

10 Years  
WELLAN CHINA

WELLAN  2000

Information brochure



[www.wellan2000.cn](http://www.wellan2000.cn)

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## Company Profile

Supported by our strong local research and development capabilities, we are a company that manufactures a wide range of equipments and devices which satisfy the niche market of fluid treatment in a physical and eco-friendly way. Our WELLAN®2000 taps into the area of quantum technology and uses the biological information encoded and transmitted from special sources by state-of-the art equipments. Such modulated information is then imprinted into the special material of our products at the sub-atomic level using modern technology. The information consists of superimposed waves which are then emitted into the water and influence various substances contained in the water therefore changing physical nature of substances in a fine-tuned way. As a result, the water conditions and properties will be improved significantly.

In Beijing, we have also established our laboratory where our specialists analyze the nature and composition of liquid samples and scale samples mainly attained from potential project sites. Thus the causes of problems can be targeted and information will be accurate.

With the current pressure of global environmental changes, we have expanded our core business to engage in more complex fluid treatment such as crude oil, paraffin and wax, heavy oil etc. This new business domain we entered since years ago has helped our customers save millions of operational costs while mitigating toxic emissions to the environment. Our newly-developed products are even being used in hospitals for improving patient treatment process.

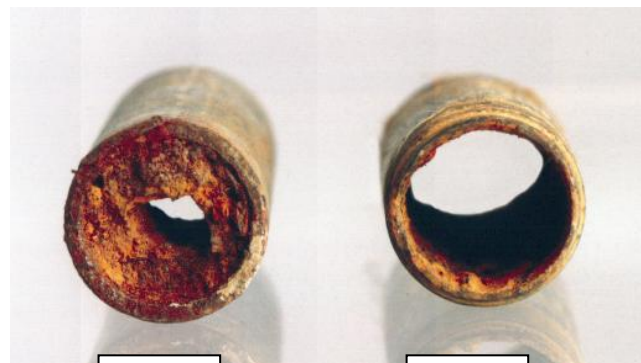


Our specialist team at Wellan Beijing draw on their wealth of product-specific expertise in conjunction with operational experiences to provide the most practical and cost-effective solution possible. Facing the global shortages of fresh water and environmental challenges, we are passionately focused on driving customer's success. We look forward to receiving your enquiries to offer you better help.

## WELLAN®2000 Introduction

### ■ Matching customers' requirements

For industrial water treatment problems, there can be multiple answers to challenges such as corrosion, scale, pipe clogging, leaking, suspended solids, bio-film, and general fluid property control such as flow rate, pressure, temperature etc; that's why we work closely with our clients to arrive at the best solution for any condition. Our patented proprietary technology and products represent a unique integration of modern physics advancement with traditional water treatment requirements.



Before

After

### ■ WELLAN®2000 – Stop corrosion and scale

Thanks to our more than fifteen years of water treatment experiences and the extensive efforts of our professional research team, we have introduced WELLAN®2000 bio-signal water treatment methodology from Germany to the local market of China, the only water treatment technology available on the market that significantly reduces or completely eliminates usage of chemicals. In many heavy industry applications we have achieved great success of “green physical” water treatment which has

enabled our customers to completely eliminate the reliance on chemicals which would otherwise be used in the water bearing systems and be released into the environment. With WELLAN®2000, water bearing system will be free of scale and corrosion and bacteria, and the water property will be more natural and beneficial to the operating facilities and environment as a whole!

Compared with all conventional water treatment units combating lime(scale) and rusts(corrosion), WELLAN®2000 water rings represent remarkable achievements made in the research area of quantum



physics. The ring operates in a unique method based on quantum oscillations and manipulations of oscillation patterns(waves) at the sub-atomic level.

The ring is made from special material with major composition of high grade silicon aluminum. With the aid of complex oscillation and laser systems, ultrafine oscillations (or in some cases called bio-energy waves) are generated and then stored in the ring material at sub-atomic level. When the ring is mounted around the water pipe, it constantly emits active oscillations through the pipe into the water.

Such oscillations propagate very quickly in the flow direction of the water and are also maintained there for a very long time. These oscillations interact with the original wave patterns of water molecular and those of substances contained in the water such as rust, scale, bio-film or bacteria etc. The resulted interactions would finally achieve such effects that irons normally react with oxygen to form a thin layer of Fe<sub>3</sub>O<sub>4</sub> to protect the inner wall of pipe from further corrosion, and calcium carbonate no longer crystallizes as hard scale in water bearing pipes and usually appears as soft muddy lime which can thus be flushed out of the system without scale buildup occurring.

■ **WELLAN®2000 – Improves water quality and makes it healthier**

Life originates from water. Thanks to many years of research and development, WELLAN®2000 is proved effective to activate water molecular. Water clusters become smaller after treated by WELLAN®2000. According to expert research from WHO, such smaller water clusters are healthier than normal water clusters which are usually composed of more water molecular. Experiments have been conducted and conclusions drawn: a qualitative improvement of the water compared to the neutral sample can be stated which is beneficial for the consumer.

■ **Features of WELLAN®2000**

- Innovative technology of low carbon solutions**
- No disturbance to existing water system**
- No installation costs**
- No maintenance activities**
- No electricity and no magnetism**
- No chemical additives, Eco-friendly**
- No service costs**
- Reduced operating costs**
- 100% protection of water-based system**
- Available for a wide range of pipe sizes**
- Future oriented**
- Five(5) years warranty**





## WELLAN® Quantum Bio-information Technology

### ■ Basic facts and discoveries

WELLAN® bio-information technology has been developed based on discoveries in research of quantum physics. Modern science has recognized the applications of subtle energy fields that have been utilized for thousands of years in the practices of Traditional Chinese Medicine. In quantum science, all



objects are described in wave functions and we can calculate and predict some features or categories of particles and energy by knowing and identifying wavelengths and frequencies and their levels or categories of tone and resonance.

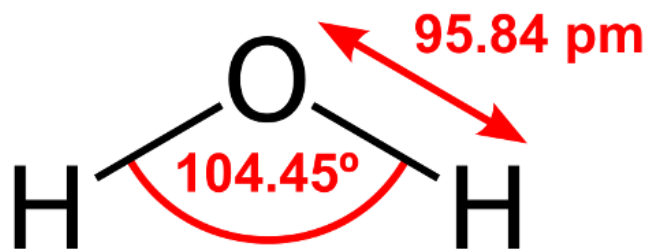
The most significant feature of WELLAN® technology that distinguishes it from all other similar technologies in the marketplace today is its tunable bio-information generator and ability of

1. Generating information of frequencies simulating ultra-fine oscillations of material particles at the sub-atomic level. According to scientific research, each chemical element available in nature has its own oscillation character due to the spinning of electronics. Using WELLAN® technology can formulate the right complex of information about oscillation patterns.
2. Identifying information of certain substances and encode it to develop ultra-fine oscillations and store them in database for later-stage applications.
3. Decoding oscillation patterns and imprinting such information into the material particles at the sub-atomic level.

#### ■ Water molecular have memories and can be activated by WELLAN® technology

Scientific research has proved that the water molecular arrangements can be modified and the activity of water can be increased by some special physical means. The alteration of water molecular structure of water and other liquid substances can be retained for some three days to over five days depending on the situation, as if the water molecule has its own memories.

The water molecule has a polar triangle structure with covalent bonding of two hydrogen atoms to one oxygen atom. There is a measured  $104.5^\circ$  angle between these bonds. Water is one of the most polar molecules known in nature. The polarity of water underlines its chemistry and thus the nature of life. Polar molecules interact with one another through attraction. This weak attraction is called a hydrogen bond. The process of water activation induces the formation of smaller water molecular clusters similar to water molecular structures found in living cells.



