LIQUID
TECHNOLOGIES
INTERNATIONAL

"Better way to the world"

LTIWET

LTIWET is the Water Enhancement Technology with many benefits

ABOUT LTI

Vision

To inspire sustainability and healthier communities through research and development on water.

Mission

Our mission is to enhance plant, animal and human life by addressing water shortages and contamination issues with most advanced water enhancement technology in an eco-friendly and cost-effective way.

History

Liquid Technologies International, Inc. (LTI) was founded in 2004 for the purpose of developing a water conversion technology (LTIWET) to enhance water quality beyond mere filtration systems with initial interest in its application to industrial water pipe delivery and storage containment systems known as water cooling towers. The focus was to develop a technology capable of activating water to eliminate storage-tank-wall chemical scale buildup, rust (due to its oxidative effects on metal), overall corrosion and algae growth problems. The company's goal focused on developing a viable cutting-edge technology for the worldwide marketplace.

The first significant application of this technology was introduced called LTIWET SRD (Scale Removal Device) and was immediately proven to be a highly cost-effective and environmentally friendly product. This discovery yielded product sales with Japanese blue chip companies having large industrial plants such as Mitsubishi Heavy Industries, Sasebo Heavy Industries, BridgeStone, UBE Industries, IHI , Sumitomo Rubber Corporation, Baxter Corporation and some large corporations in the Mitsui Group.

In 2006, LTIWET for housing the bead cluster were given for their testing by some prestigious universities. Results proved the concept of the technology's positive effects on water's molecular composition yielding significant scale and organic growth reduction. Subsequent testing took place in a Japanese Medical School, whereby the Department of Applied Physiology, Faculty of Medicine's researchers were given the same equipment given at the first test facility. This test centered on additional attributes of treated water, specifically proving its antioxidative effects. After those tests, LTIWET was applied to various industries including big buildings, subway stations, airport buildings, hotels, hospitals and etc. where LTIWET was proven to have significant effect.

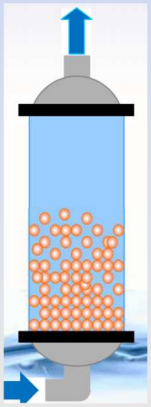
From 2010 to 2018, LTIWET technology was tested for its qualities when applied to agriculture by institutions both abroad and in the US including Plant Sciences of Watsonville, CA, Pacific Ag Research of San Luis Obispo, and Fresno State University, CA. Research clearly demonstrated a broad range of benefits including enhanced soil development, significant reduction of chemical input, improved plant health, higher yields, more efficient water use (33% reduction) – all working together to lower costs and improve profitability to the farmer. Additionally, applications in the animal husbandry sector have shown improved animal health and significantly reduced mortality rates. In 2018, LTIWET was tested in India which has a very serious water issue. It has been proved that LTIWET could bring so many benefits to the society of India.

TECHNOLOGY

Water Quality Enhancement Technology **(LTIWET)** is the technology which changes the structure of water thereby provides significant benefits to many living and creature on the globe. LTIWET has many benefits leading to the saving of a lot of water

LTIWET can be applied to any type of water including city water, groundwater, river and lake water, and even sea water. And LTIWET can get well along with any other water technology.

LTIWET simply requires a stainless tube and the specific ceramic beads Ceramic Beads need to agitate (move up and down colliding with each other) constantly at a fixed rate of speed in the tube for producing the optimal effect and for the longevity of the effect. This simple action could cause the significant benefits in a variety of applications.



Ceramic Beads ingredients are sourced from the particular natural ores. Ceramic Beads needs to be hard enough to withstand much higher water velocity during their agitation in a unit. Ceramic Beads are manufactured with the traditional art of pottery though its unique, elaborate, delicate and sophisticated process!

Dimension and shape of a unit could only be determined pursuant to the water velocity in each application. Such dimension could be precisely fixed by the specific formula (Trade Secret) which is related to the water velocity and the pipe size where a unit is to be installed.

LTIWET could deal with the maximum treatment capacity from 10L/minute to 3,500L/minute. Each unit could be manufactured under the specific formula mentioned-above.

The basic mechanism of LTIWET is
(1) make water molecule so small,
(2) deionize minerals in water and absorb those minerals or substance in water changing them into tiny soft colloids which are surrounded by " membrane " of positively charged water.
(3) provide positive charge to water (cationizing water).

