



TETRADOM

Case Studies

(Commercial & Residential Use)



TOTAL SOLUTION FOR WATER TREATMENT

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Product introduction



TETRADOM products utilize quantum physics technology to address water scaling, corrosion, microbial, and algae issues in a wide range of commercial HVAC and residential applications. Tetradom technology is a forward-thinking solution that is set to replace traditional water treatment methods. It requires no special equipment, no electricity, no magnets, no chemicals, no manual maintenance, and no contamination. Additionally, it offers a service life of up to 10 years.

All large buildings are equipped with HVAC systems to regulate indoor environments. These systems consist of three main components: the heating system, the ventilation system, and the air conditioning system. Major equipment includes boilers, chillers, heat exchangers, compressors, pumps, and cooling towers—each of which can face issues such as scaling and microbial contamination.

Tetradom's solutions are ideal for various facilities, including government office buildings, universities, hospitals, hotels, shopping centers, data centers, and large warehouses.



In addition, public swimming pools, water parks, and other public facilities, such as fountains, often have water circulation systems. These systems not only suffer from scaling issues but also require enhanced control of bacterial and algal growth. Excessive bacteria (such as E. coli) in water can lead to health risks, while high levels of algae can cause water to turn green, form slime, and clog pipes. Chlorine is often used as a biocide to control bacterial and algal growth. However, excessive chlorine can harm the skin and eyes. The application of Tetradom technology can significantly reduce the amount of chlorine needed while also addressing scaling, which reduces overall operating costs.





Product introduction

When installed on water pipes entering a building, Tetradom products can remove scale, slow down corrosion, and control microbial growth within the building's water system.



Descaling of heating equipment: Scale buildup often occurs inside water heaters. When the water is heated, the scale dissolves and increases water hardness, which can be harmful to the skin and hair. Tetradom products prevent scale formation inside water heaters, ensuring that the water remains soft and that nozzles are free from blockages.

Scale on heating surfaces can greatly reduce heat transfer efficiency, leading to longer heating times. Excessive scale buildup can even prevent water from boiling or, in extreme cases, cause container explosions due to uneven heating.

Tetradom's descaling and anti-scaling functions improve the heating efficiency of boilers, reduce electricity consumption, and promote energy savings.



Tetradom has accumulated extensive experience from thousands of projects over the past 30 years. Its products are sold in over 100 countries and regions worldwide, solving scaling issues in HVAC cooling water systems and household water supply systems, thus improving the quality of life for users around the globe.

Case 1.

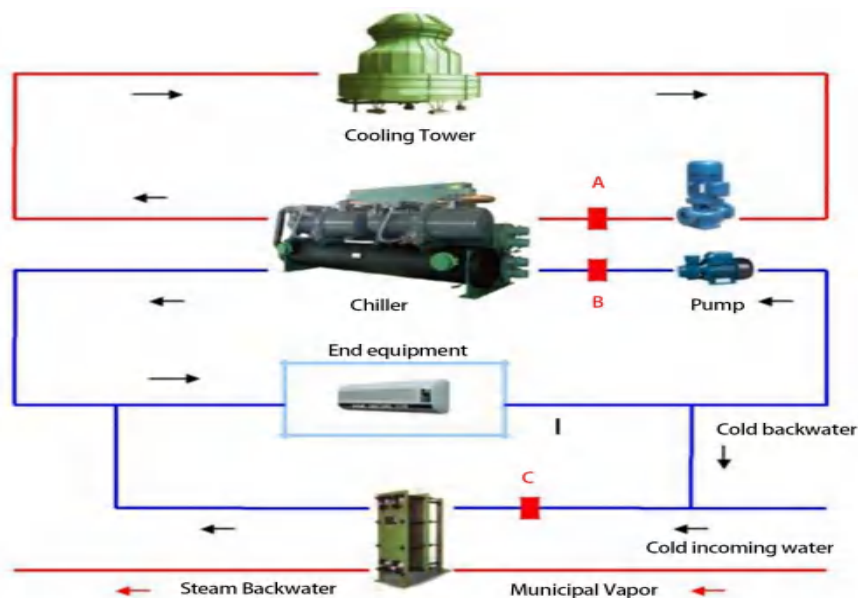


Project Domain: CB-HVAC Descaling Project (Beijing Economic and Trade Building , China)

Pain Points: The Beijing Economic and Trade Building is a large, modern, high-grade office complex that integrates both commercial and office spaces. The building's cooling circulating water system previously relied on chemical treatments to address issues like rust, corrosion, bacteria, and algae. However, this method resulted in several .

- High costs associated with purchasing and applying chemicals.
- Frequent manual maintenance and drainage were required.
- Unsatisfactory results, with persistent problems despite ongoing treatment.
- Low heat exchange efficiency, which led to increased energy consumption and reduced system performance.

Installation:





Case 1.

Cooling circulation system: 1*DN400mm, Point A located downstream of the water pump.

Cooling circulation system: 1*DN350mm, Point B located on the main pipe.

Heat exchanger system for the heat station: 1*DN250mm, Point C located at the inlet of the heat exchanger.



Before



After

Effect of Use:

After operating through one warm season and one cold season, the surfaces of the unit, heat exchanger, condenser, and other heat equipment remained clean, scale-free, and in good condition. The system's original rust and corrosion were effectively removed.

Summary

The application of TETRADOM technology for descaling, corrosion protection, inhibition of bacteria and algae in water supply systems of business apartments is integrated into a comprehensive solution. It helps to reduce maintenance and labor costs.

Note:

Tetradom products do not directly remove rust. The increase in iron levels in the water after installation can be attributed to two factors:

Scale is a combination of calcified salts and rust. When the scale is broken down, both scale and rust can enter the water.

Tetradom products create an oxide layer on metal pipes, causing any existing corrosion to loosen and fall off.

Case 2.



Project Domain: Business Apartment Water Supply System Descaling Project (Beijing, China)

Pain Points:

- **Aging Water Supply System:** The 25-story high-end serviced apartments use variable frequency water pumps, with the main water pipes made of galvanized steel. These pipes and water supply equipment have been in operation for 8 years.
- **Severe Corrosion:** The interior walls of the pipes have become severely corroded over time, leading to significant damage.
- **Water Discoloration:** Water flowing from the bathtubs and kitchen faucets has turned a noticeable reddish-brown and contains sand and sediment particles, making it unsuitable for use.
- **Boiler System Issues:** The boiler water pipe system shows obvious reddish-brown rust stains, indicating further corrosion problems.
- **Resident Complaints:** The residents have repeatedly raised complaints about these issues, affecting their daily living conditions.



Installation:

A DN120 Tetradom ring was installed in the lower section of the apartment's water supply system, while a DN135 Tetradom Ring was installed in the higher section to address the corrosion and rust issues affecting the pipe system and equipment.

Case 2.



Rust condition of the guest room bathroom on the day of installation



80 days after installation, the water in the room is clear and translucent

Effect of Use:

In line with the customer's requirements, we conducted an on-site inspection of the water quality in the apartment rooms and performed a before-and-after comparison. Less than two months after installation, rusty water no longer flows from the bathtub and sink faucets, and the water is now clear. The reddish-brown rust in the boiler plumbing system has been effectively removed, and there have been no further complaints from the customer regarding this issue.

Summary

Tetradom technology effectively removes scale from building water supply pipes and forms an oxidized layer inside the pipes, thereby slowing down the corrosion process and preventing the formation of new scale.

Note: The daily water supply system operates as a single-pass system, with relatively small pipe diameters and low water flow. The treatment capacity of Tetradom rings is sufficient to handle all the water passing through, ensuring that downstream pipes remain in optimal condition.

Case 3.



Project Domain: Bacteria suppression project (The Emilstrasse nursing home ,Germany)

Pain Points: The nursing home faced issues with Legionella counts exceeding the acceptable limits. Test results for Room 210 in Building 1 showed a Legionella concentration of 14,300 CFU/L, while the test for the warm water circulation (reflux) was 25,000 CFU/L. Both tests detected Legionella pneumophila type, whereas the standard threshold is 10,000 CFU/L. The hot water system itself showed no issues, but it was clear that Legionella colonization was present in the peripheral water distribution system.

Six months after installing 1 ring on the main pipe , a follow-up comprehensive test was conducted, and the results showed that all data from the 12 monitoring points met the safety standards.

Test Results:

The test report, dated October 8, 1996, indicated that the bacteriological results for samples 1-12 were satisfactory. Low concentrations of Legionella pneumophila were detected in samples 2, 9, and 11, and slight concentrations of Legionella pneumophila serotype 6 were found in samples 4, 6, and 8. The Legionella levels in most sampling sites were within the safe health range.

The amount of Legionella detected in the vast majority of sampling sites was within the health safety range. The testing company recommended continuing the use of the Wellan ring and conducting regular control inspections at specified intervals. *(Attached: Customer testimonials)*

Summary

This application demonstrates the use of Wellan technology to inhibit Legionella, not only Legionella, but also Total Bacteria, E. coli and other microorganisms.

Note: Wellan technology controls bacterial populations by altering the environment in which the microorganisms are growing to make it unsuitable for the bacteria to thrive.

- Wellan technology reduces the amount of chemicals required by more than 50%. Wellan technology is primarily aimed at anaerobic microorganisms and the effectiveness of Wellan technology may vary depending on the area and environmental conditions. This process also reduces biofilm formation.
- If a customer has very stringent requirements for bacterial counts, for example to achieve zero Legionella, then a combination of chemical methods will still be required. However.

Case 3.

Non-English documents have been translated using Google, so there may be some errors. They are provided for reference purposes only.

HEALTH OFFICE.
THE CITY OF DARMSTADT
AND THE DISTRICT OF DARMSTADT-DIEBURG

Magnolia
The City of Darmstadt
- Social Administration -
Stoltz-Germany-Weg 2
64283 Darmstadt

STRUCTURAL OVERSIGHT
AMT MASCHINEN UND FACH
23 APR 1996
24 APR 1996

TH-4-222
18. April 1996

Monitoring of drinking water hygiene by the health authority in accordance with Section 11 of the Federal Epidemic Control Act (Infektionsschutzgesetz) as amended on 12 September 1993 and the Drinking Water Ordinance (Trinkwasserverordnung) as amended on 9 September 1990.