So, what are the differences between regular water and activated water? Well, we may not explain the underlying reasons in the context. But according to many experiments, the crystalline structure of the frozen regular tap water compared to the activated tap water showed extensive fracturing and chaotic

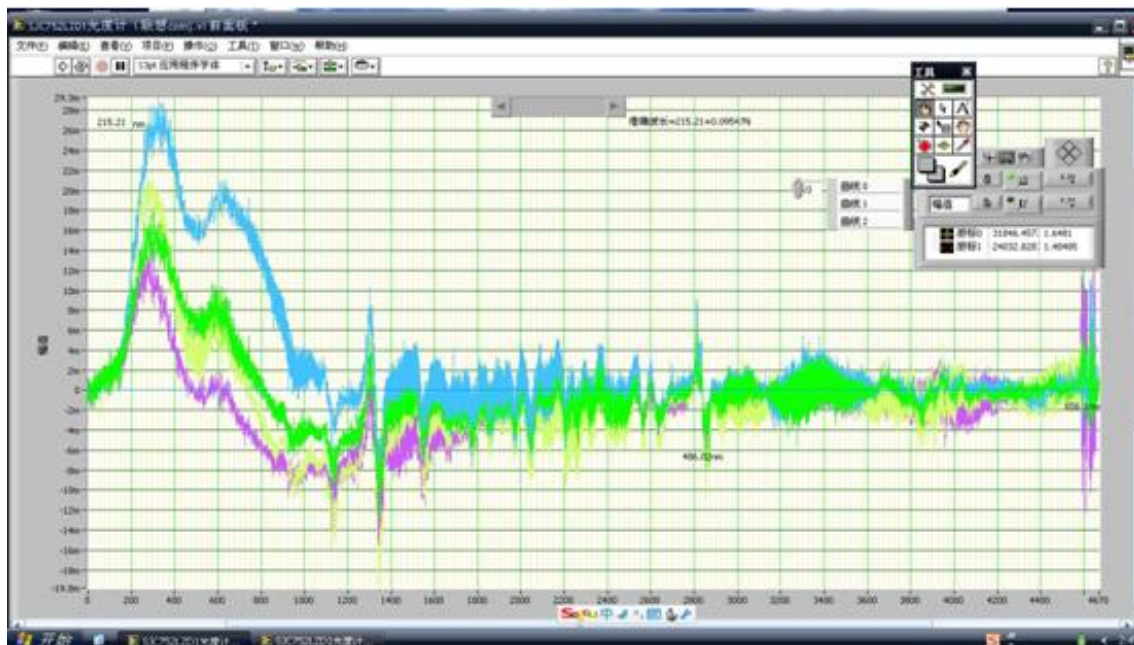


crystalline formation. This is likely due to the impurities and poor organized molecular structure in the tap water. Regular water cannot only be polluted by toxic chemicals by also by some negative information as it flows along the pipelines. While ultra-fine oscillations emitted by WELLAN® 2000 can neutralize such negative information, thus activated water samples showed well organized crystalline formations with a strong tendency of crystal axis to be oriented in one direction. Many tests have been conducted on the benefits of activated water. Results show the effect of balancing the pH and decreasing the hardness of water, increasing electrical conductivity and turbidity, significant reduction of bacterial counts. These results may be in part because free radicals, such as  $H^+$ ,  $OH^-$ ,  $Ca^{2+}$  and  $Mg^{2+}$  etc. have been increased in the activated water.

Experiments show that water molecular can be strongly activated with our WELLAN® technology. Structure of water molecular and formation of the water molecule clusters are altered significantly after the treatment. We have conducted some simple tests as follows which present the differences compared with regular water.

### ABSORPTION FEATURES OF SPECTRUM

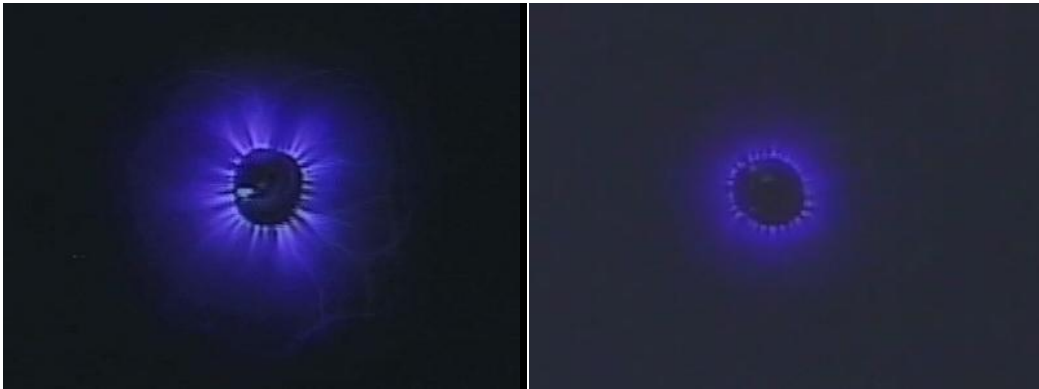
The structural changes in water after treated with WELLAN® technology were detected in experiments by the UV luminescence spectrophotometer. The activated water showed stronger absorption in the spectrum between 200nm and 400nm. This indicates that activated water molecule vibrates differently partly because the angle between the hydrogen and oxygen atoms has changed.





### ACTIVATED WATER IS ENERGY ENRICHED COMPARED WITH BEFORE

The physical process of cold emission of electrons produces the Corona Discharge phenomenon. The emission of electrons in activated water is more intensive. It means that the energy level of water molecules is higher than before activation.

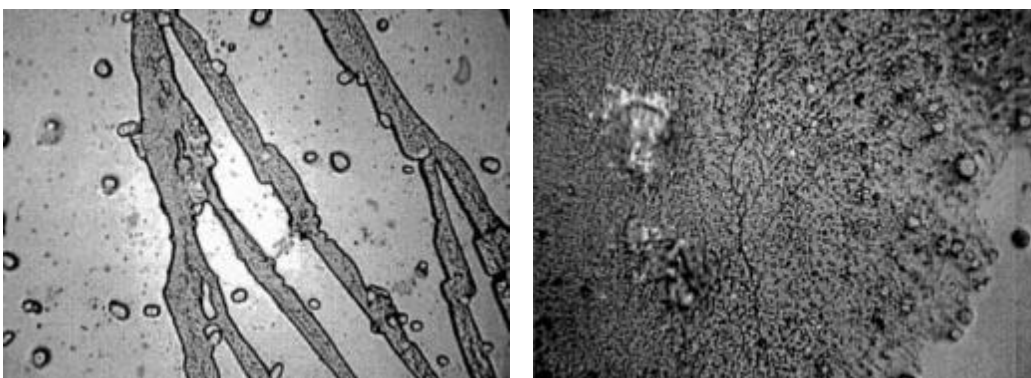


water drop treated with WELLAN® technology      water drop not treated

### ACTIVATED WATER IS HEALTHIER

Two thirds of the earth surface consist of water, and two thirds of our human body consist of water! Water is the source of life – life originates from water! Water is energy and information carrier. The knowledge that water has an inherent storage capability is of paramount importance. Unfortunately however, the physical processes of the intake of information, the storage and release of information have not yet been documented in a reliable scientific form due to the lack of proper means.

In the direct comparison in a crystallization experiment, a remarkable difference is noticeable between the neutral sample (the right) and the WELLAN® 2000 treated sample (the left) examined here (samples are 400-fold enlarged). The essential advantages consist mainly in the increase of vitality and of the order structure which exert a vitalization effect on the consumer. It is to be assumed that an increased activity of the water has taken place which still has to be corroborated by chemical analyses. In any case, a qualitative improvement of the water compared to the neutral sample can be stated which is beneficial for the consumer.