CEC (Cation Exchange Capacity) of Ceramic Beads - CEC (Cation Exchange Capacity) of our ceramic beads is 100~150 meq/100g which is far more than other ceramic beads. Such higher CEC of Ceramic Beads with their constant agitation during the time of water running in a unit which causes a thermoelectric current can provide positive charge to water and this could lead to such plenty of significant effect as describe below

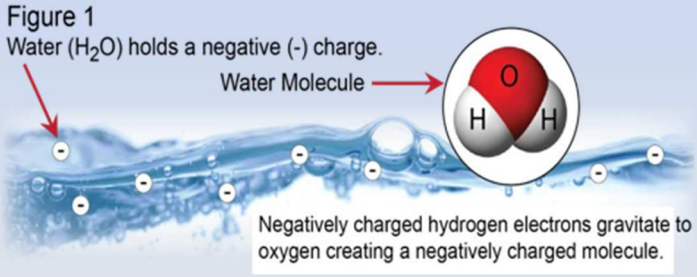
HOW DOES LTIWET WORK

The following is an abridged pictorial explanation of LTIWET:

The basics concerning our technology are our proprietary quartz-like ceramic beads and engineering which are used to create a process that positively charges water thereby changing the water's molecular structure and releasing the water's hydrogen atoms. This alteration of the water molecules provides many benefits including reduced surface tension of the water enabling our converted water to more easily enter the cells of humans, plants and animals.

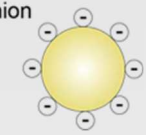
Water molecules are made up of hydrogen and oxygen atoms, with each molecule containing 2 hydrogens and 1 oxygen. Untreated Water [H2O] holds a negative (-) charge. (see Figure 1)

Figure 1
Water (H_2O) holds a negative (-) charge.



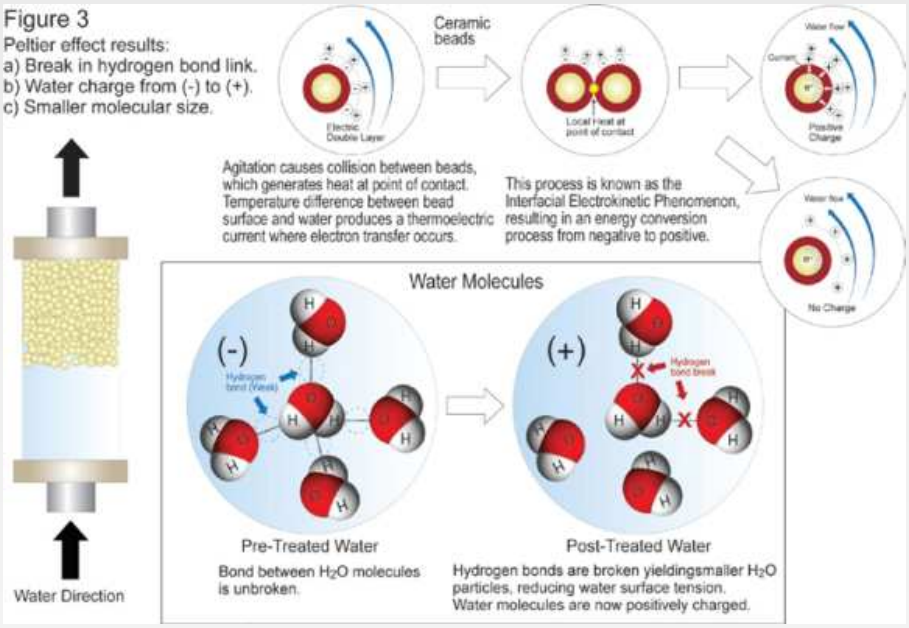
Our Ceramic Beads are negatively charged. A layer of negatively charged anions (-) forms on the beads' surface area. (see Figure 2)

Figure 2
Ceramic Bead surface holds a negative (-) anion charge.



The agitation of ceramic beads within the activation chamber causes them to collide with one another creating what is known as the Peltier effect. A second positively charged layer (cation) is created on top of the ceramic negatively charged surface layer (anion) known as an electric double layer. (Figure 3 on the next page) An electric double layer

Figure 3
Peltier effect results:
a) Break in hydrogen bond link.
b) Water charge from (-) to (+).
c) Smaller molecular size.



Where there is friction there is energy (heat) release. This is known as the Interfacial Electrokinetic Phenomenon. This action produces a conversion channel where electron transfer occurs changing the water's structure by breaking the hydrogen/oxygen bonds between each molecule. Surface tension reduction and other benefits result.

