Kamco

The power behind clean heating systems

How can you tell if a system needs power flushing?

When assessing an existing heating system, physical manifestations found as a result of sludge and corrosion debris being present are a good indication. These may be:

1. The system is slow to warm up.
2. Some radiators are completely or partially cold when the system is operational.
   (a heating engineer may use an infra-red thermometer or camera to assess the degree of fouling.)
3. The radiators are not getting very hot even with the valves on maximum, but the pipe work running to the radiators IS hot.
4. The radiators need frequent bleeding as a result of gas generation.
   (hydrogen gas is a by-product of the corrosion process.)
5. Water samples taken from radiators are dirty and discoloured.
   a) If there are black particles present in the water (see Diagram 1), these are most likely to be magnetite. As this is the final stage of corrosion, large deposits can be expected within the system.
   b) If there is a reddish tinge to the water, it indicates that iron oxide is present, suggesting active corrosion.
6. One or more radiators have failed with pin hole perforations.
7. There are 'kettling' noises from the boiler.
8. The circulator pump is found to be heavily fouled and frequently needs replacing.

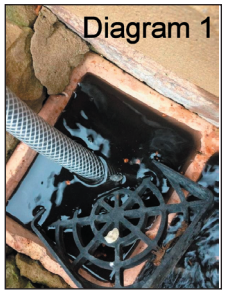
Diagram 1

<u>Replacement boiler installations</u>

With new boiler installations other factors need to be considered.
If any of the above symptoms are present a full power flush would be preferred, but may also be considered even if none of these problems are apparent:

1. A visual inspection of water drawn from the heating system can be deceptive. The sample may appear to be relatively clear and clean, but still be quite aggressive. See Diagram 2 - this water was from a system which had experienced five perforated radiators yet showed no iron in solution. Copper in solution was at 5ppm, a level which does indicate corrosion problems. Use of simple drop test kits on site would reveal these problems. The system water should be replaced with fresh clean water treated with corrosion inhibitor.


Diagram 2

2. A clear sample of water does not eliminate the possibility that corrosion has taken place in the past and that there may be substantial corrosion debris present in the base of radiators and under floor sections, having settled out over time. This occurs because the circulation rate of a standard system circulator is not enough to keep debris in suspension.

A subsequent boiler, pipe work, or pump change can disturb any 'benign' debris as a result of changed flow characteristics and it is prudent to flush the system at the time of the boiler change to remove that

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debris and other material that may be introduced at the time.
As a consequence, before a boiler change, it is prudent not only to check a sample of system water visually, but also to check the pH level, and dissolved copper and iron levels for evidence that corrosion may have taken place.

The decision whether to opt for a gravity system flush relying on the use of a flushing chemical in conjunction with the system circulator pump, and possibly a temporarily installed magnetic filter, or a full power flush is for the heating engineer to decide.

However, for peace of mind and greater certainty that the system is truly clean before the new boiler is installed, it is better to opt for a power flush for the following reasons:

1. Power flushing is considered to be the most effective method of cleaning systems currently available (see (BS7593). The quantity of debris removed is proportional to the flow rate, and a good power flushing pump has both a much higher flow rate and a greater head than a circulator pump. See Diagram 3 for why this is.

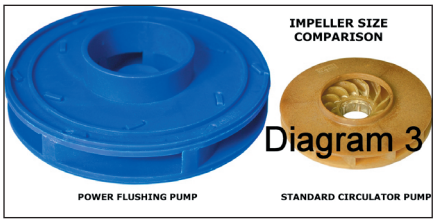

Diagram 3

2. A power flush will remove settled debris that the circulator pump cannot/ does not. High velocity water can carry debris vertically as well as horizontally, enabling far more debris to be removed than by any other method. The degree of cleanliness is particularly important with combination type boilers with integral plate heat exchangers, which are very prone to fouling. See diagram 4 for an indication of the quantity of corrosion debris (12 gm) needed to cause a boiler to lock out in hot water mode.


Diagram 4

3. Instantaneous reversal of flow can be carried out with a good power flushing pump. This creates turbulence within radiators and will remove debris that is sheltered from the normal mono-directional flow of a circulator pump.

4. Use of a power flushing pump removes reliance on the system circulator pump to move debris to a filter, or to waste. Circulator pumps have a much lower flow rate and are themselves prone to fouling (see Diagram 5) as a result of the magnetic field generated by the motor, further reducing the ability to move debris. Before attempting to carry out a system clean using only the circulator pump, it is prudent to remove and check that the pump itself is clean and functioning properly. New high efficiency circulator pumps, with permanent magnet rotors, have greater susceptibility to fouling by magnetite corrosion debris,

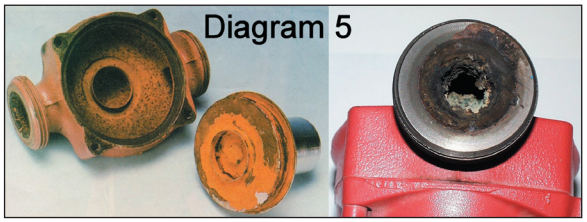
Diagram 5

5. If the boiler being replaced has an integral circulator pump (such as combination type boilers) then a flush of the system after removal of the boiler will necessitate the use of a power flushing pump.