Since old pipes and nursing home. Endstation: Legionella in the hot water network.

Results:

1. Our last letter dated 02.03.1996 on the same subject.
2. Drinking water tests from 12.12.1995 and 29.01.1996 (results received on 10.04.1996).
- 3rd sampling in the nursing home on April 15, 1996

The most recent drinking water tests in the old people's and nursing home on Endstation again showed legionella levels above the permissible guideline values.

For example, during the last examination, 14,300 CFU/l were detected in Room 1, Room 710 and 25,000 CFU/l Legionella pneumophila were detected in the hot water circulation (return flow). The guideline value for nursing homes is 10,000 CFU/l.

During the last examination in the nursing home, 8,400 CFU/l were obtained in Room 202 and 6,000 CFU/l in Room 225. The guideline value here is < 100 CFU/l.

We attach the findings in the appendix.

The findings show that the number of Legionella bacteria in the hot water supply is acceptable. This means that sufficient thermal disinfection is taking place in the boilers.

The germination apparently takes place in the peripheral hot water distribution network.

For reasons of preventive health protection, we consider the following measures to be absolutely necessary. These were already discussed on 15.04.1996 during a meeting with Bäder

VETERINARY INVESTIGATION OFFICE SOUTH
WISSE Department of Human Medicine, Epidemiology and
Environmental Hygiene

64289 Darmstadt
PO Box 11436
64289 Darmstadt
Tel.: (06151) 12 56 23
Fax : +06151) 12 62 44

Datum: D2.04.1996/Lerner

Municipal Nursing Home

Epidemiologie I

64289 Darmstadt

Result of the bacteriological water analysis
(gem. § 11 InfSchutzG)
Zgh.Nr.: Nr. 8997 - 4397
Erregerbest.: ~~no anal.~~ by yourself

Probe 1: House 1, boiler room, hot water unmixed 66°C

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E.-coli in 100 ml not proven.
d) Coliform bacteria in 100 ml not proven.
e) Pseudomonas aeruginosa in 100 ml not proven.
f) Legionella in 1000 ml 40 CFU/L Legionella pneumophila of serogroup 6 detected.

Probe 2: House 1, boiler room, hot water mixed 50°C

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E.-coli in 100 ml not proven.
d) Coliform bacteria in 100 ml not proven.
e) Pseudomonas aeruginosa in 100 ml not proven.
f) Legionella in 1000 ml 78 CFU/L Legionella pneumophila of serogroups 1 + 6 were detected.

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

Probe 3a: House 1, boiler room, hot water circulation 50° C.

- a) Colony count/ml at 20° C (48 hours): 0
- b) Colony count/ml at 36° C (48 hours): 0
- c) E. coli in 100 ml rd, not detected
- d) *Coliform bacteria* in 100 ml: not detected
- e) *Pseudomonas aeruginosa* not detected in 100 ml
- f) *Legionella* in 1000 ml yes : 25,000 CFU/L *Legionella pneumophila* of serogroup 1 + 6 detected.

Probe 4a: House 1, Room 210, hot water mixed 50° C

- a) Colony count/ml at 20° C (48 hours): 0
- b) Colony count/ml at 36° C (48 hours): 0
- c) E. coli in 100 ml rd, not detected
- d) *Coliform bacteria* in 100 ml: not detected; not detected
- e) *Pseudomonas aeruginosa* not detected in 100 ml
- f) *Legionella* in 1000 ml yes : 330 CFU/L *Legionella pneumophila* of serogroup 6 detected.

Probe 5a: House 1, Room 214, hot water mixed 50° C

- a) Colony count/ml at 20° C (48 hours): 0
- b) Colony count/ml at 36° C (48 hours): 0
- c) E. coli in 100 ml rd, not detected
- d) *Coliform bacteria* in 100 ml: not detected
- e) *Pseudomonas aeruginosa* in 100 ml: not detected
- f) *Legionella* in 1000 ml yes : 330 CFU/L *Legionella pneumophila* of serogroup 6 detected.

1) *rd* and *sublime* status according to PUC of 11.2.82: *rd* and *rd* 1) *rd* (*rd*), *rd* (*rd*)

2) not planned.

Assessment: [refers exclusively to the nature of the examined samples]

Laboratory findings do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

The bacteriological test results of samples 1 and 2 give no cause for complaint.

The bacteriological test result of sample 5 is objectionable due to the detection of coliform bacteria.

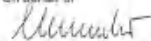
In samples 1, 2 and 5, *Legionella pneumophila* serogroups 1 and 6 were detected only in low concentrations.

The bacteriological test results of samples 3 and 4 give rise to objection due to the detection of *Legionella pneumophila* of serogroups 1 and 6 in concentrations > 10,000 KVE/l.

The hot water is sufficiently decontaminated when it enters the hot water supply. However, there is still a moderate peripheral germination, which should continue to give rise to regular thermal disinfection and flushing measures.

The water must not be used to operate or clean medical equipment, for inhalation, breathing air in hospital/ing room etc. or for washing open wounds.

People (especially infants) in contact with the water from the domestic installation system should be differentially diagnosed with regard to *Legionella* infection.

On behalf of

(Dr. med. M. Karchheiser)

Laboratory findings alone do not allow a judgement to be made about the suitability of a water supply system from a health perspective.

Case 3.

LABORATORY
FATAL MEDICAL, FOOD and
VETERINARY INSPECTION OFFICE OF SOUTH HESSE
Department I, Human Medicine, Epidemiology and
Environmental Hygiene

Wilhelmstr. 52/53, 64283
Darmstadt PO Box 1114 36

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Tel.: (06151) 12 56 23
Fax: +06151) 12 52 44

Date: 04/02/1996 Lerner

Message size:
Darmstadt Health
Department

Municipal Nursing Home
Darmstadt
56289 Darmstadt

Result of the bacteriological water analysis
(gem. § 11, BeseitG)
Tgb.Nr.: No 5465 - 5470
Receipt/withdrawal on: January 29, 1996 through yourself

Probe 1: Nursing home, boiler room, hot water mixed 50° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 0
c) E. coli in 100 ml: 100 ml : not proven.
d) Coliform bacteria in 100 ml: : not proven.
e) Pseudomonas aeruginosa in 100 ml: not detected.
f) Legionella in 1000 ml: 120 CFU/L Legionella pneumophila of serogroup 6 were detected.

Probe 2: Nursing home, boiler room, hot water circulation 47° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 0
c) E. coli in 100 ml: not detected.
d) Coliform bacteria in 100 ml: not detected.
e) Pseudomonas aeruginosa in 100 ml: not proven.
f) Legionella in 1000 ml: 40 CFU/L Legionella pneumophila of serogroups 1+6 detected.

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

Probe 3: Care IV, Room 202, hot water mixed 49° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 5
c) E. coli in 100 ml: not detected.
d) Coliform bacteria in 100 ml: not detected.
e) Pseudomonas aeruginosa not detected in 100 ml.
f) Legionella in 1000 ml: 8,400 CFU/L Legionella pneumophila of serogroups 1+6 detected.

Probe 4: Care IV, Room 230, hot water mixed 50° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 0
c) E. coli in 100 ml: 100 ml : not detected.
d) Coliform bacteria in 100 ml: : not detected.
e) Pseudomonas aeruginosa not detected in 100 ml.
f) Legionella in 1000 ml: 120 CFU/L Legionella pneumophila serogroup 6 was detected.

Probe 5: Care V, Room 228, hot water mixed 50° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 0
c) E. coli in 100 ml: 100 ml : not detected.
d) Coliform bacteria in 100 ml: : not proven.
e) Pseudomonas aeruginosa in 100 ml: not proven.
f) Legionella in 1000 ml: 330 CFU/L Legionella pneumophila of serogroup 6 detected.

Probe 6: Care V, Room 225, hot water mixed 48° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 4
c) E. coli in 100 ml: 100 ml : not proven.
d) Coliform bacteria in 100 ml: : not proven.
e) Pseudomonas aeruginosa not detected in 100 ml.
f) Legionella in 1000 ml: 5,300 CFU/L Legionella pneumophila serogroups 1+6 were detected.

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

Limit and guideline values according to TWO of 12.12.90: a) and b):
100 Colonies/ml. c) a): not proven. d): not provided.

Assessment: (Refers exclusively to the nature of the samples examined)

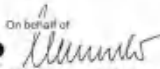
The bacteriological test results of samples 1, 2, 4 and 5 give no cause for complaint. Legionella pneumophila of serogroups 1 and 6 were detected in low concentrations in these samples.

The bacteriological test results of samples 3 and 6 give rise to objection due to the detection of Legionella pneumophila of serogroups 1 and 6 in moderate concentrations.

At the majority of sampling points, legionella was only detected in concentrations that were harmless to health. We recommend continuing the current measures and continuing to carry out checks at the specified intervals.

The water must not be used for operating or cleaning medical equipment, for inhalation, breathing air or humidifying room air, or for washing open wounds.

Severe respiratory infections in persons who use water from the domestic installation system should be differentially diagnosed with regard to Legionella infection.

On behalf of

Dr. med. H. H. H. H. H.

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

Case 3.

STATE MEDICAL, FOOD AND VETERINARY INSPECTION OFFICE OF SUTHER HESSE		400 Westwood Drive 244201 Elmfield 400 West 11th St. 400201 Lexington	
CL, Human Medicine, Epidemic and Environmental Hygiene		Tel.: (54151) 12 55 33 Fax: + (54151) 12 62 44	
City of Darmstadt - Ring: - 9 0KT, 1996 - Nursing Home, Elmstraße 1 - Se		Date: 08.30.1996 Karher	
Municipal Nursing Home		For information: Health Department Elmstraße 1	
Ermittler:		Dr. Ernst, JGK	
64289 Darmstadt			

COPY

Result of the bacteriological water analysis (according to § 11 BSeuchG)

Tab. Nr. No. 2596 - 2707
(Jingang/Collected) no. 1000000 through yourself

Probe 1: House 1, boiler room, hot water mixed 60°C

a) Colony count/ml at 20°C (48 hours): 0	
b) Colony count/ml at 36°C (48 hours): 1	
c) E. coli: 1 in 100 ml	: not proven
d) Coliform bacteria in 100 ml: not detected	
e) Pseudomonas aeruginosa in 100 ml: not detected	
f) Legionella: 2/100 ml, 100	detected

Probe 2: House 1, boiler room, hot water circulation 55°C

a) Colony count/ml at 20°C (48 hours): 1	
b) Colony count/ml at 36°C (48 hours): 1	
c) E. coli: 1 in 100 ml	: not proven
d) Coliform bacteria in 100 ml: not detected	
e) Pseudomonas aeruginosa in 100 ml: not detected	
f) Legionella in 100 ml	320 BSE/1 Legionella pneumophila serogroup 6 was detected.