Cores of LTIWET technology

1. Our Ceramic Beads of which ingredients need to include the specific substances in a fixed ratio respectively and unlike other ceramic beads, Ceramic Beads should be hard enough to live with the agitation of the ceramic beads in a tube or chamber irrespective of such fast water velocity.
2. Our Ceramic Beads have much higher CEC (Cation Exchange Capacity) than any other ceramic beads which could attract minerals so effectively softening water and could easily provide the positive charge to water. Ionized minerals like Ca, Mg and Na in water which are dissolved in water can be deionized and change into such small colloids..
3. The constant agitation of Ceramic Beads in a tube or chamber at the fixed speed should be essential for the optimal effects including antioxidant and antimicrobial effects.

Advantages of LTIWET's device

Uniqueness of our technology as follows:

1. ***No chemical use*** 100% natural ore
2. ***No power source*** to be required for the operation except water flow
3. ***Simple operation*** The water treatment itself is quite simple, economical and quite effective compared with other outer force treatment such as magnetic field treatment, electrostatic field treatment, ultrasonic treatment, microwave treatment and so on.
4. ***No maintenance*** to be required including the ceramic beads, Outstanding longevity of the units without maintenance
5. ***No operating cost.***
6. ***Long shelf life*** which is at least more than 5 years
7. Workable on " ***stand alone*** model or in ***integrated*** model (***integration*** with the existing water technology)
8. ***Multiple effects*** including removal of scale and slime, lowering surface tension and hardness, antioxidant effect and antimicrobial effect
9. ***Many possible applications*** including industrial, agriculture & livestock, domestic and water remediation
10. ***All*** of the treated ***water*** can be ***usable*** (***no waste*** ! ***no backwash*** !)
11. ***Water from any source*** including groundwater, municipal, lake, river and sea can be treated.

APPLICATIONS

LTIWET is proven to have so many good effects on many applications including the following applications where there are immediate effects:

INDUSTRIAL: LTIWET can remove scale or slime in water very efficiently so that it can save the cost of chemicals to clean up the system pipelines. The use of LTIWET can also extend the longevity of the pipes since LTIWET can remove scale and slime, and can restrain rust from building up. Our technology has vast application in industrial use in power plants, Sugar Mills, Distilleries, Breweries, Beverages, Textile, Leather, Pharmaceutical, Paper industry, Chemical, Edible oil mills, Milk Plants, Ice cream plants, Bread & Biscuit manufacturing, Packaged food industries, Rice & Flour mills and every other industry.

With installation of LTIWET device, huge savings in downstream equipment is accrued and remarkable reduction in the quantity of other consumables and also the enhanced quality of end product is achieved. Savings due to increased efficiency of process equipment, reduction in process time, reduction in maintenance cost.

- LTIWET protects cooling tower installations from adherence of scale, slime and sludge. Cooling fans, piping systems and heat exchangers remain free of harmful scale. The result is the reduction in maintenance costs and elimination of chemical agents.
- As well, both high energy consumption rates in condensers are reduced. Scale and rust in heat exchangers are reduced and, as a result, maximum heat efficiency can be achieved
- Our Device By cationizing (giving a positive charge to) circulating water, the treated water is able to absorb a large amount of carbon dioxide (CO_2) from the atmosphere. The captured CO_2 bonds with ionized Ca, Si, Mg and other molecules in the water, and facilitates the forming of $CaCO_3$, $MgCO_3$, SiO_2 crystals. A cat-ionized membrane forms around these crystals which are dispersed in the water as colloids. Such colloids have the same charge. As a result, they do not bond to form large crystals, and do not adhere to pipe walls or heating surfaces of heat exchangers. The colloid-state crystals settle and accumulate in the slow-flowing collection basin of the cooling tower. Further, since a cationized membrane forms on the outer surface of the crystal particles, any bond formed with other crystals in the pan is weak, and large-scale deposits do not form.
- Of course, the incidence and growth of detrimental bacteria including legionella can be dramatically reduced
- After installation on a cooling tower, our device will prevent rust and scale build-up without chemicals by circulating cat-ionized water.

CONCRETE MIXING: LTIWET can reduce significantly the amount of water required for concrete mixing and the chemicals which are required to increase hardness of concrete.

HOUSEHOLD: Domestic use of LTIWET provides significant improvement in the quality of water used in everyday housekeeping activities, removing the hardness of water and adding anti-oxidant and anti-microbial effects. LTIWET also maintains and optimizes the efficiency of boiling and heating equipment. In addition, LTIWET can add water the significant detergent effects with much less chemical detergent.