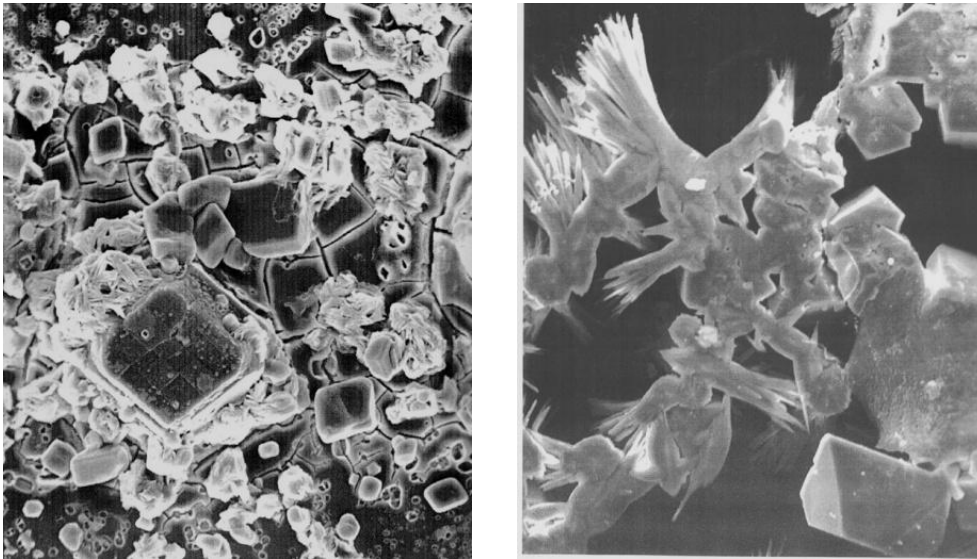


Crystal treated with WELLAN® technology      Crystal without WELLAN® technology treatment



## OTHER FINDINGS

Crystals of mineral ions ( as shown in the pictures)



With regular untreated water, when temperature rises, the positive mineral ions such as  $\text{Ca}^{2+}$  bound with  $\text{CO}_3^{2-}$  and form crystals of  $\text{CaCO}_3$ . Under microscope, the crystals look like piercing cubes which firmly attracted each other (right). Thus if large amount of such crystals accumulate, hard scale would form. With water treated by WELLAN® 2000, the crystals under microscope look very different, as most of these crystals are in a round or square shape of pattern which make them “in a free state” not easily attracted by each other (left), so hard scale will not be formed.

It was also found that the activated water has a germicidal effect on microorganisms. The activated water features antibiosis properties in respect of a wide spectrum of microorganisms, in particular of the following: E.coli. Aerococcus viridians, Salmonella tiphymurium, klebsiella pneumonia, pseudomonas aerogenosae, proteus vulgaris, candida albicans etc. that cause infectious diseases among people, animals and birds.

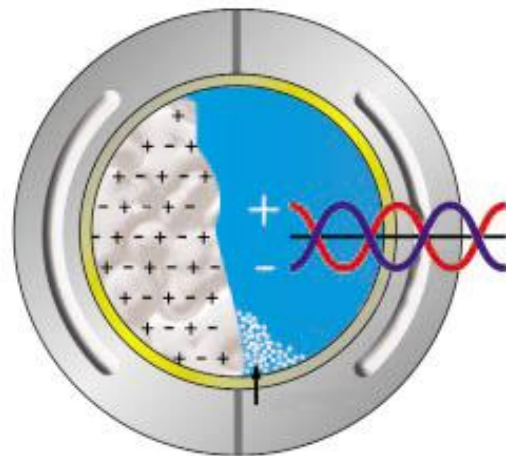
Tests on biological effects of activated water also showed accelerating plant growth and immediate improvement in cellular conductivity, resistance and capacitance in human subjects. This is a proof of health enhancement benefits to human beings.





### ■ Calcium carbonate

Calcium carbonate in dissolved form is contained in virtually all water. Calcium carbonate only becomes a problem if it is precipitated and deposited on surfaces of water pipes or heat exchangers. This occurs for two reasons. "Normal water" starts losing its ability to bind calcium carbonate at the temperatures of 30°C. The ability to bind the calcium carbonate drops continuously as the temperature increases and the calcium carbonate is precipitated. The second essential reason for the deposits is when water evaporates. Minerals dissolved in the water, such as



the calcium carbonate, are unable to evaporate and are left behind. This phenomena leads to scale being deposited in machines and pipes, primarily if they operate at high temperatures, and this scale is deposited on the surfaces. If suitable measures are not taken, the pipes or heat exchangers frequently clog up after a very short time.

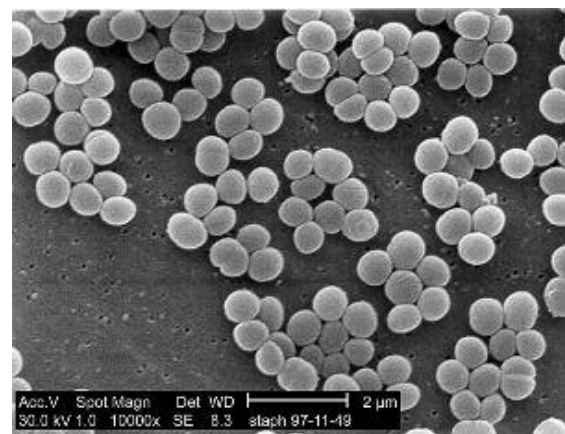
The water pressure drops more and more until, ultimately, virtually no water is able to flow. Consequently, water is chemically pre-treated, primarily in the case of critical applications. This is a relatively expensive procedure since costs are incurred for chemicals and servicing on the machines. In many applications, a great deal of water is consumed so that it makes very little sense economically to pre-treat this water and a decision is taken to accept the need to descale heat exchangers etc. from time to time.

WELLAN® solution represents a very good-value-for-money alternative to the above procedures. The oscillations emitted into the water by the WELLAN® rings change the structure of the calcium carbonate on a sustained basis. This means that the calcium carbonate can be bound far better by the water and is thus precipitated only at far higher temperatures. If the flow in the pipe or the machine is adequate, the scale is entrained by the water. If the flow rate is low or too low, scale with a soft, grimy consistency may be left behind. This can then be removed mechanically very easily without the use of chemicals. Very good experience is available from operators of several heat exchangers worldwide, some of them with capacities exceeding 1,000 m<sup>3</sup>/h. In most cases, using WELLAN® makes it possible to fully dispense with chemical descaling of the installations. WELLAN® is even used successfully on certain steam generators. These are generally steam generators which cannot be operated with boiler feed water owing to the technical situation or spatial conditions (e.g. on board ships).

This increased ability of the water to bind calcium carbonate also leads to a situation in which even existing scale, such as that in pipes for instance, is dissolved and entrained by the water flowing past. This ability of the water to bind calcium carbonate is maintained over a long period. It is decreased only if energy in the form of electrical fields is supplied to the water externally. In certain applications WELLAN® reaches its limitations. These are applications in which water is sprayed in open systems and large quantities of water evaporate. Scale and other minerals are left behind when water evaporates. This leads to the familiar incrustations if it cannot be ensured that a constant water stream flows over these surfaces at least from time to time.

#### ■ Bio-film, bacteria

In many systems, deposits attributable to microorganisms are formed. The origin of these



*staphylococcus aureus* bacteria magnified 10,000x

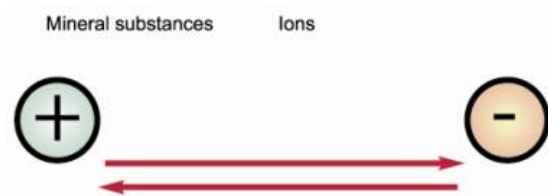


deposits is debatable and it must be assumed that they are generally entrained from the outside. These microorganisms, once they are in the system, propagate and frequently spread throughout the entire system and form a film on the pipe walls. This film is considered as a form of corrosion, primarily since some of these microorganisms emit secretions which are very aggressive and which attack the pipes. The bacteria emit spores in the biofilm or other deposits, and these spores can be removed only with great difficulty. In such cases, thermal and chemical methods frequently reach their limits since it is very difficult to kill all spores during the rehabilitation process. However, we shall not discuss this problem in greater detail at this point. WELLAN® has developed special units for this problem. Good successes have already been achieved in such cases on a small scale. On this subject, we are constantly seeking installations for practical tests.

## ■ Corrosion

Water has many characteristics and properties. Thus, water, in unsaturated state is amongst the most aggressive fluids in existence and attacks metals quite particularly. This leads to corrosion. Even stainless steel of optimum quality is not immune to such corrosion. WELLAN® stops and reverses the simple forms of corrosion, i.e. corrosion owing to stagnant water and unsaturated water (water with a low mineral content). In the case of corrosion owing to galvanic elements, weak acids, it generally at least slows down corrosion. However, in some cases, such forms of corrosion have been completely stopped.