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

- 3 -

Probe 3: House 1, boiler room, hot water 68°C.

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 1
c) E., coli Jn 199 ml : not proven.
d) Coliform bacteria in 100 ml : not proven.
e) Pseudomonas aeruginosa in 100 ml: not detected.
f) Legionella in 1000 ml: not detected.

Probe 4: House 1, 2nd floor, room 210, hot water mixed 57°C.

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E., coli Jn 100 ml: not detected.
d) Coliform bacteria in 100 ml :
e) Pseudomonas aeruginosa in 100 ml: not detected.
f) Legionella in 1000 ml:
11 KSE/I Legionella
(paraeubacteria serogroup 6 detected).

Probe 5: House 1, 2nd floor, room 214, hot water mixed 57°C.

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E., coli Jn 100 ml: not detected.
d) Coliform bacteria in 100 ml: not detected.
e) Pseudomonas aeruginosa in 100 ml: not proven.
f) Legionella in 1000 ml: not detected.

Probe 6: House 1, 2nd floor, room 218, bathroom, hot water 57°C.

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E., coli Jn 100 ml : not proven.
d) Coliform bacteria in 100 ml : not proven.
e) Pseudomonas aeruginosa in 100 ml: not detected.
f) Legionella in 1000 ml : < 1 CFU/l Legionella pneumophila
of serogroup 6 detected.

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

- 3 -

Probe 7: Nursing home, boiler room, hot water mixed 60°C

a) Colony count/ml at 20°C (48 hours): 1
b) Colony count/ml at 36°C (48 hours): 0
c) E. coli in 100 ml: not detected.
d) Coliform bacteria in 100 ml
e) *Pseudomonas aeruginosa* in 100 ml: not detected.
f) *Legionella* in 1000 ml: not detected.

Probe 8: Nursing home, boiler room, hot water circulation 54°C

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E. coli in 100 ml: not detected.
d) Coliform bacteria in 100 ml: not detected.
e) *Pseudomonas aeruginosa* in 100 ml: not detected.
f) *Legionella* in 1000 ml: not detected.

Probe 9: Care IV, Room 202, hot water mixed

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E. coli in 100 ml: not detected.
d) Coliform bacteria in 100 ml: not proven.
e) *Pseudomonas aeruginosa* not detected in 100 ml.
f) *Legionella* in 1000 ml: not detected.

Probe 10: Care IV, Room 225, Bathroom, Hot Water Mixed 55°C

a) Colony count/ml at 20°C (48 hours): 0
b) Colony count/ml at 36°C (48 hours): 0
c) E. coli in 100 ml: not proven, not proven.
d) Coliform bacteria in 100 ml: not detected.
e) *Pseudomonas aeruginosa* in 100 ml: not detected.
f) *Legionella* in 1000 ml: not detected.

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.

- 4 -

Sample 11: Care IV, Room 235, hot water mixed 30° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 0
c) E.coli in 100 ml not detected.
d) Coliform bacteria in 100 ml: not detected.
e) *Pseudomonas aeruginosa* not detected in 100 ml.
f) *Legionella* in 1000: 190 CFU/l *Legionella pneumophila* of serogroup 6 detected.

Sample 12: Care I, Room 5, hot water mixed 55° C

a) Colony count/ml at 20° C (48 hours): 0
b) Colony count/ml at 36° C (48 hours): 0
c) E. coli in 100 ml: not detected.
d) Coliform bacteria in 100 ml: not proven.
e) *Pseudomonas aeruginosa* in 100 ml: not detected.
f) *Legionella* in 1000: not proven.

Limit and guideline values according to TVO of 12.12.90: a) and b): 100 Colonies/ml. c) a): not detected. f) not provided.

Assessment: (Refers exclusively to the quality of the samples examined)

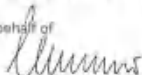
The bacteriological test results of samples 11 & 12 give no cause for complaint

In samples 2, 9 and 11, *Legionella pneumophila* serogroup 4 was detected at low concentrations.

In samples 4, 6 and 8, *Legionella pneumophila* serogroup 6 was detected in low concentrations.

The water must be used to operate or clean medical equipment, for inhalation, breathing air or humidifying room air, or for washing open wounds

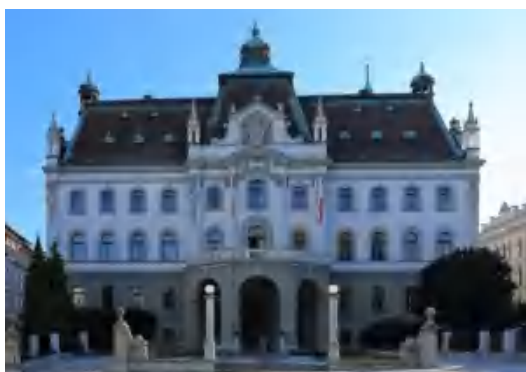
Severe respiratory infections in persons who use water from the domestic installation system should be differentially diagnosed with regard to *Legionella* infection.

On behalf of

Dr. med. Mürthsmann

Laboratory findings alone do not allow a judgment to be made about the suitability of a water supply system from a health perspective.



Case 4.



Project subject: Swimming Pool Descaling (University of Ljubljana Faculty of Sport ,Slovenia)

Pain Points:

- **Scale Buildup on Fixtures and Equipment:** Significant scale accumulation is present on faucets, showerheads, valves, and other equipment, requiring specialized tools for removal or frequent replacement.
- **Challenges in Maintaining Hygiene:** The heavy buildup of scale makes it difficult to maintain indoor hygiene, leading to persistent cleanliness issues.
- **Malfunctioning Water Temperature Control Valve:** Even after replacement, the water temperature control valve becomes unusable within just two months due to recurring scale deposits.
- **High Maintenance Costs for the Swimming Pool:** The pool requires regular additions of chlorine and soda to maintain water quality, resulting in increased operational expenses.

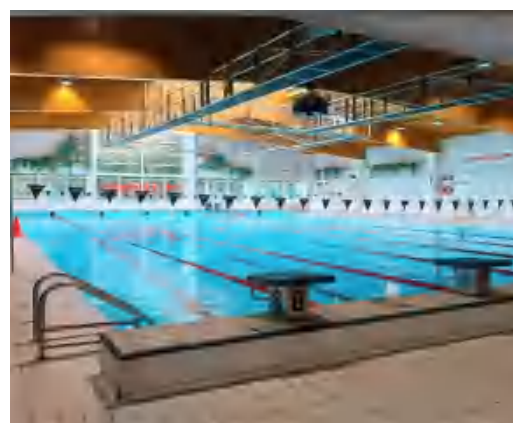
Installation:

October 4, 2022 Wellan rings were installed on the main pipes of the water supply system.

Effect of use

1. **Effective Scale Removal:** The scale buildup on faucets and showerheads was successfully addressed, allowing the mesh covers to be easily removed by hand.
2. **Resolution of Pool Shower Area Issues:** The warm water pre-conditioning issue in the pool shower area was resolved without the need for extensive renovations.
3. **Restoration of Equipment Functionality:** The old regulating valve began functioning normally again, improving overall system performance.
4. **Enhanced Pool Water Quality:** The pool water quality improved significantly, with the redox potential stabilizing above 800 millivolts.
5. **Reduced Chemical Usage:** Due to the improved water quality, the pool no longer requires chlorine shocks or the addition of sodium bicarbonate, resulting in lower maintenance costs.

(Attached: Customer testimonials)



Summary

This application demonstrates that installing Wellan rings on circulating water pipes used in swimming pools can remove scale and corrosion and inhibit microorganisms.

Note: Wellan technology changes the environment for anaerobic microorganisms, making them unsuitable for growth and reducing the use of chemicals by more than 50 percent. However, it is not as fast as chemical treatments and takes time to be effective. Microbial populations are affected by a variety of factors, including water management, ambient temperature, and air quality. Wellan technology slows down the rate at which your pool turns green and reduces the number of microorganisms in the water. Results will vary depending on the environment.

Case 4.

Non-English documents have been translated using Google, so there may be some errors. They are provided for reference purposes only.

[illegible]

Microbiological Water Inspections HERTFELDER

on site
Advice

1972 Beck Thomas & Co. Ltd. 1972 Beck Thomas & Co. Ltd.

1972 Beck Thomas & Co. Ltd.
1972 Beck Thomas & Co. Ltd.
1972 Beck Thomas & Co. Ltd.

Result log

1972 Beck Thomas & Co. Ltd.

Results of this investigation

Page 1 of 2

Sample No. 1972 Beck Thomas & Co. Ltd.

