CF30 tank (unless it was added on a prior visit), to ensure thorough distribution around the system.
- 
3. Switch on the boiler, if fitted, and in safe working order. Allow the system water to reach 50°C, and then switch boiler off.
- NOTE: Even boiler thermostat setting no.1 could exceed 50°C.**
4. Circulate throughout the complete system for half to one hour, reversing the flow direction regularly, and monitoring the system for leaks.
  5. Close off all radiator valves, and allow the full pump flow to go through the coil in the cylinder.
- 6. Reverse the flow regularly.**
7. Divert the full flow to the radiator circuit, in preparation to putting the full flow of the CF30 through each radiator in turn.
  8. Fully open both valves of the nearest radiator, on the ground floor, to the CF30.
  9. Flush this radiator, reversing the flow regularly, until all cold spots have disappeared, and the temperature across the radiator is consistent. Close the radiator valves.
  10. Note: If your initial system check identified cold or partially blocked radiators, commence the individual radiator flushing procedure with the worst radiator first, progressing to less problematic radiators. This ensures that the strongest concentration of chemical is directed at the worst areas of the system.

11. Open the valves on the next radiator, and repeat the procedure.
12. Work through the rest of the radiators in turn, so that you have flushed every radiator individually, including upstairs radiators.
13. When you have flushed the last radiator, and it has an even temperature across the surface, switch the CF30 into dumping mode, as previously.
14. With only this radiator open, and the CF30 set to dump, run until the water leaving the dump hose is completely clear, and isolate/close off this radiator.
15. Go back to the previous radiator that you had flushed, ensure both valves are open, and repeat the dumping procedure on this one radiator.
16. Work your way back around the house in the opposite direction to previously, until you have carried out the dumping process on every radiator individually.
17. Finally, with all radiators closed off, put the full flow through the boiler alone for a few minutes, using the flow reverser regularly. Switch to dumping mode on the boiler alone until dump water is crystal clear.
18. If the system has a hot water cylinder, put the full flow through the cylinder coil, with all radiators closed off, for a few minutes. If water discolours, dump with the flow through the coil alone for a few minutes.
19. An electronic TDS meter (Total dissolved solids) may be used to check that the system water is thoroughly clean. The meter should be placed in a sample of water from the dump hose, and a reading taken. This should be compared with a mains water sample reading, and the dumping process continued until both readings are the same.
20. Close the dump valve and re-open isolating valve on the same side to re-establish flow back into the Clearflow pump tank..
21. NOTE: When using HYPER-FLUSH, there is no requirement to neutralise after the flushing process.

## SECTION E –

### ***IMPORTANT***

#### Inhibition and corrosion protection

1. The system is now full of fresh, clean water, and it is prudent to add a good quality corrosion inhibitor, such as SYSTEMSAFE DM, to the system water to prevent further corrosion and scaling. This may be easily added to the system by using the Clearflow pump as follows:



2. Briefly open the dump valve to lower the water level in the Clearflow tank to 6 cm above the minimum level, close the dump valve, and add the SYSTEMSAFE DM inhibitor into the tank. Allow circulation through the system for ten minutes, isolate the flushing pump from the heating system, and switch off.

3. If the system is vented, with an F&E tank, the residual water in the Clearflow tank, which will contain a small quantity of inhibitor, may be poured into a bucket and added to the F&E tank after this has been cleaned.

#### SECTION F – Upon completion

1. Restore system to normal, restoring radiator balance valves to original settings, removing any temporary isolating valves or caps on the expansion and cold feed pipes, and restoring non return valves to normal operation if necessary.
2. Before re-connecting the feed & expansion tank, it should be thoroughly cleaned, removing all traces of dirty water and sludge, and then disinfected. Kamchlor tabs are available for the disinfection, and addition of SLIMEBREAKER FE after system cleaning will prevent any future bacteriological contamination.

The CLEARFLOW CF30 is also a very powerful descaling pump, suitable for use when descaling combination boiler domestic water heat exchangers, any conventional domestic boiler, water heaters, direct fired water heaters, thermal store type water heaters, showers, and calorifiers.