The oscillations of the WELLAN® rings convert the rust or, to be more precise, influence the iron ions. These iron ions are detached from the rust. Thus, over the course of time, existing rust is detached and is flushed out. When the existing corrosion has been removed, the inside of the pipe becomes black over the course of time. This means it is coated with a saturated iron oxide coating (magnetite, Fe<sub>3</sub>O<sub>4</sub>). This black protective coating no longer offers the rust the possibility of reforming.

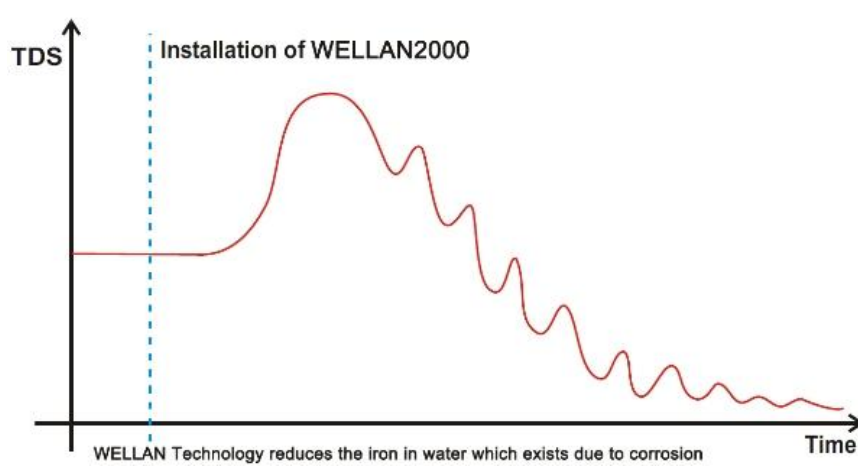


Attraction of mineral-matter ions through opposing charges. Initially, the mineral substances exist in water as ions. Ions are carriers of electric charges (anions-cations) which mutually attract each other in order to form crystals.



Electric charges are frequencies which are now influenced through the interference vibrations emitted by the WELLAN® 2000 ring. By means of these permanent vibrations the water is treated or provided with information. An offsetting or shift of charges is taking place. Ions cannot attract each other any longer. No formation of crystals (crystal lattice structures).

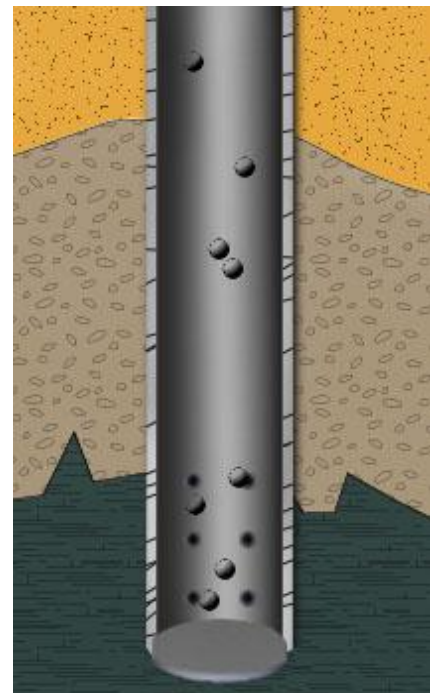




After installation of WELLAN<sup>®</sup> 2000, the total dissolved substances can normally be reduced to and maintained at a relatively lower level. However the TDS level cannot fall below the value of feed water.

### ■ Paraffin waxes deposition in oil production

Crystallization and deposition of paraffin waxes on production tubular and pumping equipment during crude oil production is a problem well known to the oil industry, costing billions of dollars worldwide through lost production and the expense of remedial actions. Choking of production tubes and flow lines by asphaltenes and or mineral scale deposition also obstructs oil production and is similarly costly to the oil industry. In heavy oils, very high viscosity impedes fluid flow in production tubes and transport pipelines, leading to substantial technological challenges to their economic development. These production problems are common to paraffinic oils, heavy oils and asphaltenes and fundamentally occur because of the destabilization of the micelle structure (micellization) of the oils as they enter the wellbore at the onset of production. In many cases, WELLAN<sup>®</sup> special units for oil fields can help ease such difficult situations. Our products have been proved to be helpful in reducing production costs for oil industry.



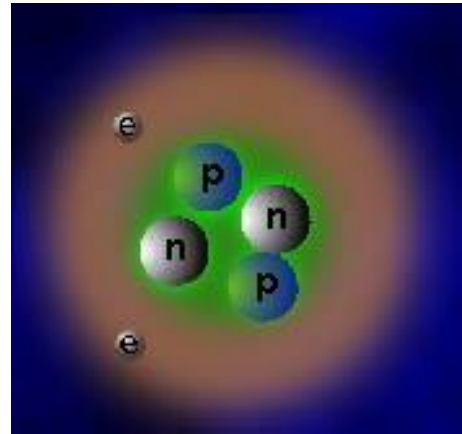
In oil and natural gas industry, we are also doing research work and experiments to expand the capability of WELLAN<sup>®</sup> 2000 technology. For instance, it might be possible to improve the separation of oil from water, boosting the productivity. Our customers will be informed of our progress from time to time. Our partners world-wide are encouraged to send us enquiries.



## WELLAN® 2000 Working Principle

### ■ The theory behind: vibration, frequency, energy

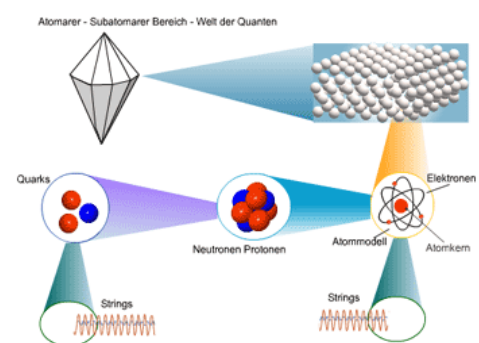
Classical physics textbooks tell us that everything in our universe is comprised of tiny particles called atoms – the smallest particles of a chemical element that can exist and still take the form of that element. Atoms are themselves comprised of even tinier particles – protons, neutrons, electrons, quarks, gluons and many others orbiting one another with such speed that they appear as solids even though they are mostly comprised of empty space. These subatomic particles are the building blocks of atoms. The number and arrangement of subatomic particles in atoms determine whether an atom takes one form or another in our physical realm. For instance, the difference between lead and gold is only three electrons, three protons and a handful of neutrons!



These tiny particles are always in motion, either spinning around or leaping from one energy state to another, causing difficulties in measurement. But anyway, to better understand the micro-world, some kinds of wave equations were discovered mathematically to use to describe the particle's movements. As vibration modes also control the basic characteristics of what appear to us as individual unconnected particles, including mass, electrical charge and spin. Thus all the particles form the whole world as seen before our eyes would manifest itself as bright and colorful.

### ■ Vibratory information defines the physical realm

Patterns of vibration of tiny subatomic particles found in every atom determine the observable form that will be taken by those particles within our physical realm. As such, every element or compound is defined by a unique blueprint of vibratory energy. For these vibrations, sometimes they were also called oscillations. They have many different frequencies. This is of pivotal importance to the WELLAN® 2000 technology, as those vibratory blueprints are the signature frequencies on which our equipments and facilities may be working.