Sample Identification: 1-7

Date of sampling: January 24, 2007

Sampling point: tapwater before pool

Pool name and type: multi-purpose pool, swimming and bathing pool

No. DN 1972	Parameter	Unit	Test method	Result	Pool water
5.3.1.1	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.2	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.3	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.4	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.5	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.6	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.7	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.8	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.9	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.10	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.11	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.12	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.13	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.14	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.15	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.16	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.17	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.18	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.19	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.20	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.21	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.22	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.23	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.24	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.25	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.26	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.27	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.28	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.29	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.30	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.31	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.32	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.33	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.34	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.35	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.36	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.37	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.38	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.39	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.40	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.41	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.42	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.43	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.44	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.45	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.46	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.47	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.48	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.49	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.50	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.51	Temperature (at 20°C)	°C	1972 Beck	19.0	19.0
5.3.1.52					

[illegible]

Microbiological Water Inspections HERTFELDER

Result log

Results of the investigation

Sample identification: 1-7
Date of sampling: 23.10.2003 Swimming pool: Dagerheim indoor swimming pool
Pool name and type: multi-purpose pool, swimming and bathing pool

**service
Advise
training**

Dr. A. B. (Büroadresse):
Muster (Anprechend):
Sage (Telefon):

Böblingen, November 4. 2002

Page 1 of 2

No. (Dr. B. Wasser 1964)	Temp.	FH-Wert	Reinwasser	Pool water
5.3.1.1	Thermometer average at 26.1°C	10 (1964)	-	0.0
5.3.1.2	Eichverif. ctrl. at 26.1°C	10 (1964)	-	0.0
5.3.1.3	Leptothrix pneumophila at 26.1°C	1/60 (1964)	-	0.0
5.3.1.4	Colony forming units (CFU) at 20.2°C	1/60	2	0
5.3.1.5	Colony forming units (CFU) at 26.1°C	1/60	0	2
5.3.2.3	Temp.	°C	-	26.1
5.3.2.4	pH value	average	-	7.0
5.3.2.5	alkalinity	mg/l	-	100
5.3.2.6	oxidizability	mg/l	-	100
5.3.2.7	residual chlorine	mg/l	-	0.0
5.3.2.8	total chlorine	mg/l	-	0.0
5.3.2.9	total chlorine	mg/l	-	0.0
5.3.2.10	total chlorine	mg/l	-	0.0
5.3.2.11	total chlorine	mg/l	-	0.0

with observation
This document is not a contract. It is a document of the service. It is not a contract. It is a document of the service. It is not a contract. It is a document of the service.

Microbiological Water Inspections HERTFELDER

**Consulting
service**

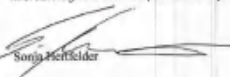
Office for Microbiological
Water Inspection
Sonja Hertfelder

Page 2 of 2

Assessment:

At the time of the investigation, all determined parameters corresponded to the specifications of DIN EN ISO.

Microbiological Water Inspections Sonja Hertfelder


Sonja Hertfelder

Sonja Hertfelder, Maurenstr. Weg 128, 71034 Böblingen, Tel. 07141-272478, Fax 07141-279190 Bank für Sozialleistungen GmbH - Bank Code 60320000, Volksbank AG in the Böblingen district

Case 5.



Project Domain:Swimming Pool Algae Suppression Project

(HAMPTON INN HOTEL ,USA)

Pain Point

The swimming pool experiences significant algae growth and has side attachments that require frequent cleaning. Cleaning costs are high, and the cleaning frequency is often.

There is scale buildup in the pipes, which compromises the safety and efficiency of the pipe system.

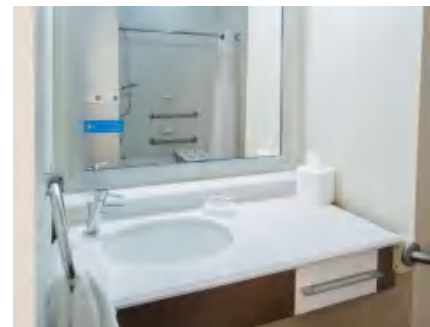
Installation:

- The 1-inch Wellan rings installed on pool inlet pipe
- Installed a 3/4-inch ring on the boiler
- Installed a 2-inch ring on the main water supply line to maintain the good condition of the pipe system.



Effect of Use:

After installing the Wellan Ring, the pool water no longer turns green, as it effectively inhibits algae growth and helps maintain a normal pH level. Additionally, the scale buildup in the pipes gradually decreases over time. (Attached: Customer testimonials)



Summary

The Wellan Ring, through its unique technology, not only inhibits the growth of microorganisms and prevents pools from turning green but also reduces the need for chemicals. Excessive use of chemicals can be harmful to the human body.

In addition, by removing scale from pipes, the Wellan Ring helps extend the lifespan of pool equipment and water supply lines, saving both time and money on maintenance and repairs.



Case 5.



Wellan Energy Systems
Box 548
Syosset, NY 1179

September 23rd 2009

Dear Dave,

Wellan Rings use at our Hotel

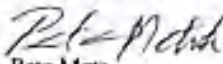
I am writing this letter upon your request. Wellan rings were introduced to us by another Hotel Manager in the area.

He had found the rings kept the swimming pool clean of algae and other stuff that sticks to the side.

My 1 inch Wellan ring on my swimming pool has performed excellent but we also have a 3/4 inch ring on the boiler and a 2 inch ring on the main supply line to keep the piping system in shape.

I am satisfied but surprised that such a ring can work. It seems like magic.

Yours sincerely


Pete Meta
President, Ramada Hotel,
248-877-3468

04299 Cecilia Drive, South Haven MI, 49090 Tel# 269 639 8550 Fax# 269 639 8555



Case 6.



Installation:

In March 2017, a Wellan ring was installed in front of the tanks and pump station.

Effect of use:

The results have been remarkable across the estate. Scale has been removed, water quality has improved and the bacteria count in the water has also improved. The installation of the Wellan Ring has been a huge success. The customer recommend Wellan technology and the use of Wellan Rings.

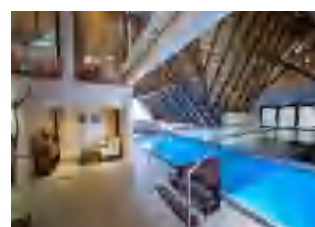
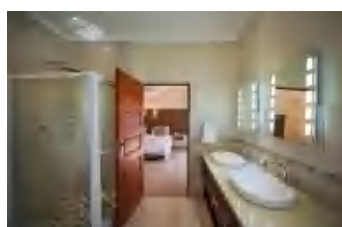
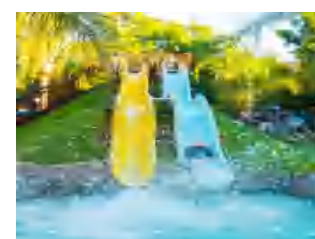
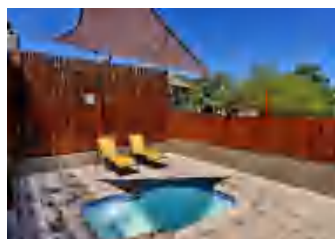
(Attached: Customer testimonials)

Project Domain: Water descaling and antibacterial in resorts

(SEASONS SPORT&SPA ,South Africa)

Pain Point

1. Severe Limescale Buildup at the Pump Station: Significant scale accumulation was present, leading to operational challenges.
2. Large Water Storage Capacity: The estate has a total water storage capacity of 650,000 litres, supplying various facilities, including the accommodation area, sports area, water park, spa recreation centre, and clubhouse.
3. Pump Damage and Restricted Operation: Scale buildup on the pumps caused damage, reduced efficiency, and hindered proper operation.



Summary

Wellan rings are used in resorts and have a very good descaling and antibacterial effect. The quality of the circulating water is improved and the frequency of maintenance of the entire water supply system is reduced, resulting in lower operating costs. As a result, the use of chemicals is also reduced, reducing the potential for environmental contamination. In addition, the efficiency of the water pumps has been improved, saving electricity. All these are in line with the environmental protection concept of Century Eco-Golf Manor as an eco-golf estate, which is also the current goal pursued by the company.



Case 6.



TESTERMONIAL FROM SEASONS ECO GOLF ESTATE; BUSHVELD VIEW; HARTBEESPOORT From Warren Dunbar – Chairman Seasons Eco Golf Estate

We encountered a massive challenge with Lime Scale at our Estate Pump Station for the Seasons Eco Golf Estate Water Supply from our 650 000 Litre Storage tank to the Residential Homes; Sport and Spa Recreational Centre and Club House. The Lime Scale Residue built up on the Duo Pump System totally covered them with a white mass of scale creating damage and restrictive operation to the pumps. A large Wellan ring was installed in March 2017 in line in front of the tank and pump station with remarkable results. The Lime scale has been eliminated as well as an improved quality of water and improved bacterial counts in the water. Great Wellan Technology Success with the Installation of Wellan 2000 Ring. We recommend Wellan Technology and the use of the Wellan Ring.

Yours Faithfully

Warren Dunbar - Chairman

Case 7.

Project Domain: Descaling of hospital water systems (Netcare Unitas hospital , South Africa)

Pain Point

- Increased Energy Consumption: Scale buildup on heating elements in hot water units led to higher electricity usage.
- Safety Valve Failure: Scale accumulation prevented the safety valves on autoclaves from properly sealing, compromising their functionality.
- Humidifier Malfunctions: Calcification inside the humidifier clogged the drain valve, making it impossible to clear the drain pipe. This caused leaks, leading to flooding in the machine room.



Installation:



On the 05-11-2015 we installed our first trail of the “Wellan ring” on the CSSD water supply pipe.



On the 05-11-2015 install in the main water supply.

Effect of Use:

- Effective Scale Breakdown: Hard water scale was broken down into small particles, making equipment surfaces easier to clean.
- Reduced Energy Consumption: Power consumption decreased due to improved efficiency of heating elements.
- Improved Water Flow: Scale removal in the pipes reduced resistance, increased water flow, and lessened the workload on the auxiliary pump set.
- Expansion of Wellan Ring Installation: Based on the positive results, it was decided to install Wellan rings at the inlet of the main water tank. This ensures that water from the municipal supply, including large-capacity water tanks and booster pump sets, is effectively treated.

Case 7.

Effect comparison

Before Installation,



After Installation



Summary

The installation of Wellan rings significantly improved the hospital's water circulation system, ensuring smoother operation. By removing scale buildup, the rings increased the internal pipe space, reduced water resistance, and lowered energy consumption. Additionally, they extended the service life of pipes and equipment, reducing the need for frequent replacements and maintenance, ultimately leading to cost savings.

Note:

In this case, a pipe leak occurred after installation, revealing severe pre-existing corrosion. The Wellan ring broke down corrosion deposits, which then detached, exposing corroded holes and causing leaks. Therefore, during the initial installation phase in aging water systems, it is crucial to closely monitor pipe conditions to prevent potential issues.

Case 8.



