Specifier's Guide 2020

Water King™

Water-King is an electronic physical water conditioner that inhibits scale formation in hot and cold water services, removes existing scale deposits and partially softens hot water. It requires no plumbing and has a 25 year maintenance free design life.

How it works

Water-King uses pre-programed microchips to transmit pulses of electrical charge into the water at varying frequencies and amplitudes. These 'signals' cause some of the minerals in the water to form sub-microscopic clusters. When a 'scaling event' occurs, like the water being heated, the clusters act as nucleation seeds upon which the calcium carbonate (limescale) precipitates. Instead of the hard encrustation on pipes and heating elements that normally occurs when water is heated, the precipitation takes the form of tiny calcium carbonate crystals that float suspended in the water. These ultra-fine crystals are carried away with flowing water.

Applications

Over twenty years of field trials around the world have demonstrated the effectiveness of Water-King in most applications where conventional softeners would normally be used. Water-King is less expensive to install and maintain than an ion exchange softener and, because the hardness minerals are retained in the water not removed and replaced with sodium, it can also be used on irrigation systems and food preparation facilities – there is no need for a separate potable drinking supply where Water-King is used.

In larger applications Water-King is often significantly less expensive and easier to install than inline magnetic and electro-magnetic water conditioners. It is also able to provide continuous protection to large scale developments, without relying on a temporary 'memory effect', providing units are correctly installed downstream of storage tanks and pump-sets.

How is the Water softened without Removing Calcium?

The nucleation seeds created by Water-King stimulate the conversion of more of the dissolved calcium bicarbonate into suspended crystals than would otherwise occur. The resulting hot water, with less dissolved calcium, is now chemically softer. Water-King is the only electronic device of its kind proven by independent laboratory tests to produce softer hot water.

Removing Existing Scale Deposits

Water-King is very effective at removing existing scale deposits. Descaling occurs within a few weeks as the scale loses adhesion to the surface it is encrusting and breaks away in flakes. For existing systems that are heavily scaled strainers should be considered to reduce the impact of loose debris. Heat exchangers with restricted flows such as the Geononi, plate and frame and the MAXXflo are particularly vulnerable to debris and should be protected, where possible.

Testing & Approvals

Water-King is the only product of its kind proven by independent laboratory tests to partially soften hot water. It has also been performance tested using the IGC-335 protocol by IAPMO R&T Laboratories in the US.

Part L Regulations & BREEAM

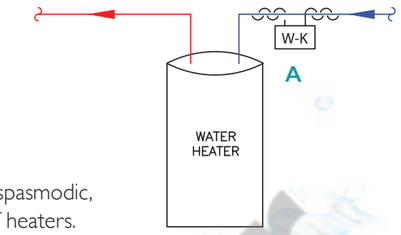
Installing Water-King ensures compliance with the Domestic Heating Compliance Guide published within the Part L Regulations – water treatment is required to reduce the accumulation of limescale in domestic water heaters for the conservation of energy. Water-King units have also been awarded BREEAM credits on building projects. Contact our helpline for more information.

Lifescience PRODUCTS LTD

We are experts in chemical free water treatment technologies with an enviable reputation of providing the very best in environmentally friendly hard water treatment solutions to consulting engineers, contractors and plumbing merchants. The market leading Water-King physical water conditioners are highly effective at reducing limescale encrustation and removing existing scale deposits. They are uniquely proven to partially soften hot water and have been independently performance tested to exacting standards.

Where to Locate Units

In general we recommend installing Water-King as close as possible to where water is being heated and scale is most likely to form. This is to ensure that continuous treatment is delivered to the area where it's needed most. In practice this normally means installing a Water-King on the cold water supply within the same plant room as the water heater.



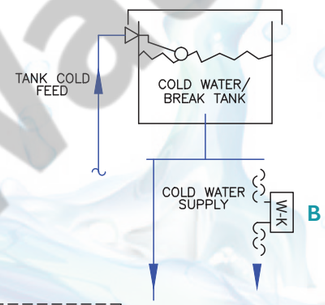
A Where point-of-use electric water heaters are installed and hot water demand is spasmodic, such as in an office, it's best to fit a dedicated unit to each water heater or cluster of heaters.

Signal Propagation

The signal generated by Water-King is continuously transmitted through the water, both upstream (back signal) and downstream, irrespective of flow. This means that appliances upstream of the unit can also be treated, although the signal won't work as effectively through pumps and storage cisterns. Water-King units should be fitted after pumps and tanks to ensure continuous signal transmission to the water heaters.