### ■ Vibratory information can be stored in the WELLAN® products

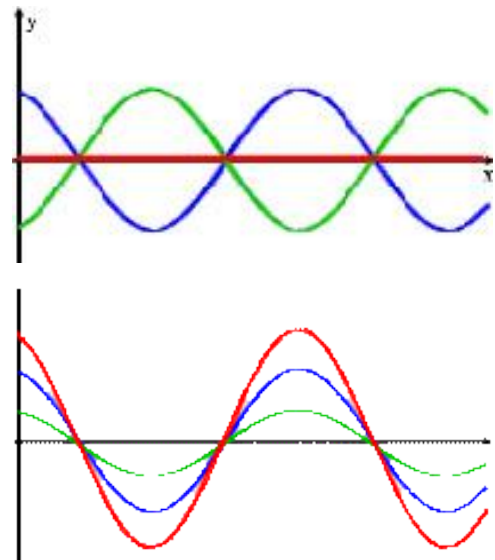


On the basis of most recent scientific findings, there is a constant exchange of signals between the atomic nucleus and the electrons. The frequencies of these exchanged signals lie in the gigahertz to terahertz band. The WELLAN® rings are charged at the works with a number of various machines so to speak and the charges are stored in the material's particles. It is mainly aluminum and silicon which are used for the WELLAN® rings. These materials are particularly well-suited for accepting charges, maintaining them and emitting them constantly. These charges are not lost either if energy is superimposed externally, primarily in the form of strong electro smog.

### ■ Vibratory information / oscillations are emitted into the water

Experience shows that the WELLAN® units emit the oscillations into the water regardless of the pipe material on which they are installed. In principle, the WELLAN rings operate with two different types of oscillation, firstly interference and secondly resonance oscillations. The interfering oscillation (dark blue) is ideally an oscillation which is 180°-phase-offset and which is precisely inverse to the oscillation (green) to be influenced. As is known from the fields of mathematics, acoustics and optics, rotating an oscillation through precisely 180° always results in zero (red line).|

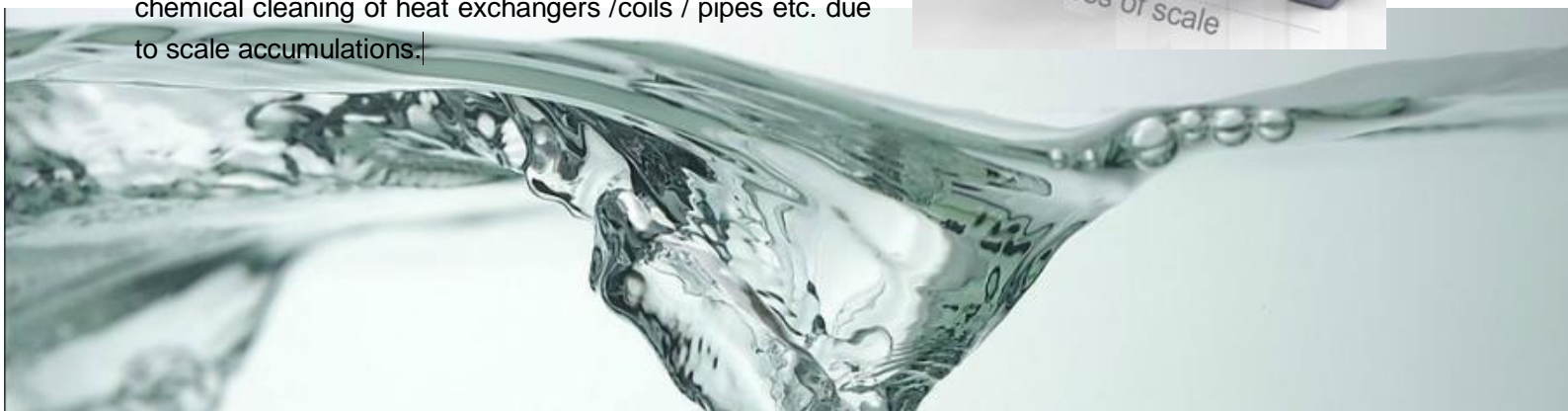
A resonance oscillation (green) on the other hand is an oscillation which has the same phase as an existing oscillation (blue) and the result is an amplification (addition) of the existing oscillation (red). These two types of oscillation now influence the calcium carbonate and the corrosion (rust) in the water or pipe and change them. Nowadays, we assume that, ultimately, charges on the molecule have been shifted, or a spin on the electron is changed, thus changing the properties of rust or calcium carbonate.



## What can WELLAN® 2000 Achieve

### ■ Reducing operating costs of facilities

According to statistical analysis, one mini meter thickness of scale can cause 9% of energy waste. WELLAN® 2000 helps customers achieve better energy efficiency because it stops scale buildups, meantime avoid frequent mechanical or chemical cleaning of heat exchangers /coils / pipes etc. due to scale accumulations.



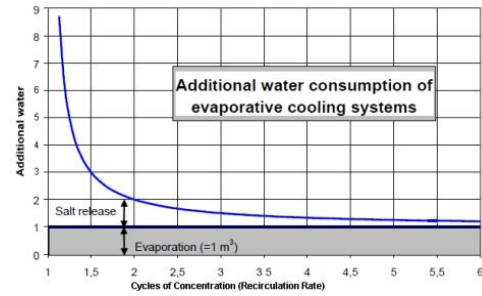


### ■ Protecting facilities to extend usage life

Facilities are protected against corrosion so there is no necessity of frequent replacement of pipelines or equipments.

### ■ Reducing chemical additives for better environment

WELLAN® 2000 is not only eco-friendly but also it can reduce chemical dosage by a significant amount in large scale open circulating cooling water systems (with cooling towers). In some cases, WELLAN® 2000 can help increase the cycle of concentration thus can save the amount of feed water. This is quite meaningful in areas where there is a shortage of fresh water. Water can be saved by up to 20% and the emission of chemicals to the environment can be reduced as much as 50%.



Water can be saved by up to 20% and the emission of chemicals to the environment can be reduced as much as 50%.

### ■ Improve water quality and increase the well being of families

When installed on the mains pipe leading to kitchen and bathrooms inside the house, water downstream to the kitchen and bathroom is all treated by WELLAN® 2000. Improvement on water property can be felt since the water is energized and water molecular better structured which is physically benefiting human health.

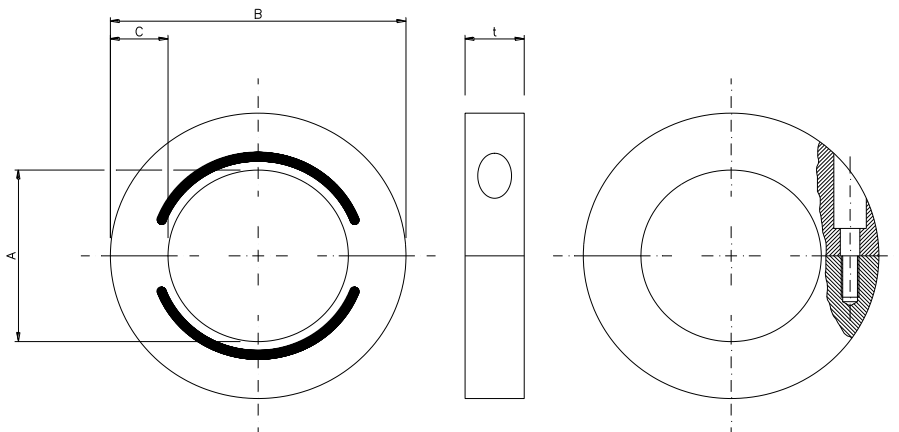
## Tests and certificates

WELLAN® 2000 is patented technology in China. Certificate is pending to be issued. Many tests were carried out by professional agencies and proved to be very positive. With our progressive research, WELLAN® technology will be expanded into many new areas. Our customers will be informed of new applications from time to time.





## Size specifications



NO.	Size			A (in mm)	B (in mm)	C (in mm)	t (in mm)
	Inch	Mm	code				
1	1/2"	15		23.0	83.0	30.0	35.0
2	3/4"	20		28.0	83.0	28.0	35.0
3	1"	25		35.0	86.0	26.0	35.0
4	1 1/4"	32		42.0	86.0	22.0	35.0
5	1 1/2"	40		50.0	100.0	25.0	35.0
6	2"	50		63.0	123.0	30.0	45.0
7	2 1/2"	65		79.0	149.0	35.0	45.0
8	3"	80		94.0	164.0	35.0	45.0
9	4"	100		118.0	198.0	40.0	50.0
10	5"	125		143.0	233.0	45.0	50.0
11	6"	150		163.0	263.0	50.0	50.0
12	8"	200		224.0	324.0	50.0	55.0
13	10"	250		282.0	382.0	50.0	60.0
14	12"	300		329.0	429.0	50.0	60.0
15	14"	350		382.0	482.0	50.0	60.0
16	16"	400		431.0	531.0	50.0	60.0
17	20"	500		534.0	634.0	50.0	60.0
18	24"	600		634.0	734.0	50.0	60.0

Sizes larger than listed above can be customized based upon request.