SWIMMING POOLS: The amount of chlorine added to the water of pools and baths can be greatly reduced by the use of LTIWET. In operation, the pools equipped with LTIWET show the following results:

- Efficient control of chlorine input volume
- Reduced chlorine damage on the human body and swimwear
- Prevention of pipe corrosion by chlorine
- Excellent water cleaning
- Elimination of chlorine odour

AGRICULTURE: Plant growth depends greatly on water and soil quality (mineral balance), light and temperature. (fruits and vegetables): It promotes use of less water (35~50% less), less fertiliser (40～60% less), less pesticide (60～80% less) and results in greater harvest (15～30% up), greater sugar concentration(15 ～ 20% up) and soil remediation (increase of major fertiliser elements like phosphorous and potassium Experience in applying LTIWET in agriculture shows the following results:

1. Better absorption of water due to the different shape of the calcium carbonate crystals which cannot be adhered to each other
2. Solid extension and growth of roots into the soil
3. Reduced Water Consumption- Expected reduction water consumption from 25 to 50% depending on crop and other variables
4. Thicker, longer and stronger stems
5. Quality Produce- Brighter colours and clean leaves of flowers and plants due to surface tension cleaning effect
6. Increased Yield- A Depending on the crop being grown, yield increase occurs at rate of 10% up over 30%.No disinfection of the soil needed
7. Shorter growing period from seeding to harvesting
8. Reduced Fertilizer consumption- The intensified solvent action of activated water by LTIWET enables fertilizers much higher efficiencies as transmitted to the plant. 50% or even more reduction of the use of fertilizer is possible.
9. Soil Remediation - increase of major fertilizer elements like phosphorous and potassium
10. Great reduction of the common disease and the use of pesticide

LIVESTOCK: LTIWET can provide the significant effects on the livestock industry. It is proven that LTIWET water can provide so many benefits to any and all of livestock including chicken, duck, pig, hog and cattle. It significantly reduces the morality rate (e.g. from 18% to 3% in the case of duck) and improving the growth rate with less feed. It shortens the cycle of growth (e.g. from 40 days to 32 days in the case of the duck). Moreover, LTIWET water significantly reduce the use of antibiotics and help in weight gain in livestock. LTIWET water increases the solubility of water; within the animal this allows it to realize more nutritional value from its food as well as increasing the effectiveness of medications and supplements by up to 30%.

PACKAGED MEAT INDUSTRY: LTIWET Water has unique antibacterial and antioxidant properties; these values would ultimately contribute to better quality meat and longer freshness in packaged meat with extended shelf life

FOOD: LTIWET has proven its effectiveness in preserving the purity and fragrance of fruits and vegetables. In the household, daily cooking, coffee, tea and beverage show improved taste and quality. It preserves food stuffs in a sanitarily good condition and prevent such food stuffs from being oxidised. LTIWET is a boon to the fresh vegetable and fruit marts.

BUILDING & APARTMENTS: LTIWET treated water possesses cleansing effect, so that less detergent materials would be required for washing clothes or dishes and deodorant effect, by spraying LTIWET water into the substance having bad odour. LTIWET in the kitchen improves home water quality while preventing or removing scale and slime from sinks and drain-pipes. In addition, the LTIWET controls the generation of micro-organisms which can cause bad odours.

HUMAN USE: Uniquely organized hydrogen activated water for drinking with antioxidation effect. It also provides nice moisture to human skin.

LAUNDRIES: LTIWET provides an extra-softening effect on all kinds of clothes, making dirt and stains easier to be removed. The special properties of LTIWET allow a considerable reduction in the quantity of washing detergent normally used.

HOSPITALS/HOTELS/SHOPPING MALLS/RAILWAY STATIONS/PUBLIC CONVENIENCES: The use of LTIWET in hospitals and public or private places guarantees the elimination of scale in piping systems and protects such installations against unpleasant odours in order to maintain toilet facilities at the highest possible standard. It also controls the generation of micro-organisms which can produce bad odours.

DIALYSIS FILTER EQUIPMENT: LTIWET can contribute to much less contamination of RO Module and it is highly expected that Water Activator will enhance the longevity of RO Module. It can be effective in keeping the dialysate solution clean and cost reduction for the dialysis operation since RO Membrane seldom requires replacement. It is fully proven that LTIWET can have significant effects on the dialysis equipment where the longevity of RO membrane can be greatly extended and can save patients from having any toxic materials which could be generated from the dialysis equipment when RO membrane is used. It is expected that LTIWET can be applied to any other medical field due to its strong antioxidation effects.