Project Domain: Circulating water system descaling and anti-corrosion (MUSEUM OF THE CITY OF NY, USA)

Pain Point:

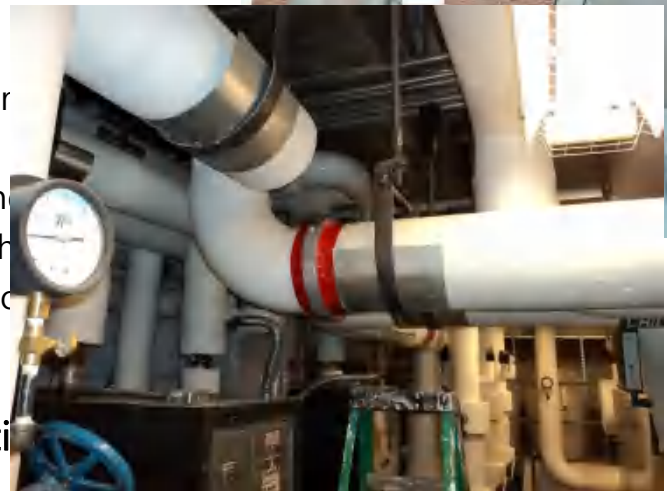
The Museum uses an open loop cooling tower water system for rejecting heat from its chilled water system. Used chemical treatment to control scale, corrosion and bacteria growth .

Substantial costs for chemical treatment of cooling tower water systems in its buildings. Hope to substantial savings in operating costs for buildings with cooling towers.



Installation:

1. 2 *Wellan rings were installed on the return for the cooling tower .
2. 1 Wellan ring was installed in front of Condenser Subsequent to installing the Wellan rings, chemical treatment was initially reduced, then about 50% completely eliminated.



Comparison before and after installation

To judge the effectiveness of the Wellan rings three (3) basic parameters were monitored :

1. Dissolved Solids: Monitored by measuring conductivity of the water.
2. Corrosion Potential: the amount of minerals including copper, zinc and iron in the water was monitored as an indication of corrosion.
3. Bacterial Growth: Bacteria levels in the cooling towers were monitored through monthly dip slide tests and Legionella testing, performed every three (3) months.

To provide monthly water quality testing from March 2012 to July 2014. Initial testing was performed prior to the installation , one month after the rings were installed with chemical treatment, and then monthly thereafter without chemical treatment.



COUPON RACK IN MER



The Carbon Steel Spool Piece As-Received. The sample was found to be in good condition



on the exterior with minor rusting, a small amount of deposit was evident.



the sample after sectioning longitudinally and mechanical cleaning of one half.



The scale was very thin



The wall after mechanical cleaning, no pitting or corrosion on the pipewall.

Museum of the City of NY, Cooling Tower Research Project (Wellan Rings)

Summary of Water Testing Performed -2012

		02/2012	04/2012	05/2012	Q1 06/2012	07/2012	08/2012	09/2012	Q2 10/2012	11/2012	12/2012
CT Water Tested for:	Target Range:	Baseline w/chem. treatment	Tower Water	Tower Water	Tower Water	Tower Water	No Service Reported	Tower Water	Tower Water	Tower Water	NoService Reported
pH(units)	7.5-10.5	8.4	8.1	8.2	7.6	7.6	-	8.5	7.8	7.7	-
Conductivity (μ mhos)	750-1200	1463	1457	2067	3320	95	-	748	365	745	-
Iron(mg/L)	<2.0	0.12	0.10	0.07	0.03	0.01	-	0.91	0.12	<0.10	-
Copper (mg/L)	<0.2	0.27	0.23	0.31	0.40	0.03	-	0.08	0.16	0.06	-
Zinc(mg/L)	<0.1	-			-	-	-			0.02	
Bacteria HPC (cfu/ml)	100-10000	-			-	-	-	1850	1240	980	
Legionella	<100	-			480				42		
HardnessCa (mg/L)	50-300	220	180	250	39	-	-	54	38	51	-
Hardness Mg(mg/L)	10-200	160	100	150	135	-	-	10	7	11	-
Hardness Total(mg/L)	50-500	380	280	400	520	-	-	176	125	172	-
Chloride (mg/L)	60-250	-	300	300	510	70	-	88	84	150	-
Conc.cycle	3-5	-	10	14	-	-	-			6	-

Case 8.

Summary of Water Testing Performed -2013

				Q3			Q4			Q1		Q2		
		02/2012	01/2013	02/2013	03/2013	04/2013	05/2013	06/2013	07/2013	08/2013	09/2013	10/2013	11/2013	12/2013
CT Water Tested for:	Target Range:	Baseline w/chem. treatment	Tower Water	No Service Reported	Tower Water	Tower Water	Tower Water	Tower Water	Tower Water	Tower Water	Tower Water	Tower Water	Tower Water	Tower Water
pH (units)	7.5-10.5	8.4	8.5	-	8.8	9.0	7.3	7.6	8.3	8.3	8.2	8.2	7.8	8
Conductivity (mmhos)	750-1200	1463	532	-	515	841	761	808	1028	902	823	902	507	602
Iron(mg/L)	<2.0	0.12	0.11	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.19	5.62	1.49
Copper	<0.2	0.27	0.14	-	0.07	0.11	0.09	0.08	0.08	0.128	146	1		0.45
Zinc	<0.1	-	0.02	-	0.47	0.12	0.05	0.05	0.03	0.05	0.07	0.04	3.82	1.06
Bacteria HPC*	100-10000	-	<10	-	100	1000	110	100	1000		100	1000	1000	100000
Legionella	<100	-		-			ND		400	ND	6	ND	ND	
Hardness Ca	50-300	220	45	-	25	53	50	50	62	55	56	60	38	169
Hardness Mg	10-200	160	9	-	5	13	12	14	15	13	12	12	7	11
Hardness, Total(mg/L)	50-500	380	153	-	83	186	172	194	215	190	186	200	126	180
Chloride (mg/L)	60-250	-	78	-	66	115	116	103	186	142	169	170	101	101
Conc.Cycle	3-5		6	-			5	7	4	2	3	4		2

	Water chemistry concentration out of Target Range
ND	Non-detectable Limit

Summary of Water Testing Performed -2014

				Q3			Q4			Q1		
		02/2012	01/2014	02/2014	03/2014	04/2014	05/2014	06/2014	07/2014	08/2014	09/2014	
CT Water Tested for:	Target Range:	Baseline w/chem. treatment	No Service Reported	No Service Reported	No Service Reported	NoService Reported	Tower Water	Tower Water	Tower Water	Tower Water		
pH	7.5-10.5	8.4	-	-	-	-	8.5	8.7	8.6	8.5		
Cond.	750-1200	1463	-	-	-	-	980	1015	901	883		
Iron	<2.0	0.12	-	-	-	-	ND	ND	ND	ND		
Copper	<0.2	0.27	-	-	-	-	0.08	0.07	0.07	0.08		
Zinc	<0.1	-	-	-	-	-	0.06	0.03	0.04	0.04		
Bacteria HPC	100-10000		-	-	1000	100	1000	1000	100			
Legionella	<100	-		-		56	ND	12	6			
Hardness Ca	50-300	220	-	-	-	-	60	65	55	60		
Hardness Mg	10-200	160	-	-	-	-	14	15	12	12		
Hardness Total	50-500	380	-	-	-	-	208	225	187	198		
Chloride	60-250		-									
Conc.Cycle	3-5	-	-	-	-	-						



Case 8.

Conclusion:

In summary, after about two and a half years of operating the cooling tower system at New York museum with no chemical treatment and the Wellan rings installed, there appeared to be no detrimental effects on the system. The Wellan rings appear to have performed successfully as a substitute for expensive chemical treatment that is normally applied for cooling tower systems.

1. Dissolved Solids: Based on water quality reports taken monthly, dissolved solids were controlled by the Wellan rings.

2. Corrosion Potential:

In spite of the questionable coupon and spool piece corrosion results, it appears that the Wellan rings are providing fair to good corrosion protection.

3. Bacteria Growth: Based on bacteria sampling and reports, it appears that the Wellan rings, along with properly controlled blowdown, provide for control of bacteria in the cooling tower water equal to what would be achieved via normal chemical treatment.

Summary

Based on 2.5 years of the cooling tower system being operated without chemical treatment, the Wellan rings appeared to be protecting the system from corrosion and bacterial growth to approximately the same extent that could be expected while using chemical treatment. Use of the Wellan rings in lieu of chemical treatment for open cooling towers appears to be a viable option.

Notes:

1. **Legionella Risk:** Legionella bacteria can be present in cooling tower sediments and may proliferate as outdoor temperatures rise. Therefore, it is essential to clean the cooling tower basin before installing the Wellan Ring.
2. **Chemical Use:** If the customer has zero values for HPC (Heterotrophic Plate Count) and Legionella, a combination of chemicals will be necessary. While Wellan technology targets anaerobic microorganisms and alters their growth environment to one that is unsuitable for their development, it does not guarantee a zero microbial colony count. This approach helps reduce chemical usage but does not eliminate the need for chemical treatment entirely.
3. **Water Conductivity Management:** Regular and timely discharges are crucial for controlling the water's conductivity and maintaining optimal system performance.

Case 9.



Project Domain: **Metro station air conditioning system** **descaling project (China)**

Pain Point

1. Cooling Tower Issues:

- The cooling tower is open, leading to the accumulation of dirt, microbial slime, and increased water turbidity.
- Scale formation occurs, depositing on the heat exchange surfaces, contributing to corrosion on the cooling equipment.
- A large number of bacteria and algae proliferate, affecting the cooling tower's water flow rate, reducing heat transfer efficiency, and causing the system to operate suboptimally.

2. Chemical Treatment Challenges:

- The use of multiple chemicals, including scale inhibitors, biocides, algacides, and balancing agents, results in increased corrosion of equipment and pipes.
- Each chemical treatment requires system downtime, affecting productivity.
- The waste liquid generated during the cleaning process pollutes the environment, creating additional environmental concerns.

Installation:

A total of 3 sets of Tetradom rings were installed:

Condenser Inlet Pipes: Two Tetradom rings were installed on the condenser inlet pipes of the two chillers.

Cooling Tower Inlet: One Tetradom ring was installed on the cooling tower inlet main pipe.

Comparison and Test Results:

A comparison of water quality between the installed station (Daxin Station) and the non-installed station (Taoyuan Station) was conducted to evaluate the functionality of the Tetradom equipment.