Cold Water Storage Tanks

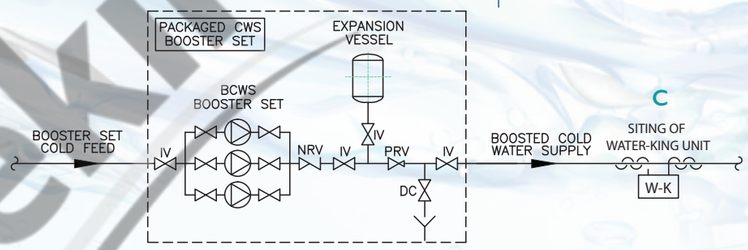
B Cold water storage tanks can cause discontinuity in the signal transmission resulting in decay of the clustering effect generated by Water-King. This problem is overcome by installing Water-King on the outlet pipes and utilising a 'back signal' to treat the stored water.



Pumps

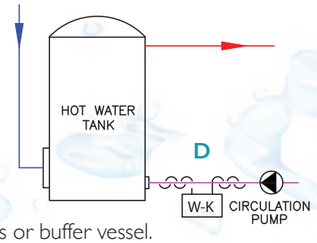
Pumps cause a significant reduction in the effectiveness of Water-King so, wherever there is a pump, in general there should be a Water-King installed downstream.

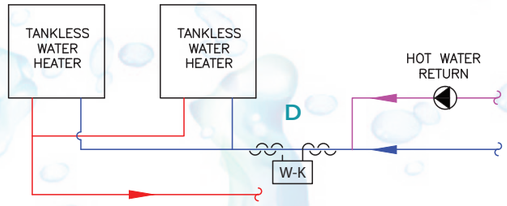
C In practice **Booster Pumps** will often be located immediately downstream of a cold water storage tank. Installing a Water-King after both will ensure continuous signal transmission to the downstream services.



Pumps continued

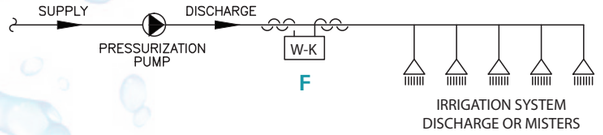
D We recommend that **Hot Water Secondary Return** pipework be treated with a Water-King installed between the circulation pump and the water heaters or buffer vessel.



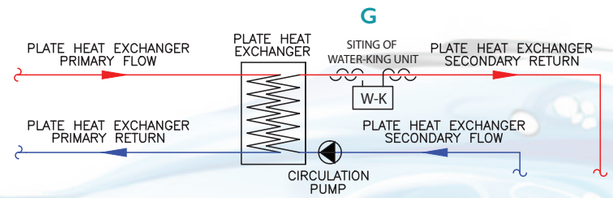


E For **Re-Circulating Systems** where water in constantly circulated, such as swimming pools, the Water-King should be fitted downstream of the pump, as close as possible to where the heating process is occurring.

F For **Irrigation Systems** install a Water-King after the pump. On high pressure mister lines we recommend installing a Sentry unit to each line.



G Where a pump is installed on the cold water inlet side of a **Heat Exchanger**, such as on a plate frame heat exchanger or **Modular Tank Heater** like the Andrews MAXXflo, it is more effective to treat the hot outlet side. The signal from Water-King will travel in both directions, treating both the heat exchanger upstream and buffer vessels downstream.



Cold Water Supply to Mixing Valves and Showers

Much of the scale formed in these fittings is precipitated from cold water. Even when a conventional softener is installed to treat only the hot water services it is common to find scale forming in mixing valves, shower heads and taps. Fitting a Water-King on the cold water services will reduce this scaling.

Fitting Requirements

Each Water-King aerial requires up to 6cm of straight pipe. Pairs can be fitted either side of bends on vertical or horizontal pipes. No plumbing is required nor is there a need for a bypass. Insulation can be fitted over aerials after installation. Units should be located within one metre of a power supply and 45cm of the pipe to be treated.

Selecting the Correct Units

Having decided where to locate Water-King, select an appropriately sized unit according to the pipe diameter. If water is being heated then select the larger size according to the maximum output rating based on the type of water heater installed (this varies according to whether they are gas fired or electrically heated).

Product Features

Running costs of all Water-King units is less than £15.00 per annum. The design life is in excess of 25 years with no servicing or maintenance requirements and a 5 year manufacturer's warranty. There is also a 100-day money back guarantee, extendable by negotiation.