DENTAL SURGERY: LTIWET has achieved outstanding results in this sector. Dental surgery equipment, such as the turbine tubing, ultrasonic scales and magnetic valves are very sensitive to scale generated by ordinary tap water. Conventional maintenance is insufficient to correct this problem. Dental equipment is not only affected by scale formation but stains, slime and unwanted odours formed by the presence of bacteria created by the decomposition of organic matter present in different areas such as the spittoon used for rinsing. Warming water, the gypsum trap and the clogging of the sink can also create unwanted effects. It prevents scale formation in dental equipment increasing its longevity.

TRAINS, AEROPLANES and SHIPS: Slime and urinary calculus adhering to tanks and drainpipes of toilets and lavatories of trains, airplane and ships, can be prevented or removed by LTIWET. After the installation of LTIWET, cleaning becomes easier and the majority of bad odours are eliminated. LTIWET prevents water pipes and tanks from rust formation and removes the chlorine smell from drinking water.

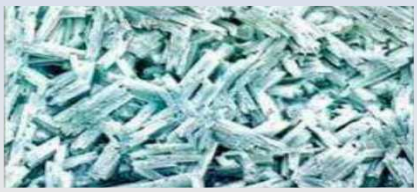
ILLUSTRATIONS

Cationized Water LTI Ceramic Bead has very strong CEC (Cation Exchange Capacity) and as a result, the constant agitation of LTI Ceramic Bead in the vessel provides positive charge to water so that water can be cat-ionized and water molecule becomes so tiny since the hydrogen/oxygen bond between each molecule can be broken by LTIWET which can make it possible for the living to absorb water very smoothly which lead to the significant benefits to animals and plants.

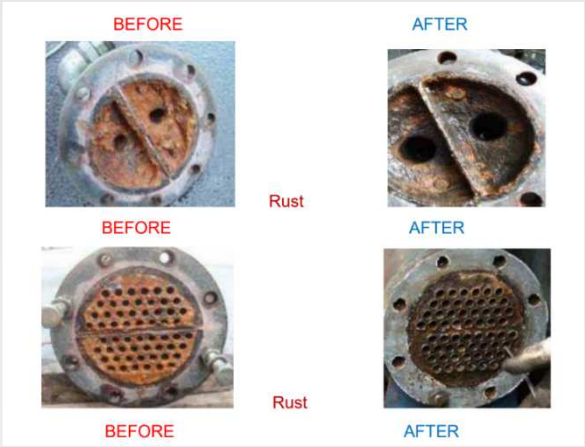
Minerals like Ca, Mg and Si absorb plenty of CO2 in the atmosphere and change into the state of soft “colloid” and such colloid can be surrounded with membrane which is formed by cat-ionized water of LTIWET, and will be dispersed in the water as such tiny colloid. Through these processes, ionized Ca and Mg can be significantly decreased so hardness can be reduced. Such colloid has the same positive charge. So they do not bond with each other to form large crystals (scale), and do not adhere to pipe walls or heating surfaces of heat exchangers, and do not form slime.

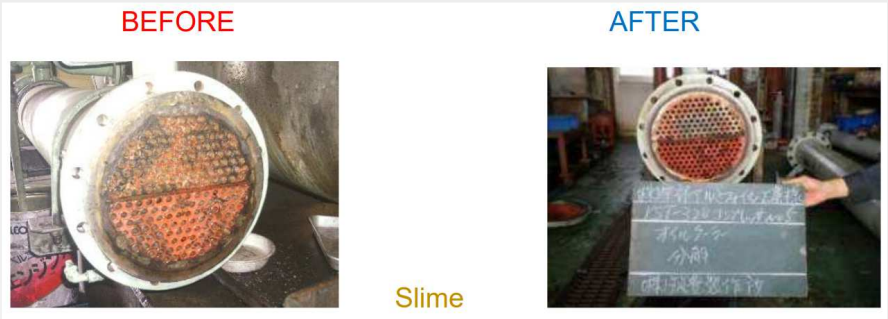
Mineral crystals with LTIWET

Mineral crystals without LTIWET



Cationized water by LTIWET can also restrain the generation of rust or further rusting if already generated by forming membrane around the red rust. You can see the red rust has turned black after the restraint of further rusting below.