1st April 2012: Full set of Tetradom equipment installed. Water samples were taken from both Daxin Station and Taoyuan Station, with the test results showing that the water quality at both stations was identical.

3rd May 2012: Dosing stopped at Daxin Station.

28th May 2012: Monitoring data from Daxin Station showed the equipment was running normally.

13th June 2012: Monitoring data from Daxin Station confirmed the equipment was still running normally.

3rd July 2012: A second sampling of water was conducted at both Daxin Station and Taoyuan Station. The results showed that the bacteria and scale levels at Daxin Station were substantially lower than those at Taoyuan Station.



Case 9.

Comparison table				
Location	Test Item	Test Result	Water Quality Standard	Unit
Taoyuan subway station (Not installed)	pH	8.36	6.5~8.5	
	Ca ²⁺	347	---	mg/L
	Total number of bacteria	1.9×10 ³	<10 ³	cfu/ml
Daxin subway station (Installed)	pH	8.28	6.5~8.5	
	Ca ²⁺	341	---	mg/L
	Total number of bacteria	105	<10 ³	cfu/ml

After the installation of the Tetradom ring at Daxin Station, the chiller operation conditions greatly improved, with fewer high-pressure alarms, and the issue of condenser copper tube fouling was resolved without the need for annual pickling of the condenser copper tubes.

1.Key Benefits of Tetradom Technology:

Water Savings:

Tetradom technology enables a concentration multiplier as high as 9-10, far exceeding the chemical treatment multiplier of 2-3. This results in a significant increase in the supplemental water cycle, promoting more efficient water use and achieving water savings.

Each set of the cooling circulatory system can save 10-20 tonnes of water per day, with an annual water savings of 3,650-7,300 tonnes, leading to an annual water cost savings of 17,500-35,000 RMB.

2.Improved Heat Exchange Efficiency:

Tetradom technology removes existing scale build-up and prevents future scale formation. With no scale on the heating surface, heat exchange efficiency improves, leading to reduced power consumption and significant electricity cost savings.

Scale in the boiler and heat exchanger can severely impact efficiency. For example, 1mm of boiler scale can increase fuel consumption by 8-10%, while 1mm of heat exchanger scale can reduce efficiency by 9%, and 3mm of scale can decrease it by more than 25%. Thicker scale may also cause localized overheating, leading to safety risks like tube bursts.

3.Microbial Inhibition:

Tetradom technology improves the microbial environment, significantly reducing the number of microorganisms over time. In enclosed environments like metro systems, controlling microorganisms in the HVAC system is crucial. Tetradom effectively inhibits the growth of microorganisms, contributing to a healthier system and improved overall performance.

Case 9.

Comparison of economic benefits

Treatment method	Water costs (RMB/year)	sewerage charge (RMB/year)	Chemical costs (RMB/year)	cleaning cost (RMB/year)	Service Charge (RMB/year)	Total Amount (RMB/1st year)
Chemical treatment	130000	11000	20000-50000			161000-191000
Tetradom Technology	94000	0	0	0	6800-50000	100800-144000

Economic Benefits Comparison:

A comparison of the economic benefits of using Tetradom products reveals the following:

First-Year Costs:

In the first year, the cost of Tetradom technology is slightly lower than that of chemical treatments.

Ongoing Costs:

The cost of chemical treatments remains constant from year to year, requiring continued purchase of chemicals for the system. In contrast, with Tetradom treatment, from the second year onwards, users only pay a small maintenance fee, which is significantly lower than the cost of chemical treatments.

Maintenance and Repairs:

Tetradom technology helps reduce the number and duration of major repairs, saving users both time and labor costs.

Summary

The HVAC system in a metro station differs significantly from that of commercial buildings:

1. Complex Design: The design of the metro's HVAC system is more complex, with extensive piping occupying a large space.
2. High Energy Consumption: The HVAC system in the metro has high energy consumption and operating costs.
3. Difficult to Modify: Once the design of the metro station is established, making changes to the system is challenging.

The HVAC system in the metro is crucial for maintaining air circulation, relying on continuous and stable operation. Therefore, the water treatment method must be reliable with minimal downtime. Tetradom technology is particularly suitable due to its simplicity of installation.

The lack of need to cut pipes, the small installation space required, and its ease of operation make it an ideal solution for metro systems.

Case 10.



Project Domain: **Water softener descaling project** **(India)**

Pain Point

After activating the water softener, a significant amount of scale accumulated on the water level controller of the overhead tank in the bungalow. The high salt content in the water caused rust and scale buildup on the outlet pipe of the overhead tank, which also affected hidden pipes within the system.

GANESH HOUSING CORPORATION LTD is a real estate company and has many properties with similar problems. The aim of the project was to test it in a bungalow first. If it works well, it will be extended to other properties.

Installation:

The installation of the Wallen ring of the overhead water tank was carried out on January 8, 2011.

Results of use

15 days After installation

The scale on the water level controller of the overhead water tank was dissolved.

The scale and corrosion on the outlet pipe of the overhead water tank were released.

The scale on the surface of the overhead water tank was released.

The maintenance time and labor of the water softener were saved.

(Attached: Customer testimonials)

Summary

After the water is softened, the minerals remain present, but they become ionic, which reduces the hardness of the water. However, when the temperature increases, the ions in the water gradually crystallize and form scale. Wellan rings help prevent scaling, especially in high-concentration ratios, by making circulating water less prone to scaling. Wellan technology effectively addresses the scaling problem caused by softened water.



Case 10.



Case 11.



Project Domain: Home Applications (Property Management Company ,Germany)

HS-verwaltungen, a property management company catering to home use, decided to try the Wellan ring themselves first. They recorded the positive changes the Wellan product brought to their clients' lives, noting significant improvements in water quality and system efficiency.

Installation:

The install 1 of the Wallen ring

1. Kettle: Nearly all scale deposits have disappeared from the bottom of the kettle. Any new scale that forms can be easily removed with a dishwashing sponge.
2. Coffee Machine: The water tank of the SAECO coffee machine was descaled initially. Since then, the small amount of scale that has accumulated can also be easily removed with a sponge.
3. Sink and Wash Basin: Previously, there were unsightly scale stains daily. After the installation, there is no need to remove scale stains or edges anymore.
4. Skin: Before installation, dry skin required careful application of cream after every shower due to tightness and rough patches. After using the water treatment, there was a significant improvement, and the need for cream was eliminated.
5. Laundry: Clothes washed in the washing machine are softer, and ironing is much easier than before.
6. Dishwasher: Dishes washed in the dishwasher feel completely different, with aggressive stains left by high-temperature drying no longer present.
7. Plant Watering: After a few weeks of watering flowers with tap water, no new calcium deposits were found.

Summary

Wellan technology offers an ideal solution for protecting household plumbing systems by preventing scale buildup in boilers, water heaters, and pipes, slowing down equipment corrosion, inhibiting bacterial growth, and preventing biofilm blockages. Additionally, the treated water brings noticeable improvements to daily life, including smoother skin, enhanced detergent performance, reduced scale buildup around faucets and sinks, and fewer clogs in showerheads.

Case 11.

Original in German

English version

HS-Hausverwaltungen
Gabi Siepmann

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Internet: www.hs-hausverwaltungen.de

Herrn
Dietrich Thümmen
Wasserbehandlung
Gammigheimer Str. 4
74304 Besigheim

Objekt: Wasserbehandlung Datum: 15.04.2006

Wellan 2000 Biosignal - Wasserbehandlung

Sehr geehrter Herr Thümmen,

Ihr einfach anzubringende „Ring“ hat uns sehr überzeugt, in meinen Eigentümerversammlungen habe und werde ich auch weiterhin diese Anschaffung empfehlen.

Wir können all die uns genannten Vorteile nachvollziehen. Hier einige Beispiele, die uns bereits nach kurzer Zeit überzeugt haben:

- Der Wasserkocher hat kaum mehr Kalkablagerungen am Boden. Dieses hat sich in nur wenigen Wochen fast gänzlich gelöst. Der neu abgelagerte Kalk konnte mit dem Spülschwamm mühelos entfernt werden.
- den Wasserhahn von unserem SAECO Kaffeemaschine haben wir gleich zu Beginn der Testzeit frisch erkalld. Der seither in geringem Maß abgelagerte Kalk konnte auch hier mühelos mit dem Spülschwamm entfernt werden.
- die Spüle sowie die Waschtische hatten jeden Tag unschöne Kalkflecken hauptsächlich an den Armaturen. Seit der Wasserbehandlung seinen Dienst tat, war ein Entfernen der Kalkflecken und -ränder nicht mehr notwendig. Auf der geputzten Oberfläche setzte sich kaum mehr Kalk ab.
- Mein größtes Problem war meine trockene Haut. Nach jedem Bad und nach jeder Dusche musste ich mich sorgfältig eincremen, weil die Haut sehr angespannt war und teilweise auch große rote Flecken zu sehen waren. Nachdem der Wasserbehandler angebracht war, habe ich vorerst das Eincremen sein und musste feststellen, dass auch hier eine große Besserung eintrat.
- Die Waschmaschine (weicher aus der Waschmaschine, die Bogenwäsche war nicht so schmerzhaft und spart immer.
- Das Gießen aus der Spülmaschine fühlte sich ganz anders an. Die Oberfläche war irgendwie viel angenehmer. Die Plastikschalen (Dosen und Vespertöpfchen) hatten bisher oft nach Kalkflecken vom Herkühlen. Das war weitestgehend weg.
- Meine Bonsai-Sammlung hatte ich seit langem nur noch mit gekauften Mineralwasser gegossen, weil der austretende Kalk den Pflanzen schadete und die Pflanzschalen unschön aussahen. Nach ein paar Wochen fand ich dem Mul, meine Pflanzen ebenso wieder mit normalem Leitungswasser zu gießen. Neue Kalkablagerungen gerade auf den empfindlichen Bonsaischalen konnte ich nicht feststellen.

Gern empfehlen wir den Biosignal - Wasserbehandler weiter. Dieses Schreiben dürfen Sie auch gerne als Referenzschreiben ansehen.

