Water Quality and Treatment

To ensure long life and efficient, reliable performance from Andrews Water Heaters, it is essential that the Water Heater is installed and serviced in accordance with our Installation, Operating and Maintenance instructions.

Consideration also needs to be given to the quality of the water supply, which can impact on the lifespan and efficiency of all types of hot water systems, including water heaters, and in particular hard water, where lime scale formation can occur. The temperature and volume of water used will affect the level and frequency of any lime scale build up.

However, this problem can be minimised by reducing the water temperature in the heater and by fitting suitable water pre-treatment equipment.

If reducing the stored water temperature then consideration must be given to Legionella.

UK water quality is variable, with a recent marked increase in hardness in defined geographical areas. Some water suppliers are now dosing with polyphosphates in order to meet the new permissible lead levels in water supplies from 2013.

In order for the water heating system to operate effectively and efficiently, particular attention should be given to the type of water treatment system used and the maintenance regime employed.

MAXXflo

ECOflo

Legislation

Manufacturers have a duty to produce products that are sympathetic to climate change and the effects of ever escalating fuel costs. Also, legislation has become more stringent requiring manufacturers to develop more efficient water heaters.

The main drivers for these changes have been the Building Regulations and Scottish Building Standards, and this has resulted in the development of water heaters utilising condensing technology and low water content heat exchangers, typically constructed from stainless steel.

Product development will need to continue as Building Regulations are further amended, eventually deferring to the EU Energy Related Products Directive (ErP) for product standards. Current ErP draft proposals aim to harmonise energy efficiency ratings across all EU member states and propose minimum efficiency cut off points at regular intervals after implementation.

Working towards a cleaner future

ANDREWS WATER HEATERS

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These requirements will encompass all products placed on the market and apply to both new build and replacement installations.

Importantly, it is anticipated that this directive will prevent the supply of non-condensing water heaters below 400kW rated heat output or 2000 litres storage capacity.

As this directive progresses towards implementation we will communicate to the market to confirm final cut off dates and product implications.

Water Treatment Devices

There are a number of devices available to treat hard water and the most commonly used methods for treatment are:

Water Softeners

These typically make use of the ion exchange process where the calcium and magnesium salts in the water are replaced with sodium salts, resulting in softening of the water.
Important factors to consider when using Water Softeners include the need to have a dedicated drinking supply and the need to dispose of the waste water.

Physical Water Conditioners

Often referred to as "Magnetic" Water Conditioners, the hardness levels do not alter as the calcium and magnesium salts are not removed, nor is there any distinct change to the chemical composition of the water, therefore calcium salts can still precipitate when the water is heated or concentrated by evaporation.

Important factors to consider when using Physical Water Conditioners include the location of the device(s) to ensure effective treatment, the longevity of the effect and the effect of turbulent flow (pumps, certain fittings) on performance.

Both methods of treatment require dedicated maintenance.

Building Regulations

Within the Building Regulations there is no defined requirement for treatment of mains water in commercial buildings; however the Domestic Compliance Guide refers to B.S. 7953 and states;

Where the mains total water hardness exceeds 200 parts per million, provision should be made to treat the feed water to water heaters to reduce the rate of accumulation of lime scale.

Historically guidance was also available from **BS 6700:2006+A1:2009** – Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

After the publication of BS EN 806-5, BS 6700 will be withdrawn on 1st August 2012 and BS 8558 will become the lead standards document in the area of domestic water supply.

Section 4.3.48 of BS 8558 states the following:

Formation of scale in boilers and water heaters occurs due to the "hardness" of the water supply. Hard water contains dissolved minerals, mainly calcium, magnesium and associated anions bicarbonate, sulfate and chloride. When hard water is heated, bicarbonate decomposes and calcium carbonate is deposited in the heater and associated pipework. Whilst this can cause blockage and equipment failure, it also coats the heating surfaces, effectively insulating them so that the efficiency of the heater is impaired. Tests have shown that this can reduce the heater efficiency by up to 30%.

For primary circuits during final filling of the system, an appropriate chemical water treatment formulation should be added to the primary circuit to control corrosion and the formation of scale and sludge.

For secondary circuits (i.e. feed water to water heaters and the hot water circuit of combination boilers) in areas where water hardness is greater than 200 ppm, consideration should be given to fitting a base-exchange water softener, scale inhibitor, continuous dosing or physical water conditioner.

Andrews would recommend water treatment when the hardness reaches 150ppm (7-10 degrees Clark) and above.

Unlike Base Exchange Softeners, the science and effect of Physical Water Conditioners is often uncertain. However, Physical Water Conditioners have been shown to be effective in reducing lime scale build up in many applications utilising both storage and low water content water heaters.

Whatever the situation, whether using base exchange or not, it is important to ensure the water treatment devices being considered are compatible with the type of water heater (storage or low water content) being specified, and why, when specifying Andrews Water Heaters, we would strongly recommend that a water treatment specialist is consulted.

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