Comparison of the tubes with our device (left) and w/o our device (right)

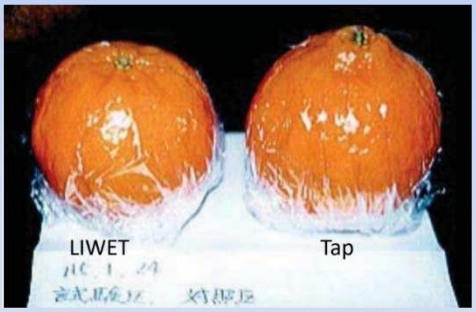
Antioxidant and antimicrobial effect Membrane formed by cat-ionized water can protect human, animal and plant cells by surrounding them against bacteria or oxidized objects thereby can produce yield enhancement and reduce the mortality of livestock significantly.

Comparison of the growth of wheat: Treated (left) & Control (right)

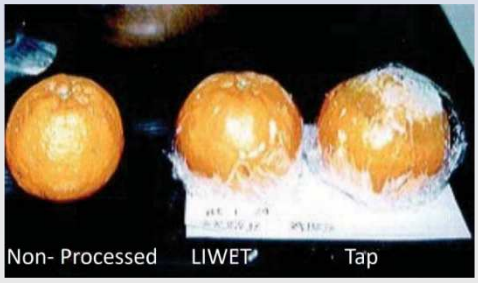
WITH LTIWET **WITHOUT LTIWET**

Comparison of non processed, Treated with LTIWET treated water and tap water washed oranges.

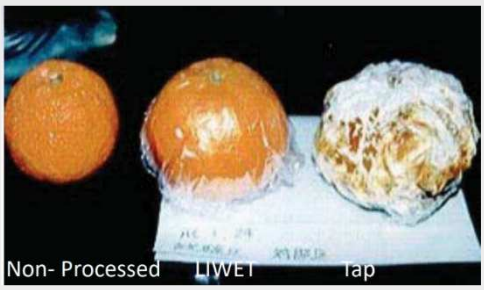
Oranges were soaked, one in tap and the other in activated water. In order to promote decay, both have been wrapped and sealed in plastic wraps.



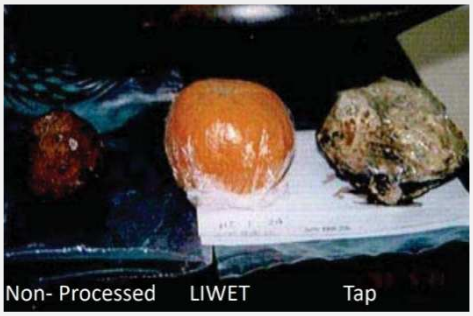
Month 1:
No visible changes are observed in the orange soaked in activated water.
Notice some water coming out of the orange soaked in tap water



Month 2:
No visible changes are observed in the orange soaked in activated water.
Tap water soaked orange has started dripping moisture and decay process has begun.



Month 3:
No visible changes are observed in the orange soaked in activated water by LTIWET.
Tap water soaked orange has started its decay. A visible mold can be seen. Non processed orange started to shrink due to dehyration.



Month 6:
Activated water soaked orange (center) has dripped some water out but is still in edible condition.
Tap water soaked orange progressed with so much decay that obvious deformation is seen. The non processed orange has further progressed through dehydration process

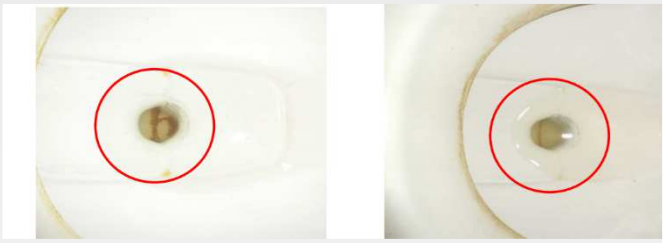
12 years after insatallation in Mitsubishi

14 years after installation in Bridgestone

Prevention effects of urinary scale and rust in the toilet of the vessel " CHIKYU"

Unit fitted in toilet onboard

In drain pipes, hard urinary scale had become much less hard which is easily removable. Ammonia odour is also removed.



.Inside of the drainpipe had turned out to be black instead of red. 5. Soon after the installation of the LIWET-1, the color of inside of the drainpipe of the FWD Machinery Room had been nearly brown. This is because iron of the pipe which contacted water became oxidized and corroded, and it was mixed with scale. Iron dioxide (red rust) has turned out to be iron tetroxide (black rust). Such corrosion restraint as mentioned above would lead to the better longevity of the facility which is required to make use of water, which would enable the significant cost reduction.

Industrial & Commercial Hospitals, Apartments, Restaurants Installations







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"Better way to the world"

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