Mit freundlichen Grüßen
Gabi Siepmann

HS property management
Gabi Siepmann

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Herrn
Dietrich Thümmen
Water treatment
Gammigheimer Str. 4
74304 Besigheim

Object: Water treatment Date: 15.04.2006

Wellan 2000 Biosignal - water treatment

Dear Mr. Thümmen,

The easy-to-install "ring" really impressed us. I have and will continue to recommend this purchase at my owners' meetings.

We were able to understand all the advantages mentioned to us. Here are some examples that convinced us after just a short time:

- The kettle hardly has any limescale deposits on the bottom anymore. This has almost completely dissolved in just a few weeks. The newly deposited limescale could be easily removed with the dishwashing sponge.
- We descaled the water tank of our SAECO coffee machine right at the beginning of the test period. The small amount of limescale that had built up since then could also be easily removed with the dishwashing sponge.
- The sink and wash basin had unsightly limescale stains every day, mainly on the fittings. Once the water treatment system had finished its work, it was no longer necessary to remove the limescale stains and edges. Hardly any limescale settled on the well-maintained surface.
- My biggest problem was my dry skin. After every bath and shower I had to carefully apply cream because my skin was very tight and sometimes there were large patches of skin. After the water treatment was installed I deliberately stopped applying cream and noticed that this also improved a lot.
- The laundry came out of the washing machine softer and the ironing was not as stubborn as usual.
- The dishes from the dishwasher felt completely different. The surface was somehow much more pleasant. The plastic items (pots and lunch boxes) often had limescale stains from hot drying. This was largely gone.
- For a long time, I had only been watering my bonsai collection with purchased mineral water because the lime effluence was damaging the plants and making the plant pots look unsightly. After a few weeks, I found the courage to water all my plants again with normal tap water. I could not detect any new lime deposits, especially on the sensitive bonsai pots.

We are happy to recommend the Biosignal water treatment system. You can also view this letter as a reference letter.

Best regards:
Gabi Siepmann

Case 12.



Project Domain: Shopping Center anti-bacterial and descaling project (Sunridge Shopping Center Port Elisabeth , South Africa)

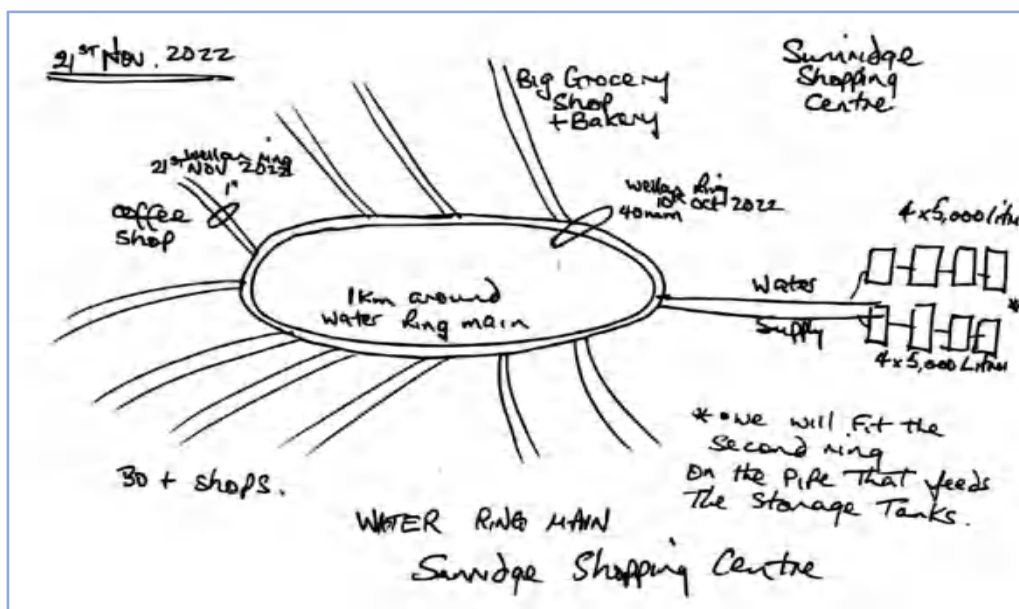
Challenge: The users of the commercial center were dissatisfied with the water quality, particularly due to issues such as high EC (electrical conductivity), chlorine content, scale buildup, and turbidity.

Installation:

A total of two 1.25" rings were installed:

1. The first ring was installed on October 10, 2022.
2. In December 2022, a second ring was installed on the water supply line to the cafe, but it was removed in February 2023.
3. A second ring was installed on the water supply line to the storage tank in March 2023.

A schematic layout of the pipe work



Case 12.

Results of use

Element	8-Jun-22	20-Oct-22	4-Nov-22	15-Dec-22
Sodium	608	446	1908	—
Chloride	864	900	847	—
Electrical Conductivity	293	298	302	—
Turbidity	3.6	0.79	0.21	—
Total Hardness	311	353	321	—
TDS	—	1490	—	—
Sulphate	92	101	92	—
Total Alkalinity	66	65	67	—
pH	6	6.78	7.1	—
Total Coliforms	52	2	—	—
Standard Plate Count	1000	153	221	—

Note:

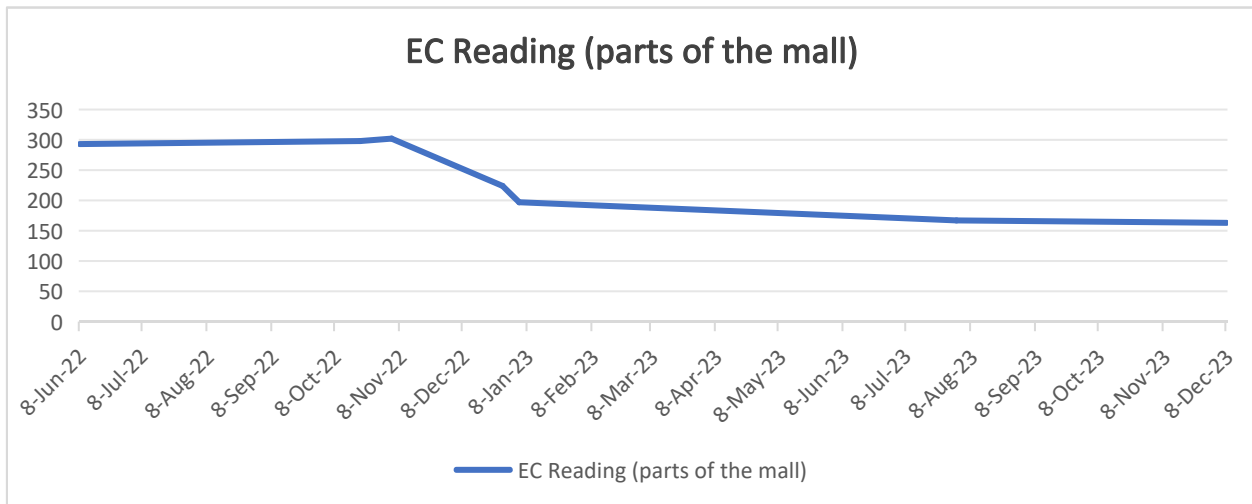
Some values are marked with "-" indicating that the information is not available or not provided for those specific dates.

The first Wellan ring was installed on October 10, 2022. The first column of data represents the water quality before installation, the second column represents the data 10 days after installation, and the third column represents the data 25 days after installation.

The Water tests for Electrical conductivity

Item	Date	8-Jun-22	20-Oct-22	4-Nov-22	27-Dec-22	4-Jan-23	1-Aug-23	8-Dec-23
EC Reading (parts of the mall)		293	298	302	224	197	167	163
EC Reading (Borehole)								165
1st ring fitted			10-Oct-22					
2nd ring fitted				20-Dec-22				
Remarks:								

Case 12.



- ① 1. EC values continue to decrease from in Nov.2022 to Dec. 2023.
- ② 2. The clients goal was to get the EC reading down to 170 mS/m or below.

1. Over the course of 6 months, the Sodium count, Electrical Conductivity (EC), hardness, Turbidity, and TDS (Total Dissolved Solids) values will initially increase as the Wellan ring works to clear out existing buildup. Afterward, these values will decrease as the ring stabilizes the water.
2. The Chloride count will rise due to the dosing of water with chloride, which is also associated with leaching or corrosion.
3. The bacteria count is steadily decreasing.

Note: The TDS (Total Dissolved Solids) value, along with the EC (Electrical Conductivity) count, provides a rough overview of water quality, indicating the total amount of dissolved substances in the water. These substances can include minerals, salts, metals, as well as pollutants and impurities like pesticides.

Summary

The water quality in the shopping center has seen significant improvement, with the EC value reduced to within the normal range.

Note: The effect of the bacteriostatic agent is not immediate and typically takes 1-6 months. This is because the Wellan ring works by altering the water quality to prevent anaerobic microorganisms from receiving the nutrients they need. However, it takes time for these microorganisms to die off.

Case 13.



Project subject: **Boiler Descaling Project for Government Facility (Great Hall of the People ,China)**

Pain Point:

The steam coil boiler used for hot water supply had not been cleaned for many years, leading to significant scale accumulation on the heating tubes, with thicknesses exceeding 10mm, and in some areas, reaching 30-50mm. The gaps between some coils were completely filled with scale, and the furnace walls were also severely scaled.

The scale buildup caused a decrease in heat exchange efficiency, leading to longer heating times for wastewater. This resulted in higher power consumption and made cleaning more difficult. Acid washing was not only time-consuming and labor-intensive but also produced wastewater for discharge.

Photo showing the scale buildup
in old boilers.



The test was conducted in 2 phases.

Phase I:

From Sep. 2007 to Jun.2008, Install 1*2.5" and 1*1.25 Tetradom rings on Old Boiler.

The old boiler had serious scale inside. The scale thickness exceeded 10mm, and more than 90% of the coil surface was covered with scale. The inner wall of the boiler was also covered with scale. The scale was hard and difficult to clean.

1. 2 weeks after installation, it was found that there were pieces of scale discharged from the water during sewage discharge (never before).
2. After 3 months, the original old scale on the boiler coil and wall had local loosening and falling off, and many of them fell and accumulated around the sewage outlet at the bottom of the boiler.

Case 13.