Every Water-King unit comes pre-fitted with a 'guard chip' which monitors the performance of the main program and resets the system automatically if it detects any variation or system failure. There is no need for manual resetting after a power outage.

Water-King Sentry is the entry level unit designed with the needs of housing associations and developers in mind. It is compact, tamper resistant and automatically resets so requires no monitoring. It is fully waterproof so can be used in damp or hostile environments, including commercial catering applications, shower blocks and external irrigation systems. It is especially suitable for protecting individual appliances.

Water-King WK-SE is designed for treatment of high output electric water heaters or hot water cylinders with multiple immersion elements. It should be selected for individual heaters or clusters of heaters where heat output is up to 12kW.

Water-King WK2 is larger and more powerful than the Sentry. It has two pairs of aerials which can be used to reinforce the signal to a single pipe (up to 42mm) or be split between two smaller pipes. This arrangement ideally suits the designs of many heat exchangers.

Water-King WK3 is a powerful unit designed for most commercial applications. It is frequently specified to treat mains cold water supplies to direct fired water heaters and paired with a Sentry on the secondary return. The WK3 and all larger units feature an LCD display and benefit from an output for building management systems (BMS) to detect power failure.

Water-King WK4 is designed to treat larger commercial applications, with pipe sizes up to 108mm. It is frequently used in high rise office and residential developments, student accommodation blocks and hotels where it can provide continuous treatment to downstream services irrespective of flow.

Water-King WK5 is the largest standard Water-King. It has six aerial outputs arranged as three pairs and is designed to be used in the same applications as the WK4 but where the pipe size is up to 159mm. Larger units are available upon request.

Sizing Table overleaf...

Sizing Table



Selection	Sentry	WK-SE	WK2	WK3	WK4	WK5
Maximum pipe diameter	28 mm	42 mm	42 mm	67 mm	108 mm	159 mm
Direct fired gas / oil boiler	35 kW	N/A	40 kW	350 kW	750 kW	1125 kW
Electrical boiler	5 kW	12 kW	10 kW	30 kW	100 kW	150 kW
Product Data						
Aerial number/length	2/2.0 m	4/2.0 m	4/2.0 m	4/4.0 m	4/7.0 m	6/9.0 m
Minimum aerial turns	12 turns	12 turns	12 turns	15 turns	15 turns	15 turns
Frequency range	1–10 kHz	1–10 kHz	1–10 kHz	1–10 kHz	1–10 kHz	1–10 kHz
Peak to peak output voltage	82 V	82 V	82 V	82 V	82 V	82 V
Power supply required	230 V or 110 V	230 V	230 V or 110 V	230 V or 110 V	230 V or 110 V	230 V or 110 V
Input current	0.02 A	0.03 A	0.03 A	0.04 A	0.08 A	0.1 A
Power consumption	1 W	1.5 W	1 W	2 W	2 W	3 W
Lead length	1.5 m	2 m	1.5 m	1.5 m	1.5 m	1.5 m
Dimensions (mm)	140 x 85 x 50	140 x 85 x 50	220 x 155 x 67	220 x 165 x 60	270 x 260 x 110	270 x 260 x 110
Weight	0.80 kg	0.50 kg	1.25 kg	1.50 kg	3.00 kg	3.25 kg
Ambient temperature	0 – 70°C	0 – 70°C	0 – 70°C	0 – 70°C	0 – 70°C	0 – 70°C
Humidity non-condensing	Waterproof	80%	80%	80%	80%	80%
IP Rating	IP 68	IP 65	IP 65	IP 65	IP 65	IP 65
BMS output	No	No	No	Yes	Yes	Yes

Suggested Specification

For consulting engineers looking to specify Water-King for their projects we recommend inclusion of the following text:

One or more Water-King electronic water conditioner shall be fitted to the cold mains supply and HWSR in accordance with the manufacturer's recommendations. The unit shall have one or more pairs of open-ended aerials wrapped around the pipework generating a series of square waves of random length and occurrence between 1kHz and 10kHz. The peak to peak output voltage will be in excess of 80 volts. Units should be proven by independently laboratory tests to partially soften hot water and performance tested using the IGC-335 protocol.

Technical Hotline: 01608 811707

Where technical advice is required, please contact our helpline. We're experienced at advising consultants and contractors on the most effective way of treating hard water using water conditioning technologies. We are also able to provide CIBSE and CIPHE accredited training seminars for those looking for a more detailed understanding of the technology.

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All information stated in this brochure correct at time of publication, June 2020.