For residential in-house installation smaller rings, we have customized sizes. The inner diameters include 17mm and 21mm. These smaller rings are made according to the pipe (tube) OD leading to small boilers or water purifier systems in Chinese houses.





WELLAN 2000  
for Water, Energy  
and Environment

## Cooling Water Treatment

### Application and installation

There are many areas we can apply WELLAN® technology in. For the heavy industry, our WELLAN®2000 H<sub>2</sub>O RING of high utility is recommended for combating scale and corrosion and bio-film. The large cooling water systems are one of the most appropriate sectors where our WELLAN®2000 H<sub>2</sub>O RING can be applied to.

#### Cooling water systems

Open cooling water systems usually face the following problems:

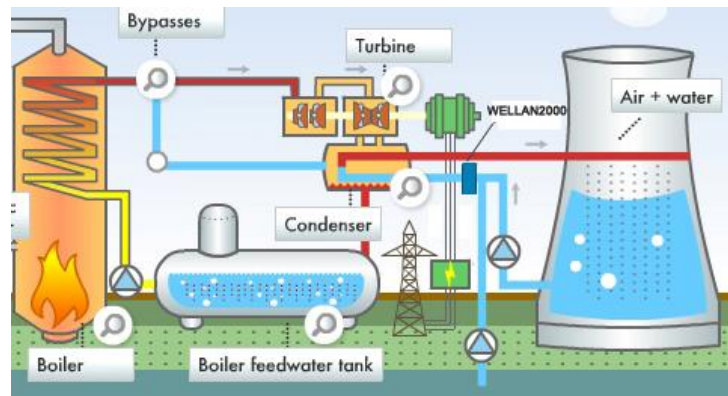


### Scale

Scale is a dense coating of predominantly inorganic material formed from the precipitation of water-soluble constituents. The common scale includes calcium carbonate, calcium phosphate, magnesium silicate and silica. Scale results when dissolved ions such as  $\text{Ca}^{2+}$  in the water exceed the solubility of a given mineral in this case which is  $\text{Ca}^{2+}$ . Four principal factors determine whether or not a water is scale forming: temperature, alkalinity or acidity (PH), concentration of scale-forming minerals (generally represented by TDS or conductivity), and water flow rates.

### Corrosion

Corrosion is an electrochemical process by which a metal returns to its natural oxide state. For example, carbon steel is a commonly used metal in cooling water systems that is very susceptible to corrosion. Corrosion causes loss of metal thickness or even penetration of tube walls which can cause leakage of process fluids into the cooling water or vice versa. Corrosion is generally a greater concern with the more common, lower cost materials like mild steel.



### Fouling

Fouling is the accumulation of solid material, other than scale, in a way that hampers the operation of plant equipment or contributes to its deterioration. Examples of common fouling materials are:

- Dirt and silt
- Sand
- Corrosion products
- Natural organics
- Microbial masses

Conventional methods to control such problems include dosing prescribed chemical additives into the cooling water and meantime open the system to do some mechanical cleaning during maintenance periods usually from year to year depending on the situation. By using WELLAN®2000 RING, up to 50% or even 100% of chemicals can be saved. This also means the environmental pollution can be minimized to zero in some cases. Payback period usually is less than three years with WELLAN®2000. Cooling water systems are widely used in heavy industry such as power generation, steel manufacturing, and chemical plants etc.

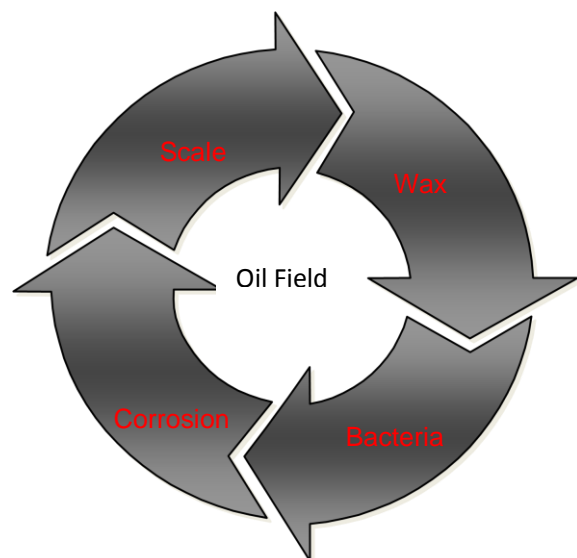


The working parameters of WELLAN®2000

Items	WELLAN Application Requirements
<b>General</b>	
Scope of application	All water bearing facilities, unlimited to pipe material
Effective distance of ring function	10 KM along pipe downstream of installation point
Maximum temperature of fluids	150°C
Maximum temperature of pipe wall	150°C
Environment temperature range	-50°C ~ 150°C
Maximum flow rate for non-circulating	15000 M <sup>3</sup> /hr
Maximum flow rate for circulating water	120000 M <sup>3</sup> /hr
Pipe OD (outside diameter)	12mm ~ 2000mm
Service life span of WELLAN®2000	More than fifteen (15) years
<b>For Cooling Water Treatment in The Circulation System</b>	
Total hardness	≤12 mmol/L (CaCO <sub>3</sub> )
Conductivity	≤2500 us/cm
Recommended flow rates	0.5 ~ 2.5 m/s
Recommended pH value	6.5 ~ 9.5
Turbidity	≤20 NTU
Total iron	≤1.0 mg/L
Silica	≤175 mg/L (SiO <sub>2</sub> )
Cl <sup>-</sup>	≤700 mg/L
Remarks	Water quantitative measurements beyond above parameters should be consulted based on local specific situation.

### Oil and water pipelines above ground

As petroleum products including natural gas are produced, salt and water molecules cause **scale** build-up that puts additional stress on the production equipment and **corrosion** that leads to premature failure of production equipment. In addition, during long transport process, **bacteria** such as SRB, IB etc. grow. Secretion from such bacteria is acidic that exacerbates corrosion situation. **Wax** in the state of liquid at high temperature begins solidifying and depositing on the inner wall of transport tubes and pipelines. After some time the pressure goes up and flow rates go down along all the pipelines and choking and leaking may occur at some critical parts. The whole transport system will soon be paralyzed.



In many oil fields, WELLAN®2000 has been successfully applied to solve such problems, saving billions of dollars for customers. In the market of China, our products have witnessed outstanding performance by reducing the corrosion rate by as much as 96%.

### Down-hole tubes and pipes in oil extraction fields

Wellan has developed a fantastic down-hole tool for the oil field customer. Petroleum crude oil consists of four factions, namely oil constituents, resin, asphaltene and pre-asphaltene (ie carbene and carboid). The chemical and physical properties of crude oil depends significantly on the relative amounts of each faction and their properties. The asphaltenes usually contain more condensed aromatic compounds than do the resin and oil factions.

- Asphaltenes and Preasphaltenes in their natural state exist in micelle form, peptized with resin molecules.
- When crude oil flows into the wellbore, the pressure and temperature decrease.
- This causes paraffin and water to be released from the water-in-oil emulsion resulting in paraffin solidifying and depositing on production equipment.
- The WELLAN®2000 down-hole tool stabilizes the water-in-oil emulsion structure and prevents the paraffin being released from the micelle structure and forming solid states.

