The principles of powerflushing

A central heating system that is free from sludge and rust is essential for its overall health, and powerflushing is a proven method for achieving that aim. Carol Hitchcock stopped by Kamco's one-day training course to find out how installers can take these skills on board.

Each Kamco course begins with a fundamental question: Why do we need to powerflush a domestic central heating system? Trainer Giles Hanford knows that his class full of plumbing and heating engineers will have some good answers to this query, but understanding why and how the process works might be less well appreciated. Answering all these questions in a practical way is a big part of what the one-day powerflushing class is all about, as I found when I sat in on a recent course at Kamco's head office in St Albans.

Trainer Giles Hanford shows off the magnetite collected from the flush

A trainee gets to grips with Kamco's Clearflow CF30 machine

Proof positive

The 18 people I joined on the course came from a wide variety of backgrounds, from a veteran gas engineer who had never power flushed before, to a plumbing apprentice who'd assisted on a few jobs, as well as a group of water treatment and leak detection specialists. Giles's job was to make sure he pitched the instruction so that it addressed the needs of each and every trainee, and to achieve this he took full advantage of the well equipped training facility.

A completely operational heating system features prominently on the front wall of the room and is a main focus of the day. The trainees used the better part of the morning learning how to flush it out, which means that a day off work in the field is by no means a day off the tools for those who attend. There is also a cabinet full of props and specimens that Giles frequently draws upon in order to better illustrate particular points of fact.

"It's not enough to talk about what clogs up a system," says Giles. "You've got to show the evidence to illuminate the concept. These guys know that rust, for example, will block the small waterways of a combi boiler, but when I show them tangible evidence of how little it takes – just 12 grams – when they hold that small sample in their hands, it gives them a better idea of what they are fighting against."

Another approach Giles takes to keeping the classroom environment lively and stimulating is to ask lots of questions. "This makes it a two-way course," he explains. "These guys don't come in here to get a monologue from me. They're here to learn, and a good way to do that is through discussion with their peers. I want to provoke a bit of thought and keep them engaged at all times."

Before we get on to the main business of powerflushing on Kamco's training equipment, Giles asks us to think about what factors contribute to a successful cleaning process. Many of the trainees offer up some good ideas, and we find that the ideal combination of flow rate, heat and quality chemicals makes the difference between a squeaky clean system and one that remains beset with sludge and dirt.

Fluid dynamics

"If they learn nothing else today," Giles told me, "I want it to be the importance of flow rate. Water moving slowly in a system is going to pass over solids and leave them behind. That's why you've got to get the water moving very quickly. The key words are high flow rate, velocity, speed and volume – that's the critical point of powerflushing. The rest of the day is about ways of achieving that."

Prior to undertaking a powerflush, the trainees are expected to make sure the heating system is operating properly, an essential step they will need to take in real world applications. They take a look at a wide range of indicators by switching on the heating and hot water, including making sure the flow and returns on all the radiators and the cylinder are getting hot, that the immersion heater works and that hot water comes out of the taps where it should.

"A system survey is important for a couple of reasons," Giles explains. "The first is that it helps to identify any faults, and this gives them the opportunity to communicate with their customer about the condition of their heating system."

Giles makes a big point of the fact that once an installer shows up on site to carry out a powerflush, any faults that already exist in the system become his problem once he starts working on it. Because this is such an important issue, Kamco has produced literature that installers can use to talk with their customers to help them understand what a powerflush is and, to some extent, what the risks are of having one done.

"It's about a balanced level of warning," Giles explains to us. "You can't go in there and say, I'm going to do a hot acid flush and it may turn your system into a sprinkler, but you can't be too laid back either and say there won't be any problems. With proper preparation – and communication – installers can conduct a powerflush with confidence."

Pump prep

By late morning, Giles has the trainees on their feet and at the machines as they start to look at the practical aspects of powerflushing. The training room is equipped with no fewer than four Clearflow machines, from the latest model to one of the older units that isn't manufactured anymore.

"We make sure they get to work on the older machines as well as the new ones because there are plenty of them out there still in operation," Giles tells me. "Quite a few of the trainees here today own the old CF30, and we need to support them with training just as much as someone who just bought a brand new CF40."

Full circuit

The practical session begins with connecting the hoses to the machine, adding the CombiMag to the circuit and looking at the nitty-gritty of how to operate the controls. The heating system in the training room is a vented system with a feed and vent pipe to the atmosphere and an F&E tank on the other side of the wall. To get the guys going, Giles asks them lots of leading questions, such as whether the F&E tank would need to be drained down, what should be done with the water from the dump hoses and how best to deal with bypasses.

The powerflush carries on while we break up for a short lunch. By the time we come back, the process is drawing to a close and the trainees get to glimpse the CombiMag, which is now thoroughly coated with magnetite, indicating a successful flush. The next important step is testing the water for clarity, purity and pH. Once all tests are completed, we finish up by recommissioning the system and talking about how to hand it back over to the customer.

We closed the day with the trainees asking Giles follow-up questions, with topics ranging from how to deal with microbore pipework to working on systems with thermal stores and the importance of using inhibitors that meet the DWTA Buildcert standard.

Signing up

Kamco runs its powerflushing course in St Albans twice a month and offers it free to those who have purchased a Clearflow pump. Otherwise it's £45, with the cost redeemable towards a new machine if purchased within two weeks of the course. The day begins at 10.30 in the morning and usually runs to 4pm, including a break for lunch.

Testing the waters: Using a turbidity tube (left), a TDS meter (centre) and a pH meter and paper (right) to ensure the system has been properly cleaned