Purge debris from an open system

Powerflush's Tarquin Purdie looks at the benefits of power flushing, and explains how Powerflush would clean an open system with an accessible pump

Powerflushing's ability to extend the life of the pipe system has a huge environmental and financial benefit. It reduces the need to replace copper pipework, and to redecorate and repair damage to floors and walls.

Powerflushing involves cleaning corrosion and scale debris out of radiators, pipes and boilers. It will also often include checking for and clearing blockages, attempting to clean the hot water side of combination boiler plate heat exchangers, diverter valves, thermistors, and trying to reduce boiler kettling.

Powerflushing is becoming a vital part of boiler installations, as a result of the high risk of blockages in low-water content plate heat exchangers, and other sensitive combination boiler components.

To powerflush an open system with an accessible pump, we remove the circulator pump and connect a magnetic filter, then our Powerflush equipment.

It is important to connect at the pump, as powerflushing requires maximum flow control, and connecting at a radiator reduces it.

Powerflushing often involves clearing blockages, which are usually found in the cold feed. First, the feed and expansion (F&E) cistern mains supply is stopped by turning off valves or tying up ball cocks, and the air vent is capped.

We then check to see if there is a blockage by opening the pump valve in the cold feed direction. If all is clear, the feed tank contents drop into the empty powerflush container.

If not, we cut the feed pipe 20cm above where it joins the system pipework, with bucket and towels ready, and we manually clear the blockage.

The cold feed is reconnected with a full-bore ball valve, which is turned off so we have a closed system. The other pump valve is opened to start circulating the system water so it leaves the pipework and radiators carrying loose corrosion debris to the powerful magnetic filter.

During powerflushing, radiators should be vibrated to remove debris build up

The rust – magnetic iron oxide – sticks to the magnet and is largely removed at this point. Always keep the powerflush machine clean and filter the water before it enters the boiler heat exchanger.

Next we add chemicals, loosen and filter the rust. The filtered water goes on to the powerflush pump, where a chemical cleaner is added. Whether an acid-based chemical or a milder non-acid chemical is used is up to the engineer, and opinions differ on which is preferable.

The water and cleaning chemicals pass through the boiler and get hot. Chemical reactions speed up with hotter temperatures, so raising it by 50ºC increases the cleaning efficiency many times over.

As hot chemicals pass through the radiators, infrared thermometers can be used to measure the surface temperature. Good flow results in high temperature readings, but corrosion debris build-up will cause cold spots.

We can then vibrate the cold areas, reverse the flow and add more chemicals until the whole surface reaches a uniform temperature.

There will still be a layer of rust on the inner radiator surface, so we close the radiator valve and leave the hot chemicals to soak in. We then repeat this process for each radiator and the hot water coil until everything has soaked.

While the system is heating up, it is a good time to clean out the F&E cistern, either in situ or outside depending on the risk of causing other problems. After the last radiator is hot all over, we close it and open the hot water cylinder circuit.

This is rarely blocked but can have surprises of its own, such as a blown hot water coil. The hot water coil is then closed off.

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Once everything is soaking, we open the mains-water connection into the powerflush machine and open the valves on the radiator which has been soaking for the longest. Clean water is sent along the system flow pipes, through this open radiator and back along the return pipes.

Then we isolate the magnet filter so that we can assess the water condition and dump the water down a drain. After a while, the water will start to run clear. The bottom of the radiator is vibrated to loosen stubborn debris, which is carried out of the radiator by the flow.

This ensures that as much rust and corrosion debris is removed as possible. We continue purging and taking TDS (totally dissolved solids) and pH readings (the latter only if we are using acid-based cleaners) of the dumped water, until we have clean pH neutral readings. Then we close off the radiator.

Changing flow direction is useful, but vibration is even more effective. This process is repeated for each radiator, then the hot water coil, until all are clean and pH neutral.

We then add a small amount of alkali neutraliser in case any acidic cleaner is hiding on radiator surfaces. We purge this, and add a Domestic Water Treatment Association (DWTA) approved corrosion inhibitor. We then disconnect our equipment, replace the circulator pump and balance the system.

Powerflush pays £50 for each job referred to it by heating engineers. Since the company only does powerflushing, there is no risk that it might poach other work from installers. Any secondary work from a specific job is always referred back to the introducing engineer if they want it.