With WELLAN®2000 tools installed, scale and corrosion is eliminated, resulting:

- ✓ **Improved production equipment efficiency**
- ✓ **Prolonged production equipment life**
- ✓ **Less downtime**
- ✓ **Increased overall production**
- ✓ **Significantly reduced labor work**
- ✓ **Improved operational safety**

### Heat exchangers between water and steam and hot oil

This is one of the most common applications. In modern factories, exchangers are often used to provide hot water for production process or to provide cooling efficiency to facilities. In this case, it is possible to observe the differential pressure through the heat exchanger. It can be seen that after applying WELLAN®2000 the differential pressure no longer rises or that it even drops again and reaches the



value of a new heat exchanger. One other simple method is to monitor the efficiency of the heat exchanger by comparing the quantity of cooling/heating medium with the effect achieved. It can be seen that the efficiency of heat transfer on a new exchanger remains the same or that the efficiency on a used exchanger increases again slowly.]

However, all these methods are only indirect methods which frequently provide only indications. The clearest results are, of course, supplied by visual inspections, i.e. fitting test specimens in pipes or opening heat exchangers, boilers or steam generators. In such cases, it is generally possible to determine a clear difference. There is only very little scale, rust or incrustations have disappeared and a protective coating will have formed.

In summer, central air conditioners are running to provide cooled air to office rooms or guest rooms at hotels or office buildings to maintain a comfortable working environment. More than 80% of such facilities use cooling water to take away the heat through the condenser which essentially is a heat exchanger between water on one side and coolant on the other. In cities, shopping malls, office towers, hotels and restaurants are all equipped with central air conditioners (sometimes called chillers). Among them, big names are Carrier, York, McQuay, Trane, Mitsubishi, DAIKIN etc. WELLAN®2000 can be applied on these facilities. Chemicals are dispensed with and operational costs are reduced.



### Industrial boilers

Almost all industrial boilers require the feed water to be treated. Using softeners to generate soft water for high temperature steam boilers is a common practice. For hot water boilers under certain working pressure, usually feed water can be low hardness tap water with some anti-scale chemicals added in the feed water leading to the boilers. Whatever used, many boilers are still running with concerns of scale and corrosion which causes further potential worries of safety.]

In addition, improving the feed water quality will lead to a decreased blowdown rate and other benefits throughout the hot water or steam distribution system. However, any opportunity that will require higher energy or cost in treating the water should be carefully evaluated against boiler blowdown energy losses to ensure the lowest energy





and lowest cost solution is found. Boiler blowdown rate (% of feed water flow, kg/h) is an important part of maintaining boiler performance. Too frequent and you are wasting high value energy; too infrequent and you risk the steam quality and boiler condition. Determine the optimum blowdown rate based on the energy and cost required for blowdown compared with water treatment costs, and then consider automating it based on acceptable concentrations of total dissolved solids (TDS).

WELLAN®2000 can improve the feed water property against scale and make optimized blowdown rate possible, increasing boiler efficiency with improved safety operations.

### RO Systems

In RO(reverse osmosis) systems, two measures of performance of an RO membrane are recovery rate and rejection rate. Recovery rate refers to the fact that only part of the water that flows into an RO system comes out as treated water. Part of the water fed into the system is used as wastewater to wash away the rejected contaminants. Salts present in “Hard” water can clog membrane. RO membranes are easily fouled if concentrated contaminants are not washed away soon enough. Conversely, if the waste flow rate is

too fast, the recovery rate is low and excessive water flows down the drain. In case nutrients and bacteria are present in the feed water, often a dense biofilm will develop due to the accumulation and growth of micro-organisms on the membrane surface. This biofouling results in operational problems like reduced production capacities, more frequent membrane cleanings and/or an increase in costs per amount of produced water.

All treatment methods have limitations and often situations require a combination of different treatment processes to effectively treat the water. Microorganism and/or bacteria related problem is a very common case in the above water (treatment) systems. WELLAN®2000 can be applied properly to each of them to combat effectively bio-film and bacteria growth.



### District central heating systems

District heating is used to heat buildings primarily in conurbations or areas in which large quantities of waste heat are available. Hot water or steam are provided by the power utility and are emitted to the building system via a heat exchanger. If untreated fresh water is heated in the secondary circuit of the heat exchanger, this may result in substantial scaling up in the heat exchanger. The scale is deposited and acts as an insulator so that heat exchange is far less efficient. WELLAN®2000 reduces deposits in this heat exchanger, the efficiency increases and, in most cases, it is possible to dispense with costly servicing. In addition, corrosion is stopped, thus prolonging the service life of the heat exchanger.

### Special applications in chemical industry



In many cases, WELLAN®2000 RING can be used to solve special problems in industry, for example, the problem of formaldehyde crystallization in chemical industry. In such cases, the fluids inside the pipe are a special type of mixed chemical materials instead of just water. Therefore, we have to get some sample of the fluids and with our technological means we are able to create special information for the ring.



### Residential Application – in house

For home applications, our smaller WELLAN®2000 RING is recommended. The ring can be installed either on the water mains downstream the meter in the house or before any individual equipment that needs to be protected against scale or corrosion.

#### *Shower cubicles / valves and fittings*

Many shower cubicles today are made of glass and scale makes a great mess of them. WELLAN®2000 can help as well. When you are showering, warm or hot water strikes the body and, from there, splashes against the shower cubicle walls. These droplets evaporate very quickly and scale is left behind. In many homes, this scale is wiped off directly after showering so that no stains occur. Using the WELLAN®2000 water ring, far less deposits occur right from the very start under normal conditions since the water flows away more quickly owing to the lower surface tension. In addition, it helps to rinse off the shower cubicle walls with cold water briefly after showering. Some stains may form nevertheless. These stains can generally be removed easily with a sponge or cloth if you do this twice per week.



#### *Washing machines / dishwashers*

Almost every home has a washing machine and dishwasher. These appliances tend to scale up if appropriate measures are not taken. Thus, regeneration salt is added to dishwashers and chemicals, such as Calgon or other agents, are added to many washing machines. WELLAN®2000 maintains the calcium carbonate in the water under normal conditions so that, generally, far less scale or no scale at all is precipitated and deposited in these machines. Very frequently, it is possible to dispense entirely with the regeneration salt on dishwashers. This results in savings in detergent of up to 50 % on washing



machines and it is frequently possible to do without descaling additives entirely

#### *Coffee machines*

Water is heated in coffee machines. This releases calcium carbonate which is deposited as scale in the machine. Unfortunately, it is not possible to dispense entirely with the need to descale the coffee machine using chemical agents in all cases on smaller machines for domestic use. This is attributable to the fact that the pipes and valves in the coffee machines are frequently very thin. When the last portion of water runs through the machine, it evaporates directly and scale is left behind. When new coffee is then made, the quantity of new water frequently does not suffice to partially dissolve the old scale since the flow velocity is too low. WELLAN<sup>®</sup>2000 is able to substantially prolong the intervals at which the coffee machine needs to be descaled. In the case of large industrial machines, it is frequently also the case that loose scale sludge collects at the bottom of the machine, and this can be removed simply during normal cleaning. Some customers have also reported that it has been possible to reduce coffee powder consumption by up to 15 %, depending on water quality.

#### *Kettles*

The problem relating to scale can be seen particularly clearly in electric kettles. Such appliances are used to heat water very quickly and strongly. In the case of untreated water, scale is deposited on the walls even after only a short time. This reduces the efficiency of the kettle and more time and energy is required to heat the water. WELLAN<sup>®</sup>2000 is not able to fully prevent precipitation of the scale either. However, if WELLAN<sup>®</sup>2000 is used correctly, far less scale is generally produced. If a little cold water is always added to the kettle after boiling, the treated water is able to partially dissolve the scale again. If no satisfactory result is achieved despite the use of WELLAN<sup>®</sup>2000 this may be due to the fact that the kettle generates an electrical field which reduces or cancels the effect even when not in operation. You should simply disconnect the mains plug when the kettle is not in use.

#### *Swimming pools*

Swimming pools or swimming baths encounter several problems, dependent on water quality. In the case of very hard water, large quantities of scale are deposited on the wall of the pool. Even in the case of small quantities of scale, scale encrustations build up along the evaporation edge, and these encrustations can be removed only with great difficulty. WELLAN<sup>®</sup>2000 removes this scale and solid scale encrustations generally no longer occur. Rather, the scale can generally be simply wiped off. WELLAN<sup>®</sup>2000 also changes the water so that, frequently, far less algae or even no algae build up in the water. This allows the use of chemicals to be appreciably reduced.