3. After 6 months, the scale on the boiler coil and furnace wall showed signs of softening. If you touch it lightly with your hands, it can fall off in pieces. The original scale on the coil inside the tea furnace has been reduced by about 20%. When discharging sewage, white scale fragments are still washed out by water; according to the staff, tea stains (scale) will no longer form on the teacup when using the water from this tea boiler to make tea.

Summary

1. The water of the boiler is one-through, and the energy passed to the water by the ring is less than that of the circulating water, so it takes longer.
2. Because there was too much scale in the past, it takes a long time for Tetradom technology to treat the old scale. Therefore, it is recommended to remove the old scale by acid before installation, and then use the scale inhibition performance of Tetradom technology to maintain the normal operation of the boiler.

Phase II: August 2008 to August 2009, 12 months,

Installation: 2.5" 1 unit, 1.25" 1 unit Tetradom ring

The new boiler was installed in early July 2008 and the condition of the scale is checked every three months.



1. On Nov. 5, 2008, white scale flakes were found flowing out during the sewage discharge. There was very thin soft scale on the coil and the wall surface inside the boiler. The staff reported that when using the water from the tea boiler to make tea, there would be no more tea stains (scale) on the teacup. The scale was significantly reduced compared to the boiler without Tetradom installed, and the effect was quite obvious.

Case 13.



2. On January 15, 2009, the boiler was opened for the second time. Except for a small number of coils and the wall that still had a thin layer (about 1 mm thick) of soft scale, more than 70% of the coil surface was scale-free. According to the on-site inspection, the thin scale on the metal surface will continue to fall off by itself and be discharged with the drainage.

It only takes more than five minutes to boil the cold water, which greatly shortens the water boiling time.



3. On April 24, 2009, the third time the boiler was opened, a thin layer (about 1 mm thick) of soft scale was left on the coil and the furnace wall, and more than 70% of the coil surface was dirty. The thin scale on the metal surface will continue to fall off and be discharged with the water. The impact of scale on the thermal efficiency of the equipment is almost zero.

Case 13.



4. On August 18, 2009, the fourth time the boiler was opened, a thin layer (about 1 mm thick) of soft scale was left on some coils and the furnace wall, and more than 70% of the coil surface was free of scale. The thin scale on the metal surface will continue to fall off and be discharged with the water. The impact of scale on the thermal efficiency of the equipment is almost zero.

It can be seen that the condition of the coils and the boiler walls remained virtually unchanged for the third and fourth time, indicating that the Tetradom ring allows the boiler to be operated for a long period of time without any special maintenance. The number of overhauls can be reduced. The quality of the water has greatly improved and the staff say that the water tastes odourless and there are no water stains on the tea set.

Summary

By tracking the scale condition of the new boiler for one year, the characteristics of Tetradom technology are illustrated:

1. The remarkable descaling and scale inhibition effect of the Tetradom ring is very important for potable water boilers. Scale accumulates traces of heavy metals such as lead and mercury in the water, and it is beneficial to people's health to have it discharged at all times.
2. The descaling effect of Tetradom rings improves the heat exchange efficiency of the boiler and saves energy.
3. Normal chemical descalers will have residue and are not suitable for descaling drinking water boilers. The Tetradom technology is a physical method, which is safe and reliable.

Note: Boiler system is one-through system, the water inside the boiler is basically not flowing, so a thin layer of soft scale will still remain in some high temperature parts, which can be easily dislodged.



Case 14.

Project subject: Feedback from family with 15 years of application (Germany)

Effect of Use:

1. Put red insulating tape underneath the Wellan ring, this improves the transmission rate.
2. After applying the red tape, haven't limescale problem in entire house for 15 years.

Life Changes:

- I. The bathroom is made of natural stone and glass and the water calcification was serious. With Wellan Ring, there is no longer any need for any limescale remover or other cleaners, just a little Sidolin on the glass.
 - II. The amount of shampoo and detergent used has been greatly reduced.
 - III. No more calcified appliances of any kind.
 - IV. There is no need to clean the filters on the taps or the shower head.
 - V. Before using Wellan Ring, it was necessary to descale the coffee machine or washing machine every 4-6 months. Not necessary after installation.
3. After 15 years, the effect of the Wellan ring has diminished. Need a new one. (Our warranty period is 3 years, but it can generally be used for 10 years).
4. It is difficult to determine how much money is saved by equipping an oil-fired heating system with Wellan Ring, as the amount of oil consumed depends on the weather. Only the cheapest heating oil without additives is used and the boiler is no longer cleaned once a year. According to the test results, the oil heating system is in optimal condition after 27 years. The boiler rusts normally, there is almost no sulphur residue and no soot. Everything burns without residue.
5. It is not recommended to use rings on pipes that are more than 50 years old (zinc steel pipes), which are usually rusted, with deposits and scale keeping the walls from leaking. Once the deposits and scale are removed, the pipe will leak.
- After 12 months of using Wellan rings, the old water distributor from the 1960s developed several leaks. But the inside of the distributor was clean and the rust was coming off. Most of the dirt was in the filter for the first six months of installation and had to be removed from the screen every fortnight, after that it was fine. The rest of the pipework is copper so no problems there. The length of time it takes for this scale to come off varies depending on the state of calcification, but the Wellan ring does work.

Case 14.

Non-English documents are translated by Google, so there may be some errors. They are for reference only.

REFERENCE WELLAN

07.09.2022

Dear Mrs. Wagner

Thank you for the friendly conversation this morning.

I never normally do what I write to you here, but in this case I have to say that the product has turned my opinion around 180°, and that is something that rarely or never happens in my life.

Therefore, because this is so extraordinary, I am happy to give you detailed feedback not converted to a grade in your case. To summarise, let me briefly give you some background.

13 years ago I worked with Mr Wagner on optimising the information density of your rings and discussed and partly implemented various possibilities with our laser technology.

After the initial rather mediocre result, her husband pointed out to me that I should please stick a red insulating tape under the ring, that would improve the transmission. ??? What does this colour of the tape have to do with it? At that time I could only laugh at it, but I tested it.

The result amazed me so much that I have since fundamentally changed my opinion about this kind of information from water or other media.

I can't measure it or say technically or physically why it has such an influence, but the result speaks for itself. And the promised durability has now been exceeded by 50%.

After applying the red tane and now for 15 years, I have no limescale problems in my entire house.

My bathroom is made of natural stone and glass, a horror with calcified water. After using your ring, I no longer know any limescale remover or other cleaner.

A little Sidolin for the glass is all that is needed, the consumption of shampoo and detergent has been significantly reduced, and I no longer have any calcified appliances, nor have I had to clean a single strainer on the tap or clean the shower head.

I did at the beginning, because all the old dirt and limescale gradually came out of the pipes, but that was done after about 6 months. Before using the ring, I was doing those things every 4-6 months.

Descaling the Caffè or washing machine is no longer a problem. With my Caffè machine, I just let the descaling process run through with water, which is what the stupid programme wants.

lately, the effort has diminished somewhat, but the promised 10 years are now well over.

You are welcome to use these lines for your website etc. I fully support your excellent product.

PS. A few years later I also equipped my oil heating system with your ring, but it is difficult to really define the savings because the consumption depends on the weather.

What I haven't had since then is an annual boiler cleaning, although I use the cheapest heating oil without additives, my 27-year-old oil-heating system is in top shape according to the measurements. The last time I cleaned the boiler was 5 years ago and even then it was more the normal rust of the boiler, hardly any sootish residue and virtually no soot.

That alone suggests that there must be a saving, because now everything burns without residue.

The money for additive and co. is better invested in a ring, chemistry is not everything.

In the last 20 years my heating system has been running perfectly, even though nobody really looks after it (0 heating service and the boiler has been brushed out twice in 20 years). I will probably have to replace the ring in the next few years, but only if the valves deteriorate again.

Just for the sake of completeness, I must advise against using the ring on pipes that are already over 50 years old (zinc steel pipes), which are often already so rusted through and are usually only kept tight by the deposits and limescale.

After using the ring, I had to replace my old water distributor in the cellar from the 60s after about 12 months, because several leaks appeared, but it was now also nice and clean inside and even the rust had come off.

I had found most of it in my strainers in the first 6 months. There were times when I had to remove the dirt from the sieves every 2 weeks. After that it was quiet.

The rest of the pipes are made of copper, so there were no problems. Depending on the state of calcification, this period will probably vary, but it only shows that the ring really works.

I am so convinced of your product that I would like to offer you our full support for the future to further optimise the information density and improve the information duration beyond the 15 years.

Technical progress in laser technology opens up new possibilities.

I would be very pleased about a further and closer cooperation.

Yours sincerely / Kind regards



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CEO



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HONORABLE MR. J. D. SMITH
WITNESS TO THE SIGNATURE OF
THE SIGNED PARTY

[illegible]

Summary

This customer's experience over 15 years with Wellan products underscores the long-term benefits and reliability of Wellan technology in preventing scale and corrosion in home water systems. It's clear that the product plays a vital role in maintaining water quality by keeping boilers, water heaters, and pipes free from the damaging effects of scaling and corrosion.

Case 15.



Project Domain: **Fountain Algae Prevention Project** **(Republic Square Fountain ,Braga,** **Portugal)**

Pain Point:

The high temperatures and biofilm are causing significant issues with the fountain's plumbing. Wellan rings could potentially help in this situation by inhibiting the growth of microorganisms, preventing the biofilm buildup, and maintaining smoother water flow.

Installation:

At the water inlet, a DN 200 Wellan ring was installed.



Results of use

After installation, the water quality of the fountain remained clear for an extended period, without turning green. No algae or biofilm formed, ensuring that the pipes and nozzles of the fountain remained unclogged.

Summary

Fountains, being open and exposed to the sun, are vulnerable to contamination by microorganisms in the air, leading to bacterial and algae growth. Due to the complexity of the waterway and the numerous nozzles, if these microorganisms gather in clusters, they can easily clog the nozzles, affecting the fountain's performance. By inhibiting the growth of microorganisms, Wellan products ensure that the water remains clear and free-flowing for an extended period, preventing it from turning green and maintaining optimal fountain functionality.



"Say Goodbye to Scale, Corrosion, and Bacteria with Tetradom."

**Efficient, Eco-friendly, and Effective:
Tetradom Does It All.**



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