

The Revised Building Regulations Part L, produced by John Prescott's office and due to come into force on 1st April 2006, will probably for the first time require that some kind of provision is made for the alleviation of the effects of hard water in domestic water heaters.

Many installers already use physical water conditioners (PWCs) and they are even recommended by some boiler manufacturers, but there has never been any kind of requirement to fit them.

Now that they may become compulsory, there is more focus on what they actually do and how effective they really are. Unlike Germany, the UK has no performance standard for PWCs so, if money has to be spent, how can you tell if it is being spent wisely?

It is important to remember that PWCs don't stop scale from forming, but instead stop it from sticking to surfaces by creating nucleation seeds onto which the scale is formed, thus keeping it in suspension in the water.

Most PWCs fall into one of two categories, differentiated by the mechanism they employ to inhibit scale encrustation. Zinc dosing is the most common mechanism employed.

Zinc released into hard water converts to zinc carbonate which has a similar crystal structure to scale (calcium carbonate) and therefore acts as a seed upon which the scale forms in suspension in the water. Most of the more effective 'in line' magnetic PWCs incorporate a zinc anode which corrodes into the water.

As water passes through the magnetic field it generates a DC current releasing the zinc from the anode. Similarly, electrolytic systems incorporate dissimilar metals that create an electric current without the water flow.

Such units can be very



Iveagh Court, Bracknell. Owned by The Guinness Trust. Water-King Sentry water conditioners were chosen to be retro-fitted after extensive trials.

Water conditions under Part L

Lifescience Products examines the effects of PWCs on hard water build up in domestic water heaters.

effective in preventing scale. They can be cheap and simple to fit, but they often suffer from having a relatively short life of two or three years, possibly more, before the performance falls off and scaling of the heating system recurs.

For many people such a short term solution is perfectly acceptable. Many house builders and developers are only concerned to get through the guarantee period with as little cost as possible. Those with an interest in longer term sustainability and reduction in full life costing seek other alternatives.

The other main class of PWCs are described variously as electromagnetic or electronic systems. Generally these are powered by mains electricity and transmit a signal into the water either by wires wrapped around the outside of a pipe, by a ferrite ring or by using powerful electromagnets or

internal copper coils over which the water is forced to flow at 90° to the field.

The mechanism employed is not fully understood but current thinking suggests that they cause an electro-chemical change in certain salts in the water, turning them into nucleation seeds for the scale to form upon. Effectively, these seeds act as bait to attract the scale which then stays in suspension in the water.

Location is critical for these devices and test have shown that they are far more effective when located downstream of cold water storage cisterns and booster pumps.

Pressurised systems are fine as long as they are treated after the booster set. Correctly installed and located, they require no consumables and will continue to work effectively for many years.

The added benefits of these devices are appreciated by

housing associations and social housing providers who are concerned with extending the life of their heating installations and reducing the amount of planned and unplanned maintenance.

Surprisingly, many housing associations are prepared to accept cheaper products installed by house developers not appreciating that most of these products have a relatively short life. They are effective long enough to get through the developer's guarantee period but performance then deteriorates leaving the housing association with an ongoing problem.

The Water-King electronic water conditioner from Lifescience Products has been fitted for many years by Evesham & Pershore Housing Association in all its replacement heating projects. Some housing associations, such as Hanover, have retrofitted their properties with Water-King and significantly alleviated their maintenance problems.

Without an agreed standard for PWCs there is no benchmark by which they can be compared, and competitive pressures have resulted in many 'me too' products appearing on the market, some of them of very dubious quality. Purchasers are advised to examine the manufacturer's literature very carefully, to ask for independent test data, and to check the quality of design and manufacture.

One widely distributed product that looks like an electronic device actually utilises the mechanism of in line magnets but fails to provide its own anode as a source of zinc. The results are unpredictable to say the least!