#### *Hot-water boilers*

Drinking water is heated and stored in hot-water boilers which are generally connected to the central heating system. These boilers also tend to scale up very greatly if the water is hard, primarily if the temperature is high accordingly. Frequently, such boilers also start to rust after a few years and this is why stainless steel boilers are used to a greater extent today. WELLAN<sup>®</sup>2000 clears the scale in the



boilers if used properly and this scale is then flushed out with the water. Existing rust deposits are partially dissolved and converted. The same situation as with kettles occurs on boilers heated electrically. These electrical heating systems may emit fields which impair the action of WELLAN®2000 so that only slight scale removal occurs. Generally, only the build-up of scale again is greatly reduced in such cases.

### WELLAN®2000 Power Ring Applications

At the moment , there are two types of power rings available from our company. The first one is used for vehicles and the second one for boilers.

Power ring for vehicles is a small ring which is placed around the neck of the tank inlet pipe before filling up the fuel tank. It can also be mounted on the oil tube leading to the engine. WELLAN2000 Power Ring is the result of many years of development work. During the course of intensive investigations and tests it was ascertained that the use of power ring achieves 5-15% savings in fuel consumption (this applies to all types of fuel: diesel, regular petrol and super).

Benefits achieved with WELLAN®2000 power ring:

- **better atomisation of the fuel - a finer gas mixture**
- **better combustion**
- **improved engine performance**
- **fewer harmful emissions**
- **prolonged service life of the engine**
- **contributions to cleaner environment**

The changes which are achieved in the petrol due to power ring become immediately evident in that the road behaviour and mileage performance are improved.

In order to improve the road behaviour even further it is recommended to use the Power Ring ring also for filling in lubricating oil. Here, it is not necessary to exchange the entire quantity of oil. The addition of some extra 100ml is sufficient to improve the oil.

Power ring for boilers ranges from smaller size of 1 inches to larger size of 3 inches or 4 inches or even larger than 4 inches. Installation of power rings for boilers generally



achieves a better saving on fuel consumptions. Based on our experiences, a saving rate of 5% is attainable. The fuel could be any kind of oil such as heavy oil or diesel.

### Installation steps

Installation of WELLAN®2000 is always simple and easy as described in the following diagram. However, we recommend you obtain our professional training before installing the first Ring. There are some observations you must pay attention to in order for the ring to work properly. We are committed to 7X24 online services to our customers. We encourage you to contact us directly if you have any question.



## References

### Customers in China (part of)

Dong Huan Plaza, Beijing	Property Mgt
Yan Jing Beer Group, Beijing	Beer Manufacturing
Tsing Dao Beer, China	Beer Manufacturing
Gong Niu Beer, China	Beer Manufacturing
Wei Xue Beer, China	Beer Manufacturing
Beijing ZiZhu Pharmacy, China	Medicine Manufacturing
Fresenius Kabi, China	Medicine Manufacturing



Beijing YuRun Food Production Co., Beijing	Food Industry
Nanjing YuRun Group, China	Food Industry
Yi Li Food Group, Beijing	Food Industry
Dao Xiang Cun Food Group	Food Industry
De Rui Food, Beijing	Food Industry
Ai Fen Food, China	Food Industry
New World Shopping Mall, Beijing	Commercial Building
China Sugar Group	Office Building
Hong Li Yuan Mansion	Office Building
The Great Hall of PRC	Central Government
National Information Center	Central Government
China Missile Research Institute	Research Institute
Home Inn, China	Hotel
Marco Polo Hotel, China	Hotel
Yue Du Hotel, Beijing	Hotel
Kun Lun Hotel, China	Hotel
Marriot, China	Hotel
Beijing Shun Feng Restaurant, Beijing	Restaurant
Xiang Qing Yuan Club, Beijing	Business Club
Beijing Toshiba Electronics	Electronics



Bi Zhong Hai SPA Center, Beijing	SPA
Swan Sauna Center	SPA
Yi Li Group, China	Dairy
Xi An Yin Li Group, China	Dairy
Meng Niu Group, China	Dairy
Meng Niu Dairy Production Base, Beijing	Dairy
San Yuan Well Hope	Livestock
Beijing Forestry University	School
Capital Normal University	School
Beijing Guo Hong Hotel	Hotel
Harbin Boiler Heating Supply	District Heating
Da Qing Oil Field	Oil Field
Sheng Li Oil Field	Oil Field
Xing Jiang TuHa Oil Field	Oil Field
Petro China Tianjin Company	Petro-chemical
Da Xie Petro-chemical Company	Petro-chemical
Yang Tze Petro-Chemical Industry	Petro-Chemical
Mei Shan Chemical Industry	Petro-chemical
Jin Ling Petro-chemical Inc.	Petro-chemical
Beijing Organic Chemical Factory	Chemical



Red Sun Chemical Group	Chemical
Tian Ye Chemical Group	Chemical
Ji Lin Ethanol Fuel Co., Ltd.	Energy
Beijing Railway General Hospital	Hospital
Beijing Tumor Hospital	Hospital
Xuan Hua Steel Group	Steel Manufacturing
Yun Nan Copper Industry Power Plant	Power Generation
State Grid Shuang Ya Shan Power Plant	Power Generation
Tian Jin Thermal Power Plant	Power Generation
Luo Yang Molybdenum Mineral Group	Mining Industry
Lan Lou Coal Minging	Mining Industry
Jiu Long Coal Mining of Fengfeng Group	Mining Industry
Beijing Kuan House	Residential Community
Haidian Qing Shang Yuan, Beijing	Residential Community
Army, Luo Yang	Army

### Customers Outside China

Name	Industry
Coca Cola	Beverage
Pepsi, Europe	Beverage
Citro Misr, Europe	Beverage





Unilever, Israel	Food
HP, USA	IT
Mitsubishi Auto Group, Japan	Automobile
Hyundai Motor Company, Korea	Automobile
Frankfurt Airport, Germany	Aviation
Exxon Mobil, USA	Oil
Saudi Aramco, Middle East	Oil
Hapag Loyd Shipping, Europe	Shipping
Thenamaris Shipping, Europe	Shipping
Leonhardt&Blumberg, Europe	Shipping
Vialcho Gruppe, UK	Steel
Hellenic Petroleum, Greece	Oil Refinery
GeWoBau, Germany	Property Management
Kappa Packaging, Germany	Paper Manufacturing
Posco, Korea	Steel
Hengstenberg, Germany	Food
Tnuva Dairy, Israel	Dairy
Fagerdala World Foams, Germany	Packing
Segmuller, Germany	Furniture
Hochhäuser, Germany	Business



Arriba Erlebnisbad, Germany	Recreational Center
Großhotels, Germany	Business
Mannheimer Wohnungsbau, Europe	Property Management

## Customer services

### ■ Global unique code for each product sold

To maximize the interest of our customers, each WELLAN®2000 ring is marked with a unique serial number (code) as required by our ISO quality management system. If you have any question about the installation or performance of our products, please feel free to contact us.

### ■ Free training is available for all partners

At our headquarter office in Beijing, we conduct regular training to our partners and customers free of charge. Throughout the course of training, free work lunch is provided to every participant. Only trained technicians are qualified to install WELLAN®2000 rings.

### ■ Assistance and Guidance to field survey

For new partners or customers, they may have some questions specific to their facilities not covered by our standard questionnaire survey. In this case, at least a skype communication can be established. And if requested by customers, we can send our engineers to assist with local field survey.

### ■ Free sales promotional literature

Flyers, PDF, PPT, Video Clips are available for business partners.

### ■ Free sample analysis service

For some special fluid problems, we may request a little sample of the scale or similar unknown material to conduct some chemical analysis.

### ■ Information Charge Service

This is our latest technical service we offer to private clients. If you are interested in imprinting special information onto personal care or wear items such as pendants, bracelets, or finger rings or whatever you would like to place in your handbag, please contact us directly.



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