

# Water-King: How it Works



Extracts from a report by

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The Water-King device differs from most available non-chemical water conditioning devices because it applies an electric field to water inside the pipes rather than a magnetic field. The electrodes are fixed to the outside of the water pipes and they comprise two or more coils of insulated wire, they do not provide for any magnetic field production. A rectangular pulsed voltage is applied between the two coils and this induces an electric field inside the water pipe. The electric field will penetrate any normal water pipe.

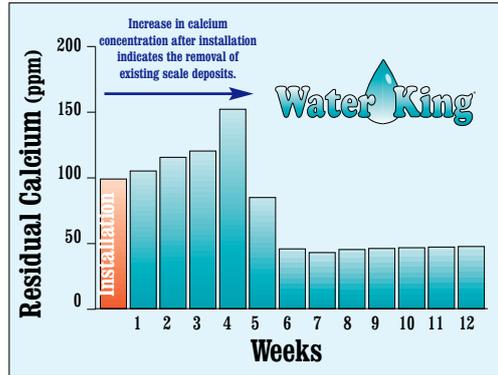
The normal scale that builds up in hard water areas is calcite, often mixed with some magnesium carbonate. Application of Water-King to a system produces an increase in suspended nanoparticles, which tend to have a higher percentage of aragonite present, and these particles tend to flocculate rather than build scale, and form a fine sludge that is flushed away. There is also evidence that the application of Water-King to an existing installation brings about a removal of scale. The presence of traces of iron in the water also appears to enhance the effectiveness of Water-King, probably by enhancing the electrical charge on the suspended nanoparticles.

## Softer Water

Unlike other types of water conditioner, Water-King is proven to produce softer water with less dissolved calcium occurring in hot water. The results of independent tests carried out for the Advertising Standards Authority and following advice from British Water are shown overleaf. The adjacent table shows week by week how much Water-King can soften hard water. After the first few weeks, during which the existing scale is removed, the hot water is half as hard as it was without the Water-King treatment.

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Independent tests carried out on a Water-King installation by TFW Associates, Forensic Engineering Consultants to the Legal Profession show that at the end of the trial period, **the residual calcium concentration was reduced by approximately 50% compared with the initial pre-installation value.** Additionally, there was a marked

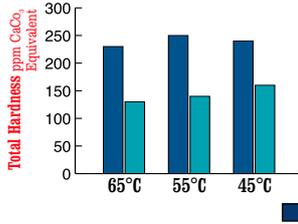


**Tested by Forensic Experts**  
**reduction in calcium deposition on appliances fed only from the cold water supply.**

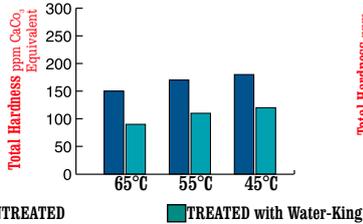
In the tests a WK1 model was fitted in a domestic premises, located in a hard water area, to treat the hot water system. It was sited on the cold supply pipe between the header tank and the hot water storage cylinder. Water was sampled weekly and double filtered through a 0.45 µm micro-fibre filter. The residual calcium concentration was measured using a Z8100 Hitachi Absorption Photometer.

## Total Hardness Test. (Powell Technique)

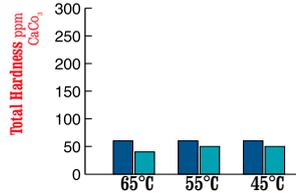
SAMPLE 1: WINCANTON (Hard Water)



SAMPLE 2: FARINGDON (Moderately Hard)



SAMPLE 3: PENSELWOOD (Soft Water)



The total hardness test is described in "Water Conditioning for Industry" by S T Powell pages 476-479 (McGraw - Hill 1954 source Mr R Gregory, WRc). Three water samples (hard, moderately hard and soft) were used and heated to three temperatures (65°C, 55°C and 45°C).

The graphs illustrate the level of residual dissolved calcium bicarbonate in the water expressed as calcium carbonate equivalent. They demonstrate the effectiveness of the Water-King in comparison to the untreated water. The difference is more obvious in the hard water area, although results in the soft water area are also significant.

## Brown Bowl Test.

SAMPLE 1: (Hard Water)



SAMPLE 2: (Moderately Hard)



SAMPLE 3: (Soft Water)



- = short lived lather
- = lasting lather (> 15 sec)
- = lasting lather and 'soft feel'

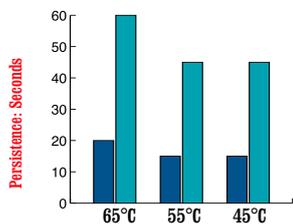
■ UNTREATED

■ TREATED with Water-King

The Brown Bowl test, as described by Dr Ian Pallett of the Quality Water Group, British Water, 1 Queen Anne's Gate, London, was also undertaken using the same control conditions described in the Total Hardness Test above. The results showed that better and more persistent lathering is observed when the water had been subjected to treatment by the Water-King device.

## Milk Bottle Detergent Test.

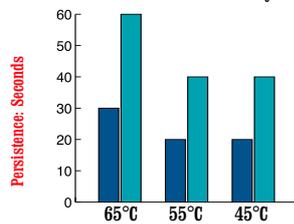
SAMPLE 1: WINCANTON (Hard Water)



■ UNTREATED  
(Dense scummy foam)

■ TREATED with Water-King  
(Light deep lather)

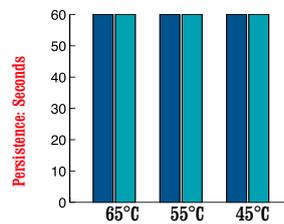
SAMPLE 2: FARINGDON (Moderately Hard)



■ UNTREATED  
(Thin scummy foam)

■ TREATED with Water-King  
(Light deep lather)

SAMPLE 3: PENSELWOOD (Soft Water)



■ UNTREATED  
(Light deep lather)

■ TREATED with Water-King  
(Light deep lather)

The Milk Bottle Detergent test was described by Mr Gordon Holden of John Crowther & Sons Ltd., Huddersfield and involves adding a detergent solution to 200ml of water in a milk bottle, shaking for 15 seconds and making visual observations of the appearance and persistence of the lather or scum formed.

The results from the Analysis at Cary Foods on the same samples of water utilised in the tests above, showed that better and more persistent lathering is observed when the water had been subjected to treatment by the Water-King device.

No visual differences were observed with the soft water. This is expected as the lathering is very good even before treatment was applied.