

## POSITION STATEMENT

### ARTIFICIALLY SOFTENED WATER AND BOILERS AND WATER HEATERS WITH ALUMINIUM HEAT-EXCHANGERS

Naturally soft waters of low alkalinity have a tendency to increase the corrosion of metals typically used in the construction of domestic boilers. This has led to the misconception that all artificially softened water is corrosive and should not be used in domestic boilers and central heating systems under any circumstances. In fact, softening has been shown to be beneficial to most system metals when small amounts of dissolved heavy metal ions that are present in the water are removed by the softening process (these have a tendency to increase corrosion).

Soft to moderately soft water is supplied to approximately 35% of the country. Also, certain Water Utilities partially soften the hard water supply before it reaches customer premises.

The removal of dissolved calcium and magnesium ions by artificial softening is an effective means of preventing limescale formation and has been shown to have a dramatic effect on maintaining boiler efficiency. The Domestic Heating Compliance Guide, issued by the Office of the Deputy Prime Minister (May 2006), which gives guidance on how to comply with Part L of the Building Regulations, specifies the use of some form of water treatment in hard water areas (>200ppm total hardness) to inhibit limescale formation to maintain boiler efficiency. The installation of an ion-exchange water softener therefore provides an effective means of complying with this part of the regulations.

Although it is recognised that alkaline waters (pH > 8.5) may be corrosive towards aluminium, the Water Supply (Water Quality) Regulations: 2000 (Statutory Instrument No. 3184) allow the supply of water with pH up to 10 in England and Wales.

Softening water with an ion-exchange softener does not significantly increase pH.

**Experts have now considered the effect of water quality on the materials used in the latest high efficiency boilers and systems and concluded the following:**

#### **Central Heating Systems**

Although waters of certain quality may be more corrosive than others, water quality is largely determined by the supply to the premises - consumers often have no choice when filling a central heating system. British Standard 7593:2006 *Code of practice for treatment of water in domestic hot water central heating systems* has therefore been revised to allow the use of any supply waters, including artificially softened water, in central heating systems (including those with aluminium) provided an appropriate corrosion inhibitor is added. Installers are advised to consider hardness of the water being used to fill the system and to check suitability of the inhibitor product.

*Softener sales representatives and installation engineers are advised to refer boiler manufacturers and consumers to British Standard 7593:2006 or the Association where there are objections to the use of artificially softened water in central systems, particularly those containing aluminium.*

#### **Water Heaters and Combination Boilers**

Although softening water does not significantly increase pH, it may marginally increase the potential for the corrosion of aluminium where the supply water exceeds pH 8.5. However, some manufacturers of boilers with aluminium heat-exchangers are confident of the durability of their products across the entire range of water quality in the UK. The Association has approached manufacturers of boilers with aluminium heat exchangers in the UK to obtain confirmation of the suitability for use with artificially softened water. None have produced any evidence to confirm experience of problems in the field but to date, only MTS Ariston have confirmed compatibility of their entire range of boilers with artificially softened water. Most of the manufacturers of boilers with stainless steel heat exchangers do not appear to consider softened water a problem but customers are advised to check and obtain confirmation from the boiler manufacturer before purchase.

*Softener sales representatives and installation engineers are advised to request that customers insist on the installation of an MTS Ariston high efficiency boiler or any other boiler from a manufacturer confirming that the use of artificially softened water does not invalidate the boiler warranty.*

The Association is currently carrying out testing in real systems with on-line corrosion monitoring to categorically define whether artificially softened water presents any increased risk to aluminium boiler components.